Global Alliance
for Genomics & Health

GA4GH Federated Analysis (Formerly Cloud) Work Stream: Minutes and Actions

8th Plenary (virtual, Sep 29-30 2020)
Connect 2021 (virtual, March 1-4 2021)
9th Plenary (Barcelona Oct 5-8 2021)
Connect 2022 (Montreal, April 20-22 2022)
10th Plenary (Barcelona Sept 21-23 2022)
Connect 2023 (London April 2023)
11th Plenary (San Francisco Sept 2023)
Connect 2024 (Switzerland,April 21-24)
12th Plenary (Melbourne, Australia ,Sep 16-20, 2024)
Connect 2025 (Broad Institute, April 1-4, 2025)
13th Plenary (Sweden , Oct 6 - 10, 2025)
Connect 2026 (Montreal, April 14-17, 2026)
14th Plenary (Singapore, Sep 28 - Oct 2, 2026)

These are the minutes for the GA4GH Cloud Work Stream, starting from Oct 2020. Previous minutes are listed here.

For further information, please visit the GA4GH Cloud Work Stream page.

Cloud work stream Champions

Google Drive

Global Alliance for Genomics & Health

Jump to Latest Meeting Notes ⬇️

Planning Documents

- 2022 Cloud WS Roadmap
- 2023 Cloud WS Roadmap
  - Slides
  - SC 2023-01-26 slides
- 2024 Cloud WS Roadmap
- 2025 Cloud WS Roadmap
- 2026 – 2030 Long-term Roadmap (preparation in Sept 2024 for GA4GH grant renewal)
  - WES: NIH grant renewal - Cloud WS -WES.docx
  - TES: NIH grant renewal - Cloud WS - TES.docx
  - TRS: NIH grant renewal - Cloud WS - TRS.docx
  - DRS: NIH grant renewal - Cloud WS - DRS.docx
- Cloud WS Contacts
- Cloud WS Meeting Schedule
- List of papers:
  - Shared drive location: Manuscript, blogpost etc
  - WES_Manuscript_20260304-2.docx
  - 20230920 - DRS paper draft.docx
  - GA4Gh Blog posts FedML-3.docx
  - https://ieeexplore.ieee.org/document/10564576

Current and Previous Connect/Plenary Materials/Sessions

Including these for reference to see what we did in the last 3 Connect meetings.

Connect 2026 (September)

Federated Analysis Hackathon: Ship Real Code, Together

Hackathon topic sign-up sheet - CONNECT_Hackathon_Topics_Sign_Up.xlsx

Session time : 2:00 – 3:30 PM SGT (Pt.1) and 4:00 – 5:30 PM SGT (Pt.2)

Connect agenda - Federated Analysis Hackathon: Ship Real Code, Together.docx
Slide deck - Federated Analysis Hackathon: Ship Real Code, Together- Connect s…

Connect 2026 (April)

a) **Register-a-thon**
Date : 17th April at 9:00 - 10:30 AM ET
Agenda : April Connect Agenda Register-a-thon.docx
Slide deck : GA4GH Connect slide Register-a-thon.pptx

b) **Integrating GA4GH APIs**
Date: 17th April at 11:00 AM - 12:30 PM ET
Agenda : April Connect Agenda - Integrating GA4GH APIs.docx
Slide deck : GA4GH Connect slide - Integrating GA4GH APIs.pptx

c) **Next Steps for Federated Learning and GA4GH: Discussion and Hackathon (3 hrs session)**
Date : 15th April at 9:00 AM to 12:30 PM ET
Agenda: April Connect Agenda - Next Steps for Federated Learning and GA4GH: Dis…
Slide deck : GA4GH Connect slide - Next Steps for Federated Learning and GA4GH: …

d) **Implementation Forum: Towards Federated Trust**
Date : 15th April at 14:00 - 15:30 ET
Agenda: Connect Agenda - Implementation Forum: Towards Federated Trust.docx
Slide deck: GA4GH Connect Federated Trust.pptx

Plenary 2025

- Agenda
- Cloud-related sessions

Wednesday
Connect Welcome Session
- Agenda: Connect Welcome & GA4GH Updates.docx

GIF TRE Open Suite
- Agenda: 2025 October Connect - GIF TRE Open Suite Workshop.docx

Agentic Science
- Agenda: Agentic Science: Enabling AI Agents to Reason with Biomedical D…

Thursday

Influencing EPR and LIMS suppliers to adopt FHIR standards
- Agenda: not linked yet

GA4GH in the real world
- Agenda: GA4GH in Real world - Connect Agenda .docx

FAIR in action using GA4GH products
- Agenda: FAIR in action using GA4GH products

Passports that Scale
- Agenda: Passports that Scale Agenda - GA4GH Connect.docx

Where is Global
- Agenda: Where is Global? Geolocation in Genomics.

Next steps on the use of Verifiable Credentials
- Agenda: Next steps on the use of Verifiable Credentials Agenda - GA4GH …

An Analytics Dashboard
- Agenda: GA4GH Analytics Dashboard for Everything - Connect Agenda.docx

Friday

Securing Beacon Networks with Passports and trust federation
- Agenda: Securing Beacon Networks Agenda - GA4GH Connect.docx

The Cloud Work Stream Roadmap 2026 and Beyond
- Agenda: The Cloud Work Stream Roadmap 2026 and Beyond - Connect Agenda .d…

In the (GIF) Spotlight
- Agenda: In the (GIF) spotlight: 2025 Uppsala Connect (clean)

Path to normative
- Agenda: Path to normative: implementing a GA4GH maturity model

Connect 2025

- Agenda
- Cloud WS Session
  - Data Repository Service (DRS) working session
    Agenda doc
  - Cloud Workstream - New Standards
    Agenda doc
  - GA4GH in the real world
    Agenda doc
  - Standards for enabling federated machine learning
    Agenda doc

Plenary 2024

- Agenda
- Cloud WS Sessions

    - Session Title: DRS 1.6 and beyond/DRS Access options for compute tools
      Date/Time: Tuesday September 17 at 9:00 - 10:30 AEST
      Agenda document
      Presentation slide deck
    - Session Title: Cloud Work Stream in 2025
      Date/Time: Tuesday September 17 at 11:15 - 12:45 AEST
      Agenda document
      Presentation slide deck

Connect 2024

- Agenda
- Cloud WS Sessions
    - **DRS session**
        - Session title: DRS 1.5 - Key Features and Plans for 2024
            - Date/time: Tuesday April 23 at 9:00 - 12:00 CEST.
            - Agenda
            - Slides
- Related WS Sessions
    - Passports
        - Session title: Passports in production
            - Date & Time: Monday, April 22, 2024, 3:00 PM - 4:30 PM
            - Agenda
        - Session title: AAI and Passports "what's next?" unconference sessions
            - Date & TimeWednesday, April 24, 2024, 10:30 AM - 12:00 PM
            - Agenda
            - Slides
    - Cohort handoff
        - Session title: Federated cohort building
            - Date & Time: Wednesday, April 24, 2024, 1:00 PM - 2:30 PM
            - A place for us to discuss the PFB use case → Brian to request slides from Gen3
            - Agenda
            - Slides
    - AI/ML
        - Session title: Driver Project workshop: artificial intelligence (AI) and machine learning (ML)
            - Monday, April 22, 2024, 10:30 AM - 12:00 PM
            - Notes
            - Agenda

Connect 2023

- Agenda: https://broadinstitute.swoogo.com/ga4ghaprilconnect23/agenda?i=KVm1MNi4yNoQkyJnnpY_z4rvULhPBUed
- Cloud WS and related sessions:
  - DRS and Connect 2023 - Agenda Template-2-2.docx
  - DRS test-a-thon.docx
  - Connect 2023 - Agenda - Passport Update
  - 20230420 - Connect 2023 - Beacon, Phenopackets, Cohorts — combining …

Connect 2022

- Agenda: https://broadinstitute.swoogo.com/connect-2022/agenda?i=XJN8YW1Q3rz53DUqoCGgyeeSGvBVoe1E
- Cloud WS and related sessions:
  - 4 - GA4GH Connect 2022 - Agenda - Implementers Workshop (WES, TRS)
  - Connect 2022 - Cloud Work Stream Roadmapping for 2022.docx
  - 17 - Connect 2022: FASP Use Case Session Agenda
  - 21 - Connect 2022: FASP Collaboration on Passports, DRS and Discovery
  - Nov 2022 session; FASP Builder Session

Meeting Protocols

- Please note that by participating in meetings, attendees agree to adhere to the GA4GH Standards of Professional Conduct.
- Meetings may be recorded fo
- Wr note-taking purposes. Recordings will be deleted within three months of the meeting taking place.
- Dates should be specified in the international format yyyy-mm-dd
- The link for the call: https://zoom.us/j/6971797978
- Future scheduled meeting plans are available on the Meeting Topics Spreadsheet. Please indicate here if there are any topics you'd like to discuss.

2026-MM-DD: TEMPLATE

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees "Name (Affiliation)": , , ,

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	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.	Sub-group Update (TES/WES/TRS/DRS)	
5.	Cloud WS Initiatives Leading up to Plenary	
	-	

List of Meetings

TBD

Upcoming agenda on workflow IO… from Alex Kanitz

Hi all,

Following up on discussions about the **workflow I/O definition gap** (going back, e.g., to the Connect meetings in Boston and Uppsala last year and earlier), which makes it hard to, e.g., render UI input forms for workflows, which in turn is an obstacle in real-world user-facing WES adoption, I've put together a formal draft spec and validator for a universal IO Schema Profile: https://github.com/uniqueg/ga4gh-io-schema

A few quick points:

- The proposal is for a domain-agnostic pure JSON Schema **Interface Definition Language for computational workflows** to auto-generate client UIs, strictly validate WES payloads, and enable AI agent interoperability.

- Addressing this gap (either through a spec or recommendation report) is an open deliverable for ELIXIR Compute Platform WP4, due at the end of this year.

We would love to develop this in the open as a **candidate GA4GH product** (probably under the Federated Analysis WS).

2026-10-26:

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: , , ,

2.	Previous Actions Review	
3.		
4.	Sub-group Update (DRS) ○ Oct 26th: review the tagging PR and the changes for writeback suggested by Brian W. ○ The PRs to review ■ Graham - writeback DRS PR: https://github.com/ga4gh/data-repository-service-schemas/pull/418 ■ Tagging: https://github.com/ga4gh/data-repository-service-schemas/pull/424 ■ Controlled access PR: https://github.com/ga4gh/data-repository-service-schemas/pull/423 Feedback: ● 418 ○ Venkat… can we look at the query, new standard in HTTP spec… htsget is looking at this (issue 866) ○ Next steps ■ → Let's add DELETE for when you're not using a Passport, Graham is working on this now ● Support for DELETE using basic or bearer auth now in the PR, alongside PUT for Passport protected objects. There is also a bulk delete endpoint and that still uses PUT too, because it needs a body. Note that all of these are optional and many servers may choose not to implement deletes or updates (or indeed accept uploads at all) https://github.com/ga4gh/data-repository-service-schemas/pull/418 ■ → next step, merge once the change is done above ● 423 ○ Indicate what visa is needed to access this DRS object ○ Field is optional, uses URL-based visa semantics from the spec: ■ https://github.com/ga4gh-duri/ga4gh-duri.github.io/blob/master/researcher_ids/ga4gh_passport_v1.md#url-claims ■ https://github.com/ga4gh-duri/ga4gh-duri.github.io/blob/master/researcher_ids/ga4gh_passport_v1.md#value ○ Brian W. no requirement to use passport here… hence the general name… ○ Service info, added some syntax here to be able to specify ○ Kyle E. mapping to S3 bucket… that's how they will use it…	Brian Walsh

	○ Feedback ■ Michael B. helpful for metrics, tracking/logging ■ Tom C. naming? ■ Brian O. array (yes, it's an array of strings) ■ Michael B. dual use writeback and read… conflation… authorization + cloud credentials ○ Questions ■ Is controlled access the right name? ■ What about tokens in the header with particular scope? This doesn't cover that, right? ■ For writeback, how is this used for multi-cloud writeback? ○ Next steps ■ → rework to specify both visa requirements and scope for a standard bear token ■ → think about how this might change in the future when there aren't exact matches ■ → what's added to service info to specify bear token with scoping is required? ■ → service-info controlledAccessClaimFormat should be an array? What other controlled vocab do we want here e.g. for bearer token scopes for examples ■ → Venkat and others… take this as feedback to general service-info capabilities… could be used for more than just DRS	
5.	GA4GH IO Schema Profile https://github.com/uniqueg/ga4gh-io-schema	Alex Kanitz (to discuss on 14-Dec)
5.	Cloud WS Initiatives Leading up to Plenary	
	A.O.B **Connect 2027:** ● We're opening proposals earlier so we can confirm sessions before registration opens. That way, attendees can choose the sessions they'd like to attend when they register, and we'll get a rough sense of how many people will attend each one. ● A draft agenda will be required to be submitted with each session proposal. This will help us better evaluate sessions and make sure they're engaging and not presentation-heavy. ● We've put more weight on the in-person engagement criteria	

	and added a new one for clear vision and planned outcomes. You can see the full evaluation criteria here. ● All session chairs will be required to attend in person The submission process will be the same, through Nolt, and a brainstorming spreadsheet is also available. Here is the timeline: ● Proposals open: **Oct 22** ● Proposals close: **Jan 12** (staff review period Jan 12-21) ● Send results: Jan 21 ● Confirm agenda: Jan 28 ● Registration opens: first week of Feb Possible FAWS topics ● Agentic GIF / FL GIF working session? Demo session? ● Hackathon?	

Meeting recording:
Meeting minutes:

2026-10-12:FAWS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”:, , , ,

2	Update CWL WES implementation to API version 1.1 and document all standalone WES implementations with TRS support	WES leads?	
3	Ensure all WES implementations cited in the manuscript are registered in the GA4GH official registry prior to publication	Jimmy and team	Next TASC meeting

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.	Sub-group Update WES - update on WES Manuscript	Valentin
5.	Cloud WS Initiatives Leading up to Plenary - We'll refresh this after connect and the hackathon	Brian / Venkat
6.	AOB 1) Third Co-lead - **Federated Analysis Work Stream Co-Lead - https://www.ga4gh.org/open_call/federated-analysis-work-stream-co-lead/** Deadline - 5th November	

Meeting recording:
Meeting minutes:

KEY_TAKEAWAYS_OVERVIEW

- **WES Manuscript:** Final preprint submission targeted for next Monday, highlighting GA4GH API's role in workflow management and community adoption.
- **API Visualization:** Consensus to use mermaid diagram as main figure and detailed parameter table as supplementary material for clarity.
- **Federated Analysis Roadmap:** New project sheet tracks 2026-27 priorities, with champions assigned for key tasks like Mesh cards and DURS writeback.
- **Leadership Recruitment:** Third code lead role open until Nov 5, seeking hands-on GA4GH experience to improve Europe-Asia-Pacific meeting accessibility.
- **Workflow Engine Testing:** Plan to validate WES abstraction by running federated analysis across engines like Nextflow and Snakemake on same data.
- **Process Improvements:** Tutorial page revamp underway, recorded plenary sessions published online, and project boards introduced to track dependencies and progress.

Notes

WES Manuscript Progress and Publication Plans

The team is finalizing the WES manuscript to submit a preprint by early next week, focusing on clarifying the GA4GH API's purpose and broad community adoption.

- **Manuscript refinement with strong GA4GH focus** was driven by Valentin and Sasha's recent contributions, emphasizing the WES API as a GA4GH product and its role in federated workflow execution (05:30)
    - Valentin restructured the introduction to highlight workflow abstraction and management as the API's core purpose.
    - Sasha added content strengthening the G4JH (GA4GH) identity throughout the paper.
    - The manuscript aims to balance technical details with readability, converting API calls to JSON format for clarity.
- **Discussion on visualizing API endpoints using a mermaid diagram versus a table** explored how best to present user workflow interactions (08:30)
    - The mermaid diagram offers a clear visual of API call sequences, aiding user understanding.
    - The table contains more detailed parameter information but is less intuitive.
    - Brian suggested a sequence diagram as an alternative to improve clarity.
    - Consensus leaned toward including the diagram as a main figure and the table as supplementary material.
- **Manuscript content covers WES adoption scenarios and implementation categories**, though Valentin hesitated to overclassify implementations (15:00)
    - Examples range from standalone tools to platforms like Galaxy and workflow engines.
    - Valentin plans to verify all WES implementations are registered in the official GA4GH registry before publication.
    - The manuscript also acknowledges the limited number of standalone WES implementations supporting TRS and D, noting ongoing efforts to expand this.
- **Publication timeline targets preprint release by next Monday**, with remaining comments to be addressed this week (30:00)
    - Valentin is responsible for final revisions and coordinating with Sasha and Reggan.
    - The team believes the manuscript is mature enough and welcomes additional feedback for a smooth submission.
    - After preprint, the next major goal is submitting the DURS paper early next year, followed by a white paper on API integration strategies.

Federated Analysis and Agentic Science Roadmap

The group is consolidating strategic goals and action items into a shared project sheet to organize efforts around federated analysis and agentic science through 2027.

- **Development of a collaborative roadmap sheet** led by Venkat and Brian collates key initiatives such as Mesh cards, DURS writeback, and service info improvements under federated analysis and agentic science buckets (35:30)
    - The sheet will be expanded with a new tab focused on 2026-2027 priorities.
    - Champions will be assigned to key tasks including Mesh cards (Michael), standardized input/output formats (Alex), and DURS writeback (Kyle).
    - Integration of Passport 2.0 into WES, TES, and DURS standards is a significant focus.
- **The roadmap will enable clearer issue tracking and resource allocation** by linking related tasks and dependencies (42:00)
    - Venkat and Brian are creating project boards to map dependencies among standards and features.
    - This approach helps identify stale or partially merged issues needing implementation.
    - The boards will support triage and prioritization across interdependent standards like service info and DRS.
- **This coordination effort aims to increase transparency and alignment** across the workstreams, improving collaboration and delivery predictability.
- **The roadmap will also help accommodate global contributors** by enabling more flexible meeting schedules and participation, especially from Asia-Pacific regions.

Community Engagement and Leadership Recruitment

The group is seeking a third code lead with real-world implementation experience to broaden perspective and improve geographic meeting accessibility.

- **Announcement for a third code lead role closes on November 5, 2026**, targeting someone with hands-on experience implementing GA4GH standards (38:00)
    - The new lead would complement Brian and Venkat, who focus on TES and DRS.
    - Preference is for candidates engaged in multiple standards to bring diverse insights.
    - This addition aims to enable more Europe-friendly meeting times and increase input from Singapore, China, and Australia.
- The leadership expansion reflects growing community interest and geographic diversity, with Singapore, China, and Australia showing increased engagement.
- This initiative supports sustaining momentum and ensuring broader community representation in decision making and standard evolution.

Technical Discussions on Workflow Engine Interoperability

The team is advancing plans to demonstrate WES API abstraction over multiple workflow engines, reinforcing its flexibility.

- **Valentin described plans to run a federated analysis using different workflow engines (Nextflow, Snakemake) on the same data subset** to validate WES abstraction (23:30)

    - This effort involves converting workflows to a common standard while keeping execution engines distinct.
    - The goal is to show that analysis results remain consistent regardless of engine, proving WES agnosticism.
    - Coordination with Landfried is underway to implement and verify this approach.
- **Discussion acknowledged that reviewers may request detailed supplemental tables** comparing workflow outputs to support reproducibility claims (26:00)
    - The team plans to prepare full comparison data as backup but not include it in the primary manuscript.
    - This aligns with the manuscript's focus on the API's abstraction rather than deep variant analysis details.
- **Valentin emphasized the importance of honest discussion of WES API gaps and future needs in** the manuscript's discussion section (29:00)
    - He noted many papers overpromise and underreport limitations.
    - The manuscript details missing endpoints and plans for future API enhancements.
    - This transparency aims to build trust and guide ongoing community development.

Process Improvements and Documentation

The team is improving tutorial access, documentation, and communication workflows to better support community users.

- **Ian reported ongoing collaboration with the communications team to revamp tutorial webpages**, aiming for a dedicated tutorials page on the GA4GH site (04:10)
    - This addresses a previous action item to improve tutorial visibility and access.
    - The comms team is also producing session summaries and consolidated reports from plenary meetings.
- **Recorded plenary sessions and meeting notes will be uploaded to YouTube and shared via Zoom links**, enhancing transparency and accessibility for newcomers (40:30)
    - This supports onboarding new members and those unable to attend live sessions.
    - A consolidated "connect summary" is being prepared by the comms team for each plenary.
- The group is adopting project boards modeled after successful examples by Andrew and Tom to track issues and dependencies across standards (42:00)
    - These boards improve workflow visibility and help coordinate multi-standard development efforts.
    - Venkat emphasized this approach will help clear stale issues and align roadmaps.

Meeting Cadence and Participation

The team acknowledged low attendance due to a holiday and anticipates adjustments to meeting times with new leadership.

- The meeting had fewer participants than note takers, attributed to a holiday in Canada and the US (01:00, 43:40)
    - This highlighted the need for more globally considerate scheduling.
- With the upcoming addition of a third code lead, the team hopes to adjust meeting times to better accommodate Europe and Asia-Pacific participants (39:00)
    - This aims to increase engagement and regular contributions from these regions.
- The current meeting structure is evolving to support asynchronous collaboration through improved documentation and project boards, reducing reliance on live attendance.

Action items

- Address all manuscript comments by the end of the current week to enable preprint submission (31:22)
- Coordinate with Sasha on finalizing GA4GH-focused comments in the manuscript (31:22)
- Finalize WES manuscript status (32:58)
- Update CWL WES implementation to API version 1.1 and document all standalone WES implementations with TRS support (19:34)
- Ensure all WES implementations cited in the manuscript are registered in the GA4GH official registry prior to publication (18:02)
- Work with Lanfried on cross-workflow-engine simulation for federated analysis validation (24:06)
- Prepare or have ready supplemental concordance data comparing different workflow engines for reviewer requests (27:41)
- Develop a white paper on coordinated use of WES, TES, DRS, and TRS APIs together (33:00)
- Synchronize work with Alexia on use case applications and publications (33:00)

Venkat

- Populate and update “leading up to plenary” sheet with 2026/2027 goals and standardization topics (36:40)
- Support creation of project boards identifying dependencies and triaging issues for standards (40:40)

Brian

- Collaborate with Venkat on project boards for tracking standard dependencies and issues (40:40)

Communications Team

- Upload recorded plenary meeting sessions to YouTube and Zoom (40:40)

- Prepare and circulate session summaries with key takeaways and action items (40:40)

Recruitment Team

- Close applications and onboard a third code lead for workstream 1 by November 5, 2026, targeting candidates with practical implementation experience (38:54)

2026-09-14:FAWS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: Denis Yuen, ,Michael Conway ,Zhenyu Zhang , Kyle Ellrott, , , ,

	Federated Analysis Hackathon: Ship Real Code, Together- Connect …	
5.	Cloud WS Initiatives Leading up to Plenary - We'll refresh this after connect and the hackathon	
6.	AOB	

Meeting recording:
https://us02web.zoom.us/rec/share/AJny1Q_XLB-lfyh6f2N4QYlLMGn6LSkB2G6R4U2h8CRrLmir6j-PgXeKoRufJ4UL.R74-RJSu_F29VCIe
Passcode: CXO%$gG3

Meeting minutes:

2026-08-24:FAWS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees "Name (Affiliation)": , , , , , , , , , , , , Landfried Kraatz (BIH Charité Berlin), Michael Lukowski (U Chicago), , Emilio Righi, Nathan Sheffield, Bhargava Reddy Morampalli, Michael Bauman, Heather Creasy, Michael Conway , , , , , , , , , , , ,

6.	Connect Hackathon topic discussion Connect agenda - Federated Analysis Hackathon: Ship Real Code, Together.docx Slide deck - Federated Analysis Hackathon: Ship Real Code, Together- Connect slide.pptx	Brian / Venkat
7.	Cloud WS Initiatives Leading up to Plenary	
	-	

Meeting recording:https://us02web.zoom.us/rec/share/RR5l6TxWWA0NQ7d-hF-yuZ1U68HT3neKDY3JpgzkqZzXKctRK1TIMmF4XBa6WBY.C5YnWmSi-dE79G2w?startTime=1787583467000

Passcode: pHq5F.g!

Meeting minutes: (Ai-generated)

Summary

Venkat reported that TES plugin testing is done and a supplemental figure mapping WES/TES engine support (Nextflow, Sprocket, Toil/CWL in progress) will go into the WES manuscript. Two GIF projects are kicking off: federated analysis and Agentic AI, the latter including MCP servers for the GA4GH registry and refget plus a draft "agentic harness" standard. Emilio presented RNAget beaconization — three models (matrix, genomic feature, expression value) to make expression data queryable in slices rather than bulk-download only — with discussion on reference genome provenance and extending the genomic feature model to regulatory elements and other coordinate-based assays. No TRS updates; cloud initiatives deferred.

1. Backlog / Standing Updates

- **TRS:** no updates
- **WES manuscript:** still circulating; author list and affiliations need confirming.
- **TES plugin backends:** Venkat has completed testing and built a matrix of which workflow engines work with TES. This will go into the manuscript as a supplemental figure showing the WES/TES overlap.
    - Nextflow — working
    - **Sprocket** (St. Jude WDL engine) — working; ships a full Rust plugin for TES. Potential to extend Rust bindings to WES; Landfried to follow up with them.
    - **Toil/CWL** — PR in progress for GA4GH compatibility. Partial only: storage backends currently limited to AWS and GCP. Group will work with them on other cloud storage.

2. GIF Projects Kickoff

Two projects are spinning up out of this group:

Federated analysis — led by Venkat and Brian. One of the Federated Analysis Working Group calls will be repurposed to scope the project and identify champions. Buy-in already from TES and WES implementers; other implementations to be approached. Goal is to work with the GA4GH tech team on infrastructure-as-code to deploy example federation architectures to AWS, building on work already underway for the Plenary showcase of GA4GH API endpoints.

Agentic AI — run through the AI Working Group meetings, also with tech team support.

- First target: an MCP server in front of the GA4GH registry, enabling chatbot-style discovery of which endpoints exist, what standards they implement, and whether they can be called.
- Second: an MCP server for refget (Nathan already developing), to support finding reference genomic files and orchestrating tools around them.
- A draft standard for an "agentic harness" is being written — deliberately not reinventing industry practice, but scoping what GA4GH specifically needs for agentic discovery.
- Key open question driving member concern: what an agent is actually permitted to do, and which agents have which permissions against which APIs.
- Aim is to present some of this at Plenary.

3. RNAget Beaconization — Emilio Righi

Goal: after RNAget v1, fit RNAget models into Beacon to provide the discoverability layer. Beacon already covers the variant side; this addresses the first-class RNA question — which genes/transcripts are expressed in which biosamples, under which assay and units. Today RNAget only supports bulk download of a whole expression matrix; the target is queryable slices.

Three core models:

- **Matrix** — the experiment container. Holds identity, assay type as ontology terms, dimensions (features × biosamples), semantics, and context (genome assembly, annotation source). Attempting to use the GA4GH experimental metadata schema; an issue was opened but has had no response yet.
- **Genomic feature** — the hardest and most valuable model. Represents genes, transcripts, exons, and genomic intervals. Uses the VRS location model for coordinates, plus a stable ID, a Sequence Ontology type term, aliases and cross-references, and parent/child hierarchy. Links back to matrices still undecided.
- **Expression value** — the individual matrix cell; essentially a cross-join table of matrix ID, feature ID, and value.

Endpoints implemented: counts and details for features; matrices containing a given feature; matrix counts, details, and paginated feature lists; equivalents for biosamples; and matrix slicing with URL parameters (lists of feature IDs, lists of biosample IDs, value-greater-than filters for most/least expressed genes).

Open issues / next steps:

- Defining "feature" robustly — real RNA-seq matrices are heterogeneous, sometimes mixing gene names and Ensembl transcript IDs within the same matrix.
- Deciding whether expression value is a full model or just a payload/slice of the matrix.
- Documentation and a path to production.
- Cross-working-group friction: Beacon uses camelCase, VRS uses snake_case.

4. Discussion

- **Reference genome provenance (Venkat, clarified by Nathan):** how to distinguish expression aligned to GRCh37 vs. GRCh38. Emilio: assembly accession belongs to the matrix metadata, since a given transcript version can persist across genome releases. Consequence is that you can end up with two TP53 features pointing to different annotations — you query by alias first, then need a mapping to identify the version you want. Multi-step queries are currently unavoidable (e.g. "which matrix has the most highly expressed TP53 in renal cancer tissue" cannot be done in one request).
- **Scope beyond RNA (Venkat):** since the model is coordinate-based, is the plan to rebrand RNAget as a general "data get"? Emilio confirmed that is the intent — the genomic feature model should also cover ChIP-seq, enhancer locations, exon-level data, and anything projectable onto the genome, with locally minted IDs where no external identifier exists.
- **Regulatory elements (Nathan):** Nathan is in an RDA working group on verification of genomic annotations, approaching the same space from the regulatory element side. Gene space is grounded in accepted identifiers from providers like GENCODE; outside it, definitions collapse to coordinates, raising questions like whether slightly offset coordinates represent the same element. Emilio noted VRS already handles indefinite ranges (e.g. known start, unknown end). Both agreed to connect; Nathan shared a link in chat.
- **Beacon vs. standalone (Venkat):** the plan is to bake this into Beacon, though Beacon's modularity means there may be RNAget-specific Beacon instances.
- Venkat will add RNAget/Beacon query patterns to the AI work as candidate agent use cases.

5. Plenary & Connect Hackathon (Singapore)

- Sign-up sheet is open for hackathon topics — add ideas directly.
- Existing topics include interconnectivity between GA4GH standards; Venkat will help lead some of that.
- At least one more meeting expected before Singapore, depending on who is attending.

6. Cloud Initiatives

Brief framing only: a retrospective on the 2026 cloud initiatives is underway, reviewing who signed up for what and how far each got. Reduced funding and general bandwidth constraints are acknowledged. The question is whether each initiative still has a champion and should be carried into 2027. Venkat and Brian have already done some backlog grooming; others are asked to add their thoughts.

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Notes:

Aug 12, 2026 |
Focussed meeting - WES and DRS marker paper

Attendees: landfried.kraatz@bih-charite.de Michael Lukowski Patrick Magee Tazro Ohta Jimmy Payyappilly Brian D OConnor Reggan Thomas Venkat Malladi Brian O'Connor Kyle Ellrott Schneider-Lunitz, Valentin
Attached files: Cloud_WS_manuscript_meeting_agenda (1).docx

Notes

- WES update: WES_Manuscript_20260318.docx
    - Authors opportunity to approve
    - Last minute comments
        - Venkat is going to work on a TES plugin backend table, could be a supplement
    - GA4GH approval
    - Going to Bioinformatics (pre-print) before Plenary
- DRS update: 20230920 - DRS paper draft
    - Michael and I need to work on yellow sections

The process for GA4GH review

Hi Valentin, I was working in the background with Angela to identify the manuscript category. Based on the GA4GH publication policy, the manuscript falls under the category " Output Manuscript".

As per the policy document, the next steps are :

1. **Initial proposal**
    - Submit a proposal to develop an output or position manuscript as early as possible
    - Secretariat and any relevant group leads will approve or reject the proposal within 10 business days of submission
    - The proposal form may also be used to notify secretariat of aligned manuscripts on the horizon
2. **Mid-draft review**
    - Submit a request for mid-draft review once a substantive draft of the manuscript is ready for internal feedback

- Within 5 days of receipt, secretariat will circulate manuscripts to the full PSC for either formal review (position manuscripts) or awareness (output and aligned manuscripts). Lead authors are required to circulate output manuscripts to their authorship group for detailed review.
- Consolidated feedback from PSC will be provided to authors within 10-20 business days following circulation.

3. **Final pre-submission approval**
    - Notify GA4GH when your manuscript is ready for journal submission
    - Authors will receive approval to submit within 10 business days of receipt of position manuscripts and within 5 business days of receipt of output manuscripts. **Please plan accordingly.**
    - If PSC determines that further action is required prior to submission, you may not submit your manuscript on behalf of GA4GH until such action is completed. If you choose to proceed with submission without approval, all references to GA4GH as the organizing body of the work must be removed.

Action items

- [ ]

2026-08-10: FAWS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: ,Valentin Schneider-Lunitz (DE) ,Heidi Sofia (NIH), , , , , , , , , , , , , , , , , , Michael Lukowski (U Chicago), , Denis Y,Navid ,Mariah Kenney , Kyle, , , , , , , , , , , , , , , , , ,

	• Continue development efforts on the WES repository post-summer break, focusing on making the API more AI-ready and improving features		
3.	• Review the Mesh Card paper manuscript and prepare it for final submission, incorporating Bob's input • Collaborate with the team post-plenary and during GIF projects on Mesh Cards and their applications in federated learning	Micheal Luksowski	
4.	• Continue testing workflow engines including Toil's CWL implementation and Galaxy, focusing on funnel integration and updating the workflow engine compatibility matrix • Research provenance standards and coordinate with community groups on RO-crate and minimal implementation efforts for 2027 initiatives	Kyle	
5.	• Start a discussion thread on client policies for handling DRS multi-endpoint access, write-back handling, and security concerns in the GitHub repository	Brian	
6.	• Champion and update the status of federated compute initiatives and assist in identifying hackathon topics	Venkat	

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (WES) Publication update	Valentin / Landfried / Tazro
4.	Connect proposal - Federated Analysis Hackathon: Ship Real Code, Together (full-day double session hackathon) - Accepted Date (Day/Month): 2 October 2026 Session time : 2:00 – 3:30 PM SGT (Pt.1) and 4:00 – 5:30 PM SGT (Pt.2)	Brian / Venkat / Reggan

	Connect agenda - Federated Analysis Hackathon: Ship Real Code, Together.docx Slide deck - Federated Analysis Hackathon: Ship Real Code, Together- Connect slide.pptx	
5.	Cloud WS Initiatives Leading up to Plenary - Let's review for status and *hackathon ideas*	
	-	

Meeting recording:
https://us02web.zoom.us/rec/share/yYR79WS3Wj8-Fo7GK66Ha9oWz55b5-43yurqtDtx-EyjcBVBH5AdMMIGyH0qlOf5.vFJBIf8GcBEoLB_I
Passcode: 5.bj5z=A

Meeting minutes:

KEY_TAKEAWAYS_OVERVIEW

- **Wes Manuscript Submission:** Shift planned to Bioinformatics journal after Scientific Data rejection; revisions underway balancing grant and event prep.
- **Federated Hackathon Planning:** Topics finalized soon, focus on security, Gen3 integration, and workflow equivalency testing across tools like Galaxy and Nextflow.
- **DRS Integration Priority:** Technical review needed, with emphasis on client policies for secure write-back and trust models in multi-access federated setups.
- **2027 Strategic Focus:** Continue federated DIR registry, DRS 1.6 upgrade, API harmonization; hackathon at Connect offers flexible participation slots.
- **Mesh Cards & Federated Learning:** Nearing publication; using TCGA data to test federated workflows and AI agent metadata extensions.
- **Process Enhancements:** Emphasis on issue tracking, service metadata testing, and provenance validation; managing workload balance and community engagement stressed.

Notes

Publication and Manuscript Progress

Publication efforts around the Wes manuscript are advancing with a clear next step to refocus submission plans after initial journal rejection.

- **Decision to shift Wes manuscript to Bioinformatics journal** followed rejection from Scientific Data due to scope mismatch (10:27)
    - Valentin updated manuscript text and author sections to improve flow and clarity.
    - Sven provided a new round of comments prompting restructuring for Bioinformatics article format.

    - Valentin is balancing this with grant writing and biohackathon prep but aims to finalize revisions soon.
    - Reggan will be informed before the manuscript submission to coordinate next steps.
- **Focus on drafting a federated workstream paper post-Wes publication** to highlight GA4GH's federated initiatives beyond policies (11:50)
    - Valentin and Sven see this as important to raise community awareness and emphasize federated efforts.
- **Collaboration needed for DRS integration in Wes manuscript** with Brian, Michael, and Patrick providing technical input (12:40)
    - Brian and Michael offered to review and comment on early draft sections relating to DRS.
- **Publication process includes internal peer review steps** with Sasha and PLC involvement before final submission (13:45)
    - Valentin targets completing revisions this week and coordinating reviews for timely submission.

Federated Data and Compute Initiatives

The team is preparing for hackathon sessions to advance federated data and compute topics with a focus on real-world code integration and policy alignment.

- **Federated analysis hackathon topics will be finalized over next few meetings** with open collaboration encouraged (16:00)
    - Reggan, Venkat, and Brian emphasized the need to solidify topics and participants before Connect event.
    - Aim to incorporate security group outputs and Gen3 integration work into hackathon focus.
- **Gen3 integration with Tess and Kubernetes support nearing completion** with testing underway for long-lived workflows (17:40)
    - Michael reported stable development and addressing token management issues targeting completion this year.
    - Helm charts finalized as a key release milestone; ongoing funnel-related testing continues.
- **Evaluating workflow engine compatibility and equivalency for federated Wes computations** as a hackathon goal (20:40)
    - Discussion around using RO crates and LLMs to validate functional equivalency between workflows like Galaxy, Nextflow, and CWL.
    - Kyle leading research on provenance standards and minimal metadata for workflow validation, with cross-community input planned.
- **Consideration of MCP servers and client policies for DRS implementations highlighted as critical next steps** (24:40)
    - Brian and Kyle stressed the need for documented client behaviors relating to multiple access methods and write-back permissions.
    - Emphasis on trust models and secure write-back locations apart from sensitive data buckets to avoid security risks.

Strategic Planning and Hackathon Preparation

The group is aligning on 2027 priorities and hackathon topics to maximize limited bandwidth and build on 2026 initiatives.

- **Review of 2026 initiatives identified ongoing work and areas to pause or carry forward** to optimize team efforts (39:30)
    - Federated DIR server registry integration continues as a key objective for 2027.
    - DRS 1.6 upgrade and publication preparation remain high priorities with planned hackathon focus.
    - API constraints, capabilities, and optional extensions flagged as promising hackathon topics to harmonize standards.
- **Hackathon will leverage three hours of dedicated time at Connect plus ongoing week-long activities** for flexible participant engagement (35:40)
    - A sign-up mechanism will be created by Reggan for participants to select or propose hackathon topics by next call.
    - Venkat encouraged broader volunteerism to distribute responsibilities beyond original proposers.
- **Brian clarified registry submission process has improved significantly with an online form and monthly vetting** (43:50)
    - Encouragement to document client policies for DRS to support emerging federated workflows and clarify user expectations.

Mesh Cards and Federated Learning Integration

Mesh Cards and federated learning frameworks are emerging as strategic enablers for federated analysis workflows and AI agent integration.

- **Michael Lukowski is progressing on Mesh Card documentation and publication** which ties into federated learning and federated analysis standards (50:10)
    - Paper nearing archival submission, with collaboration and review ongoing.
    - Potential for Mesh Cards to advertise agentic AI services through metadata extensions discussed with Brian and others.
- **Federated learning projects using Mesh Cards and TCGA data offer a practical test case** for integrating standards and federated compute (52:40)
    - Kyle sees this as a way to validate GIF project infrastructure and federated workflows with heterogeneous environments.
    - Strategy involves starting with simple toy problems and evolving to more realistic scenarios with synthetic data for risk mitigation.
- **Integrative federated tests including Galaxy, Nextflow, and Wes kit instances proposed** to uncover interoperability challenges (54:40)
    - Multiple workflow engines running in different environments will help identify practical federation issues and solutions.

Process Improvements and Operational Coordination

The group is refining workflows, documentation, and collaboration approaches to support federated compute and data standards development.

- **Ongoing effort to manage multiple GIF projects with project management approaches** to track standards and implementation issues (25:00)
    - Emphasis on issue tracking across standards to prevent loss of progress and maintain visibility.
- **Testing of service info metadata including job counts and capabilities is underway** with PRs for cloud and HPC environments planned (46:30)
    - Venkat focusing on testing and feedback cycles for minimum viable info needed for federated compute discovery.
- **Documentation and workflow equivalency validation remain open challenges** requiring multi-stakeholder coordination (48:00)
    - Engagement with external communities on provenance standards like RO crates is planned to inform 2027 efforts.
- **Hackathon topics include pushing forward DRS releases, geolocation metadata, and API capability harmonization** (57:00)
    - Reggan tasked with organizing sign-ups and tracking progress to ensure alignment with community bandwidth.

Speaker Insights and Team Dynamics

The discussion showed a collaborative spirit emphasizing transparency, workload balance, and community engagement.

- **Venkat, Reggan, and Brian emphasized inclusive participation in hackathons and responsibility sharing** to broaden engagement (45:25)
    - Encouragement for new contributors to step up and join ongoing initiatives to expand capacity.
- **Brian provided detailed clarifications on technical and procedural issues**, including client policy needs and registry processes (26:40 & 43:50)
    - His contributions helped frame key open questions around client behavior and federated write-back security.
- **Michael and Kyle shared progress and challenges in technical development**, focusing on Kubernetes, long-lived tokens, and provenance research (18:25 & 46:30)
    - Their insights inform practical timelines and technical feasibility for upcoming releases and hackathon goals.

Action items

Valentin

- Address PI Sven's comments on the Wes manuscript and restructure it for submission to the Bioinformatics journal (10:27)
- Coordinate with Reggan and Sasha for final review and submission preparations of the Wes manuscript (13:51)
- Continue development efforts on the WES repository post-summer break, focusing on making the API more AI-ready and improving features (07:01)

Reggan Thomas

- Inform Valentin before manuscript submission and support the submission process for the WES manuscript (13:51)
- Follow up with Angela and Sasha to expedite review of DRS and Wes federated blog posts for publication before the upcoming plenary (33:39)
- Prepare a hackathon signup sheet to capture participant interests for the Connect hackathon sessions (40:55) - **Done** - CONNECT_Hackathon_Topics_Sign_Up.xlsx
- Organize and assign hackathon topics based on the 2026 initiative review and team input prior to the plenary meeting (38:01) - **In progress.** The team has to start volunteering for the topics listed in the hackathon sign up sheet.

Michael Lukowski

- Review the Mesh Card paper manuscript and prepare it for final submission, incorporating Bob's input (50:14)
- Collaborate with the team post-plenary and during GIF projects on Mesh Cards and their applications in federated learning (51:56)

Brian

- Start a discussion thread on client policies for handling DRS multi-endpoint access, write-back handling, and security concerns in the GitHub repository (28:57)

Kyle

- Continue testing workflow engines including Toil's CWL implementation and Galaxy, focusing on funnel integration and updating the workflow engine compatibility matrix (19:12)
- Research provenance standards and coordinate with community groups on RO-crate and minimal implementation efforts for 2027 initiatives (46:57)

Venkat

- Champion and update the status of federated compute initiatives and assist in identifying hackathon topics (39:35)

General Team

- Review and add names to the initiative spreadsheet for 2027, propose champions, and identify hackathon topics to prepare for the plenary meeting (01:00:09)

2026-07-27: FAWS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi

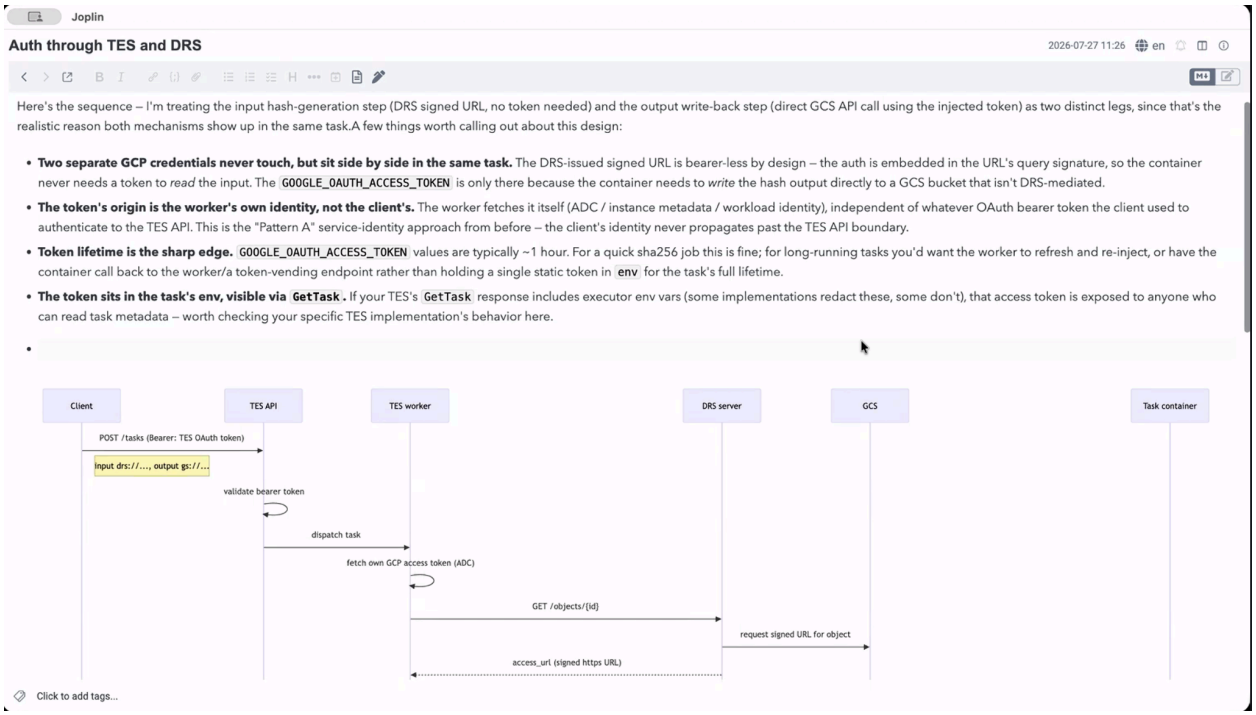
Global Alliance for Genomics & Health

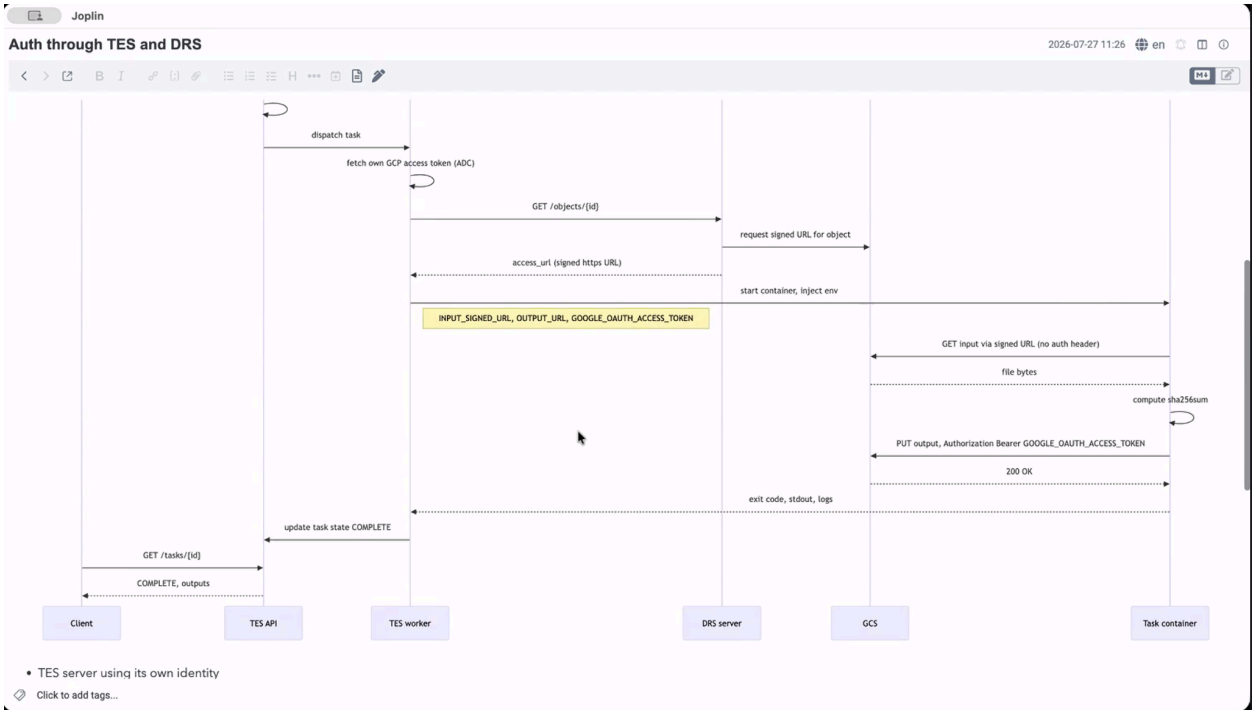
Attendees “Name (Affiliation)”: ,Michael Baumann (Broad) ,Denis Yuen (OICR-Dockstore) , Thomas Conner (Broad), ,Nathan Sheffield ,Graham Ritchie ,Jaclyn ,Surya Saha , Andrew Gearhart, Landfried Kraatz, , , ,

- Take a look at the registry to see if that's useful for Refget: https://implementation-registry.ga4gh.org/

Passports + WES/TES and delegation for DRS

- Passing from client to TES to accessing DRS
- Trying to remove complexity of passport passing
- Proxy to translate passport to native token
- Four different options for how we support Passports + APIs (different pros and cons for each)
    - Passport broker that knows how to make tokens for various services (task specific tokens)
    - Each API knows how to work with Passport POSTs directly
    - Each API provides an exchange endpoint that handles a POST for a passport
    - There's a service that exists between the client, broker, and service (TES, WES, etc) that does the exchange (what Tom is presenting below)
- From Andrew:
    - this is strongly related to the issue of task-specific tokens--i have the start of a draft PR here: https://github.com/ga4gh/data-security/pull/137
    - I haven't completely solved the issue of pass-through yet, but have some ideas.
- From Venkat:
    - Take look at this new standard: https://x402.org/
- From Tom and Claude, a very raw draft set of ideas to pass researcher identity / passports through to APIs. The assumption is that machine identities are not acceptable for controlled-access data and for more and more use cases going forward.
    - WARNING: The screenshots are pretty raw





- the hope is that we can keep the specifics of auth tokens confined to proxies / sidecars and TES or WES runtime
- The task just calls APIs through TES runtime, and the proxies / sidecars lean on token exchange and knowledge of req

DRS works in progress

Mesh Cards and the new PDAP

Session Planning for Connect

2026-07-13: FAWS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: , Michael Lukowski (U Chicago), , , , , , , , , , , , , , , , , , , ,

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian / Venkat/Reggan
2.	Previous Actions Review	Brian / Venkat/Reggan
4.	Sub-group Update (TES) - Interoperability	Venkat/ Kyle
5.	Connect Ideas - Due 15 Jul submit via Nolt **Connect Session Ideas** ● Double-session for Federated Analysis hackathon (full day). Topics would be organized ahead of the meeting and at the meeting. Potentials include: ○ How we add requirements/capabilities to all our APIs (DRS + TES/WES) ○ Passports PRs ○ Common input/outputs between TES and WES ○ RO-Crate support added ○ and more!! ● Federated Analysis Roadmap: a session looking at what 1) initiatives we have for 2026-2027 and 2) individual APIs roadmaps	Brian / Venkat/Reggan

Meeting recording:
https://us02web.zoom.us/rec/share/abSVsmagb465ZhQjawk7YxUBnS-NmkWqZi-4FStRPqmGKhOo8tVB8k6HYlB5gmia.5yGSiEFdHArHqjYE
Passcode: 2Re2yg*%

Meeting minutes:

- Test Interoperability: Most test servers support workflows, but St. Jude's server limits local testing; no robust CWL examples yet.
- Workflow Engine Support: Issues with Toil dropping CWL support; Snake make's single-node test reduces efficiency; cloud test server deployment planned.
- Test Server Deployment: Funnel identified for broad compatibility; deployment led by Jimmy to enable common standard validation.
- Passport 2.0 and Tokens: Progress on JSON-LD support, Passport Lite, and task tokens; draft PRs planned; hackathon to refine specs.
- Federator Sessions: Two sessions proposed for July 15 covering hackathon updates and 2026-27 roadmap; GSoC presentations included for visibility.

- Publication Efforts: WES paper near draft completion; DRS paper manuscript type pending; blog posts to increase transparency underway.
- Hackathon Goals: Focus on task-specific token architecture with draft PR outcome; post-hackathon prototyping and Funnel integration planned.
- Feature Enhancements: Geolocation added to service info schema to prep for federated compute; no current implementations ye

2026-06-22: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”:Valentin Schneider-Lunitz (DE) , Jeremy Adams (GA4GH/OICR), , , , , , , , , Michael Lukowski (UChicago), , Graham Ritchie, Jinny park ,Michael Baumann ,Chen ,Denis Yuen , Jimmy Payyappily, , ,Reggan Thomas , , , , , , , ,

6.	• Implement service info capabilities schema updates and create generic examples for DRS and TES APIs	Jimmy / Tech team	

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Reggan
2.	Previous Actions Review	Reggan
3.	PDAP - Roadshow PDAP v2.0 slides	Angela/Justina / 10 mins
4.	LSG & Cloud → Federated Analysis WS - New co-lead opportunity - https://www.ga4gh.org/open_call/cloud-work-stream-co-lead/ - LSG APIs (Refget , RNAget and Htsget) and FAWS (Cloud) joining together	Venkat / Reggan/ 5 mins
5..	GIF project application discussions - Opportunity to discuss GIF project ideas ahead of the 30th deadline	Venkat / 10 mins
5.	Sub-group Update (TRS) - No updates	Denis
6.	DRS at EBI	Dash / 10 mins
7.	Service Info & Metadata Expand Service Info with structured capability descriptions (GPU/CPU specs, geolocation) Migrate Service Info repository under GA4GH organization	Venkat / 10 mins
8.	Passports + WES/TES and delegation for DRS	Tom Conner / 10 mins
	A.O.B GA4GH 14th Plenary - GA4GH 14th Plenary will take place from **28 September to 2 October 2026 in Singapore** at the One Farrer Hotel. Details here: https://broadinstitute.swoogo.com/ga4gh-14th-plenary/11059298 Early bird registration closes on May 14, 2026	

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Meeting recording:
https://us02web.zoom.us/rec/share/dKrQ-gY1D0WG-BW59kt6P-pNX-qlOkWC4J9Hb2D3ZKGCDYnaBcq8mKSaC9cA6QzL.v9MvCpLKPRN5mhiN
Passcode: 0iqPPQ

Meeting minutes:

No previous action items
20260420 - GIF Proposal - Federated AI/ML Analysis

20260420 - GIF Proposal - Federated AI/ML Analysis
20260420 - GIF Proposal - Researcher Agents

Slide deck - PDAP v2.0 slides
Full PDAP document: GA4GH_Product_Development_and_Approval_Process_v2.0

You can also share feedback here: https://forms.ga4gh.org/pdap

- **PDAP Update:** New approval process with four stages, risk-based reviews, AI checks, and a living product dossier streamlines product approval.
- **Faster Feedback:** 14-day consent voting, single dossier documentation, early team engagement, and strong rationale needed for late objections.
- **Federated Analysis Workstream:** Expanded scope, renamed from Cloud, seeking new co-lead, integrating LSG APIs, and pushing two AI-focused GIF proposals.
- **DOSA API Pilot:** EMBL-EBI uses DRS and Passport for automated controlled access management, focused on UK Biobank and 1000 Genomes datasets.
- **Service Metadata:** New capability schema added to service info, aiming for cross-API examples in WES and DRS before plenary meeting.
- **Plenary Deadlines:** Session submissions due July 15, registration closes August 15; communications planned to ensure maximum participation.

Notes
Product Development Approval Process (PDAP) Update

The GA4GH team introduced a new product development approval process designed to improve feedback timing, risk-based review, and documentation to streamline product approval.

- **New PDAP framework with four stages and decision gates** guides product teams through triage, development, candidate, and approval phases (04:46)
    - Introduces checkpoints during heavy development points to catch issues earlier
    - Adds AI workstream review alongside regulatory, ethics, and data security checks
    - Risk tiering at stage zero dictates review intensity, reducing unnecessary overhead for low-risk products
    - A product dossier serves as a living document tracking product details throughout its lifecycle
- **Significant process changes target faster feedback and clearer documentation** (09:16)
    - Early engagement with product teams avoids last-minute surprises

    - A single product dossier replaces scattered documentation, simplifying record-keeping
    - Voting updated to a 14-day “consent window” where absence of objections equals automatic approval
    - Late objections require strong rationale to prevent delay and inefficiencies
- **Stage-specific expectations include evidence of use and public comment** (13:27)
    - Stage two requires demonstration of at least two independent implementations to prove interoperability
    - Public comment and a product introduction video are required before approval
    - Feedback responses must be documented to show how concerns have been addressed
- **Angela emphasized community collaboration and encouraged timely review** (18:31)
    - She noted limited current feedback and urged early input before the process finalizes
    - A real product will be documented as an example to guide future teams
    - Acknowledged expected growing pains and committed to minimizing future process changes

Federated Analysis and Cloud Workstreams Renaming and Expansion

The Cloud workstream was renamed to Federated Analysis Workstream, expanding its scope and membership while seeking new leadership.

- **Cloud workstream renamed to Federated Analysis Workstream and actively recruiting a new third co-lead** (21:24)
    - Role description shared with an open application link despite official deadline passing
    - The rename reflects the broader focus on federated analysis APIs and integration
- **LSG APIs like RefGet, RNAGet, and HTSGet are being incorporated into the expanded workstream** (22:45)
    - These APIs are mature and discussions focus on requested changes and integration with federated and AI workflows
    - LSG members invited to join weekly or biweekly meetings to contribute and align efforts
- **Two major GIF project proposals led by this workstream are seeking driver projects** (25:44)
    - One explores using agentic AI frameworks to query GA4GH standards for data discovery and workflow automation
    - The other focuses on federated AI model training across distributed sites with practical issue discussions
    - Deadlines for GIF applications are set for July 30, with encouragement for interested projects to apply soon
- **Workstream aims to foster collaboration across AI, federated analysis, and API teams for integrated solutions** (27:28)
    - Plans to create GIF-specific meetings to surface practical challenges and champion needed features
    - Intends to escalate cross-workstream security and agentic handling needs to AI and federated analysis groups

DRS API Pilot at EMBL-EBI

Dash presented a pilot project integrating GA4GH standards (DRS, Passport) at EMBL-EBI to modernize controlled access data handling.

- **Pilot introduced automation for controlled access data management at EMBL-EBI using DRS and GA4GH Passport** (30:09)
    - Targeted UK Biobank (controlled access) and 1000 Genomes Project (open data) datasets
    - Automated indexing of files with metadata CSV ingestion into DRS DB via a custom bulk insert API
    - Analysis pipeline CNIST accessed files by resolving DRS IDs with Passport tokens, demonstrating interoperability
- **Passport UI configured with open source identity provider (Or Hydra) to manage user visas and access tokens** (33:09)
    - Users request visas representing data access rights and use JWT tokens for authentication in data requests
    - Demonstrated correct handling of valid, invalid, and expired tokens for secure data access control
- **Project is a starter pilot limited to EMBL-EBI internal use, not yet deployed in production or accessible externally** (38:14)
    - Challenges included integrating Passport with identity providers and aligning standards across starter kits
    - DASH plans a more detailed presentation at the upcoming plenary to discuss roadblocks and solutions
- **Jeremy Adams introduced a complementary Reference Cloud project aiming to extend this work to a cloud environment** (40:56)
    - Will deploy on AWS with public sign-up to register for datasets and interact with Passport and DRS APIs
    - Plans to expand to additional GA4GH standards like Beacon for federated analysis and data discovery
    - Expected to provide a production-ready environment and keep starter kits updated automatically

Service Info and Metadata Enhancements

Efforts are underway to standardize and extend service info metadata to improve API capability discovery and interoperability.

- **Capability schema added to service info to describe compute requirements, supported data operations, and auth constraints** (47:37)
    - Divided into standard capabilities across GA4GH and custom extensions for specific API implementations
    - Hackathon work is refining naming patterns to be more generic and introducing strict namespacing
- **Goal to implement updated capability schema in Test WES and DRS APIs for examples before upcoming plenary** (49:20)
    - Plans include creating two to three validated, cross-API examples to illustrate the schema in practice
    - This will help users understand core service info and how to extend it for specific needs

- **Community collaboration and AI tools are being used to test and review these schema updates** (49:57)
    - Reviewers offered support to accelerate progress on the generic capability schema PR

Meeting and Event Logistics

Key deadlines and scheduling updates were communicated to ensure community participation and planning.

- **Registration for the upcoming plenary meeting closes on August 15, with session submission deadline on July 15** (51:28)
    - Members were urged by Regan to complete registration and session submissions promptly
    - Only one more meeting likely before the session deadline to finalize agenda items
- **Presentation on Passport visitors and delegation postponed due to absent speaker** (51:28)
    - This topic will be moved to a future meeting to ensure full participation
- **Communications and reminders will be sent to ensure deadlines are met** (51:28)
    - Organizers plan proactive outreach to maximize attendance and contribution at plenary

Action items
Angela Page

- Encourage the community to review and provide feedback on the updated Product Development Approval Process (PDAP) document before final approval (18:31)

Regan Thomas

- Share Angela's PDAP presentation slides in the slack channel and follow up with an email to the group (19:14)
- Send reminders to the group for plenary registration (deadline August 15) and session submissions (deadline July 15) (53:32)

Team members interested in Federated Analysis Workstream co-lead role

- Apply for the third co-lead role for the Federated Analysis Workstream via the shared link (21:10)

Brian and GIF project leads

- Continue outreach to driver projects to participate in GA4GH Interoperability Framework (GIF) proposals before the July 30th deadline (27:28)

DASH Tech team

- Present detailed EBI project and challenges during the upcoming plenary session (36:44)

Jeremy Adams and David (Venkat)

- Progress development of the Reference Cloud project and prepare roadmap presentations for technical alignment and plenary meetings (40:56)

Tech team / Jimmy

- Implement service info capabilities schema updates and create generic examples for DRS and TES APIs (47:37)

Jul 8, 2026 |

Focussed meeting - WES and DRS marker paper

Attendees: landfried.kraatz@bih-charite.de Michael Lukowski Tazro Ohta Venkat Malladi Schneider-Lunitz, Valentin

Notes

- WES paper
  - wes manuscript is going in the GA4GH review process
  - if any co-authors/contributors are missing please add
  - valentin and alex kanitz have iterated on the abstract and introduction
    - more focussed on workflows and on what WES brings to the table
  - valentin workin on result section - close to finishing
  - comments on WES manuscript soon
  - manuscript deadline mid of august
- DRS paper
  - DRS manuscript is just a draft, won't be finished until august
  - focus on WES manuscript for now
- Consoildated FAWS APIs paper
  - venkat is working on a consolidated paper about using the different cloud workstreams together
  - trying to finish until end of the year
- GIF projects
  - working on skills for TRS, currently testing workflowhub workflows and fix them

Action items

- [ ] valentin today informs GA4GH officials via Reggan about the draft (share final version later)

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Jun 17, 2026 |
Focussed meeting - WES and DRS marker paper

Attendees: landfried.kraatz@bih-charite.de Michael Lukowski Tazro Ohta Jimmy Payyappilly Brian D OConnor Reggan Thomas Venkat Malladi Brian O'Connor Patrick Magee Kyle Ellrott Schneider-Lunitz, Valentin
Attached files: Cloud_WS_manuscript_meeting_agenda (1).docx

Notes

- WES paper
  - Finished the interop study with Saporo and WesKit!!
  - Works!
  - Able to aggregate the results
  - Working on the text finalization … next week … sending to the co-authors
  - Valentin is taking a final pass now
- DRS paper
  - Not much progress given grants and a ARDM conference
  - Mid-august coordinated sub to scientific data 10th anniversary
  - → **coordinated submission … mid July for contacting the editor … TASC meeting**
- GIF projects
  - Brian's trying to push these, met with NIH and APPFL folks at ARDM

For ref, TES instances

Services
Manage and monitor registered services across all Environments
ID Name Artifact Organization Environment Version
TO2M7W https://funnel.cloud.e-infra.cz Czechia Funnel/OpenPBS online 1.1
XY96KZ https://poiesis.dyn.cloud.e-infra.cz/ Czechia Poiesis online 1.1
9YFP9U https://csc-tesk-noauth.rahtiapp.fi Finland TESK online 1.0
GQOZI4 https://fip-86-50-228-254.kaj.poutavm.fi/ Finland Funnel/Slurm online unknown
8EVX8B https://poiesis.rahtiapp.fi/ Finland Poiesis online 1.1
PDHXZ9 https://test-poiesis.rahtiapp.fi/ Finland Poiesis online 1.1
QVP95I https://spe4hd.tes.bihealth.org Germany Funnel/Slurm online 1.0
YDQYGB https://tesk-eu.hypatia-comp.athenarc.gr Greece TESK online 1.0
-
https://elixir-cloud-registry.bihealth.org/

https://galaxyproject.org/news/2026-06-09-llm-agents-reanalyze-rnaseq/ Agentic on Galaxy

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Need a lifescience login…

Action items

- [ ] DRS paper needs to be able to review for “scientific data” journal publication by July 15th…
- [ ] July 15th reach out to editor for special edition for co-submitting both papers
- [ ] Brian reaching out to folks now for GIF projects
- [ ] Valentin → send a brief email to the editor now to see if we’re a good fit

Jun 10, 2026 |

Focussed meeting - WES and DRS marker paper

Attendees: Valentin Schneider-Lunitz (DE), Landfried Kraatz, Jimmy Payyappilly Reggan Thomas, Tazro Ohta
Attached files: Cloud_WS_manuscript_meeting_agenda (1).docx
Notes

- The main WES manuscript section is ready for review.
- Figure 1 & 2 refactored
- Interoperability section updated
- Write to scientific data editor
- What are the plans for the DRS manuscript?
- Scientific data deadline 14.08

Next Steps for Coordination: Meeting scheduled for next week to track progress; focus on final manuscript review and submission readiness

Meeting recording:
https://us02web.zoom.us/rec/share/-4CrmReg-jWhM3df4eNuP5b_kDxbO91v1Foul1oOP4WPmxKI4o_qLQpN_Hco3I6S.UbDFTXaroEbYK9Yz
Passcode: ewAN7+NG

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Jun 8, 2026 | Cloud AMA with the GIF Team

Attendees: Brian D OConnor

Notes

- Slides: 20260608- GIF-AMA-Cloud
- Notes
    - Hackathon interest for Connect!
        - Let's do a double session for hackathon
        - DRS compliance test suite
        - TES (up to date) and WES (not sure) test suites too

Action items

- [ ]

Meeting recording:
https://us02web.zoom.us/rec/share/B-eFoLX6OvJgKnnlK9vkk1Z1Y8t8hoPey6Knyy2fe1bwwPzccYz0aza8Mu7jMm7E.leT1umFiJtEd9RSY
Passcode: Aj=B3?7y
Agenda - Q&A updated here

May 13, 2026 |
Focussed meeting - WES and DRS marker paper

Attendees: landfried.kraatz@bih-charite.de Michael Lukowski patrick@dnastack.com Tazro Ohta Jimmy Payyappilly Brian D OConnor Reggan Thomas Venkat Malladi Brian O'Connor Kyle Ellrott Schneider-Lunitz, Valentin
Attached files: Cloud_WS_manuscript_meeting_agenda (1).docx

Notes

- WES paper
    - Does TES/WES need scanning?
        - Or is this TRS
    - Github repo for federated workflow execution across Landfried and Tazro's system… they are working on the demo
    - Draft:
        - Revised figure 1
        - Folder: WES_manuscript
        - WES_Manuscript_20260318.docx

        - https://github.com/sapporo-wes/wes-interop-demo
- DRS paper
    - Not today… will do GIF first
    - Folder: Shared Folder - DRS Paper
    - Doc: 20230920 - DRS paper draft
- GIF projects drafts… goal is to identify Drivers/Implementers that want to participate
    - 20260420 - GIF Proposal - Federated Data Sharing Between NIH Systems
    - 20260420 - GIF Proposal - Agentic Researcher
    - 20260420 - GIF Proposal - Federated AI/ML Analysis
    - 20260505 - GIF Proposal - Federated AI/ML Analysis with APPFL framework (Ravi's team)
    - Kyle & Gen3 DRS LFS project
    - FYI, blog post GA4Gh Blog posts FedML-3.docx

Agentic GIF draft notes:
Possible driver projects/implementations: reach out to the following:

- Dockstore
- Weskit + Sapporo:
    - Sapporo
        - https://github.com/sapporo-wes/pa-cwl
        - https://github.com/sapporo-wes/yevis-cli
        - https://github.com/sapporo-wes/porkchop
        - Workflow verification system… he's used claude code to explore agentic work. Checking workflows for security
        - **Could this be a Scenario in this GIF project?**:
            - Working on a benchmark dataset
            - Showing agents checking workflow integrity / safety
    - Tazro, Landfried, and Valentin… they own one of the scenarios they work on via their hackathon
        - **Elixir Hackathon** being planned by Valentin (hasn't been accepted yet)… could that be part of this GIF project?
        - Agent within secure environment, create workflow, run it, scan output … can we lean into this as an example scenario? This would be great to see an agent creating code to run in the environment (help people convert bash scripts into cloud-ready workflows)
        - Can explore airgaps here… agents to scan outputs
        - **Could this be a Scenario in this GIF project?**:
            - Research question
            - Dockstore workflow examples
            - Agent creates workflow based on research needs
            - Execute on Weskit + Sapporo via WES
            - Generated workflow back to Dockstore

        - **Results back** as blog post or spotlight with comms
- Elixir AI platform
    - Agent teams… do we have contacts there?
    - Landfried brought up secure code environment and agents … has a co-lead for Elixir AI
    - → introduction
- Would BDC be interested in agents within secure environments?
- eLwazi → Brian will talk to them next week

Federated Learning draft notes:

Possible driver projects: reach out to the following:

- Sapporo/WES kit: Tazro, Valentin, and Landfried will look to see if they can participate
- Terra? Michael Baumann… Alisa Manning
- Velsera? Surya?
- DNAstack? Marc?
- eLwazi?
- Elixir?
- → can we do a **virtual hackathon**?
    - → can we leverage the japanese biohackathon Sept 13-19th?

Action items

- [ ]

2026-05-11: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: ,

	Actions Arising	Assigned To	Deadline
1			
2			
3			
4			

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5			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Reggan
2.	Previous Actions Review	Reggan
3.	TES Updates 1. Nextflow tes support 2. Testing and updating TES implementation	Venkat / Kyle
4.	***Federated Learning & Policy*:** ● We have the hackathon and we are going through those PRS ● need to reach out to New AI leads to setup Policy discussion	Venkat
5.	GIF applications reminder 20260420 - GIF Proposal - Researcher Agents ● **Due June 15th** ● Application form: https://docs.google.com/forms/d/e/1FAIpQLSdHlf8sQ4RTTWQTIDjC-EqXbuVKiGP1QIhI5y5dGwYPPxRCIw/viewform ● Some drafts to consider joining ○ Agentic: ■ Interested in Dockstore and WES/TES nodes joining! ○ Federated Learning: 20260420 - GIF Proposal - Federated AI/ML Analysis ■ Interested in Driver Projects joining!!	Venkat
6.	Reminder of AMA on June 8th (during cloud call) ● Can we have champions join please? ● Venkat and Brian will make brief intro slides	Reggan
7.	A.O.B GA4GH 14th Plenary - GA4GH 14th Plenary will take place from **28 September to 2 October 2026 in Singapore** at the One Farrer Hotel. Details here: https://broadinstitute.swoogo.com/ga4gh-14th-plenary/11059298 Early bird registration closes on May 14, 2026	Reggan
8.	Next meeting on May 25, 2026 - Cancelled due to Memorial day	Reggan

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Meeting recording:
https://us02web.zoom.us/rec/share/AHdSW9P_WZkj6lrvr3t-B7AEwdVLFPN8yaSmDQSVnO99xCskiKqEmk7h0lNfmVa2.5f-W2HU897G71my1
Passcode: 7Mj@S6da

Meeting minutes:

2026-04-27: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: ,Mike Conway (NIH/NIEHS) , , , , , , , Landfried Kraatz (BIH Charité), , , Michael Lukowski (U Chicago),Reggan Thomas (GA4GH) ,Denis Yuen (OICR - Dockstore) , Michael Baumann (Broad), Heather Creasy (NCI), Tom Conner, Micheal Baumann,Mike Conway ,Ali Demir ,Jose Maria Fernandez

	Actions Arising	Assigned To	Deadline
1			
2			
3			
4			
5			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.	Sub-group Update (TES/WES/TRS/DRS) 1) TRS a) See slides 2) WES a) WESkit and Sapporo implementation harmonization i) Next WES, review the ambiguous sections of spec ii) Working on download of results through WESkit	Denis / 10 min Valentin /10 mins Brian / 5 min

	b) PR based on eLwazi PR, Brian to look at Valentine's new PR c) Meet later this week d) Publication on track, incorporate learnings from federated hackathon 3) DRS (20230920 - DRS paper draft)	
5.	Connect Recap **Register-a-thon** Date & Time Friday, 17 April 2026, 09:00 - 10:30 ET April Connect Agenda Register-a-thon.docx GA4GH Connect slide Register-a-thon.pptx https://www.ga4gh.org/services-map/ **Integrating GA4GH APIs** Date & Time Friday, 17 April 2026, 11:00 - 12:30 ET April Connect Agenda - Integrating GA4GH APIs.docx GA4GH Connect slide - Integrating GA4GH APIs.pptx ***Other Sessions…*** ● ***GIF*** ○ **Agenda:** Agenda ○ **Slides:** GIF Connect slides April 2026.pptx ● ***Federated Learning Working Group*** ○ **Agenda:** **April Connect Agenda - Next Steps for Federated Lear.**	Brian / Venkat 15 min
6.	What does our debrief from Connect mean for: ● Cloud WS Initiatives Leading up to Plenary ? ○ Landfried and Denis, working on a workflow report back metric capability? ● Future GIF projects?	Brian / Venkat 15 min

	○ 20260420 - GIF Proposal - Federated AI/ML Analysis ○ 20260420 - GIF Proposal - Agentic Researcher ○ 20260427 - GIF Proposal - TES/DRS/WES interactions ○ Others? ■ TRS GIF? ■ Dates!! Recap from the Dating Game session, there's a lot of GIF proposal ideas here!	

Meeting recording:
https://us02web.zoom.us/rec/share/Z0eQzGdfjK5uvXOgB1Ds3QXNRRLwZVWjj30-GmSjBx-JYnsWYI-fX6dR2R5hNthJ.kspeorLTM2Uqs-9h
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Meeting minutes:

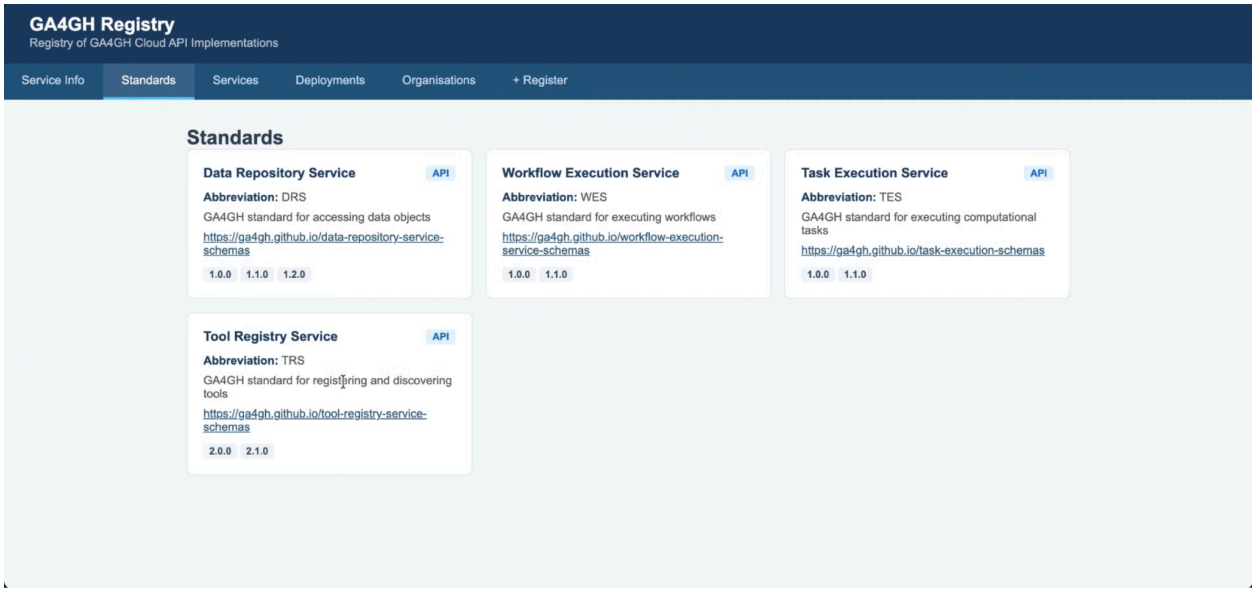
Action Items
- Brian → review Valentine's PR for WES
- Reggan → schedule another WES/DRS paper session week of the 4th
- Next time → We'll focus on GIF proposals (see above to collect your thoughts)

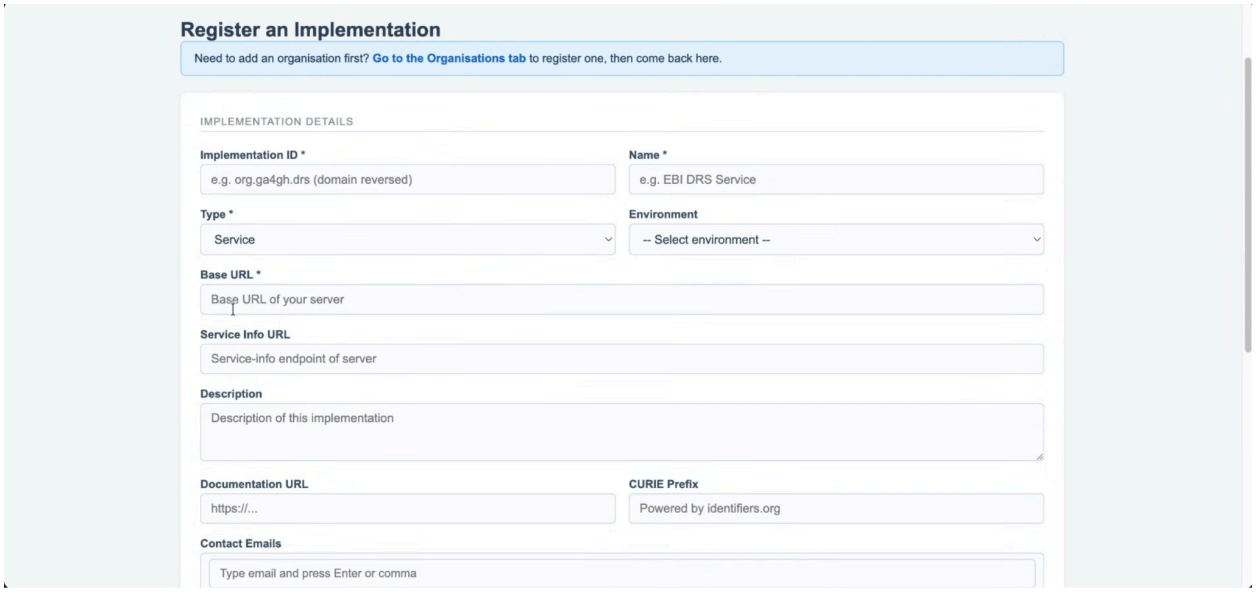
Apr 9, 2026 | Touch base on GA4GH registry

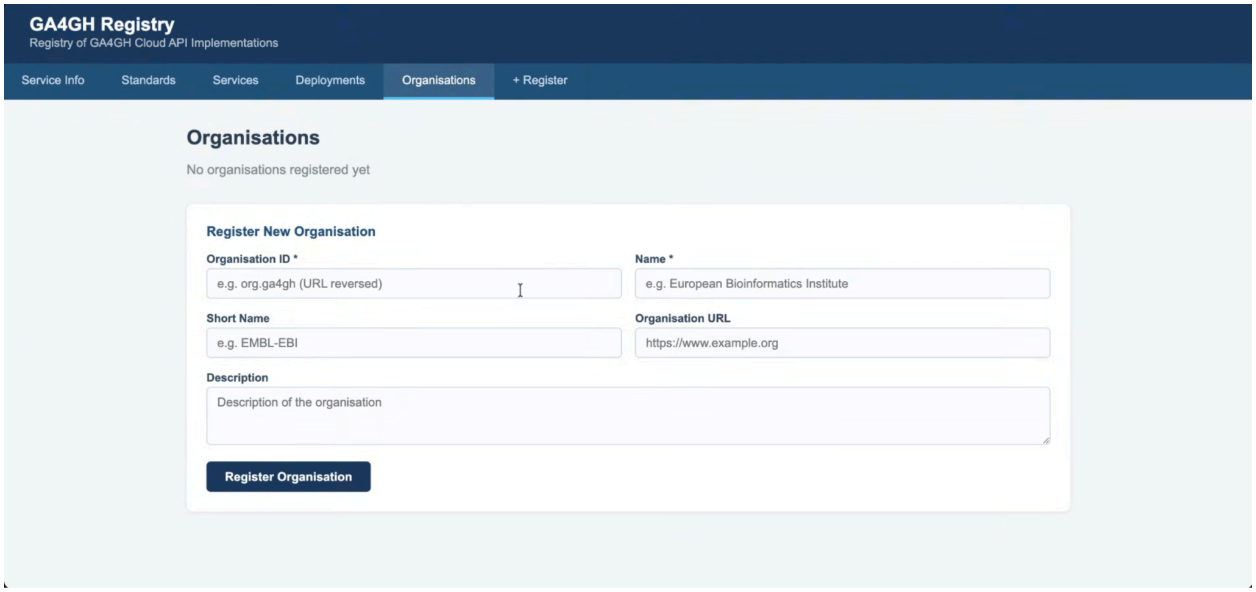
Attendees: Jon Turner, Jimmy Payyappilly, Brian D OConnor, Venkat Malladi, Sasha Siegel

Notes
- Brian's notes
  - Current Spotlight text: 20251210 - GIF Spotlight - DRS Map
    - https://github.com/NimbusInformatics/ga4gh-registry-tools repo from previous work is the spotlight outcome right now, can we replace it with the map+registry?
  - Where do we stand with the tooling for the Register-a-thon? Can we test today?
  - Walkthrough
    - By end of day, ingesting current data
    - Need to have an organization to register things
    - This is a separate instance, not production instance
    - Can I pull the JSON?
    - Map? Yes, will be on a hidden URL on the website
  - Next step

- Jimmy will give Jon endpoints by end of day
- Tomorrow Jon will connect the hidden map to it
- Venkat and Brian can then test
- Jimmy will do cleanup before the register-a-thon session







Action items

- [ ]

2026-04-01: Focussed meeting - WES and DRS marker paper

Attendees “Name (Affiliation)”: , , ,

	WES_Manuscript_20260318.docx https://github.com/sapporo-wes/wes-interop-demo	
3.	Registry work, heads up on Register-a-thon at Connect and the toolchain we can use in the papers (generating maps if desired) ● Yes for DRS ● Probably not for WES	Brian - 5 min
4.	API integration session - Kyle's ideas on DRS from last time, do we want to add this to the integrating APIs session at Connect? ● PASSPORTS… how does this work in federated compute ● Yes, let's do a DRS session here (30min) ○ And focus on writeback ○ We could also use for models/embeddings/etc ○ Problem of DRS only returning URLs, is this limiting? ○ Can we generalize DRS to a Passport + ID → things (bytes, URLs, task-specific tokens?) ○ Start fleshing this out in the Discussion session of the DRS paper… see if the room in Connect is interested in a more abstract DRS ● WES… DRS + TRS and WES relates to the global view, federated computation, how WES should be deployed, what kind of gateway	
5.	Next meeting April 8th	
	-	

Notes

- How far do we go on the methods section?
  - Let's use the TES paper
    - https://ieeexplore.ieee.org/abstract/document/10564576
  - Let's just describe in a paragraph the community process and do that in the DRS paper as well
  - Community standards and link to the cloud work stream…
  - Need to get a DOI
- WES paper
  - Adding an interop section
- DRS
  - Block today
  - Reaching out to implementers once I have discussion section done
  - Use John's map after Register-a-thon as figure in the paper
- Tools
  - Check out https://paperreview.ai/
  - LLM/chat bots brainstorming and outlines

- Do we cite? Acknowledge?... Human in the loop

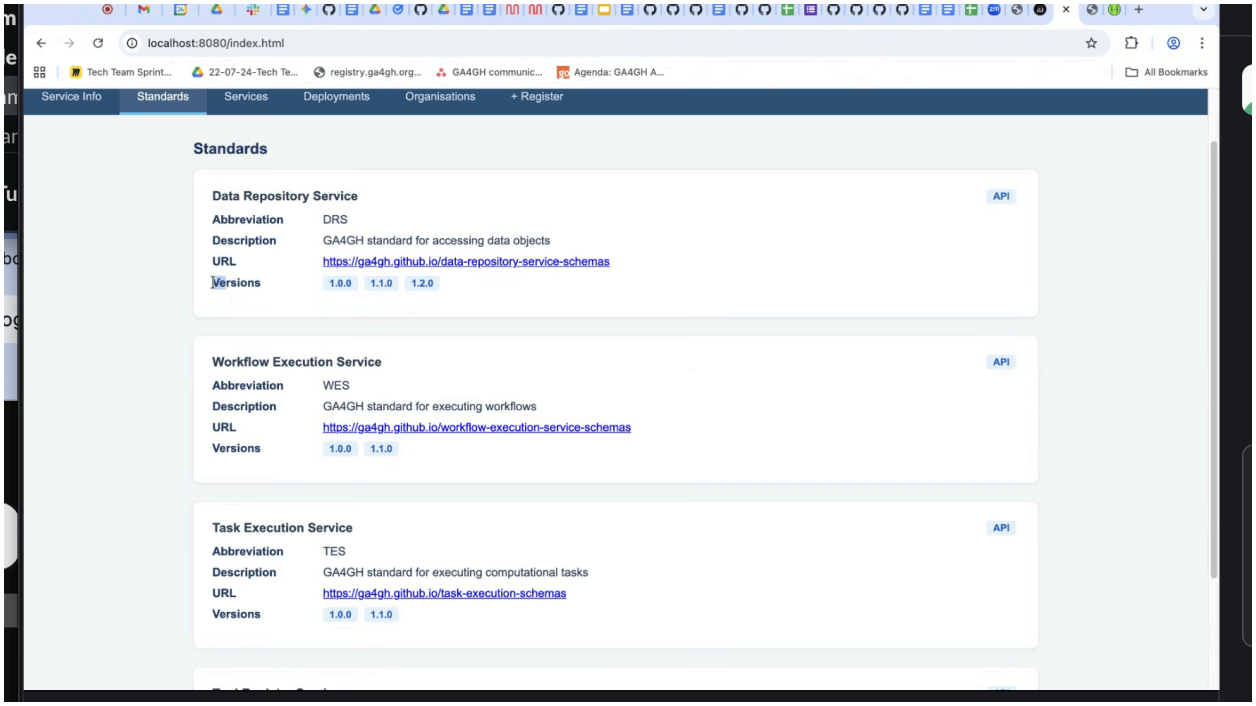
Mar 26, 2026 | Touch base on GA4GH registry

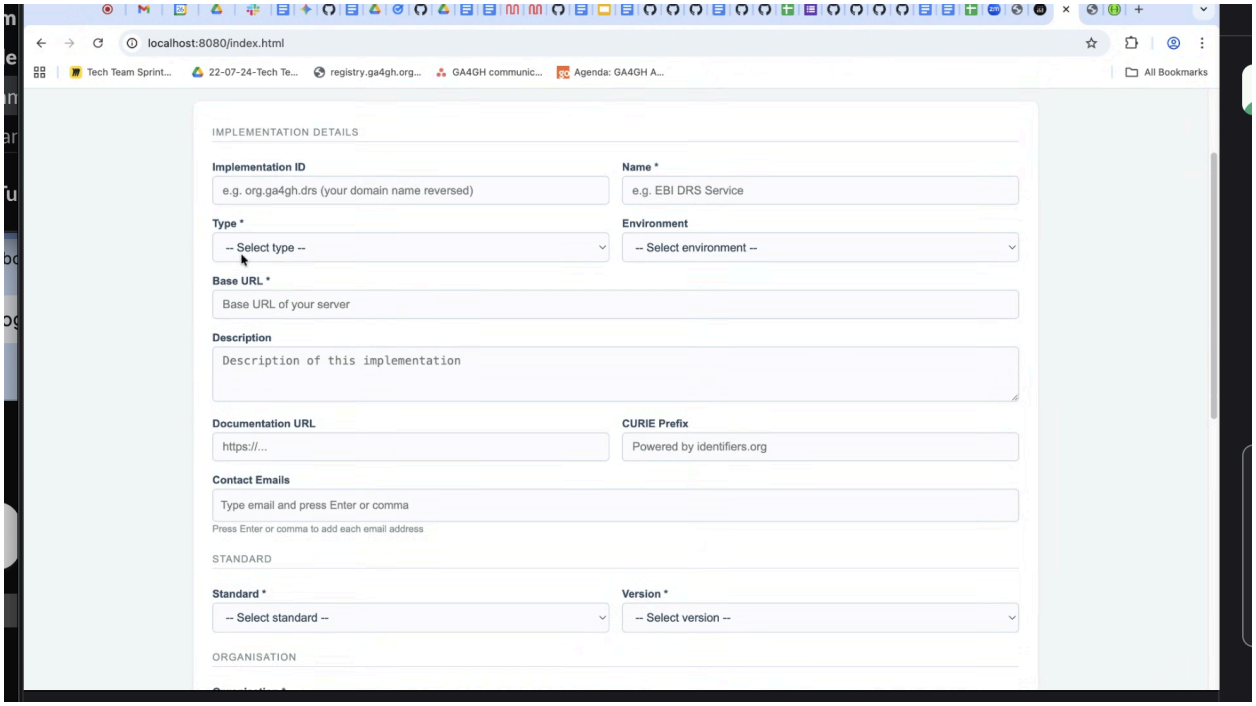
Attendees: Jon Turner, Jimmy Payyappilly, Brian D OConnor, Venkat Malladi

Notes

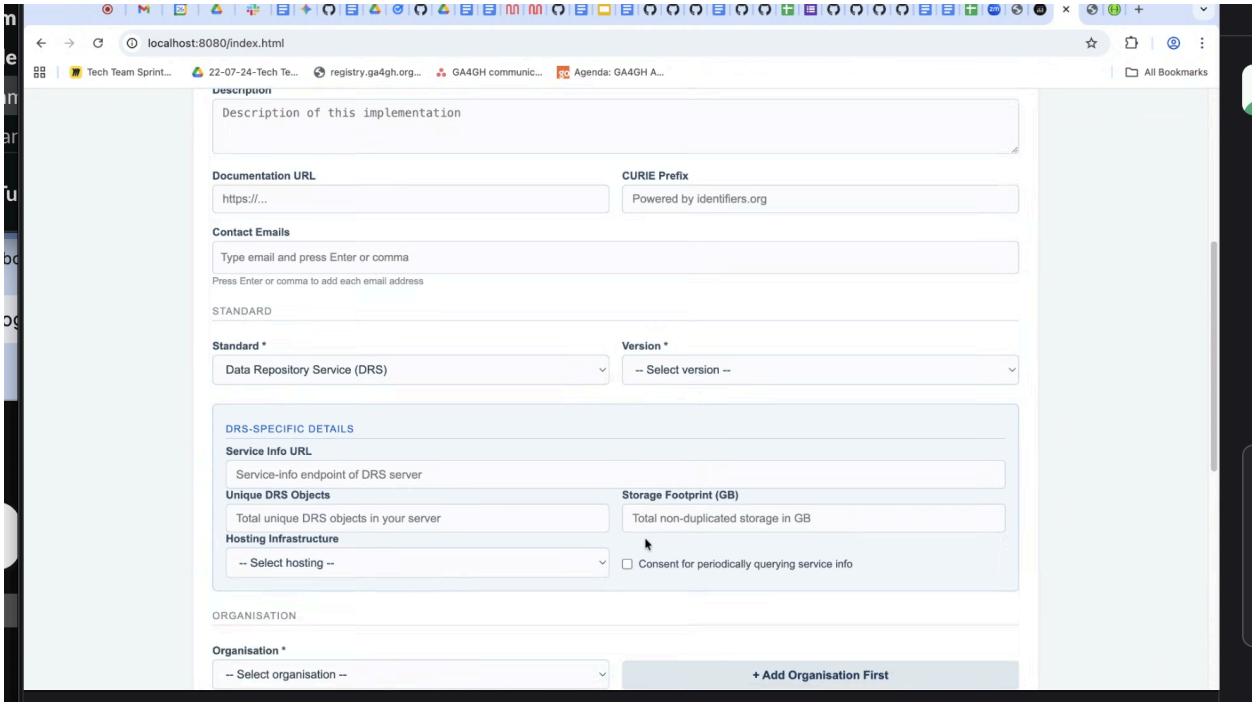
- Brian's notes
  - **Register-a-thon**
    - Agenda: April Connect Agenda Register-a-thon.docx
    - Slides: GA4GH Connect slide Register-a-thon.pptx
  - Toolchain
    - Form for collecting
      - See below
      - AI → we need TRS, TES, and WES specific fields
        - WES/TES
          - WES
            - Number of workflows for WES
            - Workflow engines (e.g. NextFlow, Cromwell, Snakemake, etc)
          - Number of tasks for TES
          - Compute availability
        - TRS
          - Number of workflows
          - Number of tools
          - Number of notebooks
    - Staging registry
      - Jimmy has a DB
      - Pre-populate with current registrations
      - Enable PUT to update
    - Map
      - He showed this, looks great!
      - Will ultimately live on the dashboard
      - Also be on GA4GH.org as well

Current registry:

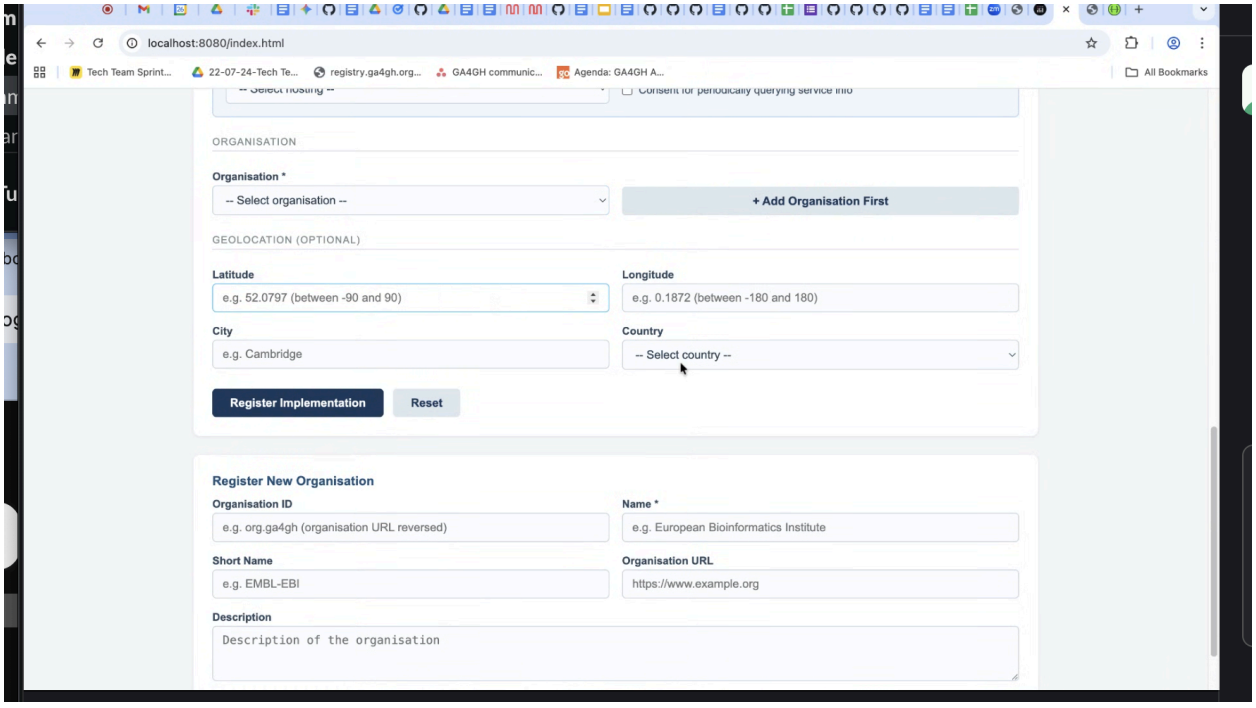




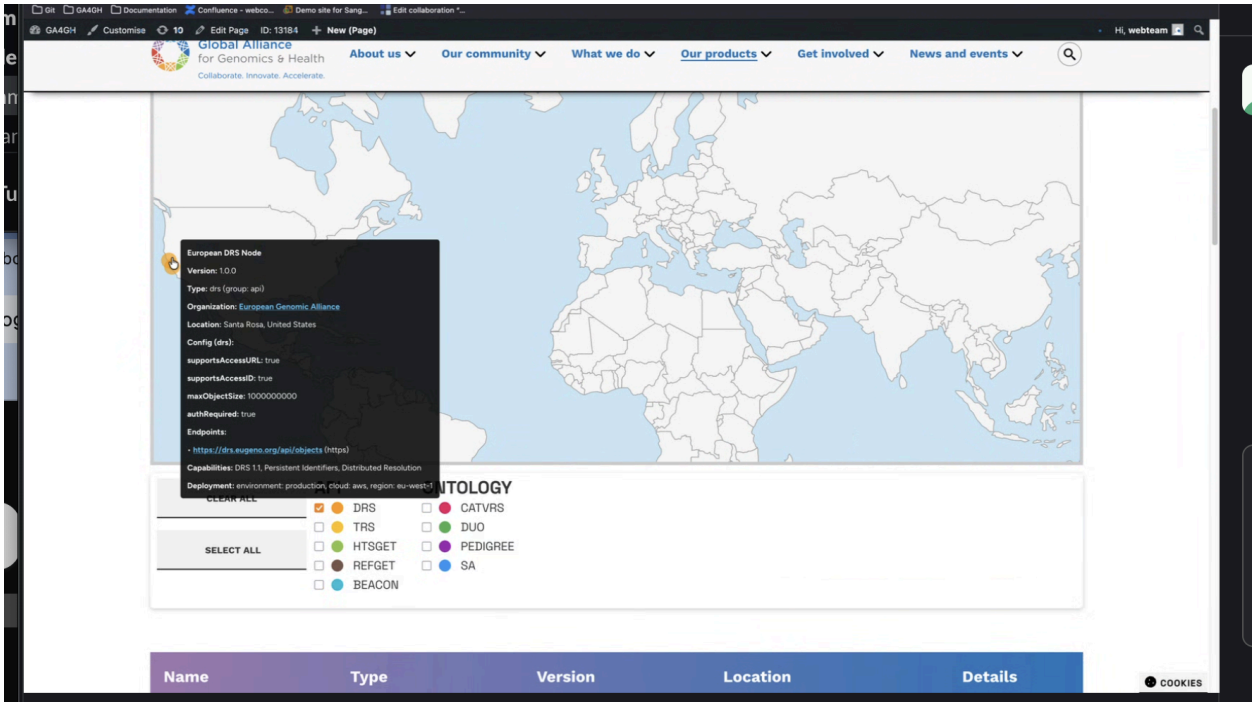
DRS specific



Location… will switch to ISO code



Map



Action items

- [ ] Venkat/Brian → we need TRS, TES, and WES specific fields
- [ ] Jimmy → give Venkat and Brian the form once it's on a public URL, we can clean out the registrations ("Test GA4GH Org" for test entry)
- [ ] Meet again on 4/9 to do a final test and runthrough the toolchain

2026-03-23: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees "Name (Affiliation)": , Landfried Kraatz (Charité Berlin), , , Michael Lukowski (U Chicago), , , , , Tom Conner (Broad), Pavel Nikonorov (IIAP), , , Mike Conway (NIEHS/NIH), Venkat Malladi,Jinny Park , Reggan Thomas, , , , , , , , , , , , , , , , , , , ,

			Connect hackathon
2	Need to get feedback on PFB product approval doc, see section 14.8.4		
3	Post-connect, GIF AMA and reach out to drivers to help with WS engagement	Group	After Connect
4	What do we want to propose for a future Cloud GIF project as an outcome of the Integrating APIs session at Connect???	Group	During Integrating APIs session at Connect, After Connect
5	Feedback on Pavel's Trust RFC: GA4GH RFC on Trust in Federated Environments – draft.d… Please leave comments Add this to the next WS agenda	Group	Please give feedback before next WS call, add to the agenda

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Mesh cards / PFB ● Status and documents being created ● Goal of moving these through product approval process ● PFB Study Group Doc 20251201 - PFB Study Group & Development Process ● *Reggan → what's the latest word on the updated product approval process forms/docs/process?* ○ *The current status, GA4GH is doing internal review on the new product approval process… next week* ○ *Will release for public comments… ~2 weeks* ■ *Michael and Brian can discuss with GA4GH folks at Connect* ○ *Plan is to release 2.0 version by May/June* ● Slides: PFB and Mesh Card Discussion ○ PFB: Has a "study group" doc in product approval process (see link above) ○ 14.8.4 → documented feedback from adopters	Michael Lukowski / 30 min

	○ PFB ■ Goal Plenary ■ Need for best practice around schema and version naming within PFB… need for BDC as a driver project ● Look at metadata section and give best practice here in the PFB spec ■ Security information would be helpful (BDC Driver) ● Visas needed for which columns/tables for example ○ MeshCard ■ Will have an implementation by connect ■ Discuss during integrating APIs session at Connect?	
4.	Sub-group Update (TES/WES/TRS/DRS) ● *Any updates from sub-groups?* ● DRS ○ Doc build problems, still working on this (helps with the DRS writeback feature) ○ DRS paper in progress, see below ○ Does Brian Walsh want to discuss his proposal? https://github.com/ga4gh/data-repository-service-schemas/issues/421 ○ DRS 1.6 by plenary ● WES ○ WES paper in progress, see below ○ Landfried gave an update ■ Proof of concept for WES implementations ■ Tazro has created a Github repo… showing request going to Japan and Germany WES endpoints ■ Text for the WES paper, working on use cases now and in the future… different models to discuss there… federated use cases as well. ■ Could this be part of a future GIF project!?!?!?! Let's discuss this as a group in Connect Integrating APIs session ● Landfried interested in this ● Venkat multiple WES, can we link to TRS repos for testing? ● TES ○ Venkat… doc build stuff, look at WES as example repo ■ Cleanup merge requests for 1.2… hopefully this year… beta by Plenary? TBD ■ Some new TES implementations needing validation ■ Registering TES ● TRS	Brian / sub-group champions / 10 min

	○ *… any updates? …*	
5.	Connect prep **Register-a-thon** Date & Time Friday, 17 April 2026, 09:00 - 10:30 ET W April Connect Agenda Register-a-thon.docx P GA4GH Connect slide Register-a-thon.pptx → *Action Items* ● Jimmy/Jon: working on the toolchain for this event ○ Just put in the DRS information in the Registry! (from last connect) ● Brian/Venkat: testing in upcoming meeting ● Reggan → need to get help promoting this to driver projects and implementers **Integrating GA4GH APIs** Date & Time Friday, 17 April 2026, 11:00 - 12:30 ET W April Connect Agenda - Integrating GA4GH APIs.docx P GA4GH Connect slide - Integrating GA4GH APIs.pptx → Action Items ● Can we get confirmation from the WES champions? ● Could we evolve into a GIF project? ●	Brian / 10 min
6.	RFC ● See his document: W GA4GH RFC on Trust in Federated Environments – draft.docx	Pavel / 10 mins
	A.O.B ● Venkat has an image that uses MCP to talk to the GA4GH registry ● → can we do a GIF spotlight on this? ● → https://github.com/vsmalladi/ga4gh-mcp	

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Meeting recording:
https://us02web.zoom.us/rec/share/kDPZvq0jww5oPTfS2eiVEWxI1JykpqESFGI5xfhxH1CaSihmdNAv6HYrLaldHNE.MD9PvvKmqR0LnmPs
Passcode: Af.v#1@!

Meeting minutes:

Mar 11, 2026 |
Focussed meeting - WES and DRS marker paper

Attendees: landfried.kraatz@bih-charite.de Michael Lukowski Jimmy Payyappilly Brian D OConnor Reggan Thomas Brian O'Connor Kyle Ellrott Schneider-Lunitz, Valentin

Apologies: Venkat Malladi Patrick Magee
Attached files: Cloud_WS_manuscript_meeting_agenda (1).docx

Hi all, As discussed in the last WES/DRS paper meeting, I've created a shared folder and added the following documents to it. The list is also available at the beginning of the Cloud agenda document. Please feel free to let me know if there are any other documents that should be added. Thanks!

1. WES_Manuscript_20260304-2.docx
2. 20230920 - DRS paper draft.docx
3. GA4Gh Blog posts FedML-3.docx
4. https://ieeexplore.ieee.org/document/10564576

Notes

- WES
    - Brief walkthrough by WES leads (Valentin/Landfried/Tazro):
    - WES_Manuscript_20260304.docx
    - Has integrated points from last time
    - We'll focus on DRS today
- DRS
    - Folder: Shared Folder - DRS Paper

- **Doc: 20230920 - DRS paper draft**
- Registry of DRS servers
  - Git for visualizing the worlds DRS servers: https://github.com/NimbusInformatics/ga4gh-registry-tools
  - Form: https://docs.google.com/forms/d/e/1FAIpQLSeEI6QOtNQoyha0ZcLQYaTVsA3IkWZLOzz9g1L7ZQjke2MIBA/viewform?usp=dialog
  - Form Responses: DRS Server Registration (Responses)
- Brief walkthrough by DRS leads(Brian):
  - Kyle… Gen3 is more of a publish, read only
    - Now DRS 1.6 is potentially user driven
    - A researcher driven flow not just publisher
    - So very different
    - And it's very related to federated AI/analysis examples
    - A shift from a platform developer-focused to researchers being able to integrate it into their day-to-day
  - Brian
    - Could be great topics for integrating APIs session at COnnect
    - Maybe these new flows are a part of the Cloud WS paper below?
    - Who are we building the APIs for?
  - → let's talk more about this in the next cloud call
  - For the DRS paper… what systems / datasets and how can I access?
  - Kyle - look at Data Lakes and use… cite that… DRS provides a federated level of this.

- General Cloud
  - 20260304 - Cloud WS Paper
  - Valentin - Focus on background and what's been done so far.
  - Kyle - history… what was our view 10 years ago?
    - Cloud mobility was an issue
    - Cost was a big concern FUD
    - Geolocation was a big issue
    - History of TES… copy of Google… then google copied us… stability
    - Vender agnostic
    - What's relevant today
  - Valentin
    - We could do this as an interview format
    - Why did you do this?
    - Outcome?

- What does the ecosystem look like today
- What are problems still to be solved?
- Future?
- How does the cloud WS change?

Action items

- [ ] API integration session → let's talk more about this in the next cloud call
- [ ] Reggan collect the various papers and put links in a google drive add to the top of this doc as well
  - [ ] DRS
  - [ ] WES
  - [ ] Cloud WS Blog Post
  - [ ] AI/ML federated paper
  - [ ] TRS/TES (already published)
- [ ] Brian → flesh out the DRS paper and Cloud WS blog post by the next meeting (3 weeks)
- [ ] Reggan → will setup a meeting for 4/2 to check in before connect

Meeting recording:
https://us02web.zoom.us/rec/share/PpUIykW3WPqOmbChNXj0mw499JO9L6trmi2OVK6JvILh1aER_cU98OddyhtGdklm.YvA10xW3AZPVR77i
Passcode: DMRN^94a

2026-03-09: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees "Name (Affiliation)": , Graham Ritchie (GEL), Valentin Schneider-Lunitz (BIH/GER), , , , Pavel Nikonorov (IIAP NAS RA), , Takudzwa Musarurwa (eLwazi ODSP-UCT),Tom Conner , ,Kyle Ellrott , Denis Yuen, ,Andrew Gearhart ,Surya Saha , , ,

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1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review - Ga4gh registry work has AIs, see below	Reggan
3.	WES Publication https://doi.org/10.1093/bioinformatics/btag091	Valentin / Taz/ Landfried
4.	Add metadata (number of jobs) to TRS, TES & WES via service-info (https://github.com/ga4gh-discovery/ga4gh-service-info/pull/76)	Venkat
5.	Provenance and how to share via our APIs. How data connects to operations. Longer term, how to search this	Kyle
6.	A.O.B	

Meeting recording:
https://us02web.zoom.us/rec/share/8CvfIy0MOjkdjIe66j6gWyprDVHYsnWEPg6-HK-jCz5-25x7c63AzuXm7Kw3gls_.cWYyhBeKnAHlGugt
Passcode: 3c%&*0sv

Meeting minutes:

Service Info

- From Pavel:

@Venkat Malladi Relevant GSoC project around ServiceInfo
https://docs.google.com/document/d/1SeDP5Ny7Gt42g5oY9jdN15Wx6RXtJ9dDcaPeYBvKBcE/
Project description improvements and new mentors are highly welcome!
status: approved, engaging with potential contributors.
https://developers.google.com/open-source/gsoc/timeline

- Include in register-a-thon session at Connect

Provenance

- Based on AI/ML working group
- How does FHIR/Data Connect etc connect to DRS?
- Do we want bi-directional
- What level of detail for provenance?
- What can people depend on for previously analyzed data?

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Mar 5, 2026 | Touch base on GA4GH registry

Attendees: Jimmy Payyappilly, Brian D OConnor, Venkat Malladi, Jon Turner

Notes

- Today we're going to talk about the toolchain for the Register-a-thon
- Strawperson
    - submission web form
    - → registry JSON script
    - → registry (staging?)
    - → script from JSON to map (if needed)
    - Website with the map
- Notes
    - Jon could use https://www.humancellatlas.org/learn-more/global-community/ codebase
        - Also will make a table
        - Filter for API type
        - Goal few weeks working prototype
    - Jimmy
        - Came up with a form
        - Stores info in registry UI DB (staging area)
        - Validation
        - Then move into main registry

Action items

- [ ] Jon → few weeks, have a working prototype
- [ ] Venkat/Brian → take a look at Jimmy's form
- [ ] Goal → by 3/26 have the toolchain fully working: form → map so we can test for the register-a-thon

Mar 4, 2026 |
Focussed meeting - WES and DRS marker paper

Attendees: Patrick Magee, Michael Lukowski, Tazro Ohta, Brian D OConnor, Reggan Thomas, Venkat Malladi, Brian O'Connor, Jimmy Payyappilly, Kyle Ellrott, landfried.kraatz@bih-charite.de, Schneider-Lunitz, Valentin

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Attached files: Cloud_WS_manuscript_meeting_agenda (1).docx

Agenda:

Agenda (60 minutes total)

Possible places to publish (by priority):

1. Nature Scientific Data https://www.nature.com/collections/eedeeaaihi ?
    a. Reach out to editor
    b. They put out the workflow hub paper: https://www.nature.com/articles/s41597-025-04786-3 which uses GA4GH standards
2. BMC Bioinformatics Database issue
3. F1000???

1. WES Manuscript Discussion (25 minutes)

1.1 Overview of WES Draft (5 minutes)

- Brief walkthrough by WES leads (Valentin/Landfried/Tazro):
- WES_Manuscript_20260304.docx

1.2 Open Discussion & Feedback (15 minutes)

- Scientific/technical clarity
- Use-cases, figures, references

1.3 Action Items (5 minutes)

- Timeline for next draft & meeting

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2. DRS Manuscript Discussion (25 minutes)

2.1 Overview of DRS Draft (5 minutes)

- Folder: Shared Folder - DRS Paper

- Doc: 20230920 - DRS paper draft
- Registry of DRS servers
    - Git for visualizing the worlds DRS servers: https://github.com/NimbusInformatics/ga4gh-registry-tools
    - Form: https://docs.google.com/forms/d/e/1FAIpQLSeEI6QOtNQoyha0ZcLQYaTVsA3IkWZLOzz9g1L7ZQjke2MIBA/viewform?usp=dialog
    - Form Responses: DRS Server Registration (Responses)
- Brief walkthrough by DRS leads(Brian):

2.2 Open Discussion & Feedback (15 minutes)

- Scientific/technical clarity
- Use-cases, figures, references

2.3 Action Items (5 minutes)

- Timeline for next draft & meeting

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3. Possible Cloud WS paper

- We may want to put together an opinion piece that pulls together our WS mission and the 4 APIs we created
- See
    - 20260304 - Cloud WS Paper for collecting ideas/materials

4. Next Steps (5-10 minutes)

- Decide on cadence for future manuscript-focused meetings
    - → meet next week and then monthly
- Confirm next meeting date and focus
    - → DRS paper and also discuss general Cloud WS paper

Notes

- Brian's
  - Journal choice
    - We prioritized… Nature Scientific Data… August 2026 special issue
    - Archive publications by September Plenary
    - Want to have a draft of DRS by April Connect
  - WES
    - Valentin walked through the current state of the WES paper
    - Next steps
      - Do we use a similar PR approach in DRS?
      - Focus on researcher?
  - DRS
    - …
    - Next steps
      - …
  - Do we want…
    - A cloud work stream paper/blog to link TRS, TES, WES, and DRS?
      - How do you develop standards together?
      - Could be a really good thing to do in 2026
  - General comments
    - Call for authors … idea of having a google form for registration
  - Next time
    - We meet in a week
    - We focus on DRS paper
    - We create a general cloud WS paper that we can start dumping content into

Action items

- [x] ~~Brian → cloud WS paper outline to dump content into (if we decide to go for this)~~
  - ~~20260304 - Cloud WS Paper~~
- [ ] Reggan → create publication channel in Slack
- [ ] Reggan → setup followup meeting in 1 week

2026-02-23: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees "Name (Affiliation)": ,Andrew Gearhart (Nimbus Informatics) ,Valentin Schneider-Lunitz (BIH/GER) , Heather Creasy (NCI),Surya Saha (Velsera/Seven Bridges) ,Noble D ,Tom Conner ,Reggan Thomas , , ,

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	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Trust relationship framework with TES/WES and Passports 2.0	Tom/ Venkat
4.		
5.	A.O.B Complete the agenda by Mar 20, 2026 List of approved sessions for connect: **e) Register-a-thon** **Date : 17th April at 9:00 - 10:30 AM ET** **Agenda : W April Connect Agenda Register-a-thon.docx** **Slide deck : P GA4GH Connect slide Register-a-thon.pptx** **f) Integrating GA4GH APIs** **Date: 17th April at 11:00 AM - 12:30 PM ET** **Agenda : W April Connect Agenda - Integrating GA4GH APIs.docx** **Slide deck : P GA4GH Connect slide - Integrating GA4GH APIs.pptx** **g) Next Steps for Federated Learning and GA4GH: Discussion and Hackathon (3 hrs session)** **Date : 15th April at 9:00 AM to 12:30 PM ET** **Agenda:** **W April Connect Agenda - Next Steps for Federated Learning and GA4G.** **Slide deck** : **P GA4GH Connect slide - Next Steps for Federated Learning and GA4G..** h) Implementation Forum: Towards Federated Trust **Date :** 15th April at 14:00 - 15:30 ET	

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	Agenda: Connect Agenda - Implementation Forum: Towards Federated Trust.… **Slide deck:** GA4GH Connect Federated Trust.pptx	

Meeting recording:
https://us02web.zoom.us/rec/share/XkjmijQDUnd9LMMtn44G1zP_dy561ps0G3tEgYX-r_tGzn8p1d3H7MXQuTlC5cDU.TFjMC4sx4557hQEQ
Passcode: irdMAy1!

Meeting minutes:

Trust framework

- Venkat - how do you build the network of trust?
- So from a cloud perspective…
    - Registry for storing information about trust
    - Mesh cards to describe the trust mechanism
    - The actual mechanism to secure pairwise… might be multiple
- Valentin/ Andrew - how does Elixir handle this?
- Venkat - one of the driver projects… can we leverage one of them
    - Constraints / capabilities in /service-info
    - Therefore the registry can contain that
    - Trust and there will be multiple ways to then establish this like mTLS
- Valentin
    - Jonathan Tedds is the ELIXIR Europe Programme Manager for Scientific Computing
    - else
    - Ivar Janmaat: Netherlands
    - Sven Twardziok: Germany
    - Alexander Kanitz has a broad overview anywhere
- Venkat
    - Do we have a driver project?
- Heather Creasy (NCI)
    - NIH wide GA4GH working group
    - DRS best practices document for NIH… this working group will be working on that
    - Passport spec… maybe need accommodate best practices here
    - Driver project & best practices approach

- Surya
    - What are we talking about trust here?
    - Trust based on ISAs currently
    - Tom wanted to touch on this with data passports
    - authentication/authorization… made a lot of progress
    - But executing tasks across compute nodes … who's paying for this?
- Andrew
    - Billing information is one of the hot button challenge issues for federated learning
- Brian/Venkat
    - How do we eat the elephant?
    - Maybe we can try /service-info capabilities section and that's what we focus on?
        - And we focus on additional info for DRS/TES/WES?
        - region/cloud
        - Passport broker
        - Trust mechanism
        - Compute
    - Longer term… mesh cards to start linking things together… describing trusted networks as a whole
- Andrew
    - Are we reinventing the finger protocol?
    - Should we have a conversation with REWS on their interest in trust
- Venkat
    - Could we deploy (along with the registry) instances of test DRS/TES/WES instances?
    - Notebook showing capabilities to go with them
    - Will help people get started
- Tom
    - Avoid pairwise connections… that's his key goal
    - DRS 1.5 will help
    - Data Passports… the idea about being more transparent of the policy of the data you're trying to access would be useful
    - Passport Access Token use
- Valentin
    - Elixir Cloud… use GA4GH APIs to deploy research environment
    - A good example that we can learn from
    - https://elixir-cloud-aai.github.io/services/
- Heather
    - NIF and conversation with Heather, Angela, Peter
    - Something for Connect as well!!!

Action Items

- [ ] Venkat → move PR into service-info repo… to start capabilities… add this to a future cloud call

    - [ ] See Elixir cloud https://elixir-cloud-aai.github.io/services/
- [ ] Brian → Connect using APIs together session
    - [ ] invite REWS to the connecting APIs session
    - [ ] Elixir cloud
- [ ] Venkat → can the tech team keep sample DRS/WES/TES servers running for people to test?
- [ ] Venkat/Brian → new time for this call???

Feb 12, 2026 | Touch base on GA4GH registry

Attendees: Jimmy Payyappilly Brian D OConnor Venkat Malladi

Notes

- Jimmy
    - Added TRS, 2 of them
    - History, we should keep them but don't need to display right now in public registry
    - They finished their GitHub actions
    - They are working on Docker image building
    - Working on Google Form to registry
    - Venkat and I should capture info in Google form for now… plan to port to GA4GH URL in the future
    - Goal is to have the Google-form version running for connect and Venkat/Brian can then plot from it… showing DRS, TES, TRS
    - In the future, add validation step to avoid spam registrations (or mistakes)

Action items

- [ ] Venkat/Brian → review the Google form from Jimmy when available
- [ ] Jimmy → will send an update tomorrow over email
- [ ] Jimmy → going to talk to Jon next week to see if we can get the map code on the ga4gh website by connect too…
- [ ] Meet again March 5th to review toolchain (google form → registry → map) we will use in the register-a-thon

2026-02-09: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi

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Attendees “Name (Affiliation)”: ,Valentin Schneider-Lunitz(DE/BIH) , Michael Lukowski (U Chicago), Andrew Gearhart (Nimbus Informatics),Denis Yuen (OICR-Dockstore) , Brian Walsh, Gerald Mboowa, Kyle Ellrott, Landfried Kraatz, Noble Dzakpasu, Surya Saha, Tom Conner, Vic Sliwa, Reggan Thomas, Jinny Park , , ,

	https://github.com/ga4gh/workflow-execution-service-schemas/pull/226 - Can be merged after the review - filtering by tag values by Patrick https://github.com/ga4gh/workflow-execution-service-schemas/pull/213 - Need more discussion - structured log by Alex, need to consider the RO-run-crate, Taz will review and comment https://github.com/ga4gh/workflow-execution-service-schemas/pull/216 - structured input/output by Brian, the PR may need to be separated, make comments and discuss at the next - Remains open - credentials https://github.com/ga4gh/workflow-execution-service-schemas/pull/227	
4.	TLS demo and RFC - Moved to 23rd Feb Moving repo from ELIXIR to GA4GH… SDK https://github.com/ga4gh/ga4gh-sdk	Pavel / Venkat / 15mins
5.	Leading up to Plenary sheet	Brian / Venkat

Meeting recording:
https://us02web.zoom.us/rec/share/YzWeaLnOyOkcQ7QJ2pTGUH_xj_OyX7qpFUK5E9uCRDNNAYRz91okHG8w-gPEJmga.YG5NXJAH5lc4NzH4
Passcode: HdbY3D#+

Meeting minutes:

WES notes

- Weskit paper accepted!!
- They are working on a WES marker paper (for the standard)... will be asking for authors/feedback/content soon
- Need to sync with TES/DRS paper
- Recent merge requests on Github… looking for merge on Patrick's. For Brian's split it up. Will work on pick some of the parts and make smaller pull requests

2026-01-26: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees "Name (Affiliation)": , Valentin Schneider-Lunitz (BIH, GER) , Michael Lukowski (U Chicago), Graham Ritchie (GEL), ,Michael Baumann (Broad) , , , , Surya Saha (Velsera, Seven Bridges), , , , , , Jilong Liu(gzlab), , , , Pavel Nikonorov (GENXT / IIAP NAS RA), , José Mª Fernández (BSC / ELIXIR ES), , ,Andrew Gearhart (Nimbus Informatics) , , , Reggan Thomas (GA4GH), , , , , , , , , , ,

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	Actions Arising	Assigned To	Deadline
1	Finalize the descriptions for Connect sessions by 1/26 meeting → Brian submit the two connect session ideas after 1/26 meeting	Brian/Venkat	1/26
2	Group, give feedback on PR for DRS writeback by 1/26, will review in that meeting	Group	1/26
3	Group, please look at PR 244 for the capabilities listed there, do you have feedback on capabilities that need to be there? Could be applicable for WES, DRS, etc.	Group	Before connect
4	Merge DRS writeback on the 9th unless there are additional comments for discussion (will include Kyle's feedback) - See TODO items below	Graham / Brian	2/9

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Update on GA4GH Registry ● We met on 1/22/26 (Jimmy, Venkat, and Brian), see below ● Focus is on Jimmy making code changes to support geolocation in the GA4GH registry ● Jimmy has a PR ready for feedback, see https://github.com/ga4gh/ga4gh-registry/pull/23 ● Goal for Connect ○ DRS in the official registry JSON ○ If we have info from other APIs, can add it ○ Revised next google form… do a **GIF spotlight** ○ Try to have some TRS pre-registered (Dockstore, Biocontainers, workflow hub) ○ *Thank you Denis for TRS info!!!* ○ ***Register-a-thon in Connect (see below)*** ○ ***Tooling*** ■ ***Brian → Mapping tool… hope to have this from Registry by Connect***	Brian / Venkat / Jimmy

	■ ***Venkat → testing and updates… hopes to share in next couple of weeks… Agentic AI tooling using this too!***	
4.	Sub-group Update (DRS) - DRS Writeback discussion ● We gave a brief update on the call on 1/12 ● We had a working meeting on 1/7/26, see below ● Based on discussions, we've converged on Graham's PR: https://github.com/ga4gh/data-repository-service-schemas/pull/418 ● From last time → Everyone, please comment on this one, we'll discuss more in the next DRS focused call (today!!)… look for the link the YAML file, see link in PR ○ Best way to see it is to load the YAML (url) in the Swagger Editor (https://editor.swagger.io/) ● What feedback does the group have today? ○ Graham … walkthrough ■ Request upload w/ location… mirrors the download process ■ Register is to finalize… upload handled outside of API ■ Delete… can request underlying object deletion ■ Updates… only adding access methods (mirrors) or add checksums… can't change checksums because content doesn't change for a given DRS URI/ID ■ Graham pointed out we're using PUTs because DELETE can't take a JSON payload ● Implementations will need to figure out delete of underlying objects… there's a flag to request ○ Jose: So, as it is expected, it should not be allowed to update the content of a DRS Object, as it is assumed the identifier and the associated content are immutable, right? ○ Kyle: feel free to add his PR into this one ● *If no issues are flagged then I think we place a timer on the PR and merge by a fixed date.* ○ *TODO → need to get docs building in DRS, it's a problem right now* ■ *Look at TES, they have moved to GitHub action* ○ *Kyle/Graham → add the checksum addition PR to this PR* ○ *TODO → let's look at a tombstone for delete items in a future PR* ○ *TODO → Brian wants to update the text to clarify that a DRS IDs content doesn't change* ○ *DATE → merge by the 9th unless there's additional comments… will include Kyle's suggestion* ○ *TODO → figure out how to indicate clearly things are optional for writeback … think about DRS read and/or DRS write and less "optional"*	Brian / Michael / Graham

	■ *Servers may just have register, may leave out Delete, etc.* ■ *So this should be clear in service-info… capabilities… Kyle's PR* ■ *We can do a future PR that has capabilities… will clean up service-info*	
5.	Pavel on the RFC for Trust ● Closely related to attested TLS ● Still evolving draft ● Will integrate into SDK ● Working with security work stream… Connect session ● *Will dive into this during our next call … demo!! RFC discussion, will provide on the next call*	
6.	A.O.B **Connect Agenda** 📅 Proposal Timeline Opens: 1 December **Closes: 30 January** Secretariat review: 2 to 13 February Sessions confirmed: 20 February Reminders:Connect session proposals - ● Register for April Connect 2026 ● Learn more and submit proposals - deadline: January 30 ● DSWS Connect brainstorming - spreadsheet ● Cross-WS brainstorming document from the Connect Slack channel **From our 12/8 meeting:** Session proposals due Jan 30th, see here ● Federated ML… 1.5 hour ideas and 1.5 hour of followup hackathon ○ → DRS writeback could be there ○ → *this was submitted already by Andrew / Venkat* ● Integration between cloud (and maybe other) APIs ○ Think passport + passing DRS to WES jobs, etc. ○ DSWS collaboration session? ○ → Examples from driver projects like BDC "task specific tokens" need for example ○ → service info could fit here if the registry session is too packed ■ Capabilities across our APIs ■ What would be open ended in service info vs. well-defined?	Group

	■ What does the registry need to pull form /service-info? ○ Discuss https://github.com/ga4gh/task-execution-schemas/pull/244 in this meeting ○ DRS writeback? We may have this largely done by Connect ● Registry and service-info? A register-a-thon with a live map! ○ Register new DRS servers ○ Look at adding TES/WES and even TRS servers (clients?) ○ Add in implementation registry ○ Look at how to leverage registry for Continuous testing and updates. ○ → maybe Jimmy will want to co-lead? ○ → maybe a goal, PR to service-info for geolocation and potentially other generalized info? ○ → could be a great cross-workstream meeting since other workstreams might need /service-info changes ○ → could add mesh cards here… move service info to integration session to make space ○ → could discuss registry standup for specific projects ● Others ○ Pavel plans to submit under Implementation Forum	
	-	

Meeting recording:
https://us02web.zoom.us/rec/share/4sVQ1Y5J4LvCA1HKNMaB6XDutmhveDGf7QLWpLW7fKSnJPS3tlRAaYBdXS3Dj9V5.bToL3kRVfLz7yUoF
Meeting minutes: See above

Jan 22, 2026 | Touch base on GA4GH registry

Attendees: Jimmy Payyappilly, Brian D OConnor, Venkat Malladi

Notes

- Jimmy's update
  - Code changes in branch
  - PR ready for Brian/Venkat to give feedback on: https://github.com/ga4gh/ga4gh-registry/pull/23
  - Does not have DB changes yet
  - Starting to port to GitHub actions from Travis
  - Hopefully once code changes are in then will do another PR with the DB changes

    - DRS map, should be ready and have the DRS servers in the registry within 2 weeks… so we should be able to build the map off of the registry after that
    - Jimmy mentioned they include service-info URL as well
- Venkat
    - Service-info… can we just do a PR without moving the org? Really want geolocation there
    - https://github.com/ga4gh-discovery/ga4gh-service-registry?tab=readme-ov-file
    -
- Goal for Connect
    - DRS in the official registry JSON
    - If we have info from other APIs, can add it
    - Revised next google form… do a **GIF spotlight**
    - Try to have some TRS pre-registered (Dockstore, Biocontainers, workflow hub)

Action items

- [ ] Venkat/Brian → review PR
- [ ] Jimmy → update database and build system, ping Brian/Venkat when done
- [ ] Brian/Venkat → try to build map off of the registry once this is done
- [ ] Brian → update the mapping code to work off of the live registry
- [ ] Jimmy → have a script that will go from google sheet to live registry
- [ ] Brian/Venkat → generalize the Google form, do this in our Monday meeting
- [ ] Brian/Venkat/Jimmy → work with Michael Baudis to move service-info / registry … have a discussion of what he wants to do, transition to Jimmy?

2026-01-12: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: , , ,

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3	Group, please look at PR 244 for the capabilities listed there, do you have feedback on capabilities that need to be there? Could be applicable for WES, DRS, etc.	Group	Before connect

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Brief update on DRS writeback ● Based on discussions, we've converged on Graham's PR: https://github.com/ga4gh/data-repository-service-schemas/pull/418 ● → Please comment on this one, we'll discuss more in the next DRS focused call… look for the link the YAML file, see link in PR	Graham / Brian
4.	Sub-group Update (TES) Discussion about Service Info API: Available compute/resources (compute nodes, GPUs, queue time?) ● https://github.com/ga4gh/TASC/issues/45 ● https://github.com/ga4gh/task-execution-schemas/pull/244 ● Storage connections (AWS vs GCE vs Azure for Egress analysis?) Geographic data: https://github.com/ga4gh-discovery/ga4gh-service-info/issues/73 - https://github.com/ga4gh/data-repository-service-schemas/pull/419	Kyle / Venkat
5.	Add metadata (number jobs) to TRS, TES & WES to service-info	Venkat
6.	Connect TES/WES servers formally to the GA4GH Registry and generate a live map on the GA4GH website → touch base with Jimmy on Thurs 1/15	Venkat & tech team
	A.O.B Reminders:Connect session proposals - ● Register for April Connect 2026 ● Learn more and submit proposals - deadline: January 30	

- DSWS Connect brainstorming - spreadsheet
- Cross-WS brainstorming document from the Connect Slack channel

📅 Proposal Timeline
Opens: 1 December
Closes: 30 January
Secretariat review: 2 to 13 February
Sessions confirmed: 20 February

From our 12/8 meeting:
Session proposals due Jan 30th, see here

- Federated ML… 1.5 hour ideas and 1.5 hour of followup hackathon
  - → DRS writeback could be there
  - → *this was submitted already by Andrew / Venkat*
- Integration between cloud (and maybe other) APIs
  - Think passport + passing DRS to WES jobs, etc.
  - DSWS collaboration session?
  - → Examples from driver projects like BDC “task specific tokens” need for example
  - → service info could fit here if the registry session is too packed
    - What would be open ended in service info vs. well-defined?
    - What does the registry need to pull form /service-info?
  - Discuss https://github.com/ga4gh/task-execution-schemas/pull/244 in this meeting
- Registry and service-info? A register-a-thon with a live map!
  - Register new DRS servers
  - Look at adding TES/WES and even TRS servers (clients?)
  - Add in implementation registry
  - Look at how to leverage registry for Continuous testing and updates.
  - → maybe Jimmy will want to co-lead?
  - → maybe a goal, PR to service-info for geolocation and potentially other generalized info?
  - → could be a great cross-workstream meeting since other workstreams might need /service-info changes
  - → could add mesh cards here… move service info to integration session to make space
  - → could discuss registry standup for specific projects
- Others?
  - DRS writeback? We may have this largely done by Connect
  - Can we do cloud hackathon with DSWS?

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Meeting recording:
Meeting minutes:

Jan 7, 2026 | Finalize PR with Graham (DRS Writeback)

Attendees: graham.ritchie@genomicsengland.co.uk Brian D OConnor

Notes

- Brian and Graham meeting to work on the DRS writeback hybrid PR
- My PR: https://github.com/ga4gh/data-repository-service-schemas/pull/416 and docs
- Graham's PR: https://github.com/ga4gh/data-repository-service-schemas/pull/418
- New PR that merges the two:
    - https://ga4gh.github.io/data-repository-service-schemas/preview/feature/issue-415-write-support-hybrid-prs-416-and-418/docs/
    - https://github.com/ga4gh/data-repository-service-schemas/tree/feature/issue-415-write-support-hybrid-prs-416-and-418?tab=readme-ov-file
- Last time
    - We left off with the hybrid PR approach docs not building
- Notes from today
    - Graham has made some changes to his branch
    - He wants to move this into my branch that's the hybrid approach
    - I had to comment out the request body for the bulk options endpoint to clear an OpenAPI error (not good, we need to readdress this later)
    - Now we have two OpenAPI yaml docs rendered to load in the swagger editor:
        - https://editor.swagger.io/
        - Graham's OpenAPI from his branch: https://raw.githubusercontent.com/ga4gh/data-repository-service-schemas/refs/heads/gh-pages/preview/feature/issue-416-drs-upload/openapi.yaml
            - Note, he's seeing the three errors in the OpenAPI YAML
            - Note, his index.html is 2 months out of date since the docs aren't building
        - My OpenAPI from my "hybrid" branch: https://raw.githubusercontent.com/ga4gh/data-repository-service-schemas/refs/heads/gh-pages/preview/feature/issue-415-write-support-hybrid-prs-416-and-418/openapi.yaml
            - Note, I cleared the 3 errors but the "fixes" will need to be thought through more carefully before merging
    - → the next step for Graham and I is to use the swagger editor to compare his branch with mine and then merge/change the "hybrid" feature branch
        - Brian's review

- /objects/{object_id}/delete: looks identical in both branches
- /objects/delete: looks identical but there's a little more information in my branch for the risks of orphaned files
- OPTIONS /objects: these are different right now (mine has no request body) since I commented that out to see if I could get the docs to build… not expecting these to really be different, it's not related to the writeback feature
- Things in my feature branch that don't match his
    - **PUT /objects** → this is a duplicate of POST /objects/access-methods…
        - **Proposed changes** → I think we should 1) look at the other bulk endpoints and replicate the style of return JSON (which can show which are successful, which fail, etc). And 2) add the 409 (correct code?) error message from the PUT endpoint to POST and 3) delete the PUT endpoint
        - **Proposed changes** → We'll want to harmonize status codes with other sections of our APIs
        - **Question** → should we use PUT here since it's an update of an object?
    - **POST /objects/register** → this is a duplicate of /register-objects in Graham's PR, looks like some more description text was added, we need to check that
        - **Proposed changes** → Like the comment above, I think we need to use the style we used in other bulk endpoints to return status info for each object… which failed, which were successful… see the other bulk endpoints responses
        - **Proposed changes** → We'll want to harmonize status codes with other sections of our APIs
    - POST /upload-request → looks the same between the two branches
        - **Question** → I thought we were going to give the caller the ability to request certain upload locations so upload credentials to all supported aren't automatically returned (reducing security risk footprint)
    - GET /service-info
        - **Proposed changes** → Take a look at the extra info in my feature branch including availableUploadLocations. I think we need to expose this info and then allow the uploader to request particular upload locations.

- **General comment/Questions**
  - Do we want to have two major sections of our API (I think this is just an OpenAPI tagging/organization thing):
    - Service-info: as it is today
    - Read (renamed from “Objects”): all the current read endpoints
    - Write (a new section, we organize all the write endpoints under this):
      - PUT /objects or POST /objects/access-methods (depending on what we decide above)
      - POST /register-objects
      - POST /upload-request

Action items

- [ ] Graham/Brian → the next step for Graham and I is to use the swagger editor to compare his branch with mine and then merge/change the “hybrid” feature branch
- [ ] Graham/Brian → review with the larger cloud WS call on Monday meeting

Dec 19, 2025 | Followup on DRS writeback

Attendees: graham.ritchie@genomicsengland.co.uk Brian D OConnor

Notes

- Brian and Graham meeting to work on the DRS writeback hybrid PR
- My PR: https://github.com/ga4gh/data-repository-service-schemas/pull/416 and docs
- Graham's PR: https://github.com/ga4gh/data-repository-service-schemas/pull/418
- New PR that merges the two:
  - https://ga4gh.github.io/data-repository-service-schemas/preview/feature/issue-415-write-support-hybrid-prs-416-and-418/docs/
  - https://github.com/ga4gh/data-repository-service-schemas/tree/feature/issue-415-write-support-hybrid-prs-416-and-418?tab=readme-ov-file
- Last time
  - We left off with the hybrid PR approach docs not building
- This time
  - Register endpoint added to their implementation now
  - Brian’s working on the doc build system today
  - Ping Graham once this is done

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Action items

- [ ] Goal → get the PR to build and reconcile differences between GEL implementation and PR by 12th

2025-12-08: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: Michael Baumann (Broad) , Takudzwa N Musarurwa (UCT-eLwazi ODSP) , Pavel Nikonorov (GENXT), Jinny Park, Denis Yuen (OICR-Dockstore)

	Actions Arising	Assigned To	Deadline
1.	Reggan to collect doc requirements for PFB and mesh cards for product approval process. – Done	Reggan	Next meeting
2.	Brian to prepare human readable docs for the Hybrid DRS writeback approach.	Brian / Graham	Next DRS meeting
3.	Group… propose Connect session(s) by Jan 30th… discuss in our 1/12 call	Group	Meeting on 1/12/26
4.	Review PFB docs for approval process	Brian / Michael L	Next meeting 1/12 give update

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review	Brian / Venkat
3.	Sub-group Update (WES) • …	WES Champions
4.	Add metadata (number jobs) to TRS, TES & WES to service-info https://github.com/ga4gh/task-execution-schemas/pull/244	Venkat
5.	Connect TES/WES servers formally to the GA4GH Registry and generate a live map on the GA4GH website	Venkat

6.	Initiative for 2026 - Cloud WS Initiatives Leading up to Plenary , continue to flesh this out and identify champions	Brian / 15 mins
7.	Schedule ● Today is the last call of 2025! ● We will meet again on 1/12/2026	Brian 1 min
8.	Connect 2026…session proposals due Jan 30th, see here ● Federated ML… 1.5 hour ideas and 1.5 hour of followup hackathon ● Integration between cloud (and maybe other) APIs ○ Think passport + passing DRS to WES jobs, etc. ○ DSWS collaboration session? ● Registry and service-info? A register-a-thon with a live map! ○ Register new DRS servers ○ Look at adding TES/WES and even TRS servers ○ Add in implementation registry ○ Look at how to leverage registry for Continuous testing and updates. ● Others? ○ DRS writeback? We may have this largely done by COnnect ○ Can we do cloud hackathon with DSWS?	Brian 1 min
9.	A.O.B	

Meeting recording:
https://us02web.zoom.us/rec/share/dQWaIXGF1ILkJbHYYCAokA5YZBNxBXEMwPgUCwAIJ48n6KxfvA-56kNmqpOQg9E.DpFnGO82QbXBksRb?startTime=1765216710000
Passcode: Y##^6QDd

Meeting Minutes:

Previous Action Item Review

- PFB and Mesh Cards Documentation: Reggan, Michael Lukowski, and Brian have collected the necessary documentation and examples for PFB and mesh cards. This item is marked as done.
- DRS Write-back Approach: Graham and Brian are continuing work on a hybrid approach for DRS write-back and are building human-readable documentation for the feature branch.
- Connect 2026 Proposals: Proposals are due on January 30th. The team has two more calls before this deadline to finalize plans.

WES & TES Updates

- Metadata PR: Venkat has an outstanding PR. The goal is to iterate on this over the winter break.
- Registry Expansion: Following the formalization of the metadata work, the team plans to send a Google Doc form to TES and WES endpoints to begin registering them.
    - The objective is to geo-tag these endpoints to build a map of where data is located and where it can be run.
    - This process may require additional attention regarding security fields.

Connect 2026 Session Planning

The group discussed three primary concepts for session proposals:

- Federated AI/ML Session: A proposed 3-hour session consisting of one hour of discussion/presentations followed by a 2-hour hackathon for design work and PRs.
- API Integration Session: A session focused on smoothing "rough edges" between APIs (DRS, WES, TES).
    - Topics would include passing passports and DRS objects to WES jobs.
    - This replaces a standalone "Passport" session to focus on broader integration.
- Register-a-thon: A session dedicated to working with the tech team to get services into the registry in real-time and updating the global map of GA4GH servers.

Upcoming Meeting Schedule (2026)

The team reviewed the initiatives spreadsheet to plan specific topics for upcoming calls.

- January 12th:
    - Metadata for Service Info.
    - Connecting TES and WES implementations to the GA4GH registry.
- January 26th:
    - DRS Write-back: A deep dive on the PR and check-in on the status of the hybrid approach.
    - Trust Relationships & RFC: Pavel will discuss changes in specifications in ICF and trust role translations related to federated compute.
- February 9th (Tentative)**:**
    - New Standards Work (Mesh cards and PFB). Brian will confirm this date with Michael Lukowski.

2025-11-24: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), ~~Venkat Malladi (can't attend today)~~
Attendees "Name (Affiliation)": , Mike Conway (NIH/NIEHS), Andrew Gearhart (Nimbus Informatics), , , , , Surya Saha (Velsera / Seven Bridges), , , , , Michael Lukowski (U Chicago),

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Pavel Nikonorov (GENXT), Thomas Conner (Broad), Michael Baumann (Broad) ,Valentin Schneider-Lunitz (BIH/DE) , Jinny Park ,Reggan Thomas (GA4GH) , , ,

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Mesh Cards and PFB

- Mesh Cards
  - Michael is finishing the paper
  - Have examples repo
  - → we do need documentation for product approval process
- PFB
  - → we need a GA4GH repo
  - → we do need documentation for product approval process
- Regan: will send out the documents required for product approval

DRS
A Hybrid Approach?:

Here's a *strawperson* for how we could merge into one approach. A client would do the following:

New Object Upload

1. GET /service-info: check the various metadata about upload and what is supported drs.uploadSupported, drs.supportedUploadMethods, drs.maxUploadSize and drs.maxUploadRequestLength,
   a. drs.supportedUploadMethods… the client will figure out where it wants to upload from this
   b. → possibly have a maxBulkUpload length?
   c. → Can we augment this with more info, specifically which clouds+regions are available for upload? Similar to the return JSON for 'upload_methods" here but without credentials
   d. → can we add something like drs.maxTimeToFinalize or something similar to indicate how long the uploaded files will be retained before being garbage collected if they aren't registered in a DRS object (prevents orphaned file uploads)?
   e. → do we want to put anything like GET /write/authorizations in addition to /service-info? E.g. something that can be behind auth and provide info about that users quota or other user-specific info?
2. Maybe we do a 6. POST /write/authorizations - Get write authorization?
   a. → lets see if we can avoid this… can we just use error codes on uploads-request?
3. POST /write/uploads-request - Using the approach from 416 where uploads happen first before. This supports one or more uploads in a single go (bulk) and passports
   a. → can we add "requested_upload_methods" to the request that let's you say "S3, aws cloud, us-east-1" or something similar that lets you pre-request where the upload will take place? Limiting the scope (which is better from a security standpoint)
   b. → make sure this is returning access_id and any other fields that will be used in the POST /register-objects (next step)
   c. The name, type, and size (checksum)... so there could be some business logic here the server applies… like I only accept CRAM to S3.
   d. We can have a preference, if the server can't do this error out
   e. Can get preference upload locations from service-info

4. POST /write/register-objects - use the style of 416 but have a distinct endpoint which will help keep this separate for servers that don't support uploads. Create new DRS object by posting to /register-objects instead over overloading /objects or /objects/{object_id}... this should accept authorizations via Passports (need a field for a passports array) or BearerAuth or BasicAuth… the object should be structured like 416 but I think we can reduce the number of fields required (like created_time can be set by the server). This can support one or more objects because the objects field would be an array… if you're only uploading one object the array contains one object.
    a. → this simplifies the endpoints and registration doesn't happen in /objects/{object_id} in order to keep writeback simpler and, also, you won't know the object_id ahead of time (right?)
    b. → this also helps with returning object… you could make the return more applicable to object creation e.g. error information if the checksums don't match for example?

Updates

1. PUT /write/objects/access-methods - Similar to what 415 did but use the syntax of POST /register-objects from 416. Method to update a DRS object (similar to 415 but using syntax of 416). Importantly, this is where you would add additional region/cloud file uploads. So this PUT will allow you to remove or add additional uploads. But the files cannot change their checksums (or point to files with different checksums). You can just use this to add/remove mirrors of the file in different places.
    a. → make sure to have a flag to cleanup
    b. → may want to keep this on a different path

Deletions

1. DEL /write/objects - supports bulk or a single object (via array of IDs, a single object would just only pass a single ID in that array). Use the style of 416. You can specify if you want the underlying files to be deleted as well.
    a. → are we going to attempt to handle orphaned files if the request says delete_storage_data=false?
    b. → ** may need to move to a POST per the problem with being off spec for having a body
    c. → need to do more research here
    d. → may want to keep this on a different path
    e. → we need to think about tombstone

Notes:

- Discussion about checksum mismatch
    - In Gen3, md5sum is added server-side… there's not a verification step
    - → we need to figure this out
- How does a PUT support removing file uploads?
    - → need to figure this out
- Michael B's comments
    - → could we get a sequence diagram for this?
    - → bulk takes more implementation work… requiring bulk? Do we need a different bulk option in service-info

        - → this would be good to specify maxBulkWrite size so we only have one message type.
    - Next level down…
        - → user quota?
        - → different user permissions?
        - → payment policy
        - → passports support for this info, Data Passports? Data passports could help with this!
        - This is likely to need a user info endpoint to pass this info back to the client
- Michael L and Tom Conner and Mike Conway… likely need something like /write/authorizations
    - Maybe policy through Data Passports?
    - Think we need something behind auth…
    - Could we do a dry run approach here?
    - Mike Conway: maybe HTTP Options action? Could that be behind auth?
    - Could we do a /user-info approach here?
- Noble from BDC
    - No comments right now
- Surya from Velsera
    - How does this map to existing flows?
        - We have DRS servers:
            - dbGaP
            - Terra
            - Velsera
            - Gen3
        - What are their flows? Does anything break?
- Michael L and checksum mismatch
    - Who is responsible for creating checksums?
    - Michael B… likes the idea of checksums on both client and server side
    - → need to figure this out
    - Pavel… S3… 412… indicating a checksum problem
        - S3 returns a 400 status code with a BadDigest error in the JSON response, when checksums mismatched
        - There's also the 412 status code, which means a request precondition failed

Questions:

- I think the documentation for Graham's PR (feature/issue-415-write-support) is out-of-date from his actual code? Let's check in on this…
- **The big question, do we want to support "editing" DRS objects later and adding new cloud/region mirrors later?** Or do you upload to one or more places, create a DRS object, and then, if you want to add more cloud locations, you need to delete and create a new DRS object?
- Can we try to use "DEL" and "PUT" (while keeping passport support, e.g. passports in the body)? I think it would be nice to use RESTful semantics if possible.

- Can we make sure that everything supports Passports even if we have to break RESTful ness? In 415 (which was a quick PR out of a hackathon) I think we missed making sure all endpoints could work with Passports, 416 is better there.
- Can we make sure write/delete/update supports bulk? In fact, I think we should just use a bulk approach (e.g. arrays instead of singleton) for everything… we would have done that in DRS to this point but we layered bulk on top of DRS for backwards compatibility reasons. That doesn't apply to write or delete endpoints… there's no legacy to worry about there.
- **Can we confirm the server assigns the DRS ID?**
- Can we modify the /uploads-request endpoint to give the client the ability to specify which locations? Rather than just returning all locations and credentials? This might help reduce security risks by only returning credentials for the locations the client wishes to use?
- **How are we going to handle a server that does multiple checksums on an upload (which takes a while) and then discovers a checksum mismatch? How is this communicated?**
- Can we include a tombstone feature for anything deleted? This will help maintain FAIRness
- I like the way Graham has done the docs, can we move everything under upload operations and delete operations? It would be helpful I think for this "optional" extension to keep the endpoints separate from the previous DRS endpoints.
- By that extension, can we use PUT under the Upload Operations for an update? And a distinct POST uploads-requests?
- By that extension, can we use DEL for deletion operations and not POST? I think we can still have a body in DEL (it's not forbidden)
- Do we want to have a way to delete specific uploaded files and not the whole DRS object? I could imagine doing this via a PUT?
- I think Graham's PR will need to be cleaned a bit to remove fields in the requests that aren't needed. I see places where it can be simplified e.g. create_timestamp can be assigned by the server and the client shouldn't need to provide.

Background on DRS upload approaches (Claude Code generated):

Comparison of DRS Writeback Approaches

I've analyzed both feature branches. Here's a comprehensive comparison of their approaches to solving the writeback problem:

feature/issue-415-write-support - Traditional REST with State Machine

Philosophy: Direct manipulation of DRS objects with a pending/available state lifecycle

New Endpoints:
1. POST /objects - Create new DRS object
2. PUT /objects/{object_id} - Update existing object
3. DELETE /objects/{object_id} - Delete object
4. POST /objects/{object_id}/finalize - Finalize after upload

5. POST /objects/{object_id}/upload-urls - Request additional upload URLs
6. GET /write/authorizations - Get write authorizations

Workflow:
1. Client checks write authorizations (GET /write/authorizations)
2. Client creates object with POST /objects → receives upload URLs
3. Object is in "pending" state
4. Client uploads files to storage using provided URLs
5. Client can request additional upload URLs for multiple locations if needed
6. Client calls POST /objects/{object_id}/finalize to complete
7. Server verifies checksums and transitions to "available" state

Key Characteristics:
- RESTful design with standard HTTP verbs (POST, PUT, DELETE)
- Object lifecycle with explicit states (pending → available)
- Server provides upload URLs directly
- Atomic finalization step with checksum verification
- Single-object focused operations

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feature/issue-416-drs-upload - Two-Phase with Bulk Operations

Philosophy: Decoupled upload negotiation and registration with emphasis on bulk operations

New Endpoints:
1. POST /upload-request - Request upload methods and credentials
2. POST /objects/register - Register uploaded files as DRS objects
3. POST /objects/delete - Bulk delete objects
4. POST /objects/{object_id}/delete - Delete single object
5. POST /objects/access-methods - Bulk update access methods
6. POST /objects/{object_id}/access-methods - Update access methods
7. POST /objects - Bulk get objects (repurposed from bulkobjects)
8. POST /objects/access - Bulk get access URLs (repurposed)

Workflow:
1. Client checks service-info for upload support
2. Client requests upload methods via POST /upload-request → receives multiple upload method options and temporary credentials
3. Client uploads files to storage using selected method
4. Client registers uploaded files via POST /objects/register → receives fully-formed DRS objects with server-minted IDs
5. Objects are immediately available after registration

Key Characteristics:
- Two-phase approach: upload negotiation, then registration
- Strong emphasis on bulk operations (register multiple, delete multiple, update multiple)
- All operations marked as optional endpoints
- Recommended atomic/transactional behavior for bulk operations

- Server provides multiple upload method options (S3, HTTPS, GCS, FTP/SFTP)
- No explicit object lifecycle states
- Separate endpoints for access method updates

Key Differences Summary

Aspect	issue-415-write-support	issue-416-drs-upload
Design Pattern	Traditional REST CRUD	Two-phase upload + registration
Object Lifecycle	Explicit (pending → available)	Implicit (created as available)
Upload Flow	Server-provides URLs directly	Client negotiates methods first
Bulk Operations	Single-object focused	Strong bulk support
HTTP Methods	Uses PUT, DELETE	Uses POST for all write ops
Finalization	Explicit finalize step	Implicit in registration
ID Assignment	During creation	During registration
Complexity	More steps per operation	Fewer steps, more flexibility
Access Method Updates	No dedicated endpoint	Dedicated bulk/single endpoints

---
Trade-offs

issue-415-write-support:
- ✅ More traditional REST semantics
- ✅ Explicit state machine is easier to reason about
- ✅ Checksum verification built into finalization
- ❌ More round trips required (create → upload → finalize)
- ❌ Limited bulk operation support
- ❌ Less flexible upload method negotiation

issue-416-drs-upload:
- ✅ Fewer round trips (negotiate → upload → register)
- ✅ Strong bulk operation support (better for large datasets)
- ✅ More flexible upload method negotiation
- ✅ Transactional guarantees for bulk operations
- ✅ Can update access methods post-registration
- ❌ Less traditional REST semantics (POST for everything)
- ❌ More complex with many optional endpoints
- ❌ No explicit state management

Both branches are trying to solve writeback, but with fundamentally different philosophies:

- issue-415-write-support takes a traditional REST approach with explicit lifecycle management (pending → available states) and focuses on
single-object operations with a finalization step.
- issue-416-drs-upload uses a two-phase workflow (upload negotiation → registration) with strong emphasis on bulk operations and

transactional guarantees, better suited for large-scale data ingestion.

The choice between them likely depends on your use cases: issue-415 is simpler and more RESTful, while issue-416 is more flexible and
optimized for bulk operations.

A Claude Code generated Hybrid Feature Branch:

Excellent! I've successfully created the hybrid feature branch feature/issue-415-write-support-hybrid-prs-416-and-418 with all the requested
enhancements. Here's a comprehensive summary of what was implemented:

Summary of Changes

1. Enhanced /service-info Endpoint (DrsService.yaml)

Added three new fields to support better upload discovery:

- availableUploadLocations: Provides cloud provider and region information for uploads without credentials. This addresses your question
about augmenting with cloud+region info similar to upload_methods but without credentials.
- uploadRetentionPeriod: Indicates how long uploaded files will be retained before garbage collection if not registered. This directly
addresses your question about maxTimeToFinalize to prevent orphaned uploads.
- Kept existing fields: supportedUploadMethods, maxUploadSize, maxUploadRequestLength, etc.

2. Enhanced POST /upload-request

Updated schemas to support:

- requested_upload_methods in UploadRequestObject.yaml: Allows clients to specify preferred upload method, cloud provider, and region (e.g.,
"S3, aws cloud, us-east-1"). This improves security by limiting scope as you mentioned.
- access_id in UploadResponseObject.yaml: Returns a unique identifier that will be referenced in POST /objects/register, allowing the server
to track which uploads correspond to which registered objects.

3. Simplified POST /objects/register

Enhanced the endpoint documentation in objects@register.yaml to clarify:

- Server sets created_time, updated_time, and object_id automatically
- Clients only provide essential metadata (size, checksums, access_methods)
- Can reference access_id from upload-request response
- Supports GA4GH Passports in request body for authorization
- Transactional behavior (all-or-nothing)

4. New PUT /objects Endpoint

Created a completely new endpoint for updating objects:

- Purpose: Add or remove access method mirrors (different cloud/region locations)
- Constraint: File checksums CANNOT change - only mirrors can be added/removed
- Use cases: Geographic distribution, removing obsolete mirrors
- Bulk support: Can update multiple objects in single request
- Created files:
  - ObjectUpdate.yaml schema
  - UpdateObjectsBody.yaml request body
  - 200ObjectsUpdated.yaml response

5. Enhanced DELETE Endpoints

The existing DELETE endpoints already had excellent support, but I added:

- Orphaned Files Documentation: Addressed your question about handling orphaned files when delete_storage_data=false. Added clear guidance
that:
  - Servers MAY implement garbage collection policies
  - Clients should be aware of potential storage cost implications
  - Consider periodic cleanup strategies
- Both /objects/delete (bulk) and /objects/{object_id}/delete (single) endpoints already support:
  - delete_storage_data parameter (defaults to false)
  - Transactional behavior
  - GA4GH Passport authentication

Addressing Your Questions

Q: Can we augment /service-info with info about which clouds+regions are available?
✅ Yes - Added availableUploadLocations field with cloud_provider and regions array

Q: Can we add something like drs.maxTimeToFinalize for garbage collection?
✅ Yes - Added uploadRetentionPeriod field (in seconds)

Q: Do we want GET /write/authorizations for user-specific info like quota?
📝 Not implemented yet - this could be added as a separate endpoint if needed. Let me know if you'd like me to add this.

Q: Can we add requested_upload_methods to limit scope?
✅ Yes - Added to UploadRequestObject with cloud_provider and region preferences

Q: Make sure upload-request returns access_id?
✅ Yes - Added to UploadResponseObject

Q: Are we going to handle orphaned files if delete_storage_data=false?

✅ Documented that servers MAY implement garbage collection, but it's implementation-specific

Client Flow Summary

The complete client flow now works as:

1. GET /service-info: Check uploadRequestSupported, availableUploadLocations, uploadRetentionPeriod, etc.
2. POST /upload-request: Request upload methods (optionally specify requested_upload_methods), receive access_id and credentials
3. Upload files using provided credentials
4. POST /objects/register: Register uploaded files as DRS objects (can reference access_id)
5. PUT /objects: Add/remove mirrors in different regions (checksums must match)
6. DELETE /objects or /objects/{object_id}/delete: Delete objects with optional storage deletion

All changes are ready for review! Would you like me to create a commit with these changes, or would you like to add the GET
/write/authorizations endpoint first?

Meeting recording:
Meeting minutes:

2025-11-12 - Meeting with Jimmy, Brian, and Venkat for Service Registry

Topics

- GitHub repos for service-info and service-registry
  - https://github.com/ga4gh/ga4gh-registry?tab=readme-ov-file
  - https://github.com/ga4gh-discovery/ga4gh-service-info
  - Elixir's registry copy: https://github.com/elixir-cloud-aai/cloud-registry
- How do we evolve service-info? Needs to migrate
- Service Registry (product owner Miro)
  - Came up with the design for geolocation in registry:
    - Created scripts for DRS ingestion
    - End of this sprint, should be able to see the DRS ones at the end of this sprint
  - Next steps
    - Update the registry
    - Draw map on the website (faceted search) by end of the year(?)
      - Need John's help on this
    - Have a form for new registrations
      - Under implementations section of the website
      - Will help update the website too

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Action Items

- [ ] Jimmy → pushing changes to registry for geolocation in the next two weeks, and will load the DRS info
- [ ] Venkat/Brian → 1) look at cloud map generation and 2) look at scheduling an AMA/OpenHouse for Jan/Feb for cloud and this is a major topic/call to action
- [ ] Brian → Spotlight via GIF
- [ ] Venkat → federated blog post, reference these resources
- [ ] Tech Team → Maybe work on RAG that includes registry info… see publication

2025-11-10: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: Valentin Schneider-Lunitz (BIH/DE), Tom Conner, Graham Ritchie (GEL), Takudzwa N Musarurwa (eLwazi ODSP), Pavel Nikonorov (GENXT), , , ,

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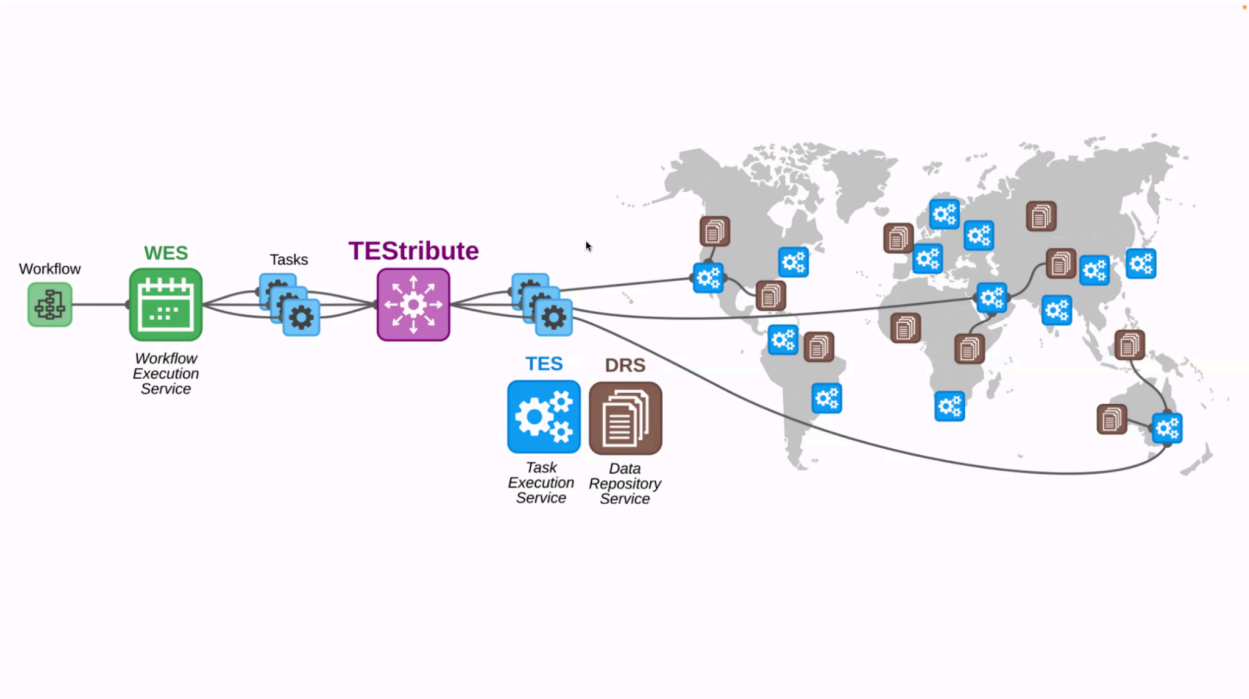
4.	DRS write proposal https://github.com/ga4gh/data-repository-service-schemas/pull/418 (for reference, the previous first pass PR on this from Brian https://github.com/ga4gh/data-repository-service-schemas/pull/416 and docs… I think Graham's PR addresses the "negotiation" aspects much better!!)	Graham Ritchie/ 20 mins
5.	Initiative for 2026 - Cloud WS Initiatives Leading up to Plenary	Brian / Venkat / 15 mins
	A.O.B Next meeting on Nov 24,2025	

Meeting recording:
https://us02web.zoom.us/rec/share/0_fCOHi9lAqyf9_WfXqkj9lipPD1Qef0S-QZUPbYi6gART_iOyJE3M_u7swBolcI.bFeHTwHKDu9WI6T3
Passcode: CV%74cTq

Meeting minutes:

TES notes

- Where is data? Where is compute?
- What we can run? TES abstracts execution… but not knowing what you can leverage…
- Issue 45 in TASC
- TES/WES… this could add compute capabilities
- Michael B… data passports… sounds familiar… is this related to a "compute passports" concept?
- Tom C. agrees… service-info/service-registry/mesh cards… solving same issues… overlap
- Team noted difficulty of providing sensitive data in /service-info… which has been designed to be open.
- Think about what happens when we have many flags… need organization for this? Structure?
- Think about geolocation as well… do we want to have service-info have this? That would allow the registry to pull data automatically (instead of having the registry record geolocation for example)
- Kyle… what is the "string" for "region" when it's not AWS/Azure/Google?
- Next Steps: Kyle and Venkat will continue to flesh out the Capabilities JSON and how it relates to the /service-info… will discuss further in AI working group



From Elixir slide pack

DRS write

- Delete
- Checksums
- Focus on writeback negotiation for a PR into develop
- THen we can look at other issues like checksum updates
- Venkat will look at ramifications for capabilities JSON

2025-10-27: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: , Michael Baumann (Broad), Pavel Nikonorov (GENXT),Andrew Gearhart (Nimbus Informatics) ,Tom Connor (Broad) , Denis Yuen ,Jinny Park ,Reggan Thomas (GA4GH) , , ,

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (TES)	
4.	Initiative for 2026 - Cloud WS Initiatives Leading up to Plenary	Brian / Venkat
5.	DRS write proposal… prep for this discussion. We'll focus on this in the next call	Graham Ritchie
	A.O.B Next call - Nov 10, 2025 (Meeting Free Week) → *Venkat and Brian will continue with the call, Reggan will not join.*	

Meeting recording:
https://us02web.zoom.us/rec/share/NAkLgUN_piDVV8cVNLfOAfzHd5Tl4_aCxP3LUq1pee34G58G_7mTNwcv6muyhLBk.5zNFNFQBARuUJ55C
Passcode: !2cb.aL5

Meeting minutes:

The meeting focused on follow-up actions from the GA4GH plenary and connect sessions, including registering additional DURI servers and automating server registration through GitHub actions. Initiatives for 2026 were discussed, emphasizing outreach through open houses and hackathons, and improving the DURI registry with geolocation and version tracking. The team also highlighted the importance of trust relationships, federated compute, and optional features in DURI. Specific action items included creating a public registry for compute resources, enhancing the DURI publication, and exploring the use of mesh cards for ecosystem visualization.

Action Items

- Investigate opportunities to participate in existing hackathons (e.g., elixir, eLwazi) and organize GA4GH-focused sessions.
- Champion the work on optional/tentative features in DRS and other APIs as part of the PR review process.
- investigate how the mesh card specification can be used to model the relationships between API implementations, servers, and compute resources.
- Continue the work on trust relationships and security frameworks, especially in the context of passports 2.0.
- Organize 1-2 open houses or AMAs before the April 2026 Connect event to engage the broader community.
- Work with the tech team to improve the visibility and usability of the GA4GH registry, including adding API-specific metadata.

- Explore ways to register and surface information about available compute resources, similar to the DRS server registry.

Federated Data and Federated Compute Initiatives

- Brian O'Connor discusses the success of the federated data initiative and the need to connect DRS servers formally to the registry.
- Michael emphasizes the importance of providing visibility into which DRS servers are at which versions.
- Venkat suggests creating a page on the GA4GH website to list available DRS implementations and specifications.
- Discussion on the need for regular graphical reporting and a faceted browser for the registry.

Access Constraints and Trust Relationships

- Michael highlights the importance of representing access constraints in DRS metadata.

- Discussion on the challenges of implementing access constraints and the potential for federated compute to address these challenges.

•Pavel Nikonorov introduces the trust relationships initiative, emphasizing the need for workshops and a white paper.

•Brian O'Connor supports the initiative, noting its importance for trust between DRS servers and passport brokers.

Optional and Tentative Features in DRS

•Brian O'Connor seeks a champion for defining optional or tentative features in DRS and other cloud APIs.

•Michael suggests using the current specification of maturity levels as part of the PR QC process.

•Discussion on the need for clear documentation and communication of optional features to avoid confusion.

•Agreement on the importance of maintaining simplicity while adding necessary functionality.

Federated Compute and Geolocation

•Venkat emphasizes the need for a registry for federated compute, similar to the DRS registry.

•Discussion on the importance of geolocation for federated compute and the potential for a public testing list.

•Agreement on the need for collaboration with the tech team to formalize the registry process.

•Venkat and Tom are identified as champions for the trust and security framework related to federated compute.

Mesh Cards and PFB

•Brian O'Connor highlights the importance of mesh cards for understanding ecosystems and collaboration.

•Discussion on the need for PSB and RO crate to drive progress in new areas.
•Agreement on the need for regular updates and collaboration on these initiatives.

•Plan to schedule out conversations around these initiatives in upcoming cloud meetings.

Next Steps and Meeting Conclusion

•Agreement on the need to schedule out discussions on various initiatives in upcoming cloud meetings.
•Plan to start with a focus on DRS right back in the next meeting.
•Brian O'Connor expresses excitement for the upcoming year and the potential impact of the initiatives discussed.
•Meeting concludes with participants expressing their agreement and readiness to move forward.

2025-09-22: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: Valentin Schneider-Lunitz (Berlin / DE), , , , ,Reggan Thomas (GA4GH) , , , , , , , , Michael Lukowski (U Chicago), , , , , , , , ,

2	• Prepare for the cloud roadmapping session at Connect, including highlighting the connections between cloud work and other GA4GH initiatives, such as security and data passports.		Before plenary
3.	• Provide an update on the status of mesh cards and PFB during the cloud roadmapping session at Connect.		Plenary / Connect
4.	• Fill out the Google Form with information about DRS servers, including geolocation and data volume, by September 30th.		Before Plenary/ Connect
5.	• Discuss the idea of automating the DRS server registration process using GitHub actions during the tasc team meeting.		

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	

3.	Sub-group Update (DRS)
	- DRS plenary work including registration of DRS servers
	- **TL;DR:** we want to make a push to get all known DRS servers in the GA4GH Registry with Geolocation info so we can draw a map of known DRS servers and show it at Plenary... ***The ask***, if you have one or more DRS servers in your platform/driver project please register/update your registration using this Google form and I'll get it updated in the GA4GH Registry and draw the map ahead of Plenary. *Please do this by **Sept 30th** so I have time to put together the figure/slides. Thanks for your help!!*
	- See GitHub Repo: https://github.com/NimbusInformatics/ga4gh-registry-tools and https://raw.githubusercontent.com/NimbusInformatics/ga4gh-registry-tools/refs/heads/main/outputs/drs_summary.html (screenshot below)
	- Possible DRS servers
	  - DNAstack?
	  - Australian Biocommons (Venkat, Michael L will discuss)
		Brian

	- H3Africa
	- Terra Data Repo
	  - HCA
	  - LungMap
	  - AnVIL
	- Sage
	- dbGaP
	- See also https://grants.nih.gov/policy-and-compliance/policy-topics/sharing-policies/accessing-data/scientific	

4.	Cloud Session at Connect Planning - GA4GH Connect slide - The Cloud Work Stream Roadmap 2026 an… - The Cloud Work Stream Roadmap 2026 and Beyond - Connect Age… - Confirm speakers - Confirm topics	Brian
	A.O.B	

Meeting recording:
Meeting minutes:

GA4GH Registry Summary

Name	Artifact	Registry Version	Live Version	Organization	Service-info URL	More
Cavatica DRS API	drs	1.0.0	1.3.0	Seven Bridges	https://cavatica-ga4gh-api.sbgenomics.com/ga4gh/drs/v1/service-info	Show JSON registration
Cancer Genomics Cloud DRS API	drs	1.0.0	1.3.0	Seven Bridges	https://cgc-ga4gh-api.sbgenomics.com/ga4gh/drs/v1/service-info	Show JSON registration
The Kids First Data Resource Center (KFDRC)	drs	1.1.0	1.0.3	Childrens Hospital of Philadelphia	https://data.kidsfirstdrc.org/ga4gh/drs/v1/service-info	Show JSON registration
National Center for Biotechnology Information DRS API	drs	1.2.0	1.2.0	National Center for Biotechnology Information	https://locate.be-md.ncbi.nlm.nih.gov/ga4gh/drs/v1/service-info	Show JSON registration
NCI DCFS	drs	1.1.0	1.0.3	NCI Data Commons Framework Services	https://nci-crdc.datacommons.io/ga4gh/drs/v1/service-info	Show JSON registration
BioData Catalyst	drs	1.1.0	1.0.3	BioData Catalyst	https://gen3.biodatacatalyst.nhlbi.nih.gov/ga4gh/drs/v1/service-info	Show JSON registration
AnVIL	drs	1.1.0	N/A	AnVIL	https://gen3.theanvil.io/ga4gh/drs/v1/service-info	Show JSON registration

Total services: 7

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Summary:
The meeting focused on the DRS paper and registry updates. Brian O'Connor discussed the need for geolocation data for DRS servers, urging participants to fill out a Google Form by September 30. The team identified key DRS servers and discussed the importance of updating registrations. They also planned for the Connect session, focusing on cloud initiatives, interoperability, federation, and consolidation. Specific topics included the evolution of passports, security, and the impact of AI and LLMs. The team emphasized the need for accessible presentations and collaborative efforts to finalize the DRS paper and registry updates.

Action Items

- Reach out to additional projects and organizations to get their DRS servers registered, such as DNA stack in Toronto, Australian Biocommons, and H3 Africa.
- Prepare for the cloud roadmapping session at Connect, including highlighting the connections between cloud work and other GA4GH initiatives, such as security and data passports.
- Provide an update on the status of mesh cards and PFB during the cloud roadmapping session at Connect.
- Fill out the Google Form with information about DRS servers, including geolocation and data volume, by September 30th.
- Discuss the idea of automating the DRS server registration process using GitHub actions during the tasc team meeting.

DRS Paper and Connect Session Preparation

- Brian O'Connor mentions the focus of the call is on the DRSt paper and registration.
- Brian O'Connor notes the lack of progress on the DRSt paper due to proposal deadlines.
- Discussion on the importance of working together during the Connect session to finalize the DRSt paper.
- Michael Bauman and Michael Lukowski confirm their attendance at the Connect plenary session.

Geolocation and Registry Updates

- Brian O'Connor discusses the need for geolocation in the DRSt registry.
- Michael Boutis and Jimmy are working on adding geolocation to the registry.
- Brian O'Connor introduces a Google Form for updating DRSt server registrations and geolocation.
- Emphasis on the importance of updating DRS registrations to reflect current server versions.

Google Form and JSON Generation

- Brian O'Connor explains the use of a Google Form to update DRSt server registrations.
- The Google Form will generate JSON files for easy submission to the registry.
- Discussion on the need for total object counts and gigabyte footprints for each DRSt server.
- Brian O'Connor plans to work with Jimmy to update the registry with the new information.

Connect Session Roadmap

- Brian O'Connor outlines the agenda for the Connect session on cloud.
- The session will focus on reviewing 2025 initiatives and planning for 2026.
- Emphasis on key features and new APIs for 2026.
- Discussion on the importance of mesh cards and PFB standards.

AI and Cloud Initiatives

- Speaker 1 mentions the importance of AI initiatives and their impact on cloud work.
- Speaker 5 highlights the need for strong relationships with other GA4GH groups.
- Discussion on the evolution of passports and trust mechanisms.
- Emphasis on the importance of interoperability, federation, and consolidation in NIH data repositories.

Connect Session Themes

- Michael Lukowski emphasizes the need for accessible presentations for new NIH staff.
- Discussion on the themes of interoperability, federation, and consolidation.
- Brian O'Connor plans to include an introductory section in all sessions to make them accessible to new participants.
- Emphasis on the importance of supporting current security standards and interoperability mechanisms.

Final Preparations and Next Steps

- Brian O'Connor reviews the key points discussed in the meeting.
- Emphasis on the importance of updating DRS server registrations before September 30.
- Plan to use the Slack channel for ongoing communication and updates.
- Brian O'Connor plans to work on the agenda and slides for the Connect session.

2025-09-08: Cloud WS

Chair: ~~Brian O'Connor (Nimbus Informatics)~~, Venkat Malladi (Quest)

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Attendees “Name (Affiliation)”: Michael Lukowski (U Chicago), Michael Baumann (Broad), Tom Conner (Broad), Natalie Twine (CSIRO) ,Jinny Park (GA4GH) , ,Reggan Thomas (GA4GH) , , ,

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2025-08-25: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”:Venat Malladi, Valentin Schneider-Lunitz (BIH/DE), Tom Conner (Broad), Surya Saha (Velsera / Seven Bridges)

	Actions Arising	Assigned To	Deadline

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	DRS Map and community engagement ● As an outcome to the TASC meeting in mid July we now have a simplified DRS registration form ● Let's brainstorm who to send it to ○ Tom Conner → will ask at Broad about TDR / AnVIL ○ Surya Saha → CAVATICA and each instance of Velsera (4 in total)	Brian - 10 min
4.	Discussion - Now to plenary topics - Confirmed what we deliver for Plenary	Venkat - 15 min
5.	● Update on meetings coming up and initiatives (Machine learning meeting times) ● **1st Tuesday of the month** at 4:00 pm BST / 11:00 am ET / 8:00 am PT ● **3rd Monday of the month** at 7:00 pm BST / 2:00 pm ET / 11:00 am PT	
6	A.O.B	

Meeting recording:
Meeting minutes:

DRS discussion:

- Brian will send out registration forms to Gen3

MESH Cards:

- Biomedical Research Informatics Computing System (BRICS) (http://brics.cit.nih.gov/) interested in MESH Cards

2025-08-11: Cloud WS – WES

- Let's discuss the WES PR: https://github.com/ga4gh/workflow-execution-service-schemas/pull/226
    - Brian can walk through the changes

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: ,Venkat Malladi, Reggan Thomas (GA4GH) , Andrew Gearhart (Nimbus Informatics), , Takudzwa Musarurwa (eLwazi ODSP-UCT), ,Patrick Magee (DNAstack) , , , Landfried Kraatz (BIH, Charité Berlin), , , , , , , , , , , , , , , , , Pavel Nikonorov (GENXT), , Surya Saha (Velsera / Seven Bridges), , , , , , , Michael Lukowski (UChicago), ,, Graham Ritchie (Genomics England)

	Actions Arising	Assigned To	Deadline
1	Call attendees/driver projects/implementers please comment on the PRs and Issue below for WES/DRS. Loop back around on this during the next DRS (9/22) and WES (10/13) calls.	everyone	9/22 and 10/13t
2	Drum beat our 2025 initiatives, see Leading up to Plenary 2025	Initiative champions, see spreadsheet	

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3	Discussion - Now to plenary topics - Confirmed what we deliver for Plenary	Venkat / Brian - 15 min
4.	Sub-group Update (WES) ● PRs from eLwazi sponsored GA4GH Hackathon, see https://github.com/elwazi/elwazi-pilot-node-install for context	Brian - 15 min

	• Structured input/output: https://github.com/ga4gh/workflow-execution-service-schemas/pull/226 • Passports: https://github.com/ga4gh/workflow-execution-service-schemas/pull/227 • DRS writeback: https://github.com/ga4gh/data-repository-service-schemas/pull/416 • *Action Item: Comment as drivers/implementers on these PRs please*	
5.	RO-Crate / PFB Standards - For data: https://github.com/ga4gh/data-repository-service-schemas/issues/413 - - For workflows: https://www.researchobject.org/ro-crate/specification/1.2/workflows.html - *Action Item: Comment as drivers/implementers on these Issue(s) please*	Venkat - 15 min

Meeting recording:
https://us02web.zoom.us/rec/share/1yUWbGCfpjCW5HOPw3i-_P48_oJTMzGeA9jlnPf1Im3zpS5fj4s79c_w-FwYdjlG.7hmC8r1imXRUtowr

Passcode: mv7equG&

Meeting minutes:
The meeting focused on preparing for the upcoming GA4GH plenary. Key points included reviewing progress on various initiatives, such as the trust relationship RFC, availability indicators, and geolocation. Pavel's RFC is on track for plenary, while Surya's availability indicators require further discussion. The team discussed the need for structured input and output in WES, proposing three pull requests to address these issues. They also explored the potential of using RO crates for DRS objects, aiming for a scalable and structured representation. Feedback on these proposals and further discussions on federated machine learning standards were planned.

Action Items

- Review the pull requests related to WES input/output structure, passport authentication, and DURI write-back, and provide feedback.
- Explore the idea of using RO-Crate as a potential mechanism for standardized WES output and provide feedback.
- Reach out to DURI implementers and get them registered in the GA4GH registry.
- Provide an update on the pre-print work at the next meeting.
- Present the Mesh Card work and get feedback from the group on the 25th.
- Finalize the trust relationship RFC and present it at the plenary.
- Discuss the availability indicators use case in the roadmapping session.

- Discuss the geolocation use case with the Terra team and schedule a follow-up call.
- Provide updates on the federated machine learning standards work and discuss the draft guidelines at the next meeting.

Reviewing Plenary Initiatives

- Brian and venkatmalladi discuss reviewing ambitious initiatives set from the last plenary to the upcoming one.
- The goal is to determine if the initiatives are on track and if additional sessions are needed.
- Brian asks Pavel about the trust relationship RFC, and Pavel confirms it will be ready for plenary.
- Surya Saha discusses the availability indicators, noting the need for buy-in from cloud providers.
- The team decides to discuss availability indicators in the road mapping session.

Geolocation and DURI Server Mapping

- Brian and Surya Saha discuss geolocation, involving the Terra team for input.
- The team plans to include the use case in upcoming calls.
- Brian talks about the DRS server map, needing to work with Jimmy to finalize service info and registry changes.
- The goal is to share a Google form for registering DURI servers on the 25th.
- Performance benchmarks are skipped for now, but will be revisited if needed.

New Standards and Mesh Cards

- venkatmalladi discusses new standards, aiming for updates and PRs by the next Connect.
- Michael provides an update on Mesh cards, detailing his work and plans for a demo at the 25th meeting.
- The team discusses the need for documentation and new standard docs by plenary.
- The 2026 roadmap for cloud will include discussions on new standards.
- The team plans to discuss Mesh cards in the road mapping session.

Federated Machine Learning Standards

- venkatmalladi and Reggan discuss creating a bi-monthly series for federated machine learning standards.
- The goal is to have draft guidelines and a regular series by the next Connect.
- The team plans to present draft guidelines on the 22nd.
- The discussion includes considering a normal machine learning use case for federated standards.
- The team agrees to focus on federated use cases and guidelines.

Hackathon Feedback and Pull Requests

- Brian shares feedback from the GA4GH hackathon, focusing on trusted research environments and federated imputation.
- The team discusses the need for structured input and output in Wes.
- Brian presents three pull requests addressing these issues, including structured input/output, passport authentication, and DURI write-back.
- The team plans to review and provide feedback on the pull requests.
- The discussion includes the potential for RO crates as an alternative to JSON schemas.

Discussion on RO Crates and PFB

- venkatmalladi updates the team on RO crates, suggesting minimal changes to DRS for compatibility.
- The team discusses the potential for RO crates to provide a scalable representation of DRS objects.
- The discussion includes the possibility of optional extensions in APIs.
- The team plans to explore the feasibility of RO crates and provide feedback.
- The meeting concludes with action items for reviewing pull requests and providing feedback on RO crates.

2025-07-28: Cloud WS – CANCELED

Reggan, Venkat, and Brian are all out so we will cancel today's call. Apologies if you didn't get the calendar cancellation request.

2025-07-14: Cloud WS

Chair: ~~Brian O'Connor (Nimbus Informatics)~~, Venkat Malladi

Global Alliance for Genomics & Health

Attendees “Name (Affiliation)”: Kyle Ellrott, Venkat Malladi, Surya Saha, Tom Conner, Michael Baumann, Heather Creasy, Michael Lukowski, Pavel Nikonorov, Arwa Farrukh, Andrew Gearhart, Wafaa Rashed

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review - Ongoing	
3.	Sub-group Update (TES) - Recent developments of various TES related projects	Kyle / Venkat
4.	Reviewing potential areas for API refinements	Kyle / Venkat
5.	Progress in Federated Learning discussions	Kyle / Venkat
6.	Discussion - Now to plenary topics: DRS working session initiatives: 1. Trust Relationships RFC 6. General Trust Discussions	Pavel

Meeting recording:
Meeting minutes:

- TES Updates
  - Poiesis: https://poiesis.vercel.app (TES Kubernetes)
  - Pulsar (Galaxy(: https://github.com/CESNET/tesp-api
  - Sprocket (WDL workflow manger): https://sprocket.bio/overview.html
  - Talking to Toil for TES support
    - CWL support
    - Miniwdl

- Pavel Updates:

- Next meeting in 2 weeks at 9am EDT

2025-06-23: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: , , Surya Saha (Velsera/Seven Bridges), Jared Rozowsky (Velsera/Seven Bridges), Venkat Malladi , , Reggan Thomas (GA4GH), , , ,

	- Map of DRS Servers (need an updated registry) - Paper hackathons coming up	

5.	Connect session proposals - July 3rd. Submit your proposal here
	- Ideate as a group
	- Idea 1 - trust relationships… co-session with Passport/DURI folks
	  - Data security workstream meeting:
	  October Connect 2025 - Connect Session Proposals DSWS
	- Idea 2 - GA4GH in the real world
	  - DRS, TRS papers
	  - Use case (GIF project?) … showing how to use the GA4GH cloud APIs together
	  - Turn this into a white paper?
	- Idea 3
	  - Cloud Roadmap in 2026
	  - Initiatives we want to push on from the above sessions
		Reggan

6	initiatives identified and scheduled in upcoming meetings - Need to identify items for discussion on 7/28 -	Reggan / Brian / Venkat
	A.O.B 1) Aus friendly cloud meeting time - shifting to 2 pm BST/ 9am ET / 6am PT	Reggan

Meeting recordings:
Meeting minutes:

DRS topics

- Geolocation (and constraints) metadata
  - Check with Jared and Surya
  - Jared
    - What notations/language we can use for providing this within DRS
  - Surya
    - One of the use cases for AnVIL/BDC integration… GCP location use case
  - Michael B
    - Use case from AnVIL for geolocation bound
    - European use case around geolocation bounds
    - identifiers.org constraint language… could be useful here
    - 1) geographic boundaries
    - 2) type of constraints… not beyond boundaries, or user pays, etc

    - Driver projects with a use case
        - BDC
        - eLwazi
        - AnVIL
    - Check out possible existing standards
        - https://github.com/SanondaDattaGupta/OPPO-Ontology
- Map of DRS servers
    - What is the state of the GA4GH registry? What DRS servers do we have in there?
        - https://github.com/ga4gh/ga4gh-registry

GA4GH Registry Summary

Name	Artifact	Version	Organization	URL
Cavatica DRS API	drs	1.0.0	Seven Bridges	https://cavatica-ga4gh-api.sbgenomics.com
Cancer Genomics Cloud DRS API	drs	1.0.0	Seven Bridges	https://cgc-ga4gh-api.sbgenomics.com
The Kids First Data Resource Center (KFDRC)	drs	1.1.0	Childrens Hospital of Philadelphia	https://data.kidsfirstdrc.org
National Center for Biotechnology Information DRS API	drs	1.2.0	National Center for Biotechnology Information	https://locate.be-md.ncbi.nlm.nih.gov
NCI DCFS	drs	1.1.0	NCI Data Commons Framework Services	https://nci-crdc.datacommons.io/
BioData Catalyst	drs	1.1.0	BioData Catalyst	https://gen3.biodatacatalyst.nhlbi.nih.gov/
AnVIL	drs	1.1.0	AnVIL	https://gen3.theanvil.io/

Total services: 7

        - So we've got 7… what about the other DRS servers from Gen3? eLwazi? Others?
    - Option 0 - google form for registration
        - Super simple, better than email?
        - https://docs.google.com/forms/d/1nfkE5Vm46LgUhMs6EWzmLEKi_r2x35muPgZEFWJ81Gw/edit
    - Option 1 - minimal update for Plenary
        - Just add geolocation to the current registry… see below
    - Option 2 - add Node Card support
        - and express geolocation via that (along with other info)
        - Heavier lift
    - Next steps
        - TASC hackathon July 15-18th… work on the registry… 1) registry API (with approval), 2) geolocation, 3) possibly Node card support
        - DRS paper hackathons
        - Reach out to the known DRS servers to get them registered


```
{
 "id": "gov.nih.nhlbi.biodatacatalyst.drs",
 "name": "BioData Catalyst",
 "type": {
  "group": "org.ga4gh",
  "artifact": "drs",
  "version": "1.1.0"
```

```
  },
  "organization": {
    "id": "gov.nih.nhlbi.biodatacatalyst",
    "name": "BioData Catalyst",
    "url": "https://gen3.biodatacatalyst.nhlbi.nih.gov/"
  },
"location": {
    "latitude": 48.85,
    "longitude": 2.29,
    "country": "US",
    "province": "CA",
    "city": "los_angeles"
},
  "version": "2.12.0",
  "url": "https://gen3.biodatacatalyst.nhlbi.nih.gov/",
  "description": "Full implementation of the DRS 1.1 standard with support for persistent identifiers. Open source DRS server that follows the Gen3 implementation. Gen3 is a GA4GH compliant open source platform for developing framework services and data commons. Data commons accelerate and democratize the process of scientific discovery, especially over large or complex datasets. Gen3 is maintained by the Center for Translational Data Science at the University of Chicago. https://gen3.org",
  "contactUrl": "mailto:aculotti@uchicago.edu",
  "documentationUrl": "http://petstore.swagger.io/?url=https://raw.githubusercontent.com/uc-cdis/Indexd/master/openapis/swagger.yaml#/DRS",
  "createdAt": "2020-07-24T12:00:00Z",
  "updatedAt": "2020-07-24T12:00:00Z",
  "curiePrefix": "dg.4503"
}
```


Upcoming DRS paper/registry hackathons

- GA4GH DRS Paper Hackathon
    - Wednesday, 6/25 9am-11am
    - Time zone: America/Los_Angeles
    - Google Meet joining info
    - https://meet.google.com/rdm-ncih-dfo
- GA4GH DRS Paper Hackathon
    - Monday, 6/30 ~~11~~ 12-1pm
    - Time zone: America/Los_Angeles
    - Google Meet joining info
    - https://meet.google.com/rdm-ncih-dfo

Global Alliance for Genomics & Health

Cloud session - Brainstorming ideas -
October Connect 2025 - Connect Session Proposals Cloud.xlsx

2025-06-09: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: ,Michael Baumann (Broad) , , ,

68-75 from the SC call,)

b) Kyle) will share current thinking around federated ML: Are our Cloud/API standards effectively enabling federated approaches today? If not, where are the gaps - and how might we bridge them.

2) Survey - **Help us improve our GA4GH internal communications!**

We aim to better understand how the community receives updates across GA4GH and opportunities to improve information delivery. Please take a few minutes to share your feedback and experience below by 20 June 2025:
https://forms.ga4gh.org/t/6HAbfaqDTZus

3) DRS Paper Hackathons / Drop-ins

- GA4GH DRS Paper Hackathon
  - Monday, 6/16 11-1pm
  - Time zone: America/Los_Angeles
  - Google Meet joining info
  - https://meet.google.com/rdm-ncih-dfo
- GA4GH DRS Paper Hackathon
  - Wednesday, 6/25 9am-11am
  - Time zone: America/Los_Angeles
  - Google Meet joining info
  - https://meet.google.com/rdm-ncih-dfo
- GA4GH DRS Paper Hackathon
  - Monday, 6/30 11-1pm
  - Time zone: America/Los_Angeles
  - Google Meet joining info
  - https://meet.google.com/rdm-ncih-dfo

Notes:

- …

Meeting recording :
https://us02web.zoom.us/rec/share/uuGHupHdmJxCOKjaAIrHIjjo72uaKmz2ZAD3woRvbEsmC8pQWl66nvUcNYMOJgeu.IxKsUAc7pEGcQS5Z

Passcode: R.JCE2j3

Global Alliance for Genomics & Health

2025-05-12: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: , ,Reggan Thomas (GA4GH) , Pavel Nikonorov (GENXT), Tom Conner (Broad, GA4GH), Alex Kanitz (ELIXIR Cloud & AAI), , , , Surya Saha (Velsera/Seven Bridges), Andrew Gearhart (Nimbus Informatics), , , ,

	• Federated learning workshop
	  ○ Slack channel (#federated-ml)
	  ○ GIF project proposal planned for next application window
	• TRE Open Suite GIF project (accepted; proposal; slides)
	  ○ TES as a basic TRE?
	  ○ Slack channel (#gif-open-tre)
	  ○ Expression of interest form
	• Updates on TES and Gen3	

4	RO Crate / DRS
	• Context: "FAIRification of Genomic Annotations WG" in Research Data Alliance (RDA)
	• GitHub issue: Align Annotation schema with GA4GH DRS standards or other standard for data access
	  ○ Goal: metadata model to describe remote data files within a larger, (but minimal) metadata model, including elements describing experiments, samples, etc.
	  ○ Idea: reuse DRS data model, but not the API
	  ■ Allows DRS server to be easily implemented, as the required metadata is already there
	• Draft of metadata model (under development), adopting DRS entities (from File entity, row 40)
	• Discussed in meeting May 6, Nathan Sheffield introduced the DRS, and its data mode, and Eli Chadwick introduced the Research Object Crate (RO-Crate) community standard, which is gaining use, esp. in Europe.
	  ○ Based on JSON-LD v1.0 and Schema.org vocabulary
	  ○ Larger infrastructure of tools and services for linked data, knowledge networks, etc.
	  ○ Important in ELIXIR, EOSC, etc.
	  ○ Being supported by scientific journals, databases etc.
	• Could the DRS data model be made RO-Crate compatible?
		Sveinung Gundersen / 15 mins

4.	Prototype mesh cards - presentation	Mike Conway / 20 mins
5.	Federated Machine Learning Standards - Initial discussion completed on 9th May. • Next steps : Will be scheduling follow-up meetings	Venkat 5 min
	A.O.B GA4GH DRS Paper Hackathon drop-in schedule for anyone interested in working on the DRS paper together. These are informal co-working sessions — feel free to join any or all if you'd like!	5 mins

Global Alliance for Genomics & Health

	Tuesday, May 13 · 9:00 – 10:00 am PT Google Meet: https://meet.google.com/znp-svpr-fjp Dial-in: +1 219-281-4428 PIN: 617 454 210# More numbers: here	

Meeting recording:
https://us02web.zoom.us/rec/share/y3aXNNOSSSVNpb9vXE3GWYtb4LmurqyuAiWFUpmMNdkWvTfslWV3MyXovRE-6yZ-.0WZFMQndtnVKzDoL

Passcode: 4+^^=FVL

Meeting minutes:

TES

- Followup meeting on federated machine learning meeting… Reggan is setting up
- Discussion around credentials storage and handoff
    - https://developer.hashicorp.com/vault
    - Still needs references to secrets you want to share… possibly passed through TES/WES… need the architecture for that
    - Possibly using a Visa in passport for credential passing?
    - Is DRS writeback going to happen? Could that be used here?
        - An optional extension (plugin) to DRS?
        - Example https://github.com/ga4gh/TASC/issues/45
        - From Alex:
          "+1 on DRS write back btw, from ELIXIR Cloud & AAI - we have been using the whole range of CRUD operations on our "generic" DRS implementation for a long time (by generic I mean that it's not tied to any particular data source, and it's main point is to handle task/outputs and intermediates, so that it can be used, e.g., in a platform, to handle data internally).
        -
        - Here's the implementation, if anyone's interested: https://github.com/elixir-cloud-aai/drs-filer (uses a very old DRS version).
        -
        - As a happy side effect, a proper, semantic "POST objects/" operation (even if optional) would force us to get rid of the REST-violating "GET with POSTing Passport objects/" abomination, which would in turn require small Passports 🙃"
- TRE GIF project was approved, see links above
    - June-July kickoff

RO Crate and DRS

- RO Create profiles
    - This would be where a DRS profile would be added
    - Should link to live URI when possible

    - Bottom up process
    - Conform to current specification
    - Someone could do this for DRS 1.5
    - AI: someone could make a profile for DRS 1.5…
- Schema with DRS metadata… need to include URI
- From Alex K
    - "My suggestion is to assemble a task force of people who are interested in GA4GH Cloud + RO-Crates, from both communities. I'd definitely join this, though I'd be more interested in Workflow Run Crates + WES/TES (we have already done some preliminary work mapping schemas and a bit of code towards a library interconverting them). We really need to capture that provenance in WES/TES!"
- From Michael B:
    - "+1 for the value of RO-Crate providing good support for including/containing DRS URIs/objects."

Mesh Card

- Ten pillars of data meshes: https://arxiv.org/abs/2411.05248
- Upcoming meeting on Data meshes in Chicago
- https://ctds.uchicago.edu/ardm25-workshop
- What is the function of the cards in defining federation?
-

From Chat

00:06:15 Tony Patelunas (ARPA-H): When is that follow up meeting?
00:06:44 venkatmalladi: @Tony Patelunas (ARPA-H) still working that out. @Reggan can you add Tony to that list
00:06:50 Tony Patelunas (ARPA-H): Reacted to "@Tony Patelunas (ARP..." with 👍
00:07:27 boconnor: I added an action items, folks can ping Reggan over email/slack if you want to be added to the federated ML working group/meeting
00:13:39 Tom Conner: Is there a data flow or threat model talking about what you're looking to lock down?
00:13:56 Surya Saha: Reacted to "Is there a data flow..." with 💯
00:15:02 Mike Conway NIEHS/NIH: +1
00:15:19 venkatmalladi: @Tom Conner can we add this to your next passports meeting agenda?
00:15:24 Tom Conner: Yes
00:15:48 Tom Conner: I should say - let me see….
00:15:55 venkatmalladi: Reacted to "I should say - let m..." with 👍
00:16:03 venkatmalladi: Ya can be anytime, I can come
00:16:46 Alexander Kanitz: Reacted to "Is there a data flow..." with 💯
00:19:10 Andrew Gearhart: hi everyone! sorry im late
00:20:01 Tom Conner: +1 plugin
00:22:24 Alexander Kanitz: Plugins/extensions/optional capabilities: https://github.com/ga4gh/TASC/issues/45
00:23:47 Denis Yuen: Reacted to "Plugins/extensions/o..." with 👍
00:26:25 Surya Saha: Reacted to "Plugins/extensions/o..." with 👍

00:29:45 boconnor: Just wanted to do a time check… we have 30 min for Sveinung and Mike
00:30:08 Surya Saha: Really great action items from Connect! I need to jump to another call. Please tag as needed
00:30:31 venkatmalladi: Reacted to "Really great action ..." with 👍
00:33:03 Alexander Kanitz: Reacted to "Really great action ..." with 👍
00:42:01 Mike Conway NIEHS/NIH: DRS as I understand it side-stepped delivering file metadata, would RO-Crate support call for some sort of file metadata endpoint that could return the JSON-LD?
00:42:43 venkatmalladi: Do you think that DRS servers will give a RO-crate for like a “shopping cart” for files?
00:45:23 Alexander Kanitz: +1 on DRS write back btw, from ELIXIR Cloud & AAI - we have been using the whole range of CRUD operations on our "generic" DRS implementation for a long time (by generic I mean that it's not tied to any particular data source, and it's main point is to handle task/outputs and intermediates, so that it can be used, e.g., in a platform, to handle data internally).

Here's the implementation, if anyone's interested: https://github.com/elixir-cloud-aai/drs-filer (uses a very old DRS version).

As a happy side effect, a proper, semantic "POST objects/" operation (even if optional) would force us to get rid of the REST-violating "GET with POSTing Passport objects/" abomination, which would in turn require small Passports 🙃😈
00:47:31 Alexander Kanitz: RO-Crate with Workflow Run Crates (https://www.researchobject.org/workflow-run-crate/) would also go really well together with WES/TES, so collaborating with the RO-Crate community would be really useful, not just for DRS
00:48:07 Michael Baumann (Broad Institute): +1 for the value of RO-Crate providing good support for including/containing DRS URIs/objects.
00:52:25 Michael Lukowski: Would love to interact with this on a issue
00:54:24 Alexander Kanitz: My suggestion is to assemble a task force of people who are interested in GA4GH Cloud + RO-Crates, from both communities. I'd definitely join this, though I'd be more interested in Workflow Run Crates + WES/TES (we have already done some preliminary work mapping schemas and a bit of code towards a library interconverting them). We really need to capture that provenance in WES/TES!
00:54:33 boconnor: @Sveinung Gundersen the DRS repo and issues queue is here: https://github.com/ga4gh/data-repository-service-schemas/issues
00:55:00 boconnor: And Reggan can schedule out future calls to loop back on RO Crate + DRS. Would be great to see this explore further!!
00:55:25 Sveinung Gundersen: Reacted to "My suggestion is to ..." with 👍
00:55:37 Sveinung Gundersen: Reacted to "And Reggan can sched..." with 👍
00:55:47 Sveinung Gundersen: Reacted to "Would love to intera..." with 👍

2025-04-28: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi

Global Alliance for Genomics & Health

Attendees “Name (Affiliation)”: ,Reggan Thomas (GA4GH) , David Steinberg (Camber), Andrew Gearhart (Nimbus Informatics), Pavel Nikonorov (GENXT), Tony Patelunas (Booz Allen Hamilton)

	Actions Arising	Assigned To	Deadline
1			
2			
3			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Venkat
2.	Previous Actions Review	Reggan
3.	DRS paper - working session ● Publication progress by Connect next week ○ Draft ○ Author signup ● Today ○ Let's work on our list of prerequisites ○ Let's get interested folks to "champion" sections of the draft ○ Establish drop-in hackathon sessions (see below)	Brian
4.	A.O.B - Next meeting on May 12, 2025 - upcoming meetings schedule ☐ Michael L for Mesh Cards, Venkat Community Use Case One-Pager	Reggan

Meeting recording:
https://us02web.zoom.us/rec/share/sUzEQ-3MAUNj9Rn-5aOK-jmN37lKOf7s7YeUn02jaLpsGU5qcww2FnE0ao4aYmo8.etrnrUF0Zt63zew7

Passcode: *j7QDYcg

Meeting minutes:

DRS Paper:

- Prerequisites and timeline
- Divide tasks/sections
- **Hackathon drop-in schedule (all pacific time)**
    - GA4GH DRS Paper Hackathon
        - Wednesday, April 30 · 10:00am – 12:00pm
        - Time zone: America/Los_Angeles
        - Google Meet joining info
        - Video call link: https://meet.google.com/sqz-omcz-mdq
        - Or dial: (US) +1 803-752-0900 PIN: 238 739 363#
        - More phone numbers: https://tel.meet/sqz-omcz-mdq?pin=2519186772645
    - GA4GH DRS Paper Hackathon
        - Thursday, May 8 · 1:00 – 3:00pm
        - Time zone: America/Los_Angeles
        - Google Meet joining info
        - Video call link: https://meet.google.com/zim-nebw-ije
        - Or dial: (US) +1 502-382-4236 PIN: 328 016 401#
        - More phone numbers: https://tel.meet/zim-nebw-ije?pin=7700535015884
    - GA4GH DRS Paper Hackathon
        - Tuesday, May 13 · 9:00 – 10:00am
        - Time zone: America/Los_Angeles
        - Google Meet joining info
        - Video call link: https://meet.google.com/znp-svpr-fjp
        - Or dial: (US) +1 219-281-4428 PIN: 617 454 210#
        - More phone numbers: https://tel.meet/znp-svpr-fjp?pin=9805368421065

2025-04-14: Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi
Attendees “Name (Affiliation)”: ,Reggan Thomas (GA4GH) , Jared Rozowsky (Velsera), , José Mª Fernández (BSC, ELIXIR ES), Pavel Nikonorov (GENXT), , ,Mike Conway(NIH/NIEHS) , , , , Surya Saha (Velsera/Seven Bridges) , Takudzwa N Musarurwa (eLwazi, UCT), , Tom Conner (Broad, GA4GH), , , , Bill Clifford (ISB, IDC), , , , ,

3	DRS paper… call small working session in the next few weeks… 1) pick journal, 2) divide up the sections	Reggan and Brian	Next two weeks

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Venkat
2.	Previous Actions Review	Reggan
3.	Connect "next action items" discussion (see below)	
4.	Sub-group Update (WES) → move to the 9th of June	
5.		
	A.O.B - Next meeting on Apr 28, 2025 is cancelled due to Meeting Free Week (MFW)	

Meeting recording :
https://us02web.zoom.us/rec/share/XchNzGCV4m6EpoAmuUiTJ7d6XBExf0ww698J4xdCe3y5Py7_VWtulK-ccjgYpNuW.IzyszlDAPhvmNY_R

Passcode: xmP=75aT

Meeting minutes:

Bold = champion that moves this item forward

Data Repository Service (DRS) working session

- Form a small working group to draft an RFC on trust relationships in DRS and present for community feedback.
  - People:
  - Pavel Nikonorov
  - **Brian O'Connor**
  - Tom Conner / Michael Baumann
  - Taku is interested as well
  - Can we get Reggan's help to see if there's a format GA4GH RFCs
  - This is not a new spec!
  - Schedule
    - June -
    - Plenary - RFC sent around, feedback, present at Plenary
- Explore integration of availability indicators (e.g., hot/cold status) into DRS specifications
  - By plenary, want a PR to vote on by drivers… in prep for DRS 1.6

        - People: **Surya/Jared**, Venkat, Brian
    - Investigate practical geolocation metadata handling in specs, without mandating enforcement.
        - Next step…
            - looking at DUO and other ontologies for how to encode this
            - Cross talk with other WS
        - By plenary, want a PR to vote on by drivers… in prep for DRS 1.6
        - Where are the DRS servers at?
        - People: **Surya/Jared**, Venkat, Brian
    - Pilot performance benchmarks (e.g., via hackathons) for data transfer methods across cloud providers.
        - People: **Ian(?)**, Jared, Venkat, **Brian**, Tom, maybe tech team from GA4GH for the registry part?
        - Topics
            - Cold storage performance
            - Data registration/location, Can we add making the "map" of DRS servers? 1.5 DRS servers?
            - Trust
            - → need to schedule out session(s)
    - Encourage contribution to DRS spec—including feedback on mounting, prefixes, and access control
    - Promote participation in Cloud Workstream meetings and invite suggestions for upcoming topics.
    - Contribute to the DRS publication: add yourself as an author if you've provided feedback or contributed.
        - → Plenary… have to have something on pre-print server

<u>Cloud Work Stream: new standards</u>

- Prototype mesh cards and explore integration with existing tools (e.g., Data Connect, RO-Crates).
    - People: **Michael L**., Brian, Andrew, Taku, Mike Conway
- PFB
    - Look at RO-Crate
    - Look at PFB as a standard
    - People: **Michael B**., Michael L, Jose,
- Develop and test software API descriptor schemas in collaboration with the workflow community.
    - People: **Alex K**., Denis,
- Advance trust discussions, including hybrid trust models and attested TLS.
- Identify champions to lead key projects and maintain momentum.
- Use upcoming sessions and hackathons to refine ideas and test solutions.

<u>Standards for enabling federated machine learning</u>

- Develop a list of requirements and use cases

    - People: Kyle, **Venkat**, Brian, Andrew
    - Presentation in July
- Determine if a new API standard needs to be developed
- Groundwork for developing a white paper
    - Goal to have draft for Plenary
    - Slot at Plenary to get buying from 1-2 driver projects to show usecase

GA4GH in the real world

- Create a one-pager outlining a specific use case to rally the community around.
    - People: David G., **Venkat**, Mike Conway, Brian, Surya
    - Circulate this in May in CW
    - Schedule with Taku good, bad and ugly of GA4GH implementation in the real world
        - Invite other Workstream leads to attend
- Reach out to community groups like neuroscience and pathoplexus to identify potential use cases.
- Reconvene the cloud work stream to further discuss how to use GA4GH standards to enable better data sharing and democratize compute.

Details from Pavel:

Here is the relevant HotRFC I provided at the IETF 122 meeting in Bangkok. Got some feedback, happy to communicate.
11. Exploring Trust Contexts in Attested TLS Environments
https://datatracker.ietf.org/meeting/122/materials/agenda-122-hotrfc-sessa-07

2025-03-24 : Cloud WS

Chair: Brian O'Connor (Nimbus Informatics), Venkat Malladi (Microsoft)
Attendees “Name (Affiliation)”: , , , , , , David Steinberg (Camber), , , Jared Rozowsky, Surya Saha (Velsera/Seven Bridges) , , , Michael Lukowski (U Chicago), Michael Baumann (Broad) , , , Reggan Thomas (GA4GH), , , , , , , , , , , ,

	Actions Arising	Assigned To	Deadline
1	Send a summary email for Connect for our sessions, slides, agenda doc, how to join remote calls to cloud mailing list on Friday	Reggan	3/28 - Done
2	Brian & Venkat will reach out to individuals for slides for Connect meeting by Thursday EOD 3/27	Brian & Venkat	3/27
3	Reggan to setup Zoom board to help with voting during the New Standards session	Reggan	3/27 - Done

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4	Maybe change “late” meeting given attendance is low	Reggan / Venkat / Brian	After Connect
5	Check on Zoom and attendees limitations, some orgs do not allow Zoom anymore	Reggan	3/27 - Done
6	Make sure our working sessions have a zoom link and can be attended remotely	Reggan	3/27 - Done

	Agenda Item	Assigned To	Deadline
1.	Welcome & Confirm Agenda	Venkat	5 min
2.	Previous Actions Review	Reggan	5 min
3.	Sub-group Update (DRS) ● Our last DRS meeting was 1/27 ● Previous Connect 9/17/24, see slides and notes ● 1.5 items ○ Publication progress by Connect next week ■ Draft ■ Author signup ← *make sure you sign up!* ○ DRS 1.5 has been released! 🥳 See DRS 1.5 release ● 1.6 ○ We have a session at Connect next week, see DRS slides/agenda below	Brian / Michael	10 min
4.	**Connect - Session agenda can be found on the event website** Connect meeting - 1 to 4 April 2025 • Broad Institute of MIT and Harvard, USA **Register for Connect** to access the zoom details. **Next Cloud meeting on Apr 14, 2025 at 6 pm BST/1 PM ET** **Gentle reminder to update the slide decks for Connect** Contributors slides are due Thursday EOD 3/27 GA4GH in the real world Friday, 4 April 2025, 14:15 - 15:45	Brian / Venkat	20 mins

Chairs: Brian O'Connor , Venkat Malladi
Agenda:
GA4GH Connect April 2025 - GA4GH in the real world…
GA4GH Connect 2025 - GA4GH in the real world .pptx
TODO: slides by Thursday 3/27

- Need content slides from presenters
- **Jilong Liu** for Bio-OS: Implementing GA4GH Cloud Standards in China
- **Ian/Jimmy** for GA4GH Starter Kit gaps
- **Venkat / Kyle** for Discussion of Real world use case

GA4GH Connect 2025 - Cloud Workstream - New Standards
Wednesday, 2 April 2025, 14:15 - 15:45 ET
Chairs : Brian O'Connor ,Michael Lukoswki, Michael Baumann
Agenda:
GA4GH Connect April 2025 - Cloud Workstream - Ne…
GA4GH Connect 2025 - Cloud Workstream - New Stand...
TODO: slides by Thursday 3/27

- **Need cloud work stream members to include pitch slides for new standards (or features) key for 2025**
- So far...
  - PFB/serialized workspaces (**Michael B, attend virtually**)
  - Mesh cards (**Michael L, attending in person**)
  - Trust mechanisms between Passport Brokers and DRS servers (**Brian, attending in person**)
  - Workflow/tool input/output descriptors (**Alex K**)
- **Reggan** to setup Zoom board to vote on items during the session

Data Repository Service (DRS) working session
Thursday, 3 April 2025, 11:15 - 12:45 ET
Chairs : Brian O'Connor Michael Lukoswski
Agenda:
GA4GH Connect April 2025 - DRS Working Session ….
GA4GH Connect 2025 - DRS Working Session .pptx

	TODO: slides by Thursday 3/27
	- Need slides from **Jared/Surya (in person)** on Section 2: Implement mechanism to encode geolocation/cloud constraints in DRS metadata
	- Need slides from **Brian/Tom** on Section 3: Investigate options for managing trust relationships between DRS servers and clients
	- Optional sections if we have time:
	  - Need slides from **Venkat, Surya (in person),** (Ian will provide context, see notebook) Section 1: Explore options for adding defrosting mechanisms to DRS for deep cold storage object
	  - Need slides from **Michael L (in person).** Section 4: Coordinate integration of Crypt4GH support in DRS
	
	Standards for enabling federated machine learning
	Thursday, 3 April 2025, 09:00 - 10:30
	Chairs : Kyle Ellrott , Venkat Malladi , Alexander Kanitz , Ravi Madduri
	Agenda :
	GA4GH Connect April 2025 - Standards for enabling f…
	GA4GH Connect 2025 - Standards for enabling federate...
	TODO: slides by Thursday 3/27
	- **Kyle, Alexander, Venkat and Ravi** for slides		

Meeting recording :
Meeting minutes:

2025-03-10 : Cloud WS

Chair: Brian O'Connor ,Venkat Malladi (Microsoft)
Attendees “Name (Affiliation)”: Venkat Malladi (Microsoft) , Surya Saha (Velsera/Seven Bridges), Micheal Baumann (Broad Institute)

Global Alliance for Genomics & Health

,Kyle Ellrott(OHSU) ,Jared Rozowsky ,Tony Patelunas (ARPA-H) ,Jose M Fenandez ,Reggan Thomas (GA4GH) , , ,

	• Voiceover preview: available here. This is the **last opportunity** to provide feedback on the animation. After this point, it will enter a final production stage. Connect - Session agenda can be found on the event website - Connect meeting - 1 to 4 April 2025 • Broad Institute of MIT and Harvard, USA **Register for Connect** to access the zoom details. Hotel accommodation - Connect 🏢 **Last call to reserve a space at the Connect conference hotel — deadline extended to 7 March.** The deadline to access GA4GH's preferred rate at the **Boston Marriott Cambridge** has been extended to **7 March**. Located in the heart of Kendall Square, the conference hotel is a short walk from the Connect meeting venue and a subway ride away from local attractions in Cambridge and Boston. You may add a hotel booking when you register for Connect. If you are already registered, you can log in and add a hotel booking to the registration. Add your hotel reservation **here**. • GIF open call for projects: 🅿 GIF-Project-Open-Call-advert.pptx https://www.ga4gh.org/open_call/propose-a-gif-project/ Next meeting on Mar 24, 2025 at 10 pm BST/5 PM ET		

Meeting recording:
https://us02web.zoom.us/rec/share/BammWukXLSSAkzfp5gfIBhGrAZ2mvR6XLRQhR-7KoGDBNzrhVx2P7V-EAwc_6Nji.J1zPypfhJrvikd-1

Passcode: U754m#u8

Meeting minutes:
The meeting discussed the upcoming GA4GH Connect session in early April, emphasizing the need for virtual attendance support. Key updates included the 1.2 PR requests, focusing on bug fixes and fractional resource requirements for CWL. The team debated the implementation of a resource info endpoint to handle specialized compute needs, such as GPU and FPGA requirements. They also discussed the challenges of cost management and billing in remote

execution, suggesting the use of external credentialing technologies like HashiCorp Vault. The comms team previewed an animation for the cloud workstream, seeking feedback on its accuracy and effectiveness.

Actions:
Explore the idea of a "resource info" endpoint to provide information on available compute resources.
Investigate existing credential management solutions like HashiCorp Vault and provide recommendations on how to integrate them.

2025-02-24: Cloud WS

Chair: Brian O'Connor ,Venkat Malladi (Microsoft)
Attendees “Name (Affiliation)”: , Reggan Thomas (GA4GH), ,Surya Saha ,Michael B ,Jared R , , ,

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1.	Welcome & Confirm Agenda	Brian / 5 min
2.	Previous Actions Review	Reggan / 5 min
3.	Sub-group Update (TES/WES/TRS/DRS) round robin (if leads have updates) - DRS, Michael merged in last change for 1.5	
4.	Connect Planning (April 1-4th) : https://broadinstitute.swoogo.com/connect25bos/agenda 1) Cloud Work Stream: new standards Wednesday, 2 April 2025, 14:15 - 15:45 ET Chairs : Brian O'Connor ,Michael Lukoswki, Michael Baumann Agenda - GA4GH Connect April 2025 - Cloud Workstream - New Stand… 2) Data Repository Service (DRS) working session Thursday, 3 April 2025, 11:15 - 12:45 ET Chairs : Brian O'Connor Michael Lukoswski Agenda GA4GH Connect April 2025 - DRS Working Session .docx 3) Standards for enabling federated machine learning Thursday, 3 April 2025, 09:00 - 10:30 Chairs : Kyle Ellrott , Venkat Malladi , Alexander Kanitz , Ravi Madduri Agenda : GA4GH Connect April 2025 - Standards for enabling federated mac… 4) GA4GH in the real world Friday, 4 April 2025, 14:15 - 15:45 Chairs: Brian O'Connor , Venkat Malladi Agenda: GA4GH Connect April 2025 - GA4GH in the real world .docx	
	A.O.B	

	Next meeting on Mar 10, 2025 at 6 pm BST/1 PM ET	

Meeting recording:
https://us02web.zoom.us/rec/share/wh4nSNtorXgOWWFPKxlJmVzDJbpp2QiCh57scBug5sH91bpA7vPsWS3H37OPfB0v.WM_vOxW0j9bqwK9a

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Meeting minutes:
AI session

- Trust of models
- Federated learning
- DRS and what can leave environments

2025-02-10: Cloud WS

Chair: Brian O'Connor, Venkat Malladi
Attendees "Name (Affiliation)": Beatrice Amos (GA4GH), Venkat Malladi (Microsoft), Michael Lukowski (U Chicago),Valentin Schneider-Lunitz (Charité/Berlin) , José Mª Fernández (BSC, ELIXIR ES), Bill Clifford, Jaclyn Estrin (GA4GH), Stephanie Li (GA4GH), Tony Patelunas (ARPA-H), Stojan, Andrew Gearhart, Jared Rozowsky, Jose M Fenandez, Mallory Freeberg, Vadim Kupv, Surya Saha (Velsera/Seven Bridges), Pavel Nikonorov (GENXT), Micheal Baumann (Broad Institute)

Apologies: Reggan Thomas (GA4GH)

	Actions Arising	Assigned To	Deadline
1	Animation storyboard→ deadline for feedback: **17 February**	Group	Feb 17th
2	Vadim to add text to spec to cover his use case	Vadim K.	When possible
3.	Feb 27th 2PM CET presentation on attested-TSL Meeting agenda Meeting Link: https://us02web.zoom.us/j/81746162406 (pass: GA4GH) **Feb 27, 8am ET / 1pm GMT / 5am PST / 2pm CET**	Pavel is presenting - Details here - https://ga4gh.slack.com/archives/CGBUL0L5V/p1	Feb 27th

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review - Thursday for Connect agenda	Reggan
3.	Sub-group Update WES	WES Leads / 15 mins
4.	DRS implementation question DRS Implementation Questions 1. **On-Demand File Generation:** ○ We are considering an approach where files are generated dynamically when requested via the */objects/{object_id}* endpoint. ○ Is this approach commonly used within the community, and are there any known implementations following a similar pattern? ○ We'd love to hear any feedback or considerations from those who have addressed similar challenges. 2. **User-Specific Data Handling:** ○ In our potential implementation, the same *{object_id}* may return different results depending on the requesting user. ○ We are unsure if this aligns with DRS expectations and best practices, and how it might affect interoperability. ○ Are there any guidelines or recommendations on handling user-specific data securely within the DRS framework?	Vadim Kupovykh Planned for 10-Feb / 15 mins
5.	Animation - Cloud Work Stream ● Animation storyboard→ deadline for feedback: **17 February**	Comms team / 15 mins
6.	1. Attested-TLS vs conventional TLS, what does it mean for data policy protection in fed env 2. GA4GH-SDK + aTLS status	Pavel / 5-10 mins Intro/announce

	3. Demo on DSWS planned on 27 Feb + IETF for aTLS presentation (global internet standard working group) Cloud WS: SDK, aTLS, IETF intro / announcement	ment

Link to meeting recording:
https://us02web.zoom.us/rec/share/ZZChEB_r9MzNqn2riF1q3HWci7rfN7aexOMkk3qodgo8ZM7BU0A-QkEu1HjOszOH.xkA8HJ8pHW-X1A_O

Passcode: a.7C7gVy

Meeting notes:

Animation - Cloud Work Stream

- Script sent around
- Preceding with the final script unless they hear

DRS Implementation Question

- Vadim is building a GA4GH wrapper for Genomic England
- Data Connect and DRS
- The core challenge, different users could have different results
- Their solution, create a unique DRS ID on a per user
    - Different user
    - Different table snapshot
- This seems fine form a spec perspective
- We clarified the access ID request using bearer token
- AI: → add the paragraph describing the dynamic ID approach, will help others.
- AI: → clarify in the spec that you use your bearer token (or passport) in the access request…

Attested-TLS

- Can provide mTLS trust and much more
- Doesn't change the GA4GH APIs
- Trusts:
    - CU/GPU enforcement
    - Software library… would like to see registry service and possibly service-info

Meeting summary:

Vadim (Genomics England) began by clarifying the main objective of ensuring their approach and solution comply with GA4GH standards within the RSPI scope.
The team is developing a GA4GH wrapper for the Dreamio system, aiming to align with all GA4GH standards, particularly focusing on the Data Connect API and DRS. They've managed

to implement Data Connect, but have come across a few issues with DRS because Dreamio does not provide direct access to physical files. Instead, it only allows executing queries on Iceberg and regular tables without additional metadata. This poses an issue as DRS is primarily designed for providing access to file-based objects. Vadim went over their proposed approach to address this limitation and sought confirmation that it aligns with DRS principles.
The two main use cases mentioned were:

- on-demand file generation and
- user-specific data handling.

Vadim outlined the primary challenge of generating DRS identifiers, particularly how users would retrieve DRS IDs for specific tables or files. He suggested using the Data Connect API as an entry point to generate and provide these identifiers but sought confirmation on whether this approach aligned with standard practices.

Michael (Gen3) explains that, in most cases, platforms like Gen3 already have files stored and ready for access via pre-signed URLs, making this type of dynamic DRS ID generation a relatively unexplored approach.
Brian (WSL) added that, while the original vision for DRS included various entity types (such as database tables or API endpoints), its implementation naturally coalesced around file-based access. However, he acknowledged that DRS IDs don't necessarily have to map directly to static files and raised an important question: would a given DRS ID always return the same result?

Vadim clarified that their system, using Iceberg tables, introduces an additional complexity - row-level security checks within Dreamio could lead to different users receiving different results from the same query. To address this, they plan to include user identifiers in DRS ID generation, ensuring that each user receives a unique DRS ID tied to their user ID and the data snapshot ID. This guarantees consistency for each user while maintaining security.

Vadim highlighted a potential issue: DRS is generally designed to allow sharing of IDs so that any user with access to a DRS ID can retrieve the corresponding object. Their approach, which restricts access based on the original requester's identity, may conflict with this principle.
<u>Security discussion:</u>
They need additional security checks to prevent unauthorised access but he's unsure if this method aligns with standard DRS expectations.

The discussion centered around authentication and security concerns regarding access to DRS objects.
Venkat raised the idea of using a passport-based authentication system akin to a visa/passport model to verify user access.
Vadim responded that their current authentication relies on a simple API key for Dreamio, and while they have considered other options, they are facing issues with external IDP support and JWT tokens, which are not yet implemented.

Michael explained that in Gen3, authentication is managed through their "Fence" service, which verifies user credentials via JWT tokens before granting access to DRS objects.
Brian summarised that the main challenge is ensuring that only the original requester of a DRS object can access it later, preventing unauthorised users from retrieving the same object even if they possess the access ID.
Vadim clarified that they can verify user identity but want to confirm that denying access to a different user aligns with the DRS spec.
Michael and Brian reassured that in production DRS systems, simply having a DRS ID and access ID is insufficient for retrieval - authentication via a bearer token, passport, or JWT is always required. This cleared up the misconception that an access ID alone could grant unauthorised access.

There was recognition that **authentication and authorisation mechanisms must be robust to prevent data leaks while ensuring compliance with DRS specifications**.
Brian to make a note of that in the documentation!

Venkat asked about the retention of generated CSV files- are they stored or regenerated each time?
Vadim explained that their approach involves regenerating the data as needed, ensuring consistency while not necessarily keeping the same physical file.
Venkat suggested this could apply to CRAM file storage while generating SAM and BAM files dynamically.

Brian: Vadim can you contribute a short paragraph describing GEL'S approach to the specification to help future implementers navigate similar challenges within the DRS framework?
Venkat suggested incorporating the paragraph into the DRS paper for better visibility.
Don't forget Augusto will be presenting on the GEL implementation at the upcoming Connect meeting, please align efforts.

Comm team animation update:
Cloud Work Stream Animation Script - feedback document

Please feedback - 1 week!

Pavel (GENXT) GA4GH SDK / CLI:
Pavel gave an overview of the GA4GH SDK project, explaining its origins under the GA4GH umbrella with funding from Google Summer of Code. The project initially focused on implementing service and phone clients, and during the biohackathon, a proof of concept for the SDK's extension subsystem was presented.
The first extension added to the SDK was attested TLS, a combination of TLS and confidential computing.

Attested TLS enhances security by not only protecting data during transmission but also ensuring it remains protected during use by verifying remote software before data is sent. This technology supports data protection policies, enabling more granular control over how data is accessed and processed, including enforcing policies for specific pipelines and software versions. Pavel mentioned the benefits of using attested TLS for data sharing and protection, particularly in remote cloud infrastructures.
He mentioned a presentation (*sorry missed this*) on February 27, where he will demonstrate ELIXIR TES in confidential computing environments.

2025-01-27: Cloud WS

Chair: Brian O'Connor, Venkat Malladi
Attendees “Name (Affiliation)”: , , ,Bill Clifford (ISB, IDC) , Michael Lukowski (U Chicago), , , , , , , , , ,Surya Saha ((Velsera/Seven Bridges), , , , , , Reggan Thomas(GA4GH), , , , , , , , , ,Venkat Malladi (Microsoft) , , , , , , , ,,Tom Conner (Broad) , , , , , , , Michael Baumann (Broad),Tazro Ohta (Chiba Univ)

	Actions Arising	Assigned To	Deadline
1	In Q1, have champions/drivers/implementers participating in initiatives	Group	Q1
2	Plan Connect sessions details and agenda, ask for content	Group	First week of Feb
3.	Share the contacts spreadsheet with group	Brian/Reggan	ASAP

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review	Reggan
3.	Update on Roadmap and new meetings - We're pushing forward for drivers/implementers/projects joining cloud to share their thoughts on initiatives - 2025 Cloud WS Roadmap.docx	Venkat/Brian

	- Add suggestions for drivers/etc - …	

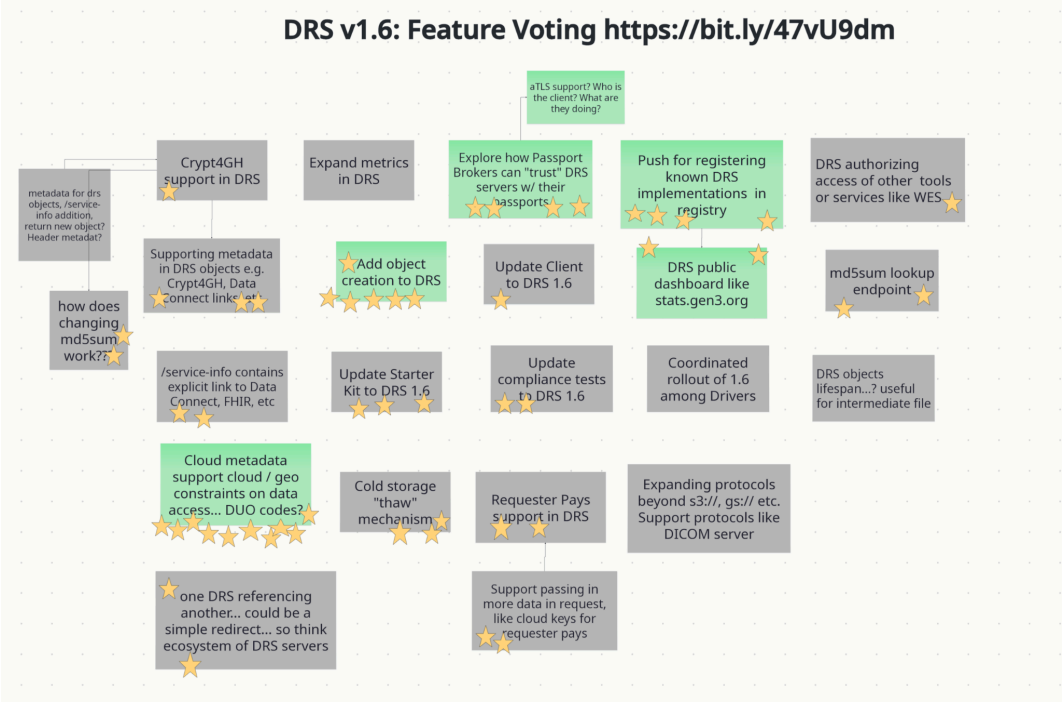
4.	Sub-group Update DRS
	● Last time we talked DRS in detail: 10/14/24, see here
	● Connect 9/17/24, see slides and notes
	● 1.5 items
	  ○ Publication by Connect → hackathon sessions
	  ■ Draft
	  ■ Author signup
	  ○ Details of 1.5 documented here
	  ○ See PR#408
	  ■ We need a quick response to David Lougheed's good feedback before I can release this… we're behind, wanted to do this right after Connect
	  ■ See Michael Lukowski's response here: https://github.com/ga4gh/data-repository-service-schemas/pull/409
	  ■ → can we get one of the DRS champions to finalize this? Need to update the OpenAPI schema and discuss maxBulkRequestLength
	  ■ → next steps… update PR 409 with this…
	  ● A 2.0 branch to track a breaking change
	  ● Deprecated maxBulkRequestLength and point people to new location
	  ● Location for metadata like stats under "drs/" in service info
	  ● Velsera and starter kit implemented bulk, gen3 not yet
	● 1.6 items
	  ○ Priorities from Connect: https://bit.ly/47vU9dm
	  ○ Implement mechanism to encode geolocation/cloud constraints in DRS metadata
	  ■ → identify champion: Jared/Surya TBD, Surya will check
	  ○ Explore options for adding defrosting mechanisms to DRS for deep cold storage objects
	  ■ → identify champion: Venkat, Surya, (Ian will provide context, see notebook)
	  ○ Explore adding object creation functionality to the DRS API
	  ■ → identify champion: Michael Lukowski, will talk with the community to see what's needed
	  ○ Investigate options for managing trust relationships between DRS servers and clients
		Brian / Michael

	■ → identify champion: Tom Conner, Brian O'Connor (Ian is interested as a user) ■ Is there a lightweight/scalable way to do trust across an ecosystem? ○ Coordinate integration of Crypt4GH support in DRS ■ → identify champion: Michael Lukowski ■ → we have an upcoming joint session, Reggan is scheduling ● Our initiatives as outlined in our 2025 roadmap draft	
5.	DRS implementation question DRS Implementation Questions 3. **On-Demand File Generation:** ○ We are considering an approach where files are generated dynamically when requested via the*/objects/{object_id}* endpoint. ○ Is this approach commonly used within the community, and are there any known implementations following a similar pattern? ○ We'd love to hear any feedback or considerations from those who have addressed similar challenges. 4. **User-Specific Data Handling:** ○ In our potential implementation, the same *{object_id}* may return different results depending on the requesting user. ○ We are unsure if this aligns with DRS expectations and best practices, and how it might affect interoperability. ○ Are there any guidelines or recommendations on handling user-specific data securely within the DRS framework?	Vadim Kupovykh Planned for 10-Feb

Meeting recording:
https://us02web.zoom.us/rec/share/Un-7bQ40-Wz-zSugcfvZ3IhR3mmSEf-zczszBxPqRs0U-u8-YPzmSw0ikAo1Lmc.XKBttAB50liUAKIh

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Meeting minutes:



2025-01-13: Cloud WS

Chair: Brian O'Connor, Venkat Malladi
Attendees “Name (Affiliation)”: , , ,Jared Rozowsky (Velsera) , , , , , , Michael Baumann (Broad), , , , , , , , , , , , , ,Binam Bajracharya(UChicago) , , , , Surya Saha ((Velsera/Seven Bridges), , , , , Michael Lukowski (UChicago), Heather Creasy (NCI CRDC),Mike Warfe (NCI) , , , , , , ,Reggan Thomas(GA4GH) , , Thomas Mooney (WUSTL),Bill Clifford (ISB, IDC) ,Venkat Malladi (Microsoft) ,Ian Fore (Independent) , , , , , , Tom Conner (Broad), , , , , ,

	Actions Arising	Assigned To	Deadline
1	In Q1, have champions/drivers/implementers participating in initiatives	Group	Q1
2	Jan 16th feedback for Animation Script	Group	Jan 16th
3	Plan Connect sessions details and agenda, ask for content	Group	After Jan 22nd

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian

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2.	Previous Actions Review	Reggan
3.	Roadmap document 2025 2025 Cloud WS Roadmap.docx	Brian/Venkat / 15 min
4.	Sub-group Update (TES) - Backlog issues - Integration with engines and other project	TES leads / 15 min
5.	Animation - Cloud Work Stream ● Project Overview ● Animation script → deadline for feedback: **16 January**	Comms team / 15 mins
6.	Connect Planning - Connect meeting - 1 to 4 April 2025 • Broad Institute of MIT and Harvard, USA **Register for Connect** - retro board here by 6th Jan - Need to submit proposals in the form by 13th Jan, **let's review today** - **We will hear back on approval on around the 22nd**	Brian/Venkat 15 min
7.	A.O.B.	

Meeting recording:
https://us02web.zoom.us/rec/share/zaaTXnsjkAs155O30vPOGSvXv1VfltGOJXemVUSJPdFSQdV_-XETIaDQO0LtlQOz.TUHtqIuKrbIKqf_T

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Meeting minutes:

- Roadmap discussion
  - Surya's comment
    - How to get implementers and users to drive the discussion
    - What is missing? What is the gap here?
  - Michael
    - We've made a lot of progress, things like DRS URI exchange, open access
    - Auth, egress, storage temp… more challenging issue … need to make progress here
    - Smoothing the flow from one system to another… new standards
    - Initiatives could
  - Venkat
    - We've done the toy examples, how do we do the "hard" real world examples?
  - Brian
    - Key to find many hands to make light work… want driver/implementer participation in these initiatives, this is key
  - Action item here → have champions/drivers/implementers participating

- TES update
    - TES paper officially released
    - Now going through backlog of issues
    - 1.2 vs. 2.0 release
    - 1.2 release in the spring
    - Nextflow and Cromwell integrated, looking at SnakeMake
    - WES workflow implementation
    - RUST TES implementation being worked on
- Animation - Comms team
    - Stephanie Li
    - Jaclyn Estrin
    - Animation for all 8 of the workstreams
    - Not naming standards, the APIs in action
    - See the animation script for our comments → due 16th

Draft of Connect Session applications:

- Easy retro here
- Form to submit today https://survey.alchemer.com/s3/8085633/Propose-a-session-at-the-2025-April-Connect-Meeting
- Should we propose 3 sessions? General cloud/roadmap/new standards, DRS, and starter kit/new implementers?

Session 1 - Cloud WS Roadmap & New Standards → submitted by Michael

Who: Brian O'Connor, Venkat Malladi, Michael Lukowski (PFB and Mesh Cards), Cross-work stream: Discovery work stream topics: connection to Data Connect, registry and mesh cards

Description of goals: 1) to discuss the overall goals of the cloud work stream in 2025. To finalize a roadmap document that focuses on overall initiatives and translate that into specific API / activity goals. To identify champions for these new activities. 2) To explore to explore new standards and identify champions (serializing workspaces/PFB, mesh cards, etc)

Format: Group discussion + whiteboarding

Session 2 - DRS working session → submitted by Michael

Who: Michael Lukowski, Brian O'Connor

Description of goals: to discuss the goals for DRS in 2025 including our release plan, features to include, identification of champions for features, implementers that will implement, and connection to other work stream products like Discovery and Passports

Format: Group discussion + whiteboarding

Session 3 - GA4GH in the Real World - Starter kit and getting implementers going → submitted by Venkat

Who: Venkat

Description: A session focused on what are the gaps in the starter kit, how to fill the gaps (who can help?), and how projects can transition from starter kit to real implementations. Part of this could be understanding what GA4GH needs to work on in 2025 to make that transition easier (from trying starter kits to real implementations).

Format: Group discussion + whiteboarding

2024-12-09: Cloud WS

Chair: Brian O'Connor
Attendees “Name (Affiliation)”: , , , , , , , , ,Denis Yuen (OICR - Dockstore) , , , , , , , , , , , , Michael Lukowski (U Chicago), Michael Baumann (Broad), , , , , , Mike Warfe (CRDC), , ,David Steinberg (UCSC) ,Reggan Thomas (GA4GH) , Venkat Malldi (Microsoft), , , , ,

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (TRS) - Discussion	Denis / 20 mins
4.		
5.	A.O.B - Connect meeting - 1 to 4 April 2025 • Broad Institute of MIT and Harvard, USA **Register for Connect**	

	- Add your connect session proposal to the Easyretro board here by 6th Jan
	  - Need to submit proposals in the form by 13th Jan
	
	Next meeting on 23rd December - Cancel? → yes!!
	
	Next meeting then is the 13th… so we need to do the easy retro in today's call and the proposal forms, let's get volunteers today
	
	API schedule for next 2025 - here
	- TES on 13th Jan,2025
	- First meeting of (1/13) 2025, we will work on a **roadmap document for 2025** similar to the 2024 document → Brian/Reggan to work on first draft ahead of this meeting
	  - We'll also map out topics for 2025 beyond just API updates…
	  - Challenges for implementers
	  - Need for guides/blueprints to get started
	  - Novel APIs	

Meeting recordings:
https://us02web.zoom.us/rec/share/p_NCSdJCm1U3F_GUL9F2nY5HqO3FjkH8df9mvZ-E9j1W2pYawN8ejiny5EaQbLnl.piXPDEw4xq8UiAi5

Passcode: J.f5$=z7

Meeting minutes:

- TRS update by Denis
  - Slides: …
  - Introduced issue of relative paths referenced in WDL, for example
  - They have an issue where they are working on solutions that make path for primary descriptor explicit
- Connect session… to submit forms… see above… form
  - **Michael L.**/Brian O. → form for DRS 1.6 and related topics
  - **Venkat** → example guidance across work streams… how would you accomplish something using GA4GH… so use case with DRS, Connect, etc
  - Michael B./**Michael L**. → PFB, Mesh Card, TRS extensions for models/dataset, other new standards scoping session
  - *We will prepare our Cloud WS 2025 roadmap ahead of connect…*

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2024-11-25: Cloud WS

Chair: Reggan Thomas (GA4GH)
Attendees “Name (Affiliation)”: , , , , , , , ,Tazro Ohta (Chiba U) , , , , Michael Lukowski (U Chicago), , , ,Mike Warfe (NIH/NCI) , , , , ,David Steinberg(UCSC) , , ,Kyle Ellrott(OHSU) , , Surya Saha ((Velsera/Seven Bridges), , , Tom Conner (Broad, GA4GH), Denis Yuen (OICR - Dockstore), Ian Fore (NIH)
Apologies: Brian O'Connor ,

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Reggan / 5 mins
2.	Previous Actions Review	
3.	Sub-group Update : DRS ☐ Mesh cards	Michael
4.	TES ☐ TES publication ☐ Recent specification PR/Issue updates ☐ tooling and community effort updates	Kyle / Venkat
5.	A.O.B - Connect meeting - 1 to 4 April 2025 • Broad Institute of MIT and Harvard, USA **Register for Connect** Fill out the **session proposal form** by 5 December 2024.	

Meeting recording:

https://us02web.zoom.us/rec/share/OpQZAxCAVUmXf7vIdLhWKmdPPjfEEUB3BIHa0GJJSyLoDd74CCwM8-1-A5IHasAu.1eYBOfdxpm0JHQ-6

Passcode: J?4RdG$.

Meeting minutes;

2024-11-11: Cloud WS - Canceled (Meeting Free Week)

2024-10-28: Cloud WS

Chair: Brian O'Connor
Attendees “Name (Affiliation)”: ,Reggan Thomas (GA4GH) , , , , , Shelby Holden (Broad Institute - Terra Data Repo), , , , , , , , , , , , ,Tazro Ohta (Chiba University) , , , , ,Michael Lukowski (Uchicago), ,David Steinberg (UCSC) , Denis Yuen (OICR - Dockstore), , , , , , José Mª Fernández (BSC / ELIXIR ES), Venkat Malladi (Microsoft) , Surya Saha ((Velsera/Seven Bridges), Ian Fore (NIH)

	Actions Arising	Assigned To	Deadline
1	MedHackathon Asia 2025: looking for a cloud workstream description here. → get some slides from Cloud WS	Brian / Taz	Feb
2	Next steps for WES improvements, Taz to talk to WES implementers		

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda • Valentin and **Tazro** joining WES as co-leads alongside current WES co-leads	Brian / 5 mins
2.	Previous Actions Review - *none today*	
3.	Next meetings • 11/11 - cancel due to meeting free week (TES)	Brian / 5 min

	• 11/25 - TRS and DRS 1.5 / mesh cards	
4.	Sub-group Update : WES WES proposals https://github.com/ga4gh/workflow-execution-service-schemas/issues/220 Action Items ☐ WES implementers… give feedback, which of these have you run into ☐ Talk to Velsera ☐ Talk to Elixir (at next week hackathon) ☐ Everyone, add feedback to issue 220 ☐ Ultimately break into separate tickets/PRs → Taz and other WES champions	Tazro
5.	A.O.B - Upcoming hackathons - Elixir next week in Barcelona - MedHackathon Asia 2025: looking for a cloud workstream description here. → get some slides from Cloud WS… Feb 3-7, 2025	

Meeting recording:
https://us02web.zoom.us/rec/share/2PD8ybstLadX06kjv6T_geCZYIaLO4YwbWt9P4f3Q4Qjyt-H-r8JynD5IPEKDQQ1.Dq_XydKNkEDx5A7q

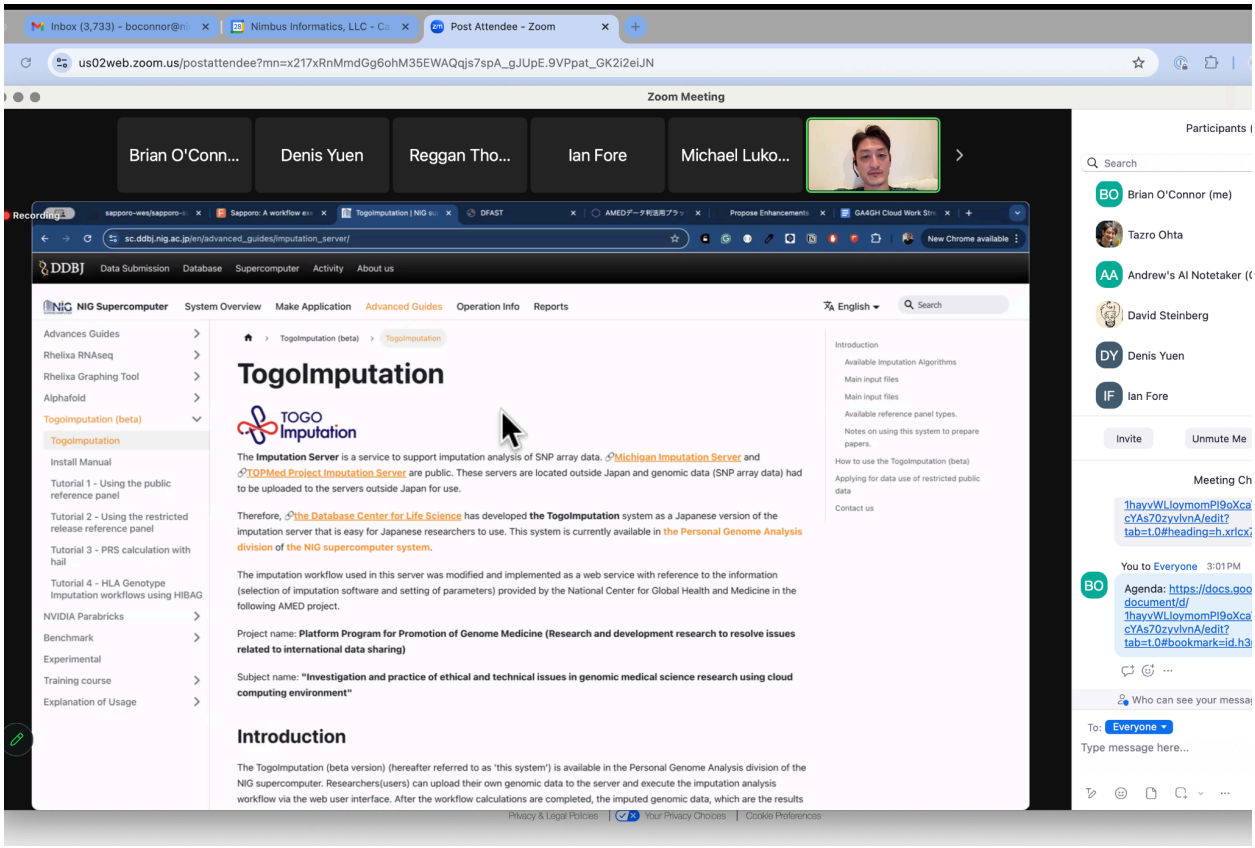
Passcode: AU%5bOp&

Meeting minutes:

Background from Tazro

- Sapporo WES implementation: https://github.com/sapporo-wes/sapporo-service
- Used in TogoImputation imputation server, DFast, AMED
- WES helpful, hidden behind the UI, users don't know it's there but helpful for development
- Updated the implementation of Sapporo 1→2… supporting wes 2.0.0
- Proposed enhancements for Sapporo (issue 220)
    - Default_workflow_engine_params: make this available per workflow engine
    - Sort_order and state to get runs
    - Enhance POST to pass in workflow attachments via download URL instead of form field
        - Opportunity to link with TRS
    - Enable downloading of run outputs
        - Including a download as a zip

        - Could this return DRS URIs too?
- Feedback
    - Ian points out, SBG's WES server produces DRS URIs for download, can we put that in the spec?
        - Access to URLs… may not be the same auth
    - Auth around file access and handling
    - Put different options for accessing output in service-info?
    - Adding link which shows how DRS can be used to retrieve the files from a WES compute on Seven Bridges/Velsera
    - https://github.com/ga4gh/Get-Started-with-GA4GH-APIs/blob/main/presenter/completed/2-2%20Run%20samtools%20view%20via%20WES-completed.ipynb
    - Need to get a list of WES implementations
        - SBG/Velsera
        - Elixir and WES proxy
        - Check the registry



2024-10-14: Cloud WS

Chair: Brian O'Connor

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Attendees “Name (Affiliation)”: , , , , , , , ,Bill Clifford (ISB, IDC) , Michael Baumann (Broad) , , , , , , , , , , , Michael Lukowski (U Chicago), , , , , , , , , , , , , , , ,Reggan Thomas (GA4GH) ,Valentin Schneider-Lunitz
Apologies: Patrick Magee (DNAstack), Surya Saha ((Velsera/Seven Bridges)

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda ● Valentin and Tazro joining WES as co-leads alongside current WES co-leads	Brian 5 min
2.	Previous Actions Review	Skip today
3.	Plenary/Connect Sessions for Cloud - **Key Takeaways and next action items - updated** - Session Title: **DRS 1.6 and beyond/DRS Access options for compute tools** Date/Time: **Tuesday September 17 at 9:00 - 10:30 AEST** **Agenda document** **Presentation slide deck** - **Session Title: Cloud Work Stream in 2025** **Date/Time: Tuesday September 17 at 11:15 - 12:45 AEST** **Agenda document** **Presentation slide deck** - **Brief summary slide pack:** 20241014 - GA4GH Summary of Connect/Plenary	Brian/Reggan - 15 min
4.	**Sub-group Update** → WES was canceled, let’s do a quick round robin for DRS, TRS, TES if champions are available	API Champions - remaining time
5.	**Upcoming Calls:** - Next call schedule [Reggan] - TRS focused meeting - Can we do “mesh cards” as well, try for the next meeting. Brian and Michael L on this.	

	- Can we add a Crypt4GH joint session to our rotation → Reggan by the end of the year… one of the DRS meetings [Reggan]
	- Standardizing metrics reportback mechanism… → Reggan to invite discovery folks … one of the DRS meetings [Reggan]
	- WES on the next call → WESkit on the next one? Plan out when to do this with Valentin [Reggan]
	- TRS moved to the next one… give Denis time after vacation [Reggan]
	- New API idea from Michael B/Terra for "resolution" of DRS objects → setup something in 2025 [Reggan]
	  - Increasing demand for analysis tools, interactive, etc that work with DRS URIs
	  - Want to make it simple for tools to provide DRS support
	  - Simple to implement API but auth is difficult
	  - A DRS client can get complicated very quickly!! Constraints, cloud, auth mechanism, download via cloud APIs, etc
	  - Can we make a library? Broad has created a DRS client as a service… give it auth credentials and DRS URI… return a collection of metadata fields and signed URL if requested.
	  - Could extend this to a more generalized resolver… helpful for complex ecosystems described	

Meeting recording:
https://us02web.zoom.us/rec/share/H2eqv87WjuMAjFmYa5nShVXiRVC-X-F8csZAtM47btJAquDNGD85NEikMxdqnOc.qJ6Q4pXqswzNNd2I

Passcode: vDwaS4$!

Meeting minutes:

DRS 1.6 session
- Requester pays brought up
- Constraints + cold storage… work on these together
- Compute to the data… more with WES/TES synergist with egress costs

Cloud in 2025
- Mesh cards could help system builders but also researchers to discover what's out there
  - Look at Verily for ARPA-H → TODO
  - Could be great for researchers
  - → Add to our rotation
-

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2024-09-09: Cloud WS

Chair: Brian O'Connor
Attendees “Name (Affiliation)”: Venkat Malladi (Microsoft), , , , , , , , , Surya Saha (Velsera/Seven Bridges), , , , , , , , , , ,Michael Lukowski (U Chicago), , , , , , , , , , , , , , Binam Bajracharya(UChicago), , , , ,Bill Clifford (ISB, IDC) , Mike Warfe (NCI), , , , , , , José Mª Fernández (BSC / ELIXIR ES), ,Noble Dzakpasu (NIH) , , , , , , ,

Apologies: Denis Yuen - out sick

	Actions Arising	Assigned To	Deadline
1	DRS feature champions (Surya (done), Jared (ask), Michael (done)) - finish PRs if needed Brian make final docs	Champions	Now
2	API Champions - review/edit NIH Grant Renewal docs → WES needs to be finished all other are done	API Champions	**Today**
3	API Champions, Ian, Brian please put slides in the Cloud and DRS session slide packs by Friday	API Champions, Brian, Ian (for DRS)	**9/13**
4	Brian to prep the DRS 1.5 docs and links to publication for the sessions	Brian	**9/13**

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review	Reggan
4.	Sub-group Update (TES) 1) nextflow updates 2) Next workflow engine to tackle	Venkat / Kyle
5.	Plenary/Connect Sessions for Cloud	Brian

	- Session Title: **DRS 1.6 and beyond/DRS Access options for compute tools** Date/Time: **Tuesday September 17 at 9:00 - 10:30 AEST** **Agenda document** **Presentation slide deck** - **Session Title: Cloud Work Stream in 2025** **Date/Time: Tuesday September 17 at 11:15 - 12:45 AEST** **Agenda document** **Presentation slide deck**	
6.	Cloud WS Co-lead position - apply now - https://www.ga4gh.org/opportunity/co-lead-cloud-work-stream/ - Closes on Sept 30th	Brian
7.	AOB	Brian

Meeting recording:
https://us02web.zoom.us/rec/share/B-b-I4h47MUN-rQnbp3g9JBjouCTt8UT00ZCm6Gix7i8Axs_TeXwrPxe99XcRm_v.38sk8Xyu1RN5DWCT

Passcode: 902#p0V^

Meeting minutes:

- TES update
  - Nextflow… released their TES plugin. Testing undergoing now.
  - Future… outreach to engine groups.
    - Galaxy
    - Venkat's team
    - Etc.
    - What are the other engines to focus on?
      - CWL?
      - Kubernetes?
      - What do folks need?
    - Other languages to support?
      - Better examples?
      - For example: https://github.com/stjude-rust-labs/tes
    - How do you support the community?
      - Documentation?
      - Do we need more walkthroughs? HelloWorlds?
      - Starter kits?
  - Longer term items for TES
    - Enterprise… auth / passports
    - Are there other blockers?
  - TES article in pre-print!
    - https://www.computer.org/csdl/magazine/cs/5555/01/10564576/1Y4iZIL5J7i

- Publications
    - TES going forward
    - DRS drafted
    - TRS and WES? In 2025?
    - Do we have a future publication that shows them working together? Like examples from eLwazi, NCPI, Elixir Cloud?
        - Could cover blockers on policy – Surya's comment
        - Secure enclaves, how do we solve that?
- Kyle - Think about docs beyond Publications
    - Medium and blog articles?
    - Actual tutorials etc.
    - Starter kits

2024-08-26: Cloud WS

Chair: Brian O'Connor
Attendees “Name (Affiliation)”: Ian Fore (NIH), Heidi Sofia (NIH), , , , , , , , , Mike Warfe, Denis Yuen (OICR - Dockstore), Surya Saha (Velsera/Seven Bridges), , , , , , José Mª Fernández (BSC/ELIXIR ES), , , ,Charles Aylward (Illumina) , , , , , , , , , , , , , , , ,Noble Dzakpasu (NIH), Venkat Malladi (Microsoft)

Apologies: Reggan Thomas (GA4GH)

	Actions Arising	Assigned To	Deadline
1	DRS feature champions (Surya, Jared, Michael) - finish PRs if needed	Champions	Now
2	Driver Projects/Implementers/Contributors/API Champions - feedback/comments on Plenary/CONNECT sessions	Everyone	ASAP… finalized on 9/9
3	API Champions - review/edit NIH Grant Renewal docs	API Champions	**Today**
4			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review	Brian
3.	Sub-group Update (TRS)	Denis / 25 mins

	• Discussion on container security when exchanging/reproducing academic workflows • slides	
4.	Reminder - Plenary/Connect Sessions for Cloud - Session Title: **DRS 1.6 and beyond/DRS Access options for compute tools** Date/Time: **Tuesday September 17 at 9:00 - 10:30 AEST** **Agenda document** **Presentation slide deck** - **Session Title: Cloud Work Stream in 2025** **Date/Time: Tuesday September 17 at 11:15 - 12:45 AEST** **Agenda document** **Presentation slide deck**	Brian
5.	NIH Grant renewal - Need all leads to provide a high-level roadmap for 2026-2030. Deadline - Aug 26, 2024 • Reminder, see our 2024 roadmap WES: NIH grant renewal - Cloud WS -WES.docx TES: NIH grant renewal - Cloud WS - TES.docx TRS: NIH grant renewal - Cloud WS - TRS.docx DRS: NIH grant renewal - Cloud WS - DRS.docx	API Champions

Meeting recording:
https://us02web.zoom.us/rec/share/0hxdhyGBQmXXlek635FspjLJfA4A6mOYR7C3ZqIWzaamGhnZcUxkcKW8N1UXnmhT.z4WwLVaU_jYCz8Pc

Passcode: DS9&N9AY

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Meeting minutes:

2024-08-12: Cloud WS

Potential topics:

- "Mesh Cards" from the ARDM conference → Brian will discuss what this is and why it might be a useful new standard for cloud

Chair: Brian O'Connor
Attendees: ,,,,Michael Baumann (Broad),,,,,,,,,,,,,,,Mike Warfe (NCI), Michael Lukowski (U Chicago),Bill Clifford (ISB, IDC),,,,Heidi Sofia (NIH),,,,,,,,David Steinberg (UCSC),Denis Yuen (OICR - Dockstore), Surya Saha (Velsera/Seven Bridges),, Michele Mattioni (Velsera),,Matthew McAuliffe (NIH),,Venkat Malladi (Microsoft),,,Thomas Mooney (WUSTL), Jared Rozowsky(Velsera), Tony Patelunas (ARPA-H CTR),Reggan Thomas (GA4GH)
Apologies:

	Actions Arising	Assigned To	Deadline
1	DRS feature champions (Surya, Jared, Michael) - finish PRs if needed	Champions	
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	

3.	Sub-group Update (DRS)
	• **Last DRS meeting was ~1 month ago (6/24)**
	• **Release DRS 1.5 before plenary in September**
	  ○ **Want all 1.5 changes merged by August 12th (today!) for Driver Project voting by Sept 9th**
	• **Cold Storage: Surya Saha**
	  ○ Issue #395, feature branch feature/issue-395-cold-storage (diff), and PR PR#401
	  ○ Decision from Connect:
	  ■ Thaw mechanism will be in DRS 1.6
		Brian/ Michael

        - For DRS 1.5 and PR#401... use terms "immediate" and "delayed"
    - ➔ **LAST TIME**: Surya, can you make the change and push to your PR? Ian and Surya to discuss specific term.
        - Keep in mind, this is for use by objects that need a restore mechanism, not "it will be ready in 10 seconds"
    - ➔ **TODAY**: is this done and ready to merge?
    - ➔ **DONE**!!: it's been merged on the call
    - UPDATE Sep 10, 2024 :
        - **This PR originally went to "master"... I back-ported to "develop" in keeping with our process**
- **Cloud/Geolocation: Jared Rozowsky**
    - Issue/Feature/PR: Issue #400, Feature branch feature/issue-400-location-constraints (diff), PR#405
    - Decision from Connect: For DRS 1.5 we include cloud and region information only... no private cloud and no geo location
        - The fields we will include are:
            - Cloud: **e.g. google or aws or azure**
            - Type: s3 or https or etc
            - Region: e.g. us-east-1
    - ➔ **LAST TIME**: Jared, can you update your PR to report just this info back on the access_methods? Let's review the enum values via comments on your PRs.
    -
```
"access_methods": [
 - {
       "type": "s3",
     + "access_url": { … },
       "access_id": "string",
       "region": "us-east-1",
     + "authorizations": { … }
```
    - ➔ **TODAY**: Did Jared make the changes and is this ready to merge?
        - ➔ he will be able to do this this week, Thursday
    - UPDATE Sep 10, 2024 :
        - **DONE** I created and merged https://github.com/ga4gh/data-repository-service-schemas/pull/407
- **Stats: Michael Lukowski**

	○ Issue/Feature/PR: Issue #396, Feature branch?, PR? ○ Decision from Connect: ■ Add the following two fields: ● ObjectCount ● totalObjectSize (bytes) ■ Will go in service-info not a new endpoint ○ ➔ **LAST TIME**: Michael, can you make a PR extending the service_info for DRS to include these two items? ■ ➔ Michael did do a PR but will reformat to be a part of service info ○ ➔ **TODAY**: Has this been done? ■ ➔ he will be able to do this this week, Thursday ○ UPDATE Sep 10, 2024 : ■ **DONE** I updated and merged https://github.com/ga4gh/data-repository-service-schemas/pull/404 ● **Metadata linking: Michael Lukowski** ○ Issue/Feature/PR: Issue #394, Feature branch(es): feature/issue-394-drs-plus-connect-docs-v1, PR? ○ Decision from Connect: For 1.5... just add text to the spec that you should have a catalog, such as Data Connect ○ ➔ **LAST TIME**: Michael, please create a pull request with your documentation change. ○ ➔ **TODAY**: Has this been done? ■ ➔ he will be able to do this this week, Thursday ○ UPDATE Sep 10, 2024 : ■ Merged and backported to changes to develop ■ ➔ build is working now, need to move the content to a new document I think... ● **Publication: Brian O'Connor** ○ Please add yourself to the authors registry if you have contributed to DRS in a tangible way. ○ Draft outline shared here, please comment! ○ ➔ **TODAY**: only 4 authors currently, please register!	
4.	"Mesh Cards" from the ARDM conference ● See document: Data mesh scenarios and their mesh cards ● Would Mesh Cards be useful to advance the cloud workstream APIs?	Brian

	• Could this complement the registry and service info?
	• Could we explore this further in this group and/or at Plenary?
	• Interest?
	  ○ Yes, Heidi S. Michael B, and others indicated interest
	  ○ Michael - can we compose them? Multiple types of mesh cards?
	  ○ Surya - how do we maintain? How do we have a registry?
	  ○ David Steinberg - Git makes it very easy to understand and implement. Toolkit for generating cards for example… could build off of their editors. Dataset cards… interesting to look at that as well. Cards for registry. Linking datasets to models… cards are key for this. Mesh → data connect for example could be powerful. No API on hugginface… opportunity to improve… API first perspective
	  ○ Venka … gravitating to this, what places could we work?
	  ○ Michaele… registry, is there a space where we can use service-info to provide information that is consumed to generate mesh cards?	

5.	Overview of Plenary Sessions - Session Title: **DRS 1.6 and beyond/DRS Access options for compute tools** Date/Time: **Tuesday September 17 at 9:00 - 10:30 AEST** **Agenda document** **Presentation slide deck** → ***Are there driver projects/implementers that would like to present their ideas/priorities?*** - **Session Title: Cloud Work Stream in 2025** **Date/Time: Tuesday September 17 at 11:15 - 12:45 AEST** **Agenda document** **Presentation slide deck** → ***Are there driver projects/implementers that would like to present their ideas/priorities?***	Brian
6.	New Cloud Work Stream Co-lead • David has transitioned to the advisory group for GA4GH • ***Thank you David for many years of guidance!!***	

	• Process
	  ○ Reggan to create a comms request - **Done**
	  ○ Timeline - 10 days for comms - **In progress**
	  ○ Comms to post it online for 4 weeks
	  ○ ~2 more weeks for GA4GH leadership to reach a decision	

Meeting recording:
https://us02web.zoom.us/rec/share/CUAv7OmExTGDYIWSv3Hwvj9_8gUPJNAPJjGQm_S5MgwW1Va0GmMB5TI34cuNmh2v.PSZGJZnKm4-pTn-4

Passcode: qY%b1%1g

Meeting minutes: Added along with the agenda items

2024-07-22: Cloud WS (Canceled due to unavailability of the leads)

Chair: Brian O'Connor
Attendees:
Apologies:

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (DRS)	Brian/ Michael
4.		
5.		

Meeting recording:

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Meeting minutes:

2024-07-08: Cloud WS

Chair: David Glazer,~~Brian O'Connor~~
Attendees: David Glazer, Mike Warfe, Heather Creasy (NCI CRDC) , Bill Clifford (ISB, IDC) , , , , , , Binam Bajracharya(UChicago) , , , , , , , , , Michael Lukowski (U Chicago), Matthew McAuliffe NIH\CIT, , , Venkat Malladi (Microsoft), Noble Dzakpasu(NIH), Michele Mattioni (Velsera/Seven Bridges), Surya Saha (Velsera/Seven Bridges), José Mª Fernández (BSC/ELIXIR ES)

Apologies: Brian O'Connor, Reggan Thomas

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.	Sub-group Update (TES/WES/TRS/DRS)	
5.	**Cloud Project Board update**	
	-	

- TODO: reach out to WES leads re potential Connect session
-

2024-06-24: Cloud WS

Chair: David Glazer,Brian O'Connor
Attendees "Name (Affiliation)": , ,,,,,,,, , , , , , , , , ,

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	Actions Arising	Assigned To	Deadline
1	Find a future meeting to discuss "mesh cards" which came out of the ARDM meeting in Chicago in June.	Reggan & Brian	Next meeting
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review (skip, none captured from 6/10)	Brian
3.	Sub-group Update DRS ● **For reference - DRS 1.4 spec**: https://ga4gh.github.io/data-repository-service-schemas/preview/release/drs-1.4.0/docs ● ***Recall our Connection session 4/23/24: Session title: DRS 1.5 - Key Features and Plans for 2024*** ○ *Date/time: Tuesday April 23 at 9:00 - 12:00 CEST.* ○ *Agenda TBD* ● **Key takeaways and action items for September Connect 2024:** ● **Release DRS 1.5 before plenary in September** ○ **Want all 1.5 changes merged by August 12th for Driver Project voting by Sept 9th** ● **Cold Storage: Surya Saha** ○ Issue #395, feature branch feature/issue-395-cold-storage (diff), and PR PR#401 ○ Decision from Connect: ■ Thaw mechanism will be in DRS 1.6 ■ For DRS 1.5 and PR#401... use terms "immediate" and "delayed" ○ ➔ **TODO**: Surya, can you make the change and push to your PR? Ian and Surya to discuss specific term. ■ Keep in mind, this is for use by objects that need a restore mechanism, not "it will be ready in 10 seconds"	Brian / Michael

- **Cloud/Geolocation: Jared Rozowsky**
  - Issue/Feature/PR: Issue #400, Feature branch feature/issue-400-location-constraints (diff), PR#405
  - Decision from Connect: For DRS 1.5 we include cloud and region information only... no private cloud and no geo location
    - The fields we will include are:
      - Cloud: e.g. google or aws
      - Type: s3 or https or etc
      - Region: e.g. us-east-1
  - ➔ **TODO**: Jared, can you update your PR to report just this info back on the access_methods? Let's review the enum values via comments on your PRs.
  -
```
"access_methods": [
 - {
       "type": "s3",
     + "access_url": { … },
       "access_id": "string",
       "region": "us-east-1",
     + "authorizations": { … }
```
- **Stats: Michael Lukowski**
  - Issue/Feature/PR: Issue #396, Feature branch?, PR?
  - Decision from Connect:
    - Add the following two fields:
      - ObjectCount
      - totalObjectSize (bytes)
    - Will go in service-info not a new endpoint
  - ➔ **TODO**: Michael, can you make a PR extending the service_info for DRS to include these two items?
    - ➔ Michael did do a PR but will reformat to be a part of service info
- **Metadata linking: Michael Lukowski**
  - Issue/Feature/PR: Issue #394, Feature branch(es): feature/issue-394-drs-plus-connect-docs-v1, PR?
  - Decision from Connect: For 1.5... just add text to the spec that you should have a catalog, such as Data Connect

	○ ➔ **TODO**: Michael, please create a pull request with your documentation change. ● **Publication: Brian O'Connor** ○ Please add yourself to the authors registry if you have contributed to DRS in a tangible way. ○ Draft outline shared here, please comment! ○ ➔ **TODO**: Brian for a more complete draft by the end of the month.	
4.	Sub-group Update TRS - slides ● Nextflow and TRS discussion ● Container Security survey	Denis Yuen
5.	AOB **Connect meeting is on 16 and 17th September 2024** Submit Connect proposal here. (submissions were due June 19th) ● I applied for a "Cloud WS in 2025" session, description: "The goals of this session will be to recap the cloud work stream in 2024 and set a target for where we want the API specs to be in 2025." ● I also applied for a "DRS 1.6 and beyond" session, description: "The goals of this session will be to recap the DRS 1.5 release in 2024 and set a target for how we want the API to evolve in 2025." Brainstorm connect meeting ideas **here** GA4GH 12th Plenary details are available here	

Meeting recording:

Meeting minutes:

2024-06-10: Cloud WS

Chair: David Glazer,~~Brian O'Connor~~

Global Alliance for Genomics & Health

Attendees “Name (Affiliation)”: ,Jared Rozowsky (Velsera),,Bill Clifford (ISB, IDC),,,,,,Mike Conway (NIEHS),,,Binam Bajracharya(UChicago),,,,Surya Saha (Velsera/Seven Bridges) ,Michele Matttioni (Velsera/Seven Bridges),Takudzwa N Musarurwa (eLwazi-UCT),Thomas Mooney (WUSTL),,Patrick Magee (DNAstack), Marc Perry (UCSC), Venkat Malladi (Microsoft)
Apologies:

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (WES) - Slides - WES - Survey - Results and next steps -	Patrick/Chris L/Lee Pang
4.		
5.	AOB Connect meeting is on 16 and 17th September 2024 Submit Connect proposal here. Due date - **19 June,2024** Brainstorm connect meeting ideas **here** GA4GH 12th Plenary details are available here	

Meeting recording:
https://us02web.zoom.us/rec/share/Cgisc6DwXFAM3GtZp13mKhOMzrobN9BTO2HE8cq-etF1Z4QwtgGi6m-56y9v_rxl.hmn0ibhQPGnUvTyo

Passcode: ^1N0RS=2

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Meeting minutes:

Patrick presented slides:

- WES v1.1 released Sep 2023; exploring WES v2.0
- sent out survey; got 9 responses (7 research, 1 industry, 1 healthcare) (4 expert, 4 novice)
- WES pillars: simplicity, compatibility, reliability
- lots of feedback was about improving WES platforms
    - vs. improving the API spec itself – e.g. cost, scalability, reliability
    - not clear which platforms people are using when they use WES
- avg satisfaction of 3.5 out of 5
    - “the bones are good”
- Compatibility – 3 multi-WES users
    - WES is *not* compatible between different implmeentations, auth is not straightforward, different languages have different requirements that hte spec does not handle, spec has ambiguity that is interpreted differently
    - e.g. WES impls of NextFlow and SnakeMake are very different
- I/O handling
    - lots of under-specified pieces (credential mgmt, often assumptions the engine has direct access to the data, no way to tell engines where to write their outputs)
    - e.g. a writable DRS API *might* be a way to talk about outputs
- limited metadata visibility
    - often have to drop down to the underlying engine to troubleshoot
- Improvement ideas
    - richer metadata (with several suggestions)
        - e.g. PR #216 to provide unified WES+TES support for structured logs
    - input/output handling
    - inter-platform compatibility
        - consider consumers and implementers
        - consider nextflow, snakemake, wdl, cwl
        - Venkat: also bifurcation between server-based and CLI-based engines
- Next steps
    - coordinate with other Cloud WS teams and AAI to coordinate around real world examples
    - resurrect the Io? schema spec
    - identify missing metadata

Q&A

- Q(Taku, U Cape Town): Re output – can we use DRS for that?
    - as an implementer, we need the output in a specific place
- Q (dG): how confident are we in the input?
    - partly – limited # of people using WES, so only have partial feedback
    - input/output is one clear request
    - happy to see 2-3 new WES impls over the past few years
- Venkat: what about the GA4GH toy playground we have?
- Q(dG): what does success for WES 2.0 look like?
    - Patrick: fully speced not ambiguous submit/execute, I/O, auth
    - “it works” is not a good enough bar

    - agree we need clearly defined goals/charter
    - we've seen people go to individual engines and then use TES – so maybe WES is the wrong layer of abstraction, given the uniqueness of each engine/language
    - dG: that's an important existential question to address
- Q(Michele): had driver projects with burning use cases, that led to clear scoping
    - do we have that for WES?
    - Patrick: few implementers who are driver projects who want to use WES
    - Elixir is a good use case, facing battle-tested issues
    - relatively low engagement beyond that
    - only very technical users need to submit workflows – may not be well-captured in our driver projects
    - e.g. "multi-cloud project that wants unified tooling" would be a good use case
    - dG: oppty to tell the WES story in a way that driver project champions could resonate with
    - Patrick: what if WES is "here's how facilitate access to my published data" ?
- Venkat: my WES 2.0 goal would be "go to methods section; use LLM to create a workflow; submit to a WES API; run it"
    - LLM should be able to get access to data via correct credentials
    - multi-cloud multi-engine WES
    - no one engine will make a WES – they'll make a native interface to their engine
    - so want one API, submit workflow in any language you want,, and it works
    - each Cloud could build a WES API that supports all the engines that run on their cloud
    - Patrick: Azure, AWS, Google have all taken small steps in that direction
    -
- Q: next steps?
    - Patrick: move the "define success" conversation forward
    - maybe do research on current driver projects and their needs?
    - formulate a problem statement for what WES is solving (in the language of user needs not of what we build)
    - Patrick will work Alex and Venkat; would love support from dG and Reggan on how to engage driver projects
    - soft target – have something prepared to circulate a month before Plenary, so we can figure out how to use face time to get more input
- dG summary:
    - We're kicking off the definition of WES 2.0, starting by defining success
    - We believe there's a compelling story to tell, and will tell it clearly.
    - If we're wrong, that raises questions about "why WES"..

2024-05-13: Cloud WS - Cancelled - Due to US/UK Holiday

Chair: David Glazer,-Brian O'Connor
Attendees "Name (Affiliation)":
Apologies:,

	Actions Arising	Assigned To	Deadline

1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (TES) - Manuscript updates - Nextflow updates - Authorization	Venkat/Kyle
4.		
5.	AOB	

2024-05-13: Cloud WS

Chair: David Glazer,~~Brian O'Connor~~
Attendees “Name (Affiliation)”: Ian Fore(NIH) , Jared Rozowsky (Velsera/Seven Bridges),Michael Lukowski (UChicago),Michele Mattioni (Velsera/Seven Bridges), Mike Warfe (NIH/NCI), Takudzwa N Musarurwa (UCT-eLwazi ODSP), , , , Bill Clifford (ISB, IDC) ,Heidi Sofia (NIH) , Matthew McAuliffe(NIH) , Marc Perry (UCSC), , Surya Saha (Velsera, Seven Bridges), , ,Patrick Magee (DNAstack) ,Venkat Malladi (Microsoft) ,Reggan Thomas (GA4GH) , , ,
Apologies:,Brian O'Connor

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	

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2.	Previous Actions Review	
3.	Sub-group Update (TES) - Manuscript updates - Nextflow updates - Authorization	Venkat/Kyle
4.		
5.	AOB	

Meeting recording:
https://us02web.zoom.us/rec/share/HffGfJzWCCgjYxxhJl8SbT9o3mla73b1tOFwl9BFaEYx9h8xB9Xp9R3N4gDLuxA6.5gYwSh-jS86hnA6v

Passcode: #R^4zA#5

Meeting minutes:

- TES manuscript
  - [2405.00013] The GA4GH Task Execution API: Enabling Easy Multi Cloud Task Execution
  - submitted in December to an IEEE special issue on hybrid computing; addressed minor review comments; back with reviewers and editor
  - target is to publish in August
  - potential future paper/whitepaper with ELIXIR, focused on TES in action
- Q: state of TES in the real world, clients and servers?
  - Terra using TES backend for their Azure workflows
  - *could* have Nextflow implement
  - DNAstack is using Azure TES
- Q: any WES implementations that call TES?
  - not sure – maybe DNAstack
  - now that NF is available, making a WES endpoint for NF that calls TES will be more practical
- Michele: we (Velsera) have WES implemented with a few backends, but don't support TES
- Kyle:
  - next step is to get the main workflow engines to support calling TES
  - after that, get to more of a devops conversation around getting systems accessible to actual researchers
- Patrick
  - met with Venkat, Alex, Kyle last week
  - discussed authZ

    - discussed the large value that TES provides to engine developers for smoothing over difficulties that every engine ends up reimplementing (e.g. how do I support Google Batch?)
    - so direct benefit to engine developers, and indirect to researchers
- Venkat
    - I think we *should* expose TES to researchers, as a way to do small simple tasks, and don't need a full workflow
- Patrick
    - WES has to deal with lots of language-specific details; TES lets you "just launch"
- Q: is there productive work to do around helping callers decide *where* to run their tasks? Or is that best left to each TES-caller to decide?
    - Kyle: TES *could* provide a std way to say "this executor has this hardware available"
    - Venkat: depends on what you care about – e.g. cost vs. time
- Q: is there work to do around advertising / discovering available task-execution services?
    - Venkat: Elixir / Alex built a "TES Gateway" – register TES endpoints, and it then decides where to route individual tasks – we *could* decide to build a standard around that later
    - Kyle: gated by authZ
    - Venkat: and billing
- Authorization
    - discussing the needs/questions; don't yet have proposed answers
    - need: if someone comes into a system, and have their own repository of files, how do they delegate access so that a future worker node can read and write to that repository?
    - need: what other things are being authorized? E.g. "you may use this FPGA", "you may run this job on this node"
    - need: how do we communicate auth failures back to the user?
    - Kyle: TES clients have to deal with whatever auth mechanism their calling environment is using – which seems kind of hacky, but matches with reality

2024-04-08: Cloud WS

Chair: David Glazer
Attendees "Name (Affiliation)": , ,,, Michael Lukowski (U Chicago),,Surya Saha (Velsera, Seven Bridges), José Mª Fernández (BSC / ELIXIR-ES),, Anne DeslattesMays (Science and Technology Consulting LLC),Venkat M (Microsoft), Reggan Thomas (GA4GH,Ian fore (NIH)
Apologies: Brian O'Connor,

	Actions Arising	Assigned To	Deadline
1			

2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (WES) - WES - general discussion - Survey	Patrick/Chris L/Lee Pang
4.		
5.	AOB Meeting on Apr 22, 2024 - Canceled Next Meeting - 13th May Connect schedule - https://broadinstitute.swoogo.com/ga4gh-connect-2024/agenda?utm_campaign=GA4GH+April+Connect+2024&utm_source=hs_email&utm_medium=email	

Meeting recording:

https://us02web.zoom.us/rec/share/hJdTwd3rJgqVcs4a9a4P1c_OAcGV5dDu6N6-Svel18TQ1QEZ4Lr7IsTo-u45XZ05.YuDxHEok_J_GL2jm

Passcode: uuR?cR=0

Meeting minutes:

2024-03-25: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , Bill Clifford (ISB, NCI IDC) , ,Jilong Liu(GZNL) ,Noble Dzakpasu (NHLBI), José Mª Fernández (BSC / ELIXIR ES),Reggan Thomas (GA4GH), Surya S (Velsera), Ian Fore (NIH)

	Actions Arising	Assigned To	Deadline

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1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Recap of Connect sessions ● Agenda has been released ● Sessions to look out for: ○ ***Session title: DRS 1.5 - Key Features and Plans for 2024*** ■ *Date/time: Tuesday April 23 at 9:00 - 12:00 CEST.* ■ *Agenda TBD* ○ *Session title: Federated cohort building* ■ *Date & Time: Wednesday, April 24, 2024, 1:00 PM - 2:30 PM* ○ *Session title: Passports in production* ■ *Date & Time: Monday, April 22, 2024, 3:00 PM - 4:30 PM* ○ *Session title: AAI and Passports "what's next?" unconference sessions* ■ *Date & TimeWednesday, April 24, 2024, 10:30 AM - 12:00 PM* ■ *Agenda* ○ *Presentation: Testbed: Monday, April 22 at 13:00–14:30 CEST) on the topic "GA4GH Testbed Infrastructure."* ○ *Look for "New Driver Project workshops" in the Agenda…* ● *Reminder… our roadmap for 2024*	Brian 10 min
4.	Sub-group Update (DRS) ● **Review connect agenda for the DRS session… Who can lead conversations? What do we want completed for the meeting in ~1 month?** ○ *30 min max per session* ○ *Stay focused: background, feedback needed, and next steps/timeline (ideally X days to review PR before accepting)* ● **Section 1: Cold Storage** ○ Who: **Ian F**. volunteered to talk through the thaw mechanism that SRA uses ○ Who: **Surya** for **Issue #395** and any resulting PRs to get feedback	Brian/ Michael L

on/timeline for merge.
    - Feature branch(es): feature/issue-395-cold-storage (diff)
    - PR(s): PR#401
    - Prep work needed for Connect:
        - Do we want to set a timeline for PR#401 to be modified & merged?
        - Do we stop at informational?
        - What drivers/implementers need this and when?
            - We heard Terra, Velsera, BDC, dbGaP/SRA interested in this, let's discuss
        - Do we want to go for a feature branch/PR to address "thawing"?
- **Section 2: Geolocation/Location Constraints**
    - **Who** Jared (Velsera)
    - Issues: **Issue #400**
    - Feature branch(es): …
    - PR(s):...
    - Prep work needed for Connect:
        - See section 3, might need that first
        - Jared to work on a PR before Connect
- **Section 3: Reliable cloud+access method determination**
    - **Who** Jared (Velsera)
    - Issues: **Issue #400** (covers this too)
    - Feature branch(es): …
    - PR(s): …
    - Prep work needed for Connect:
        - Surya points out this might be a precursor to Section 2.
        - Jared to work on a PR before Connect
- **Section 4: DRS server metrics**
    - Who: **Michael L.** and next steps with **Issue #396** and any resulting PRs to get feedback on/timeline for merge.
    - Issues: **Issue #396**
    - Feature branch(es): …
    - PR(s): ...
    - Prep work needed for Connect:
        - Can we get a PR ahead of Connect
        - https://stats.gen3.org/
    - Prep work needed for Connect: …
- **Section 5: Metadata linking best practices**
    - Who: **Michael L.** and next steps with feature and any resulting PRs to get feedback on/timeline for merge.
    - **Issue #394**

	■ Feature branch(es): feature/issue-394-drs-plus-connect-docs-v1 ○ Prep work needed for Connect: … ■ Can we get a PR for Connect? • **Section 6: DRS publication** ○ Who: **Brian O.** ○ **Issue #398**, introduce draft, how to add yourself to the authors info, where to contribute your edits/thoughts ○ Prep work needed for Connect: …	
5.	AOB	

Meeting recording:

https://us02web.zoom.us/rec/share/Sheb84iqtD7mSLbmdfwr2mbG2ufLclDIc0eUFPscpIFcGxV3-gu6cTH-7ZTE3aFm.JRsKD0s5kRodOCNO

Passcode: b&8SFAG$

Meeting minutes:

Upcoming Topic - GA4GH Connect Planning
2024 Connect Session Submissions
These are the sessions we submitted (**add yours if it's not on the list**). Once submitted, we'll look at opportunities to combine with other work streams/submitted session suggestions in order to deduplicate, collaborate, and have the biggest impact.

FYI *"please note that this is a preliminary intake form — for accepted sessions, you will have the opportunity to edit and fine-tune your session description and details down the road. If you have any questions, please reach out to amreen.mohamed@ga4gh.org."*
Session Submission 1 - DRS 1.5 - Key Features and Plans for 2024 (submitted 2/15 by Brian O.)
This session will review with Drivers and Implementers the key PRs for DRS 1.5 that will significantly advance the standard in 2024 based on the needs of the community. These include (in order of priority for discussion) 1a) cold storage (informational), 1b) cold storage thawing and lessons learned from dbGaP, 2) geolocation/location constraint (informational) 3) reliable cloud+access method determination (informational), 4) DRS server metrics, and 5) metadata linking between DRS objects and discovery APIs.

Who to invite: Cloud WS members, Driver projects using Cloud APIs, Implementers building support for Cloud APIs

→ **confirmed**

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Session Submission 2 - Cloud APIs & Passports (submitted 2/15 by Brian O.)
Roadmap discussion and features requests based on feedback from Drivers and Implementers in the Cloud Work Stream. What do cloud implementers want to see Passports do in the future? 1) mandate the ability to repackage as a "right" in the spec?, 2) work order token exchange for integrating non-Passport supporting services? 3) Trust mechanism between Passport Broker and systems the Passport can be handed to (e.g. mTLS replacement in Drivers like BioData Catalyst)?

Who to invite: Cloud WS members, AAI/Passports WS members, Driver projects using Cloud APIs w/ Passports, Implementers building support for Cloud APIs w/ Passports

→ **We are discussing this as part of the April 24 at 10:30 - 12 pm CEST session chaired by Max Barkley and Tom Connor.**

Session Submission 3 - Serializing & Exchanging Virtual Cohorts (submitted 2/15 by Brian O.)
The BioData Catalyst driver project needs to transfer cohorts representing search results, data models, and DRS object IDs from one system to another to facilitate seamless user experiences in their platform. This session will examine how GA4GH technologies (Phenopackets) and non-standard technologies (Avro/PFB) can be used to support this use case. It will also look at the opportunity for potentially new standards in GA4GH. PFB, for example, is widely used in NIH systems and could be a candidate for cohort serialization.

Who to invite: Cloud WS members, Discovery WS members, Clinical and Phenotypic Data Capture WS members with an interest in serialization technologies

→ **we are discussing this as part of the April 24 at 13:00 to 14:30 pm CEST. This session will be lead by Ian and Francis**
Previous Connect Materials/Sessions
Including these for reference to see what we did in the last 2 Connect meetings.
Connect 2023

- Agenda: https://broadinstitute.swoogo.com/ga4ghaprilconnect23/agenda?i=KVm1MNi4yNoQkyJnnpY_z4rvULhPBUed
- Cloud WS and related sessions:
  - DRS and Connect 2023 - Agenda Template-2-2.docx
  - DRS test-a-thon.docx
  - Connect 2023 - Agenda - Passport Update
  - 20230420 - Connect 2023 - Beacon, Phenopackets, Cohorts — combining …

Connect 2022

- Agenda: https://broadinstitute.swoogo.com/connect-2022/agenda?i=XJN8YW1Q3rz53DUqoCGgyeeSGvBVoe1E

- Cloud WS and related sessions:
  - 4 - GA4GH Connect 2022 - Agenda - Implementers Workshop (WES, TRS)
  - Connect 2022 - Cloud Work Stream Roadmapping for 2022.docx
  - 17 - Connect 2022: FASP Use Case Session Agenda
  - 21 - Connect 2022: FASP Collaboration on Passports, DRS and Discovery
  - Nov 2022 session; FASP Builder Session

2024-03-11: Cloud WS

Chair: David Glazer, ~~Brian O'Connor~~
Attendees “Name (Affiliation)”: , Reggan Thomas (GA4GH),Kyle Ellrott (OHSU), Matt McLoughlin (Microsoft), Tom Conner (Broad), Michael Lukowski (U Chicago), José Mª Fernández (BSC / ELIXIR ES), Liam Beckman(OHSU), Thomas Mooney (WUSTL), Anne Deslattes Mays (Science and Technology Consulting LLC/Lifebit, Michele Mattioni (Velsera), Jilong Liu(GZNL), Heather Creasy (NCI CRDC). Denis Yuen (OICR - Dockstore), Takudzwa Musarurwa (UCT/eLwazi-ODSP), Mike Warfe (NCI CRDC)

Apologies : Luke Paul Buttigieg (Genomics England), Alex Kanitz (ELIXIR Cloud)

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Reggan/David
2.	Previous Actions Review	Reggan
4.	Sub-group Update: TES • Manuscript updates • scaling experiments • py-tes updates • funnel updates • nextflow updates	Venkat/Kyle
5.	Connect planning:	Reggan/David

	• Review agenda for Connect (Reggan)
	  ○ We're planning to combine two of our proposed sessions into existing sessions by Ian and Tom
	• Add topics to the AAI/Passport session 2, see
	  April 2024 Connect - Session 2	

6.	A.O.B	

Meeting recording:
https://us02web.zoom.us/rec/share/3iNHyCq9wurEdKCdsunKkOYVrUHrqmlDVL03RwgegUF59vm9tR9Cqt5mAA5w3zjG.yWnigQVhl53XOW-k

Passcode: rQnBy!53

Meeting minutes:

Comments from chat:

dG - I agree copying is Wrong -- but there is always some moving of bytes from "home" to "worker" at some level of the stack.
Jose - Do not forget that the API is a mean, not an end, to ease distributed analyses (or massively humongous ones)
dG- I wonder if the reviewer thought about this question as carefully as we collectively are now.
Ian - Yes, I drank from the "no copy/download" fountain, but then realized there was copying going on, even with DRS. To the work area as you say. We hope that storage is temporary and doesn't impact cost/performance, but hope someone is staying on top of that.
dG - To the extent we add scalablity info to the paper, I'd suggest spelling out the tech layers, and why they have different scaling characteristics, that you just went through Kyle
Anne - seeing that you are seen as the person representing GA4GH - putting the language about the limitations of the cloud environment and all the details of limits of peopl
Matt - If we are testing the mean and standard deviation of file localization and application execution, the input files must be the exact same file size and the exact same bytes. If the same exact file is used (and not a "copy" of the same file), then an artificial bottleneck is created that will skew the results.*exact file is Not used
dG - the most concrete i heard was BAM->CRAM on 1000g
Matt - That's a good practical test, but we will lose detail on localization and execution statistics.
Mike - There are about ~2500 1KG Phase III bams.
Ian - Trying to make sure I understand what the actual scalability question is. I'm hoping it's just the question of how if I set up (say) 1000 tasks how do I stay on top of what's happening with them.
As opposed to - I have a big compute to get done - how do I structure/scale the set up and manage tasks to get my compute done most efficiently.
The second part needs to be done, but I assumed the TES API doesn't do that for me.
Anne - What is the link to the openapi-test-runner?
dG -Ian -- i think the question should be what you hope it is -- so Kyle can be clear about that in the new text in the paper describing the test results
Anne - http://nih-nichd.github.io - a workflow agnostic course taught at NIH for creating any workflow language and containerization at the process level. Aka Brian Kernighan Elements of Style approach — one could imagine "TES" would be at the process level. I think there is some confusion about this

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Matt - We certainly will include benchmarks for TES REST API performance for CRUD of tasks, but I would argue that this is not very interesting from a performance perspective in this domain since the scale is so low (vs. retail, etc.).

2024-02-26: Cloud WS

Chair: David Glazer, Brian O'Connor
Attendees “Name (Affiliation)”: , Reggan Thomas (GA4GH), Denis Yuen (OICR - Dockstore), Mike Warfe (NCI CRDC), Binam Bajracharya (UChicago), José Mª Fernández (BSC / ELIXIR ES), Tom Conner (Broad),Venkat M (Microsoft),Surya Saha (Velsera/Seven Bridges)Apologies :

	Actions Arising	Assigned To	Deadline
1	Reach out to NextFlow to understand sharing of algorithms/workflows in their community	Denis (Jose can help)	Next TRS meeting
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review	Reggan
4.	Sub-group Update: TRS ● Recent usage of TRS ● https://docs.google.com/presentation/d/13ZmOMCBQTSYtWKynnvJ4_O5qJ5NbaohNKfvsi-s90tU/edit?usp=sharing ●	Denis Y
5.	A.O.B 1) Upcoming events. If interested , please attend. **Lessons from Implementations: Sharing Variants** *(hosted by NIF)* - February 27th @ 20:00 UTC Registration Link	Group

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	Agenda **Grand Challenges in Rare Disease** *(hosted by RD CoI)*- February 29th @ 16:00 UTC Registration Link Press Release 2) Planning to publish the roadmap on the GA4GH website – Please review/ add more details if required (API leads) - Deadline - Mar 1, 2024 3) See above for submitted Connection session recommendations (add yours if you submitted one)... waiting to hear back from GA4GH on opportunities to combine with other proposals. - Once we hear back we'll have about a week to suggestion/approve merger of session ideas	

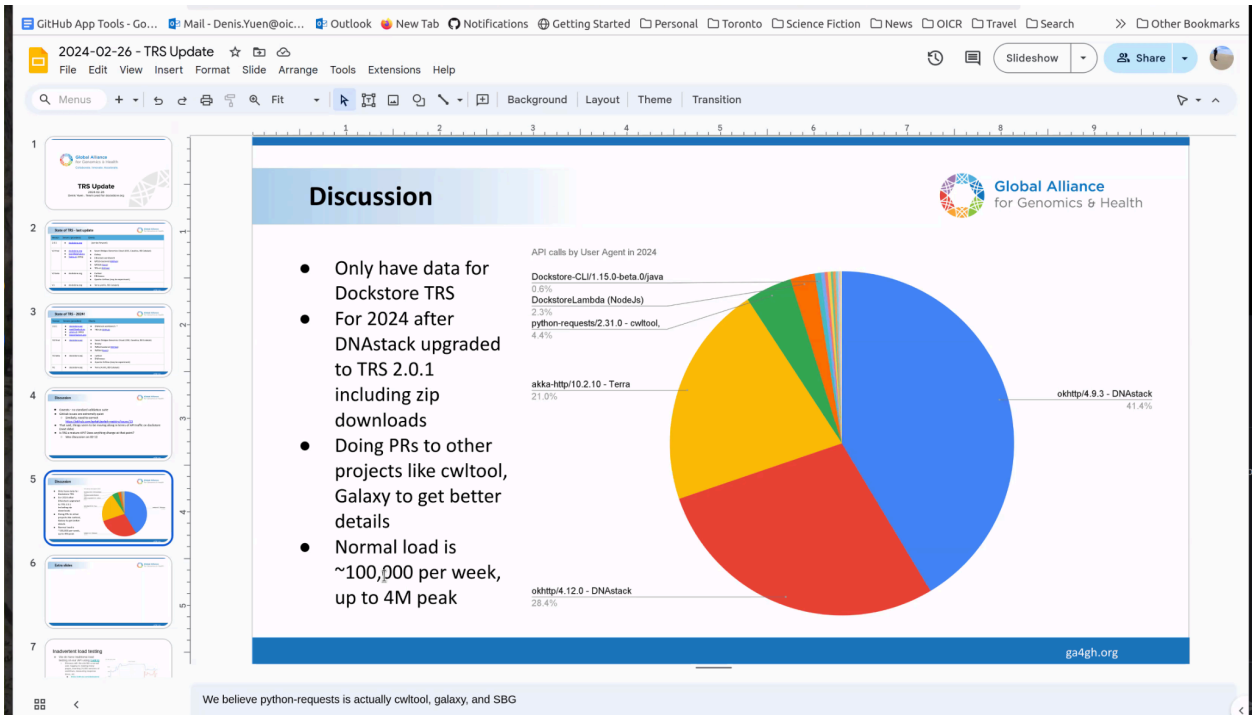
Meeting recording:
https://us02web.zoom.us/rec/share/RSMX9Xf_ai2LTvsIqcyMo5A1YoIO1RAjHmI_j-AOByCionDd0AJQaLzXb6JiO2gb.PZ9gIky3s-znE4MZ

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Meeting minutes:

- Denis' slides
  - TRS update on usage
  - Putting in PRs to projects to add agent code in order to better track usage … asking client authors
  - Dockstore traffic
  - Future features, what does TRS need to do to support clients/repositories? New algorithm types?
- Feedback to Denis
  - David
    - Queing up a few questions: 1) is there a graph of usage over time? 2) what do current clients (DNAstack, Terra esp.) say when you ask if they want more? 3) are there more kinds of content that people would like to see in the TRS ecosystem? (more workflows, notebooks ,etc.)
    - 4) where do people publish and discover tools, other thain in Dockstore? And which of those would make sense to pull into the TRS ecosystem?
    - 5) "holes not drills"
  - Jose
    - Beyond TRS it is maybe an agnostic way to describe a set of parameters for a test execution, pointing to the needed input files for that test execution

- It also depends on the ecosystem. Nextflow has its own ecosystem built around nf-core
- with their set of tools to ease the quality of the workflows under nf-core (including CI jobs to test new commits of the workflows work with the test parameters)
- But there are more ecosystems beyond nf-core community
- that's the reason there are Nextflow workflows which are not following the nf-core guidelines



From chat:
dG: Queing up a few questions: 1) is there a graph of usage over time? 2) what do current clients (DNAstack, Terra esp.) say when you ask if they want more? 3) are there more kinds of *content* that people would like to see in the TRS ecosystem? (more workflows, notebooks ,etc.)
4) where do people publish and discover tools, other thain in Dockstore? And which of those would make sense to pull into the TRS ecosystem?
5) "holes not drills"

Jose : Beyond TRS it is maybe an agnostic way to describe a set of parameters for a test execution, pointing to the needed input files for that test execution

It also depends on the ecosystem. Nextflow has its own ecosystem built around nf-core
with their set of tools to ease the quality of the workflows under nf-core (including CI jobs to test new commits of the workflows work with the test parameters)

But there are more ecosystems beyond nf-core community
that's the reason there are Nextflow workflows which are not following the nf-core guidelines
Phil Ewels

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2024-02-12: Cloud WS

Chair: David Glazer, Brian O'Connor
Attendees “Name (Affiliation)”: , Jared Rozowsky (Velsera) ,Ian Fore (NIH) , ,Binam Bajracharya(UChicago) , , , Michael Lukowski (U Chicago), Mike Warfe (NCI CRDC) , , José Mª Fernández (BSC, ELIXIR ES), , Heather Creasy (NCI CRDC), Michael Baumann (Broad) , Takudzwa Musarurwa (UCT, eLwazi-ODSP), Pavel Nikonorov (GENXT), , ,Surya Saha (Velsera/Seven Bridges) , , Venkat Malladi (Microsoft), , Thomas Mooney (WUSTL),Reggan Thomas (GA4GH) , Gerrit Botha (eLwazi) , , , , ,
Apologies :

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review	Reggan
4.	Sub-group Update: DRS ● Cold storage support in DRS 1.5 → Surya S. as Champion ○ Issue #395 ○ Feature branch… let's discuss this PR today ● Stats endpoint for DRS → Michael L. as Champion ○ Issue #396 ○ Let's brainstorm on metrics we want to report back	Brian / Michael
5.	A.O.B - Review the 2024 Cloud WS Roadmap… API Champions deadline - Feb 12, 2024 - Are any of our APIs "done" for now? - Are we missing anything big/new? - Connect meeting (April 21 - 24) at Ascona, Switzerland. Hybrid participation available. - Submit your connect meeting proposal here (deadline - Feb 16,2024) - Any requests?	Group

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Meeting recording:
https://us02web.zoom.us/rec/share/9taU4ZNp3t7GUM5OteUID9Iy6_xxomdpME4nh4GNGalgX0gpkw5QrNFZ2o9j2KiE.ybu035hsHClpfzuR

Passcode: 68J@5zvE

Meeting minutes:

- Cold storage support in DRS 1.5
  - Introduction by Surya… 1) informational 2) thaw process
  - Ian - 1) remember it's trying to be cloud agnostic… 2) see issue
    - https://github.com/ga4gh/data-repository-service-schemas/issues/395#issuecomment-1727028577
    - Performance issues for thaw… https://github.com/ga4gh/data-repository-service-schemas/issues/395#issuecomment-1753349264
      - Think about how batch might impact performance…
  - Bill - performance, need to think about this
    - Especially batch
  - Ian (Chat) - On the implementation side this is what NCBI had implemented to do it via a UI. There is an API version of this which is not widely publicized https://www.ncbi.nlm.nih.gov/sra/docs/data-delivery/
    - Ian brings up the point, how much does this need to be done exposed via DRS vs. something else?
    - Does the user care about file sizes? Or what's hot/cold?
  - Venkat
    - cold/hot… systems will likely move items from hot to cold… need to update
  - David
    - Balance risk of 1) addressing everything in one go vs. 2) risk of not reflecting the full use case… Is this step to addressing the problem? Is there a driver that needs this?
    - What's the states?
      - "Available"?
      - "Delayed"?
      - "Long delay"?
      - What do driver projects need?
    - We talked drivers/Implementers needs
      - BDC… cost savings, workflow execution
      - Terra… cost savings, multiple projects being executed on workflows…
  - Mike B
    - Google storage via Gen3 example… Google has quick defrost vs. other clouds…
    - Driver is cost control for projects like AnVIL

        - "Auto-class"... 30, 60, 90 day automatic movement of data
    - Venkat
        - Rather not do it as "hot/cold"...
        - Rather do a tiered approach + latency…
            - 0ms… hot storage
            - Xms… can be used to specify any
    - Surya
        - Semantics driving discussion…
        - But the intention was to show "available/unavailable"...
    - Possibly: "now" or "delayed"?
    - Use case… save money… multiple driver projects need this… BDC, SRA, etc.
- Stats endpoint for DRS → Michael L. as Champion
    - → we'll have to go over this next DRS call
- Roadmap
    - …
- Connect sessions topic ideas
    - DRS topics
        - Location-based downloads… constraints on this needed by data providers … maybe start informational
            - Surya and Michael B.
            - Cost, policy, etc.
            - Informational
        - Implementation of thaw process… Ian could share SRA thaw mechanism (positives and negatives of their solution)
    - Look at followup from previous Connect sessions
        - https://docs.google.com/presentation/d/1Y_c3Oz4RTE9puIcF-RMgR-FQ6FRWf7zZmd8MbFfwF-M/edit#slide=id.g12114f355b8_1_0 from Ian … previous
    - GIF work possibilities… Cloud WS in the wild!!
        - Build example
            - WES, TES, DRS…
            - What opportunities to use production systems
            - Look at 1000 genomes tutorial… WES + DRS…
        - Passports
            - How to use Passports together with WES and DRS

2024-01-24: Cloud WS (Canceled due to MFW)

Chair: David Glazer, Brian O'Connor
Attendees “Name (Affiliation)”: ,
Apologies :

	Actions Arising	Assigned To	Deadline
1			

2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.		

2024-01-08: Cloud WS

Chair: David Glazer,~~Brian O'Connor,~~
Attendees “Name (Affiliation)”: ,Michele Mattioni (Velsera), , Bill Clifford (ISB, IDC), Binam Bajracharya(UChicago), , Surya Saha (Velsera/Seven Bridges), Thomas Mooney (WUSTL), , Michael Lukowski (U Chicago), Heather Creasy (NCI CRDC), Mike Warfe (NCI CRDC), Denis Yuen (OICR - Dockstore), Pavel Nikonorov (GENXT), Reggan Thomas (GA4GH)
Apologies : Brian O'Connor

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (TES) 1. Paper was submitted 2. Nextflow funnel support 3. Testing Nextflow Azure TES 4. Discuss authorization of compute	Kyle / Venkat

4.	A.O.B Connect meeting (April 21 - 24) at Ascona, Switzerland. Hybrid participation available. - Submit your connect meeting proposal here (deadline - Feb 16,2024) - Will skip the next cloud meeting (22nd Jan) due to GA4GH Meeting free week, so the next meeting will be on 12th Feb (WES and DRS session)	
5.	The Steering Committee is on Jan 31st. Request all API champions to look into their respective areas and update the slide deck	API Leads
6.	Roadmap document (2024) - Please confirm the roadmap by Feb 12,2024	API Leads

Meeting recording:https://us02web.zoom.us/rec/share/LYN9rQG9W57MQ_hSACrEvai8iU9bbPbdILCVBYgxN7mWnjPtlYKKh_HmxwX7J5vU.cwOT49GZIvisA-PI

Passcode: W@c6mLIT

Meeting minutes:

- TES paper
  - submitted to an IEEE special issue on 'converged computing' (HPC + Cloud)
  - preprint being released to arXiv – will circulate when out
  - may need a way to credit Cloud WS contributors
- more workflow apps using TES
  - Venkat/Liam working on Nextflow funnel
  - have a beta verson of funnel and TES working together, plus some open PRs with the nextflow group
  - goal is by EOQ to have NextFlow fully support a TES plugin (in addition to Cromwell)
  - snakemake support is sort of working; have early plans to make it work better (by task)
  - Q: so the idea is multiple workflow engines all accept TES drivers, so anyone who implements a TES service can now run those workflow engines against their "worker bee" environments?
    - yes (assuming compliance, which is being worked on)
  - Q: can the worker bees be a large farm of compute resources?
    - in theory yes, but security can be complicated
    - in practice, tends to be local fully-controlled compute
  - Q: what TES impls are there?
    - funnel is deployed
    - know how often Azure TES is downloaded

        - know we have Galaxy
        - ILMN has a TES impl that forked TES spec, that need to be discussed
        - also TESK
        - summary: 5-6 implementations; less data on how often they're used
        - 1.1 compliant implementations: Azure, funnel
    - Q: TES as "bring Cloud APIs to many small local environments" value creator?
        - dG: also fits with the "starter kit" model
        - yes – for on-prem HPC, for hybrid environments, for private cloud tenants
- authorization of compute
    - how do we securely pass "you may use my compute" permissions through the stack?
    - good news is it's "just headers"; bad news is agreeing on the headers is hard
    - "nirvana" is widely deployable workflows across the TES endpoints you care about, for a group of people who are all in the same group – that's achievable
    - going further, to globally deployed endpoints that anyone can use, requires getting authZ right
    - may need fine-grained authZ of "who can do what compute for how long"
    - one approach – the funnel config file has a bunch of credentials, set up out of band – it can do whatever it was hard-wired to do; you can't get extra access without going through the DevOps team to change that hard-wired config
    - need to support data access ("prove I'm allowed to access this data from my workflow") and compute access ("prove I'm allowed to use these compute resources from my workflow"). Maybe also results ("prove I'm allowed to write outputs here").
- what's next?
    - Kyle: not feeling any pressure for a functional v2 of the API
    - Venkat: expect small 1.2'ish changes as we bring up workflow engines; primary gap may be authorization
- Q: do TES endpoints take DRS input?
    - if the implementation supports it, yes
- Q: what "nirvana" do we want to go after first?
    - probably not the global "everyone on the internet can call my endpoint"
    - probably more "we're all in an organization; we all roughly trust each other; what do we need to be able to use TES well internally?"
- Q: TES in Terra?
    - every Terra billing project has its own TES – so all usage of that TES gets billed to a known place
- Q: what's next?
    - progress on authN/authZ
    - getting all the workflow engines happily and cleanly using TES (e.g. CWL has been neglected) (Galaxy) (Terra) (...)
    - dG: suggest also cleanly documenting what it takes to deploy your own TES endpoint (including which one to pick, how to use it, and what it allows)
    - Ian: suggest including TES in Quickstart Tutorial | GA4GH Starter Kit

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2023-12-11: Cloud WS

Chair: ~~Brian O'Connor~~, David Glazer
Attendees “Name (Affiliation)”: ,Jared Rozowsky (velsera) , , , ,Lee Pang (AWS) , , , , , , , Patrick Magee (DNAstack),Justina Chung (GA4GH) , , Surya Saha (Velsera/Seven Bridges) , , Michael Lukowskki (U Chicago), Michele Mattioni (Seven Bridges/Velsera), Denis Yuen (OICR - Dockstore),Venkat Malladi (Microsoft) , Mike Warfe (CRDC) , , , , , , , , , , Thomas Mooney (WUSTL), , , , José Mª Fernández (BSC, ELIXIR ES), ,Bill Clifford (ISB, IDC) , , , , , , , , , , , , , , , , , , ,

    - Perhaps in 1.2. Simple feature that is adding something voted in TES. Filtering abilities for tags. #213
    - PR is exactly same as test API and there's comment section with Alex. Propose we've had experience filtering WES APIs in different ways.
    - DG: suggests letting people vote one over the other
    - There's implicit pairing now, if you want to pair multiples of those, it may be hard to reconstitute original pairings.
    - DG: strong consensus that there should be one syntax, continue discussion offline.
    - Need better WES/TES individual meeting; take it into that meeting as well so we can be on the same page.
    - IF: when we talk about tag values, we talk about something abstract and can be used for multiple purposes. What's the actual use case? Why wouldn't those things not be in body in the request? When we want extensibility, is there situation where there is more specific requirements on how people want to tag things? Want to understand from the user perspective what's the use case?
    - PM: please include in ticket; moment we implemented we saw people used tags (eg. for samples). A way for people to hierarchically organize thoughts.
    - IF: Worrying because we aren't compartmentalizing things we should from design perspective. To take sample metadata, I would suggest proper home is in system that deals with sample metadata. Danger in building APIs that cover all use cases rather than recognizing that different APIs; need collaboration and complementary nature between APIs that we're building between Discovery and Cloud APIs.
    - PM: Tags are available in both TES and WES and what people use it for varies by use case. It's metadata that is available and what people are use to having available.
    - LP: How do you filter that out by customer? That's one of those use cases that comes when you think of WES. Not as a layer that bioinformaticians are using directly, but more as a layer that application builders are using to build on top of.
    - VM: depends who has access; tag allows people to have access to API doing filtering on their own.
    - CL: open to idea that tags usability and for users to apply tags, Maybe WES isn't right place to store that metadata, maybe platform that's calling WES should store them? There are use cases where it's convenient especially if you're an end user. One other use case is if you want to do analysis of what you've been doing in cloud browser itself, you can ripple tags through every layer and get them applied to compute cell and can be useful without tags.
    - MM: When you submit WES api there is workflow patterns where there is a dictionary, there was another call about list of all jobs with UID; is approach of tagging to make it easier for user to tag on WES level? Could keep internal dictionary on client side and UID to list when they submit the jobs. Where does it live?
    - PM: proposal isn't to add tags but to enable feature on top of already existing metadata. Filtering by tags is simple approach. It already fits in there, serves slightly different purpose, meant to capture more from end users own idea of what this thing is.
- Discuss WES community and engagement

- PM: limited feedback and feature requests from drivers and implementers outside of WSLs, ELIXIR and other TES/community members. No way t track implementers to spur further community engagement and adoption
- IM: Is this for end users or something else? If you focus for end users, then user writing such a script can go through federated workflow.
- VM: Do we have list of all WES implementations?
    - PM: we have Cloud WS contacts but not sure if that's up to date. For DNASTack, we're spec compliant but we've extended, in ways that are nonbreaking.
- AP: vagueness and flexibility in spec has been tough to manage. Gone the same way as DNA, major endpoints are specified as expected but places where we make our own judgement is where we make it our own.
- VM: Is there a reason why this hasn't gone back to the spec? Move more rapidly towards a 1.2 or 1.3 and push it?
- PM: a number of things have gone back into the spec. Challenge is push back on how it's structured. Working through how open source specifications should look and getting buy in from different parties. Parts being held up are fundamentally 2.0 problems. Want to figure out what is problem for minimal driver engagement.
- DG: strong supporter of opening discussion and recognize there are a lot ways we can do it wrong so need to be careful; two things I'd keep eye on are 1) are there multiple engine implementers who say yes we will implement this and recommend it as the preferred way to call our engine.. If engine implementrs are willing to say once we settle on this definition of WES 2.0 we will make it our primary way to call our engine.
- VM: Disagree premise on engines; fundamentally we're just going to have command line. In that sense, technically TES could solve this problem. Platforms are going to implement, and not the engines. The engines are going to be command line interfaces.
- PM: many user cases where people want to use Cromwell;s API because it is highly permissive and allows a lot more. Everything is command line, contract of the interface stops at the person who's distributing to the engine, not engine itself.
- PM: proposing for 2.0:
    - Standardize format of inputs and outputs, standardize base set of engine parameters, push for compliance test suite, provide implementations a way to extend the API that is predictable and describable, focus on deeper integration with existing GA4GH APIs.
    - WES largely obtained by implementers, predominantly implementer-led. Need to talk to them and find out what hold ups are (why hasn't Terra implemented?)
- DG: if 2.0 is successful, who has implemented it and who is calling it? 2-4 from each that we believe when they're using WES 2.0, then we are well on our way to the intent of building it.
- PM: Try to figure out a more updated list somewhere and bring everyone to table to get feedback and start there. Figure out what success looks like. Need to identify who committed people are, who will actually be interested in driving spec.
- IF: there's only one implementation that shows up in several DPs from which I've ben able to get files back from my compute. Down to much more basic things.

    Have we properly implemented and tested out whether what we have now works?
    - PM: deeper GA4GH integration is important; getting data back is always painful. Core goal is usability, agree right now it is hard to get data out.
    - CL: Concerned when I hear success measured in implementation vs adoption/usage.
    - PM: this is where DPs really come in. How do we leverage current GA4GH initiatives to drive feature sets for 2.0.
- Next steps is fleshing out ideas for 2.0 and identifying who will be part of these discussions. No concrete timeline yet; this will be needed.

dG chat notes:

- original:
    - I strongly agree with the IDEA of a WES 2.0, given what you point out about uptake of 1.x -- but the details matter, and there's a risk of always being tempted by the shiny new thing, so let's go in eyes wide open about that risk.
    - My hypothesis -- the reason few drivers use WES is that it's a) rarely the preferred way to call any given workflow engine, anb d) it doesn't make cross-engine usage easier, given gaps
    - which suggests goals for a 2.0 would be a) engines are signed up to say "WES 2.0 is the preferred (or at least a fully supported) way to call our engine", and b) therefore, building a system that calls two different engines is easy
- lots of great feedback on this framework from Venkat and others, which is making me rethink that framing
- adding my top two personal use cases that I'd love to see WES support: 1) as a platform implementor, make it easier for me to support multiple workflow engines without writing fully engine-specific code, and 2) as someone encouraging and supporting cross-dataset analysis, make it easier to run a single workflow across multiple independent datasets and get back useful results for aggregation
-

2023-11-27: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: ,Ian Fore (NIH) , ,Bill Clifford (ISB, IDC) , , Surya Saha (Velsera/Seven Bridges) , , , , , Michael Lukowski (U Chicago), Mike Warfe (CRDC) , , , , , , , , , , ,Reggan Thomas (GA4GH) , , Alex Kanitz , , , , , , , , , ,

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1	Have recurring (1x month?) meetings with TES+WES together. Can we pick 1-2 areas to use a common schema across the two APIs (for example, logging schema or input params)	Reggan and champions	
2	GIF project for federated analytics GIF… can we write a 1 pager and shop it around to driver projects? - Variants of Unknown Significance (Melissa Klein)? - CNEST workflow (Ewen)?	Alex and others, Reggan to setup a chat on this?	

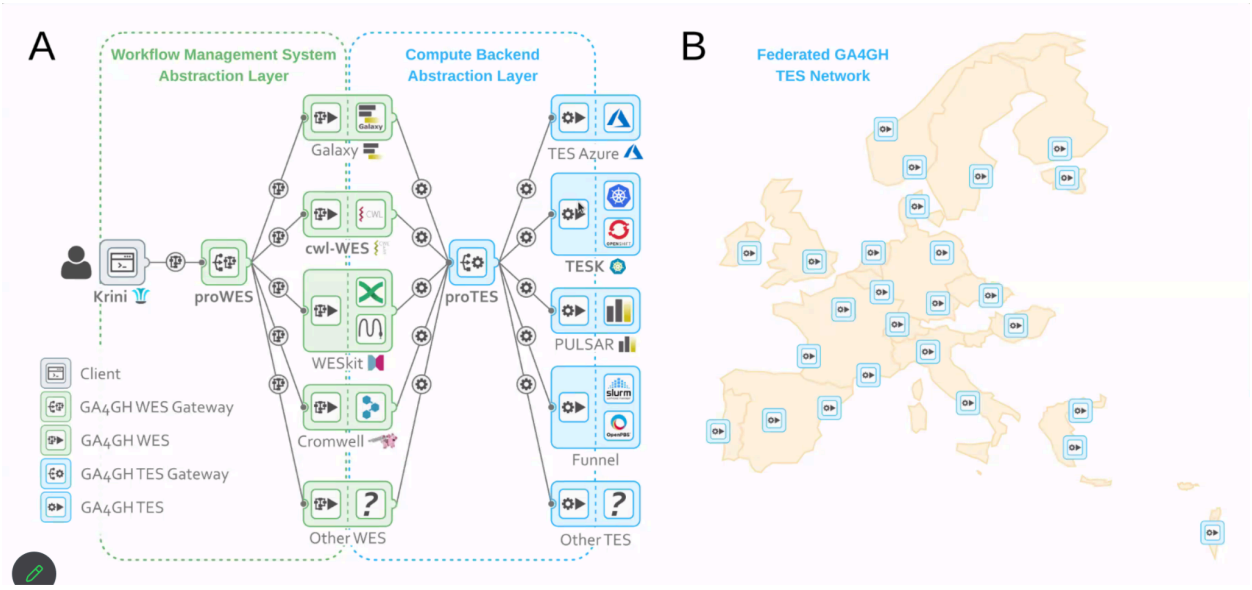
	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	TRS Updates ● Slides at https://docs.google.com/presentation/d/15uR71lRFMI1biORyNscQ3n0VnF1n9vC2jIfaUp7GTfQ/edit?usp=sharing ● Probably need opinion from Patrick for relative path issue (i.e. is zip download workaround sufficient or is a fix a high priority. What is DNAstack's current strategy)	Denis /15 mins
3.	Sub-group Update (TES + WES) 1) What do we want : a) the relationship between WES and TES to be? b) relationship between the end user and TES through WES be? 2) The current state of Work Order tokens and is there any way to accomplish what we are hoping to achieve with them?	TES and WES leads Patrick Magee /15 mins
4.	3) WES is an abstraction layer over workflow engines while TES (in the context of workflows) is an abstraction layer over compute backends (that workflow engines can optionally make use of). we should leave it at that and largely focus on the considerable structural overlap ? Years ago, we decided to keep both WES and TES (see, for example, this document for details 4) In the context of executing workflows, end users should NOT know or care	Alex Kanitz / 15 mins

	about TES? 5) Use cases and requirements for auth are being summarized for workflow and task execution, and data access [this document]	
5.	Sub-group Quick Update (DRS) • Status of DRS 1.4… it's [released]! 🎉🥳👏	Brian / 1 min
6.	A.O.B The API schedule for 2024 is [here]. First meeting is on 8th Jan at 6 pm BST / 1 pm ET	All / 10 mins

Meeting recording:https://us02web.zoom.us/rec/share/3X724MZAdGnsyvk6-RPe7d6CD9R7AKf-AkMNWUve7BnLZTBwxcksGueLR43_shol.SJ1Xc98oqyzvjwIT

Passcode: %Kqv6==F

Meeting minutes:



2023-11-13: Cloud WS [CANCELED - Due to availabilities of the leads]

Chair: Brian O'Connor, David Glazer

Attendees "Name (Affiliation)": , , ,

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (TES + WES)	
4.		
5.		

Meeting recording:

Meeting minutes:

2023-10-23: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: ,Pratik Soares (illumina) ,Ian Fore (NIH) , Shelby Holden(Broad), , , , , , , Michael Lukowski (U Chicago), Chen Chen (GA4GH), , , Surya Saha (Velsera/Seven Bridges), , , , , , Binam Bajracharya(UChicago), Heidi Sofia (NIH), , José Mª Fernández (BSC / ELIXIR ES), , , , , , ,

2	Invite Jimmy to our next call, have him present the tech team roadmap and how we influence that.	Reggan/Chen	on next DRS call
3.	Take a look at the DRS backlog, let's identify your top 3 open tickets ahead of the next call… Goal is to identify items we can close or finish in 1.5.	all	Before next DRS call

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (DRS) ● Status of DRS 1.4 ● 2024 Cloud WS Roadmap, See below…	Brian
4.	DRS starter Kit - Update ● Think about compliance suite ● Think about updates to the starter kit implementation (look at batch feature branch) ● *Let's discuss how to get it to 1.4 ASAP*	5 mins / Chen
5.		

Meeting minutes:

DRS Topics

- **Finish a release 1.4 today, we have notified Drivers/Implementers to vote on the PR → Brian/Michael**
- **DRS 1.5**
  - **Cold storage** support in DRS 1.5
    - Phase 1 - Issue/Feature branch for how to show an object is "accessible/not accessible" or "cold/hot". In the Access mechanism listing → **who**
      - Issue #395
    - Phase 2 - Issue/Feature branch for how to trigger thawing via access mechanism, keep informed of the status (maybe callback) → **who**
  - **Stats endpoint** PR/Issue #396→ Michael
  - **Publication** for DRS Issue Issue #398 → Brian/Group … can be a good entrypoint for the community

- **Longer-term DRS roadmap 2024**
    - See document DRS roadmap 2024
        - Based on the List of priorities from Connect → Brian/Michael/Group
    - Highlights
        - DRS + Data Connect recommendations/best practices
            - Related, associating key metadata with a DRS object
        - Update starter kit to 1.5
        - Update DRS client to 1.5
        - Consistency across out implementations, testing/validation
        - Requester pays
        - *See board for more ideas… We need champions to make issues/PRs/facilitate discussions*

Meeting recording:

https://us02web.zoom.us/rec/share/DCxTZMsqcfgXvj7Q8lwRVTP_qRABegveIr1Ne8yaG8ceehrvjJtPsvRFk13X-cgn.RVXh-fnITkbxruA0

Passcode: C76+$wia

2023-10-09: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , Pratik Soares (illumina), , , , , , , , Binam Bajracharya(UChicago), Mike Warfe (FNL, CRDC) , Bill Clifford (ISB, IDC), Heidi Sofia (NIH),Venkat Mallad (Microsoft) , Reggan Thomas (GA4GH), , , , , , , ,

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2.	Previous Actions Review	
3.	Sub-group Update (WES) → skip today	
4.	Subgroup (TES) ☐ Goal of TES community development (workflow engines and servers) for the next year ☐ Goals for TES v1.2 ☐ Plan for developing authentication/authorization elements for TES	Kyle / Venkat
5.	Subgroup (DRS) ● Driver projects please vote on DRS 1.4 https://github.com/ga4gh/data-repository-service-schemas/pull/397	Brian

Meeting recording :
https://us02web.zoom.us/rec/share/ux-t_-bp1AtdqN2UlQTg332wIE48aGJFuk-whYy4cwhg1e3iSxkkx-IC1TZNUjCw.0yoigjwhGkFCpFmA

Passcode: p8pO9$h2

Meeting minutes:

- TES
  - Snakemake support for TES in testing… still a work in progress… Alex put in issues around this and will create a new plugin… latest version of snakemake makes this easier
  - Cromwell using TES 1.1
  - Funnel and Azure implementation of TES being tested by Sicara (sp?) … goal is 1.1 spec compatibility
  - Put together a list of all the workflow engines, looking at outreach partners for each, offer of help to get TES working in their platforms
  - Focus now is adoption, future work is focused on security (e.g. token passing)
  - Goal, joint session with WES champions
  - Q: callers of TES you're excited about?
    - Galaxy plans to implement a frontend to TES
    - ILMN is using parts of TES – Venkat/Pratik to follow up
- DRS
  - driver project champions are voting on DRS 1.4 PR
  - goal is to push live on Oct 23

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2023-09-25: Cloud WS

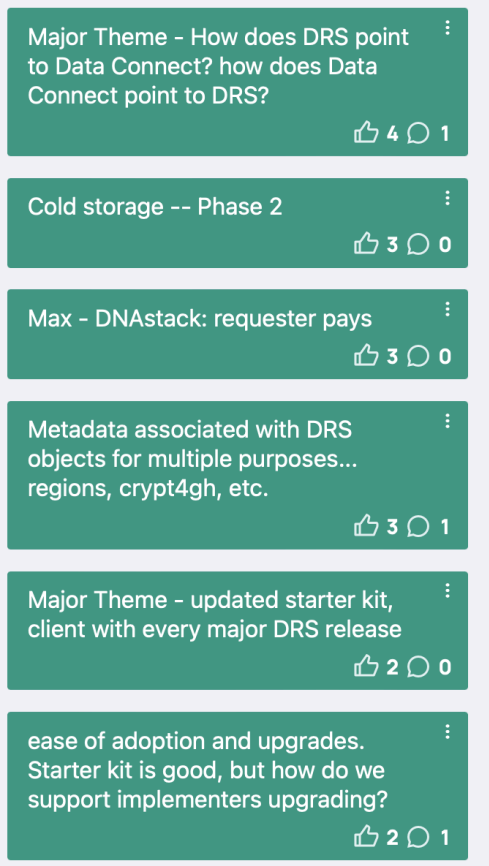
Chair: Brian O'Connor,
Attendees “Name (Affiliation)”: ,Pratik Soares (illumina) , Michael Baumann (Broad), Heather Creasy (NCI/CBIIT), , , , , Surya Saha (Velsera/Seven Bridges), , , , , , , , , , , , , , , , Michael Lukowski (U Chicago), , , ,Bill Clifford (ISB, IDC) , ,Reggan Thomas (GA4GH) , , , , , , , , , , , , , , ,

- [ ] **Open a release 1.4 branch, notify Drivers/Implementers to vote on a PR ➔ Brian/Michael**
- [ ] Cold storage support in DRS 1.5
  - [ ] Phase 1 - Issue/Feature branch for how to show an object is “accessible/not accessible” or “cold/hot”. In the Access mechanism listing **➔ who**
    - [ ] **https://github.com/ga4gh/data-repository-service-schemas/issues/395**
  - [ ] Phase 2 - Issue/Feature branch for how to trigger thawing via access mechanism, keep informed of the status (maybe callback) **➔ who**

2) **DRS v1.5 road-mapping and discussion**

- Key takeaways and next action items
- Meeting recording - Passcode: BwB3k&j*

- [ ] List of priorities will be turned to a Cloud roadmap **➔ Brian/Michael/Group**
- [ ] **Stats endpoint PR/Issue ➔ Michael**
- [ ] **Publication for DRS ➔ Brian/Group ... can be a good entrypoint for the community**

	 3) **The Task Execution Service** ☐ Key takeaways and next action items ☐ Meeting recording - Passcode : jH!?mXr9 ☐ Goal of TES community development (workflow engines and servers) for the next year ☐ Goals for TES v1.2 ☐ Plan for developing authentication/authorization elements for TES	
4.		

Meeting recording;
https://us02web.zoom.us/rec/share/P52wB47UJ3Yr0fQ4_SdgrgbWQQ3MQvxQP5l3tCS7EYTmVSHnQQReL0Rtnf8ny6o.SmJy71ECvSv3HT6C

Passcode: !4hv.ki5

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Meeting minutes:

- 1.4 - Brian will send out a voting call
- Cold storage
    - Bill brought up the penalty of calling the cloud API to find out the state
    -

2023-09-11: Cloud WS

Chair: Brian O'Connor,
Attendees “Name (Affiliation)”: , , , , , , , , , , , , , , Alex Kanitz (ELIXIR Cloud & AAI), , , Surya Saha (Velsera/Seven Bridges), ,Ian Fore (NIH) ,Michael Baumann (Broad) , , , , , , , , , , , , , , Michael Lukowski (U Chicago), , , , Thomas Mooney (WUSTL),Heather Creasy (NCI CRDC) , , Ben Sherman (Seqera Labs), , , , , ,Jilong Liu(gzlab,China) , Venkat Malladi (Microsoft),Reggan Thomas (GA4GH)
Apologies:David Glazer

	Actions Arising	Assigned To	Deadline
1	Connect session agenda items needed for the following session: - Task execution services	Kyle	12-Sep / Completed
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.	Sub-group Update (TES) ● Nextflow report ● GSOC updates: ○ Update on conformance testing Slides: GSoC 2023 - OpenAPI Test Runner ○ Dashboard Web Components for Workflow and Task Runs Slides: GSoC'23 Javed Habib	Venkat
5.	A.O.B	

Cloud WS has proposed the following sessions:

DRS: addressing scalability and cold storage

Date & Time
Tuesday, 19 September 2023, 11:00 - 12:30 PT

Agenda

Speakers
Michele Mattioni, Velsera
Ian Fore, National Institutes of Health
Brian O'Connor, Sage Bionetworks

DRS v1.5 road-mapping and discussion

Date & Time
Tuesday, 19 September 2023, 16:00 - 17:30 PT

Agenda

Speakers
Michele Mattioni, Seven Bridges
Ian Fore, National Cancer Institute
Brian O'Connor, Sage Bionetworks

The Task Execution Service

Date & Time
Wednesday, 20 September 2023, 09:00 - 10:30 PT

Agenda

Speakers
Kyle Ellrott, Oregon Health and Science University
Alex Kanitz, Swiss Institute of Bioinformatics / Pacific Analytics

Connect schedules can be found here

Meeting recording:

https://us02web.zoom.us/rec/share/oM5rQ3btyvb7q0IbGG4y822tP53b5Q3juhEFJb4DuO6qMnb_Slxeyp_x-OSy2Jid.QWNvIjgeV1A-g6L3

Passcode: $TqLm4f#

Meeting minutes:

- TES discussion
  - Kyle - issue of Passports + TES
  - Venkat - control of access to compute resources
  - Ian - gave scenario of user using Velsera, RAS passport to access DRS, TES/WES compute to be done as user. Same passport or different? Right now, uses native token not passport.
  - Two uses of Passport here…
    - Accessing data on behalf of the user
    - Access to TES/WES endpoints themselves
  - Patrick - vendor specific problem? Figure out guidance first?
  - Brian - Will passports ultimately have visas for compute in addition to data access? Which systems will implement?
  - → discuss this more in Connect/Plenary
- TES compliance suite - Lakshya Garg
  - Google summer of code project
  - See slides: GSoC 2023 - OpenAPI Test Runner
- Discovery
  - Opportunity to discuss service registry and use across groups
- Passports
  - Opportunity to discuss the TES use cases above

2023-08-28: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , , , , , , , , , Denis Yuen (OICR -Dockstore), , Bill Clifford (ISB, IDC), ,Heather Creasy (NCI CRDC) , , , , , , , , , ,

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.	Sub-group Update (TRS) • ecosystem update and survey • discussion on navigation/download of imported files "below" primary descriptorhttps://github.com/ga4gh/tool-registry-service-schemas/issues/243	Denis Yuen
5.	DRS: https://github.com/ga4gh/data-repository-service-schemas/pull/365 • Link to feature branch on the starter kit • Review last comment on bulk feature branch • Goal is to have both done before Plenary	
6.	Sessions for Plenary: • Connect September 2023 - Agenda - DRS 1.5 Road Mapping and D… • Connect September 2023 - Agenda - DRS: adressing scalability and…	

Meeting recording:

Meeting minutes:

- TRS update
  - Slides:
  - 2.0.1… Dockstore implemented
  - Denis showed usage patterns of TRS via dockstore, very interesting!!
    - DNAstack
    - Terra
    - Galaxy
    - Major users…
  - Discussed pending issues… relative path issue

2023-08-14: Canceled (Due to Meeting Free week)

Chair: Brian O'Connor, David Glazer

Attendees “Name (Affiliation)”: , , ,

2.	Previous Actions Review	Reggan/David 10 min
3.		

4.	Sub-group Update (DRS) - Michael L. will lead
	- Status of bulk PR (Brian O as champion):
	  - PR #365
	  - Issue #334
	  - Docs
	  - Original plan was a merge on 4/19 so we're well over our timeline… I have not seen any additional comments since Bill's
	  - Over the last two months I cleaned up and finished implementing bulk across the OPTIONS (for auth info), POST passports for info on multiple objects, and POST passports for access to multiple DRS objects. I think this is feature complete now and ready for merge. *I'll merge by EOD 7/25 unless I hear otherwise.* –Brian
	- Status of starter kit update to DRS 1.4 (Brian O as champion):
	  - Issue #79
	  - Feature Branch: issue-79-include-batch
	  - This feature branch is where I'm working to bring the DRS starter kit up to date with the 1.4 release (based on the PR above). *Help would be great!! My goal is to have this ready for Plenary so we can coordinate a DRS 1.4 release and a compliant starter kit.* –Brian
	- Status of Data Connect + DRS docs recommendation PR (Michael L as champion):
	  - No comments were left on issue for discussion. Will continue with PR that will be ready by connect https://github.com/ga4gh/data-repository-service-schemas/issues/394
	- Any other critical path items for 1.4???
	- Update to DRS compliance suite from the GA4GH tech team
	- Plans for Plenary
	  - Update starter kit for DRS 1.4 support
	  - Release 1.4 plan
	  - Out to vote by Aug 14th (Monday call)
	  - Finalized by Drivers/Implementers by Sept 11th (Monday call)
	  - Release in time for Plenary, Sept 19
	  - What DRS session(s) for Plenary do we want to plan?
	  - DRS 1.5/Cloud API next release scoping?
	  - Cold storage and DRS (Michele + Ian already submitted)
		Michael L 20 min

	- https://github.com/ga4gh/data-repository-service-schemas/issues/395 - Potential session on TES/WES interactions with DRS? - Make this part of the session that Ian and Michele will run	
5.	Group: we need to have our Cloud session requests for Plenary submitted by July 30th - Spend some time collecting ideas - Identify a point person to submit ideas Make submissions here : https://forms.gle/qqGRiiz441LgtyQP7?utm_campaign=11th%20Plenary&utm_source=hs_email&utm_medium=email&_hsenc=p2ANqtz-9RKY-aCnnob9GA1z2_2Fp6lZBhxeBbDyoBndbT7dv4RxWwTXKMLYKkI1nJCPqj8LnRKoqo	Group 15 min

Meeting recording:

https://us02web.zoom.us/rec/share/WZRRwi23-aZWfC905mFPLnd8sm1b1KHsIDqLjukgrx_6y52b4C-QkfVJJphGRBFp.3QHxTVBagCFiYv60

Passcode: pJ^A@ke9

Meeting minutes:

Ian and Michele planning for a session at connect – Cold storage and DRS
Brian suggested one more session i.e General Road mapping
session for DRS

ML – No comments and planning to merge the bulk PR and that will be part of 1.4

Ian and Bill has commented on the Mime type component and string providing the Mime type of DRS object. People interpreted as the mime type of the JSON DRS object.

ML – We should go ahead with this PR 365
VM – The PR are opened for too long, we need to have merges very frequently (smaller PR'S)

Status of starter kit update to DRS 1.4 – Brian is working on it
. He is working on the feature branch to bring the starter kit up for 1.4 release before connect
DRS and Data Connect – No comments received so far. Michael will start making a PR and PR will be ready before plenary

ML -Typos will be addressed in V1.4
IF - Big improvement is the simplification of the config file
ML – Action item – anyone who want to use the compliance suite to validate their DRS
VM – How can we update the starter kit to 1.4 if we haven't voted for 1.4 yet

ML -When we roll it into 1.4, we can just make the PR and merge it and ready to go
ML – Any critical path that need to look into and merge before September?
ML – Put together a list and send an email with the list of PR that have been merged into develop and will then merge into master
ML – ML to work with Brian to compose the list of what is being added into the version 1.4
ML – Update starter kit and Release plan for 1.4
ML – Brian has an idea for DRS 1.5 scoping session at connect
ML – Michele has a proposed a session on cold storage
IF – NCBI – equally active participant in the cold storage issue
ML – Cold storage – 2 stage approach – first stage – labeling. DRS objects are cold storage objects. 2nd one – how do we bring it back to repos so one can work with it

IF – 2 Phase I would like to see – Specification and implementation. That's the discussion we need to have
IF – Would like to bring back the discussion how WES and TES interact with DRS
IF – Velsera platform . even in hot storage the file gets copied into the working directory Structure. How we handle cold storage will be closely related to that

2023-07-10: Cloud WS

Chair: ~~Brian O'Connor,~~ David Glazer
Attendees "Name (Affiliation)": , , , ,Jared Rozowsky (Velsera) , Ian Fore (NIH) , , , , , , , , , , ,Noah Lebovic (Toolchest) , Heather Creasy (NCI CRDC), , , , , , , , , , , , ,Binam Bajracharya(UChicago) , , , , , , , , , , , Kyle Ellrott (OHSU), , , , , , , , Thomas Mooney (WUSTL), , , , , Jilong Liu(gzlab,China) ,Liam Beckman (OHSU) , , José Mª Fernández (BSC / ELIXIR ES), James Eddy (Sage Bionetworks), Heidi Sofia (NCBI/NIH) , Reggan Thomas (GA4GH), , , , , , ,
Apologies : Brian O'Connor

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		

4.	Sub-group Update (TES) https://github.com/nextflow-io/nextflow/pull/3990	Kyle / Venkat
5.	Call for Connect sessions - Submit proposal here. Submission due - **30 July,2023** Call for Poster - Submit proposal here Submission due - **30 July,2023**	

Meeting recording:
https://us02web.zoom.us/rec/share/fxAsR9WmWQt84RvtqBxyDl7nRkJzspqiNli-LYnF5FKFJn1WJSEO6ty1H283Wl6i.dnBT4jjPTKuEVb1P
Passcode: H2&v2@.=

Meeting minutes:

Noah Lebovic (Toolchest) presenting on their work with Nextflow:
TES <> FlowDeploy (https://flowdeploy.com/)

using TES to support biofx when developing a new pipeline
takeaways:
- TES is the best of the options, but has many gaps for Nextflow
- works well for development, but not for deployment (fault-tolerant, reliable, etc.)
- could have just used AWS Batch, but wanted to be more <vendor agnostic?>
- list of ~11 integration gaps

Biggest gaps
- need for shared file system
  - NF requires this (although in theory they support passthru of S3 URIs, it doesn't work in production)
  - hard to make sure files are synced at the right time
- fault tolerance
  - not really a TES problem
  - if one API call to our impl fails, no way to retry
- authentication
  - put up a logless proxy to bridge the gap

some gaps were in the spec, some in the impl
took lots of trial&error to see what was what

Q: tech stack?
flowdeploy takes workflow mgrs / pipelines and deploys them to the cloud

flowdeploy implements the TES API – so I can call TES to run a task on flowdeploy
“nextflow run main.nf -profile flowdeploy” tells NF to use TES to call flowdeploy

built-in NF cloud integrations are complex; we wanted to provide a simpler way to deploy more complex cloud resources w/o having to learn how to be a cloud expert

you can connect NF directly to AWS Batch (or other executors)
but that has issues in e.g. large-scale industry usage
(NF also has their proprietary way to do this via Tower)

Note: NF labels support for the TES executor as “Experimental”

“majority of new pipelines I’m seeing in industry are NF” (as opposed to academia)

we’re happy to help contribute enhancements to the NF TES plugin

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Liam Beckman
Funnel Homepage
Funnel Compliance Site
Elixir’s tes-compliance-suite

upgrading Funnel to pass TES 1.1 compliance suite

2023-06-26: Cloud Meeting

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , Ian Fore (NIH), Heidi Sofia (NIH) , , , , , Bill Clifford (ISB, IDC), , , , , , , , , , ,Surya Saha (Velsera / Seven Bridges), , , , , , , , , , , , Michael Lukowsk (U Chicago) , , , , , , Arthur Brady (CDA), , , , Binam Bajracharya(UChicago), , , , , , ,Jilong Liu(gzlab,China) , , José Mª Fernández (BSC / ELIXIR ES), , , , , , , , , , , , , , , , ,
Apologies: Reggan Thomas (GA4GH)

	Actions Arising	Assigned To	Deadline
1	DRS implementers, how long would 1.4 implementation take? (Velsera, Gen3, dbGaP implementations).		
2	Michael needs feedback on the PR for DRS+Data Connect: https://github.com/ga4gh/data-repository-service-schemas/issues/394	Group	

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian/David
2.	Previous Actions Review → none from last call, we have action items for the next DRS call, see below	
3.	Sub-group Update TRS - Denis can't make it today, update is: - Dockstore is implementing TRS 2.0.1 - TRS spec dev quiet at the moment	Denis → Brian 5 min
4.	Plenary Planning - Plenary is in Sept but it will be here in no time - Start the ball rolling on ideas for what we want to accomplish - Release of all our APIs (where it makes sense, **DRS 1.4** for example is a good target) - Update on Driver/Implementer success stories??? - DRS by the numbers - Quantitative or qualitative - Future APIs? - Would we have DRS 1.4 implementation - Need to see spec ASAP… so implementers have a change to implement ahead of Plenary - What about starter kit, can we get this to be 1.4 by plenary with bulk… would help implementers - Remember we need to ping driver projects to open a release branch for 1.4 and that will take time. - Satellite Hackathon??? - Can we look for support of this? - Look for a driver like bulk in DRS… - We will need to prep topics	
5.	Any other business - Next call is TES	

	Actions Arising from 5/22 (DRS)	Assigned To	Deadline
1	Look at the starter kit bulk implementation and compare to PR #365 to ensure they are in sync. https://github.com/ga4gh/Get-Started-with-GA4GH-APIs/wiki/Starter-Kits-(Part-1-DRS-and-WES)#iii-bulk-request-objects	Brian and TASC group	

2	Turn #394 into PR/docs build by next call	Michael L.	June 12th, merge by 7/24
3	Get feedback from implementers from #334	Brian	merge by 7/24
4	What other issues for 1.4? - Access ID consistency → Ian will look back at issues and present his workaround client. - DRSObject terminology	Group	Bring your priorities 7/24
5	Beyond 1.4? - Data in cold storage → Ian points this out. Will look for an issue. Can we standardize the response?	Group	Bring your priorities 7/24
6			

Meeting recording:
https://us02web.zoom.us/rec/play/UEAWEx7sEY2bCQWVgVXFZijh2XetHub-YSQVHNZ5WHRsrAfnHFTVZKCRQ8fEr_jQ4rbSnwZIw0ti9yzx.kID9zJfMjj24Ler0?autoplay=true&startTime=1687813116000

Meeting minutes:

2023-06-12: Cloud WS

Chair:,Reggan Thomas
Attendees “Name (Affiliation)”: , Luke Paul Buttigieg (Genomics England) , , Bill Clifford (ISB, IDC), Heather Creasy (NCI/CRDC), , , , , , Binam Bajracharya(UChicago), , , , , Michael Lukowski (Uchicago), , , , , ,Patrick Magee (DNAstack) , , José Mª Fernández (BSC / ELIXIR ES),Denis Yuen (OICR - Dockstore) , , Alex Kanitz (ELIXIR Cloud & AAI), Chen Chen ,Reggan Thomas (GA4GH) , , , , ,

2.	Previous Actions Review	
3.	Sub-group Update (WES) - 1.1.0 release https://github.com/ga4gh/workflow-execution-service-schemas/pull/210	Patrick Magee ,Lee Pang , Chris L
4.	DRS compliance suite - https://github.com/ga4gh/drs-compliance-suite/pull/70	Chen Chen / 5 mins
5.	TASC Member Recruitment - The ask is for someone on Cloud to volunteer to attend the TASC meeting 6am pacific on Tuesdays every 3 weeks	Alexander Kanitz agreed to be part of this meeting
6.	Call for Connect sessions - Submit proposal here. Submission due - 30 July,2023	

Meeting recordings:

https://us02web.zoom.us/rec/share/wZLk3NeklKTNuGzz7zuPxaPnMVeFBYkYwW7tNyU3hr-DWjqFZaCTULzkQSj1oVAs.YDWBhuA3FjgNCaID
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Meeting minutes:

Michael L
Turn #394 into PR/docs build by next call

- I believe Ian wanted to make a comment or someone wanted to. And I think that's actually a good way to go forward before we make it into an official PR. So if people want to leave comments on the 394 issue.

Patrick Magee :
Previously we reported as 1.2.0 but it should be 1.1 from semantic version perspective

In the last release someone set it to 1.0.1. To avoid confusion , migrating to 1.1

2 main focus of this release
1) Observability
2) Scalability

Observability - observability is really focusing on the ability to see additional information that you haven't been presented for in the past to make our API responses more useful to end clients, whether it be machine or end user. And also to ensure that information such as, workflow, states or additional task information is made present and available to the end user

Scalability - add a new endpoint to allow for paginated responses over tasks with some similarity to test with an intentional desire to have implementers have the option of using tests there they want it to be. This is naturally a good thing for scalability, because what essentially, we can see is in certain engines, if you respond in too much data, it will break the engine or if you have too many tasks, it'll break the response, you don't want to respond with a million objects in a single API response. More concretely, we added the preempted state, this is a reflection of what happened in tests. We also added support for defining workflow engine and versions.

increase the amount of information that's being returned when listing workflow runs, as well as creating a new task log endpoints and making the task addressable by ID.

If everything is set on this being 1.1. And there's no major changes requested that we can flag that it's ready for driver projects

Highly encourage everyone in discussion and conversion on PR.

Wanted to put it in front of the community and request comments.

DRS Compliance suite:
Updates on config files.
From the hackathon, we received lot of feedback regarding updating the config file to make it more readable

We have created a new config file and Json schema to match
New config files – feedback ?
Added default authorization to the config files
Checking with Yash on bulk request objects.

Need to add it to backlog items. But won't be done for ELWAZI

TASC –
Alex kanitz is interested in joining TASC meetings

2023-05-22: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)": , Ian Fore (NIH) , ,Jared Rozowsky (Velsera,SB) ,Bill Clifford (ISB, IDC) , , , , , , , , , , , ,Heather Creasy (NCI CRDC) , Arthur Brady (NCI CRDC/CDA), , , , , ,

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, , , , , Michael Lukowski (U Chicago), , , , , , , , ,Jilong Liu(gzlab,China) , , , , , José Mª Fernández (BSC / ELIXIR ES),Reggan Thomas (GA4GH) , , , , , , ,

	ready for review - *Pairing passports to bulk requests → propose not doing this, rely on bulk OPTIONS to discover correct authorization methods… OK* - *Pagination → propose not doing this… OK* - *Need implementers to weigh in* - *Need to add bulk response limit to /service-info* - ***Metadata+Bundles: Issue #394*** - *Champion Michael Lukowski* - *Feature Branch https://github.com/ga4gh/data-repository-service-schemas/tree/feature/issue-394-drs-plus-connect-docs-v1* - ***Next Steps:*** - *Turn it into a PR/built docs by June 5th* - *Target next DRS meeting* - **Other items TBD (champions needed, consider volunteering!!)** - The future approaches for sets (post bundle depreciation) - Pagination across all Cloud APIs - Passports evolution and work order tokens - Passing DRS passports and work order tokens to WES/TES - Clarification around “DRSObject” terminology… cleanup the docs - **By Next DRS Meeting (7/24)** - ***Batch Operations: Issue #334:*** - Implementers, can we get comments in 2 weeks? Merged before the next call on 7/24. - Do we need to support streaming responses? - Do we need to provide max bulk request size in /service info? - 50-100 the ideal size for bulk requests? Can we recommend in the spec? KISS is the recommendation. - ***Metadata+Bundles: Issue #394*** - Get a PR with the built docs by 6/12 - Merge by 7/24	
4.		

5.		
	-	

Meeting recordings:
https://us02web.zoom.us/rec/share/4RUecRS1lq9shJgyYnjch_sw2PtUiaZV6GPbOGFP0UjCqOgmkeTvQhfNhGWIKaqV.p4TTEYdkz6ti42Xd?startTime=1684788966000

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Meeting minutes:

- Notes about DRS Bulk
  - Q: Heather Creasy: what's the role of Data Connect v.s. Batch in DRS?
    - A: David G. data connect provides ability to find DRS IDs, DRS provides means of getting the bytes of that object.
    - A: Michael L. if you have 20K objects, DRS server says "413, too big", then you can break it down into smaller chunks.
  - Q: Ian Fore: bulk, ability to do a bulk request to get objects… to get the URL to download the file. Priority is to get the bytes (for implementers)
    - Was this PR using the bulk from starter kit? Check
    - 20K… streaming responses?
    - Do we want to report back max bulk request size in /service-info? Or just return 413? Up to implementer?
  - Bill Clifford:
    - /service-info for number of max bulk requests
    - DRSObject… term is a little confusing … both the entity and the JSON object are called DRSObject…
  - Michael Baumann :
    - Can we recommend in the spec 50-100 for bulk? Seems like a good compromise
  - Bill Clifford:
    - Have the server tell you how the batch is the best approach
  - Ian Fore
    - Avoiding chunking up query…
    - Need implementers to weigh in
- Notes about best practice with manifests/Data Connect
  - David G. I think a PR that updates the documentation, by adding the best practice, is a good idea. (What Brian said.)
- DRS URI
  - Ian brought up the self-URI… is it CURIE or URL?
- Are there any other pressing doc change issues for 1.4???
  - DRSObject terminology
  - self-URI lack of clarity

    - Access ID… long random number or something that helps you understand where it is. Cloud, region, location, etc. Clarify access ID.
- Michael B. Access ID is not consistent (type is OK)
    - Ian: if data is open access, get object can give you all you need…
- Ian : cold storage an issue

2023-05-08: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , , , , , , , , , Mike Conway (NIEHS), Bill Clifford (ISB, IDC), , , Michael Lukowski (U Chicago),Michael Baumann (Broad) , , , , , , Kyle Ellrott (OHSU), Ian Fore (NIH), , , , ,Heather Creasy (NCI CRDC) , , , , Surya Saha (Velsera / Seven Bridges), , , , , José Mª Fernández (BSC, ELIXIR ES), , , , , , , , , , , , , , , , , , Thomas Mooney (WUSTL), , , , , , , Binam Bajracharya(UChicago), , , , , , Venkat Malladi (Microsoft), Heidi Sofia (NIH), Denis Yuen (OICR - Dockstore)

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (TES) - Glob pattern and results https://github.com/ga4gh/task-execution-schemas/issues/102 - Resources, FPGA, GPU https://github.com/ga4gh/task-execution-schemas/issues/163	Kyle / Venkat
4.	Next meeting, DRS focus. - Followup from Connect	

Meeting recording:

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https://us02web.zoom.us/rec/share/N_FJieHGmF9mDY7D-eEnZWGaPaDzZoOqkmTTwbQHsOQp_GuuvRPEnGVS350ANpp_.TV0egWF85eSncE8X
Passcode: 9QP&!TSR

Meeting notes:

- TES focus
- Two topics
    - How should globbing be used
        - Feature added in 1.1
        - Was a blocker for Nextflow
        - Suggested change… file field can include a glob
        - Another change, file or directory, not needing to specify (changing to optional)
        - Issue, no way of knowing the output… you just get the glob. Should TES be able to reflect back the files that are the output or just report back the glob?
        - Two paths
            - A: alter record to include the output
            - B: don't do anything
        - Problem is, not really specified in the spec
        - Patrick, pointed out that passing back DRS URIs… would want to know that and not just the glob. DRS doesn't have the ability to work with globs.
        - Brian, ditto
        - Ian, points out WES and TES… having used WES from 3 different platforms, one returns results as DRS… others don't. Hard to get results back from the two that don't use DRS. Output goes to file storage without access. So DRS is useful here.
        - Kyle: Converging on the point that TES should report this information back to the caller… generally a good idea
        - Patrick suggests using a new endpoint to allow for scaling
        - Christopher, lots of examples of making output too big for a return
        - → try to look at new endpoint rather than expanding the current return document
    - How to describe resources
        - Venkat: kinda solved with "backend parameters"... FPGAs and GPUs… current approach is limited. Want to be able to solve this more robustly.
        - Kyle: can't bake very specific things into the spec since the spec moves slowly. Could have a service that provides the available "keys"? We have a mechanism to inject info into the system (but the strings are currently undefined). Have a shared giant YAML? Produce a second API to do hardware configuration searches?
        - → think about the API for giving key, possible values, descriptions of possible parameters for a given TES
- Future topics
    - tokens / passports… defer to later

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2023-04-24: Cloud WS - Canceled

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , ,

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	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update - WES • Overview of 1.2 Release • Task Identifiers • Extending the List Run Endpoint Slides: WES Cloud WS Update - 2023-04-10.pptx	WES Leads
4.	A.O.B	

Meeting recording:
https://us02web.zoom.us/rec/share/x9HXfpoFIuZgF-qQlmQTKTiK_IGU5Z0-TI4vcU_9R-ifa5v-urDrIvzJ907-zqEt.vsl8kbHguLg-WKlG
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Meeting minutes

<see link to slides above>
Working to wrap up v1.2; incorporating recent good input from Alex
merged a few changes (#188 PREEMPTED, #182 engine/version, #177 tasks pagination)
proposed changes:
- #205 tasks addressable by ID
- #172, #207: more info in Run Status

Discussion of #205
Q: what's required vs. optional in new Task support?
ID is required; state is required
new implementers are required to add the new endpoint that returns the new info
Q: is the new endpoint a breaking change?
it's required if you implement 1.2; it's not available in 1.1

comment from chat: "*as a consumer, super excited and this will be incredibly useful to present a useful UI based solely on WES and not having to 'drop down' to per-engine polling*"

Venkat: if there are multiple TES endpoints in multiple locations (true federated workflows), this will be very useful for debugging workflows and figuring out what broke where

Discussion of Run Status (#172, #207)
different flavors of syntax, to reflect different options on MUST / SHOULD / MAY

suggestion to push for a 1.2 release candidate, in the Develop branch, before Connect
include release notes explaining motivation for the changes
("scale to bigger impls with more runs/tasks" and "support engine-independent monitoring")

@Reggan – what's our latest list of WES implementers?

ARGO Data Platform
BRCA Exchange
cwl-WES
ELIXIR Cloud & AAI
ELIXIR-Beacon
Epishare Platform
Human Cell Atlas Data Portal
NHLBI TOPMed BioData Catalyst

Q: where are we on standardizing access to outputs in an engine-independent way?
A: still a hard question; we don't have a good answer yet; blocks full interoperability; good candidate for 2.0

2023-03-27: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)": , , , , , , , , , , , , , , , Surya Saha (Velsera / Seven Bridges) ,Michael Baumann (Broad), , , , , , , , Michael Lukowski (U Chicago), , , , , , , , ,Bill Clifford (ISB, IDC) , , Yash Puligundla (GA4GH), , , , , ,Jilong Liu(gzlab,China) , , , , Thomas Mooney (WUSTL), Binam Bajracharya(UChicago),Venkat Malldi (Microsoft) , , , , José Mª Fernández (BSC / ELIXIR ES), Reggan Thomas (GA4GH)

	Actions Arising	Assigned To	Deadline
1	Yash to send materials on how to test ahead of Connect	Yash	Before connect
2	For the next DRS focused call, Ian wants to revisit cold storage + DRS		

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian/David 5 min
2.	Previous Actions Review	Reggan 5 min
3.	Presentation - DataCite - “Open Data Research Metrics” - See https://blog.datacite.org/data-citation-corpus-announcement-2023/ - See slides	Matt Buys / 20 mins
4.	Sub-group Update (DRS) - **Roadmap for 2023** - From the Plenary and Connect 2022 session, batch was top priority - **Now → April Connect** (4/19-21, 2023, London UK and virtual) - 1.3 was released (1/23/23) - Landing the following PRs for 1.4 is our priority: - **MERGED to develop**: deprecating bundles (documentation changes only) #389 - Champion → David G - Deadline for revisions: 2 weeks from last DRS call (2/6) - Deadline for comments: 2/20 - Merge date: 3/27 (target 3/13 at latest) - **IN PROGRESS:** Feature/issue 334 drs bulk requests #365 (see also Feature/issue 334 bulk requests nobundle from Ian and DRS bundle contents pagination from Jeremy). We have example bulk requests but need to refine on how you pair passports with particular objects. Also, pagination. - Champion → Brian O	Brian O'Connor , Michael Michael Lukowski/ 20 mins

(but help requested)
    - Deadline for revisions: 2/13 → 4/19
    - Deadline for comments: 2/27 → 4/19
    - Merge date: ASAP post Connect
- **CLOSED**: Feature/issue 343 metadata endpoint #390
    - Champion → Michael L.
    - Deadline for revisions: ?
    - Deadline for comments: ?
    - Merge date: ? (3/13 at latest)
    - ***Replace this with appendix entry PR, work on during Connect (see DRS + Data Connect below)***
        - ***→ can we spend some time working on the agenda??? What do we need to prep for this meeting?***
- Other PRs?
    - ***What else is critical for 1.4??? Who can be a champion to create a PR???***
    - ***Bring ideas to Connect sessions below!!***
- **GOAL:** create 1.4 release branch created at Connect, contain any merged PRs above

- **March → Oct 2023 Plenary**
    - **GOAL**: 1.4 release w/ bulk operations and bundles replacement recommendation
    - Working on the following PRs

	- *TBD* - The future approaches for sets (post bundle depreciation) - Pagination across all Cloud APIs - Passports evolution and work order tokens - Passing DRS passports and work order tokens to WES/TES	
5.	Prep for Connect: FYI Cloud sessions of interest - Overall Connect Agenda (please register!) - DRS and Data Connect .docx - DRS test-a-thon.docx - Federated Compute - Connect 2023 - Agenda.d…	Brian 5 min

Meeting recording:
https://us02web.zoom.us/rec/share/En6tAPbxE1w01tauNDdgBQqb-LUVUPLjEwzRsIhnrnLXp-NTfv_D3ysn0hweQZoA.3p_03sIV7bQLg2SD?startTime=1679950735000

Passcode: pdb0P9=5

Meeting minutes:

- Matt Buys presentation on Make Data Count and DataCite
  - Open Data Research Metrics
  - Research data metrics…
  - DataCite… global non-profit with 2800+ repositories across 50 countries!
  - Global: Make Data Count initiative… a glocal community led initiative focused on development of research metrics.
  - At the stage of adopting best practices
  - Spotlight: Data Citations
    - Difficulty… how to expose data for reuse?
    - Can't make it manual
    - DOIs great, but not only persistent identifiers
    - Data Citation Corpus… extract data citations… linking these in common corpus… public access
    - 5.8M tracked data citations in DataCite, 99% are from DataCite repositories and not from publisher metadata
    - Kaggle competition: "show us the data"... CZI linking data and papers
    - Populating corpus
      - Aggregators… discover citations through various tech… full text mining, AI
      - Data source… collect citations as part of their deposit workflow as persistence identifiers

    - Stakeholders
    - Data citations need to be available
        - Dashboard of data citations
        - Expose data via APIs
- Spotlight: Data Tracker and usage
    - Using usage stats to publish who's using what
- Prototype: launching end of May for prototype with CZI
    - Q1 next year for launch
- Questions
    - How do researchers use the corpus? Is it primarily used to track how people use their data? Is it for discovery of related data?
    - How do data platforms participate? Do they publish their data catalogs to the corpus?
        - Publication metadata
    - What role would DRS URIs have in the Corpus? They link data PIDs to how to access data.
        - What can we do to help?
            - Include citations in publications
        - DRS?
            - Data usage and data citation
            - There something of a connection here to the discussions we had about CURIEs back (3+ years ago) when were thinking about DRS ids. –Ian
        - Would they accept usage information?
            - Data usage from the source… hosting service
    - What level of granularity?
        - Higher level… data citation is happening via publishers… and what the machine learning algorithms are picking up as well
        - Important to capture metadata as part of publications
        - Example of citation from Matt: https://www.projectcounter.org/counter-code-practice-research-data-usage-metrics-release-1/
    - What's the most impactful
        - Tracking CURIE's across sites?
        - Technical spec: https://www.projectcounter.org/counter-code-practice-research-data-usage-metrics-release-1/
            - This is human driven… uses and downloads
            - AI: how could this be adapted for compute←>compute interaction?
        - Citations
            - Reference of dataset in publications
            - AI: how could data mining be aware of DRS CURIEs
    - Is there an open standard?
        - AI: opportunity… data cite works across domains… pull in citations on DataCite.
        - This is the CZI Science definition: A dataset is a collection of data that have been measured, collected, and/or analyzed as part of a

research study. Datasets can be mentioned by Accession Number IDs associated with a database such as GEO or BioProject; DOIs associated with a repository such as Dryad, Zenodo, or Figshare; or resources hosted on external URLs, such as academic institutions or organizations.

2023-03-13: Cloud WS:

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , ,Yash Puligundla (GA4GH) ,Venkat Malladi (GA4GH), Heather Creasy (NCI/CRDC), , Alex Kanitz (ELIXIR Cloud & AAI), , , Michele Mattioni (Velsera / Seven Bridges), Surya Saha (Velsera / Seven Bridges) , Michael Baumann (Broad) , , , , , , , , , , , , Binam Bajracharya(UChicago), Thomas Mooney (WUSTL), , , , , , , , , , , , , ,Denis Yuen (OICR - Dockstore) , , , ,José Mª Fernández (BSC / ELIXIR ES) , ,

	Actions Arising	Assigned To	Deadline
1	DRS testing session - Connect meeting -Agenda items - To be finalized by 03/15		03/15
2	**DRS and Data Connect session** - Connect meeting - Agenda items - To be finalized by 03/15		03/15

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3	New co-lead (Chris) - Wes	David / Sara
4.	Sub-group Update (TES) 1) Updates on conformance testing 2) New release of Microsoft TES-Azure 3) ELIXIR task federation demo	Kyle / Venkat
5.	DRS testing session - Agenda items	Yash

Meeting recording:
https://us02web.zoom.us/rec/share/auRzdsKQoaKfDnxRAVqPXBicJe3Xsoin10SPWtVYA410hG8BzgJKf5ti-jhcH-y4.QGeMvHM_0NXIIlSG

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Passcode: $F%rr4Lq

Meeting minutes
Announcement of the new co-lead for WES
Walkthrough of TES updates

2023-02-27: Cloud WS:

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , , , , , , , , , , , , , ,Surya Saha (Velsera / Seven Bridges) , Jared Rozowsky (Velsera/SB) , Ian Fore (NIH) , , , , , Michael Lukwowski (Uchicago), Yash Puligundla (GA4GH),Bill Clifford (ISB, IDC) , , , , , , Binam Bajracharya(UChicago), Michael Baumann (Broad), , Chen Chen (GA4GH), , , , , , , , , , , , , , , , , , , Jilong Liu(gzlab,China), , , , , , , , ,Denis Yuen (OICR - Dockstore) , Venkat Malladi(Microsoft), Heather Creasy (NCI CRDC), , José Mª Fernández (BSC / ELIXIR ES), , Reggan Thomas (GA4GH)

	Actions Arising	Assigned To	Deadline
1	WES PRs to be merged https://github.com/ga4gh/workflow-execution-service-schemas/pull/177 https://github.com/ga4gh/workflow-execution-service-schemas/pull/182	WES champions	TBD by WES champions
2	We reached out to the Welcome/CZI/DataCite group and will follow up with an introductory call. Reggan was able to schedule a presentation by this team to cloud for late March (3/27)	Brian/Reggan + David if available	3/27
3	Yash to review https://github.com/ga4gh/gh-openapi-docs/issues/43 and see if the tech team can come up with a solution	Yash	April connect
4	Feedback on TRS PRs • https://github.com/ga4gh/tool-registry-service-schemas/pull/238 • https://github.com/ga4gh/tool-registry-service-schemas/pull/239	Interested parties	3/10
5	Let’s review the Connect topics (they are due on March 1st) • See slack: https://ga4gh.slack.com/archives/C01PS8Q01FU/p1677230286233989		3/10

	• Previous submissions:
	  ○ **DRS 1.4 session:** "This is a DRS working session where we want to explore options of using Data Connect + bulk operations in DRS 1.4 to create a scalable bundles replacement. This is our major priority for DRS 1.4." → Brian O. submitted this on 1/23
	  ○ **DRS testing session**: "It would be great to have a session where system builders can test (or test ahead of time) and bring feedback/validation result to a Connect session to aggregate results and compare with other implementations, resulting in change suggestions to the test suite and/or spec." → Brian O submitted this on 1/23
	• Michael and Ian will submit a proposal for DRS + Data Connect → let's discuss on the next call		

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	

3.	Sub-group Update (TRS) [slides]
	• Review mergeable PRs
	  ○ https://github.com/ga4gh/tool-registry-service-schemas/pull/238
	  ○ https://github.com/ga4gh/tool-registry-service-schemas/pull/239
	• implementation challenge for 2.0.1
	• assess backlog and brainstorming for 2.1 items
		Denis

4.	DRS compliance suite - update	Chen/ 5 mins
5.	Confirm topic for next meeting, TES according to our schedule	Reggan

Meeting recording:https://us02web.zoom.us/rec/share/atpSg0iX1OqrxyaiYhkltGZ4KR02ZTU-r3ga5n5VXsASm6zZt3EkbBGx3vchYjX7.gis7RHBkvhEgApv0
Passcode: SwG*T1^N

Meeting minutes:

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2023-02-13: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: ,,Yash Puligundla (GA4GH),Bill Clifford (ISB, IDC),,,,Lee Pang (AWS),,,,,,,Patrick Magee (DNAstack),,,,,,,,,,Binam Bajracharya(UChicago),,,,Michele Mattioni (Velsera / Seven Bridges), Surya Saha (Velsera / Seven Bridges),,,,,Michael Lukowski (U Chicago),,,,,,,Jilong Liu(gzlab,China),Mike Conway (NIEHS),,,,,Denis Yuen (OICR - Dockstore),,,José Mª Fernández (BSC / ELIXIR-ES),,Thomas Mooney (WUSTL, Michael Baumann (Broad),Venkat Malladi (Microsoft), Ian Fore (NIH),Reggan Thomas (GA4GH)

	Actions Arising	Assigned To	Deadline
1	Review the WES PRs below, today starts the 2 week RFC period and then the PRs will be merged by the champions.	Interested parties	2/27
2	Let Yash know if you want to attend the DRS Compliance Suite sprint reviews	Interested parties	
3	Get info from Heidi S. from the new Welcome/CZI/DataCite consortium, what role of DRS? → Review on the next cloud call and possibly follow up with a presentation by this group to cloud WS.	Heidi S.	2/27

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update - WES a) Review of prs ready to merge https://github.com/ga4gh/workflow-execution-service-schemas/pull/177 https://github.com/ga4gh/workflow-execution-service-schemas/pull/182 b) TASC pagination and WES	Patrick
4.	Tech Team Sprint Review meetings - DRS Compliance Suite - Need support (yasasvini.puligundla@ga4gh.org or on cloud_ws slack channel)	Yash / 5 mins

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Meeting recording:https://us02web.zoom.us/rec/share/U1zmrnIdW4t10xydiaRH7jtTAeim3x_mPlr9fL3vzm2Dc6zHLn-AOvV2hBvrpTTd.0smYPF9GaxTg65jY
Passcode: 9oR?!CcM

Meeting minutes:

2023-01-23: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , Bill Clifford (ISB, IDC), Kyle Vernest (Broad) , , , , , , , , , , , Chen Chen (GA4GH), , , , , , Binam Bajracharya(Uchicago), , , , , , Michael Lukowski (U Chicago), , , , , , , Jilong Liu(gzlab,China), , , , , , , , ,Danielle Pillion (PIC-SURE) , , José Mª Fernández (BSC / ELIXIR-ES), Reggan Thomas (GA4GH) ,

	Actions Arising	Assigned To	Deadline
1	Connect meeting ideas - submission form due by March 1st (we have two DRS proposals submitted)	TRS, TES, WES, DRS champions	
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review	Reggan

3.	Sub-group Update (DRS)
	- **Schedule of upcoming DRS calls**
	  - **Today** → DRS 1.3.0 release branch → release
	  - Docs: https://ga4gh.github.io/data-repository-service-schemas/preview/release/drs-1.3.0/docs/
	  - Timeline for PRs ahead of Connect, see below
	  - **3/27** → only DRS meeting before Connect
	  - The open PRs request to merge to drivers 2 weeks ahead at a minimum (3/13) so they can be included in 1.4 release branch
		Brian / Michael

- Merge what we can ahead of Connect
- **4/19-21: Connect meeting**
- 5/22 → DRS meeting, topic TBD
- 7/24 → DRS meeting, topic TBD

- **Roadmap for 2023**
  - From the Plenary and Connect 2022 session, batch was top priority
  - **Now → April Connect** (4/19-21, 2023, London UK and virtual)
    - 1.3 release (today)
    - Landing the following PRs (from 9/12 DRS call)
      - deprecating bundles (documentation changes only) #389
        - Champion → David G
        - Deadline for revisions: 2 weeks from last DRS call (2/6)
        - Deadline for comments: 2/20
        - Merge date: ? (target 3/13 at latest)
      - Feature/issue 343 metadata endpoint #390
        - Champion → Michael L.
        - Deadline for revisions: ?
        - Deadline for comments: ?
        - Merge date: ? (3/13 at latest)
        - Replace this with appendix entry PR
      - Feature/issue 334 drs bulk requests #365 (see also Feature/issue 334 bulk requests nobundle from Ian and DRS bundle contents pagination from Jeremy)
        - Champion → Brian O (but help requested)
        - Deadline for revisions: 2/13
        - Deadline for comments: 2/27
        - Merge date: 3/13
      - Other PRs?
        - ***What else is critical for 1.4??? Who can be a champion to create a PR???***
    - 1.4 release branch created at Connect, contain any merged PRs
  - **March → Oct 2023 Plenary**
    - 1.4 release
    - Working on the following PRs
      - TBD
      - The future approaches for sets (post bundle depreciation)
      - Pagination across all Cloud APIs

	- Passports evolution and work order tokens - Passing DRS passports and work order tokens to WES/TES	
4.	DRS Compliance suite - Update See https://docs.google.com/document/d/1b9qg8etioZmTSQ7zVIi8VB8rndSwKYVMnx3qtzAKuQU/edit#heading=h.p6177e1n2br3	Chen / 5 mins
5.	Connect meeting ideas - submission form ● **DRS 1.4 session:** "This is a DRS working session where we want to explore options of using Data Connect + bulk operations in DRS 1.4 to create a scalable bundles replacement. This is our major priority for DRS 1.4." → Brian O. submitted this on 1/23 ● **DRS testing session**: "It would be great to have a session where system builders can test (or test ahead of time) and bring feedback/validation result to a Connect session to aggregate results and compare with other implementations, resulting in change suggestions to the test suite and/or spec." → Brian O submitted this on 1/23	Reggan
6.	API Champions to update the 2023 roadmap slide for steering committee ● Let's start populating our 2023 roadmap doc as well ● 1/26 is the meeting ● 1/24 deadline	Reggan
7.	Next meeting agenda - 2/13 WES-focus	Reggan

Meeting recording:
https://us02web.zoom.us/rec/play/I7CPepz6523Qhw1CyMyWbYn_BaYNdFWS0Q1Jg95cQEJvbVuCpghHvWwSnyDRyFlpfOhc2VwKLoCnAUOy.qLwLKwNKqV6ZfhrJ?continueMode=true&_x_zm_rtaid=NKmZbuMLTxud_WeC1ikT2Q.1674510613966.f783469297673d103a8e786031a46028&_x_zm_rhtaid=325

Passcode: C$&6N.s^

Meeting minutes:

The topics for Connect

- DRS metadata → close this one
  - Use Data Connect
  - **AI: mlukowski@uchicago.edu to close this**
- DRS Bundles
  - Data connect + bulk → bundle replacement
  - These together could produce a "selection object"
  - **AI: can we show a mock example of this for April Connect? Add to the docs for DRS as an appendix**

        - → **Ian F.** to help on this via FASP examples
        - → **Michael L.** to help put this in a new PR for doc example of DRS+Connect in appendix of DRS spec
        - → **Brian** to clean up
        - → **Kyle V.** and **Bill** to review
    - **AI: two PRs**
        - One for cleanup
        - Second for examples of DRS + Data Connect for metadata
            - DRS and metadata exploration
            - https://github.com/ga4gh/fasp-scripts/blob/master/notebooks/drs/altMetadata.ipynb
            - https://github.com/ga4gh/fasp-scripts/tree/master/notebooks/drs
- DRS Bundle Deprecation
    - **AI: what about the mime type? A topic for Connect**
        - forei@mail.nih.gov
        - TASC registering MIME types… see links there
        - Loose end here… could be a connect topic
- DRS starter kit vs. DRS 1.3/1.4
    - **AI: 1) starter kit needs to be clear of the DRS version it supports (/service-info) and 2) match DRS 1.4 Release**

Compliance Suite Update (Chen)

- AI: need to get a public version of this doc https://docs.google.com/document/d/1b9qg8etioZmTSQ7zVIi8VB8rndSwKYVMnx3qtzAKuQU/edit#heading=h.p6177e1n2br3
- 1.2.0 is the current version supported
- **AI: update to DRS 1.3…** maybe by Connect, Chen needs to give an estimate, will talk to Yash
- How do we deal with testing systems in production? That have PB of data?

2023-01-09: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , , , Jared Rozowsky (Seven Bridges), Michele Mattioni (Seven Bridges) ,Surya Saha (Seven Bridges) , , , , , , , , , Binam Bajracharya(UChicago), Michael Baumann (Broad), , , , , , , , , , , , , , , Mike Conway (NIEHS), Bill Clifford (ISB, IDC) , Danielle Pillion (PIC-SURE), , , , , , , ,Jilong Liu(gzlab,China) , , , , , ,Kyle Ellrott (OHSU) , , , , , , , , , Chen Chen (GA4GH), Ian Fore (NIH) , , , Patrick Magee (DNAstack), , , , , Venkat Malladi (Microsoft), Yash Puligundla (GA4GH) , Sara Salahi (Broad), Alex Kanitz (ELIXIR Cloud & AAI), Denis Yuen (OICR - Dockstore),Reggan Thomas (GA4GH)

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	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Azure TES implementation - Presentation https://github.com/microsoft/ga4gh-tes	Venkat
4.	Plans for next release of TES: - Status update callbacks - Broadcasting capabilities - Passing credentials - Better support for task federation / distribution logic	Venkat
5.		
	-	

Meeting recording:https://us02web.zoom.us/rec/share/q1aDj7Hy0DNso0CixndK88I993_rPrl3jhF4Gv-zGMK-AZ-vehY7yzWCVaDTf_M3.rdq4NIDC_663c4Uv

Passcode: ty5=UDgT

Meeting minutes:

- welcome Danielle Pillion to the call!
- security discussion (esp. for WES/TES)
    - Alex Kanitz is compiling a list of requirements in <link>
    - will loop in AAI team to get their input, esp. with latest Passports release
    - goal is to queue up focused in-person meetings at GA4GH Connect in April
- Venkat preso on Azure's TES work
    - GitHub repo: https://github.com/microsoft/ga4gh-tes
    - TES 1.1 spec compliance: https://github.com/microsoft/ga4gh-tes/issues/7
    - mcr.microsoft.com/ga4gh/tes is a public Docker image with TES support

    - Cromwell will use this service
        - testing Nextflow and snakemake; require some 1.1 changes to TES
        - would like to do the same with CWL
    - Q: point to data?
        - today direct URLs (e.g. to Azure storage)
        - sweet spot is computing with data already in Azure
    - TES service will find the cheapest VM, that meets the specs you provide, in the region you specify, that you have quota for
    - TES service runs in a specific region
    - considering adding a WES interface to the same service
    - Q: did you have to make any changes to Cromwell's 2018 TES adaptor?
        - yes; we're working with them to make Cromwell changes; PRs should all be in the main branch (eventually)
        - working to get the same with snakemake and Nextflow; we submit issues to them
    - Q: documentation?
        - it will come into the Git repo, and in ?wikipedia
    - Q: is MSFT operating a TES service?
        - exploring; we could; depends on community drive
        - might need multiple TES svcs with a TES gateway; e.g. because limits on what instances are avlbl
    - Q: stateful? persistence?
        - deployed via K8S; the cluster should be able to manage state
    - Q: timeline for 1.1, and Cromwell use?
        - Cromwell mostly live already
        - changes for Nextflow are being worked on (e.g. filetype as optional, streamable flags)
    - Q: access control?
        - uses Azure Batch controls on the Batch accounts
- TES Champions
    - Venkat Malladi (along with Kyle Ellrott ongoing) is a new TES Champion
- WES PR
    - https://github.com/ga4gh/workflow-execution-service-schemas/pull/182

2022-12-26: CANCELED

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)": , , ,

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.		
5.	**Cloud Project Board update**	
	-	

Meeting recording:
Meeting minutes:

2022-12-12: CANCELED

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , ,

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2.	Previous Actions Review	
3.		
4.		
5.	**Cloud Project Board update**	
	-	

Meeting recording:
Meeting minutes:

2022-11-28: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , , , , , , ,Patrick Magee (DNAstack) , , , , , , , , , , , , , , , Michael Lukowski (U Chicago),Venkat Malladi (Microsoft) ,Bill Clifford (ISB, IDC), , ,Yash Puligundla (GA4GH) ,Jilong Liu(gzlab, China) , , , , , , , , , , , , José Mª Fernández (BSC / ELIXIR ES), ,

	Actions Arising	Assigned To	Deadline
1	call topic for our backlog, driver voting process		
2	Champions, start to gather items for the 2023 roadmap and add your suggestions	Champions	
3	Champions review text for new website	Champions	11/28
4	TRS action item for connect: - How do we get more implementers? - How do we adapt for apps/notebooks? - Future hackathon topic? FASP to pull tools via TRS? - Future… add starterkit for TRS?	Denis	Connect
5	Teams, try out compliance test suite → can we get more teams to try it? Use “develop” is the branch to use.	DRS implementers Binam (U. Chicago)	
6	PRs for WES for folks to comment on: ● 2 weeks to comment ● #188 → good to go, Patrick will merge today	Group/Patrick	Next call

	• #182 → workflow engine/version… please leave comments on the PR and will merge in 2 weeks		
7	TASC • Pagination… can we have a common way of doing this across APIs? • https://github.com/ga4gh/TASC/issues/29 • Look back at alternative approach of "limits" for return	Yash to help us make a ticket	

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian
2.	Previous Actions Review	Brian
3.	Recap of sessions from Connect • Recordings 1) Cloud Work Stream Session (Tuesday, 15 November 2022, 16:00 - 17:30 EST) 2) Cloud API's in 2025 (Wednesday, 16 November 2022, 09:00 - 10:30 EST) 3) FASP Builder session1(Tuesday, 15 November 2022, 14:30 - 16:00) 4) FASP Builder Session 2 (Wednesday, 16 November 2022, 10:30 - 12:00) • Links to agendas for cloud and FASP sessions 1) Cloud Workstream session 2) Cloud API's in 2025 3) FASP Builder Session 4) Getting started with APIs	Brian/Reggan
4.	Sub-group Update - WES 1) Quick update where we are 2) Quick vote or discussion on any pre we think are ready to be included 3) Pagination 4) Discussion on 1.2 release plans	Patrick
5.	Champions review text for new website	Reggan
6.	Sub-group Update schedule review • Cloud WS Meeting Schedule	Reggan

	• Champions, please review and let Reggan know if any dates don't work • We'll generally skip dates rather than shifting schedule	

7.	Roadmap for 2023:
	• Document
	  ○ For reference: 2022 roadmap
	  ○ Ideas for 2023
	  ■ Pagination across all Cloud APIs
	  ■ WES/TES:
	  • Passport passing? Work order token?
	  ○ TASC: can they take on pagination in 2023
	  ○ Connect: Next hackathon at April Connect: possible topics
	  ■ Pagination across Cloud APIs, see https://github.com/ga4gh/TASC/issues/29
	• Translate to Cloud Project Board
	• ***We likely will discuss on the next meeting**, Champions, start taking a look for the next call*
	• *Another call topic for our backlog, driver voting process*
		Brian/Reggan

Meeting recording:https://us02web.zoom.us/rec/play/7Zh2ZjM2MQXECvIT2Y7UKQDlyhxUVPmtrAUQhEive5g9XBc7p1x7E_9ykAZ1nh3tMXlF7JeLT3zq_c85.2lkRCQFCNLDjWNPn?continueMode=true&_x_zm_rtaid=xek_0CIXTQKpA2rRNEXDPg.1669715416637.cf26572f914913a74c64ede06cafad2a&_x_zm_rhtaid=136

Meeting minutes:

- Connect recap
  - Update format… would be better to do a deep dive
  - Hackathon next time? Topic focus?
- Pagination
  - All specs are doing something different
  -

2022-11-14: Canceled due to Connect

2022-10-24: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)": , , ,

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	Actions Arising	Assigned To	Deadline
1	TRS action item for connect: - How do we get more implementers? - How do we adapt for apps/notebooks? - Future hackathon topic? FASP to pull tools via TRS? - Future… add starterkit for TRS?	Denis	Connect
2	Teams, try out compliance test suite	DRS implementers Binam (U. Chicago)	

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian - 5 min
2.	Previous Actions Review	Reggan - 5 min
3.	Sub-group Update - TRS	Denis - 30 min
4.	DRS Compliance Suite - Updates	Yash - 10 min
5.	Connect topic prep	Reggan/Brian - 10 min

Meeting recording:https://us02web.zoom.us/rec/share/5--ipk7CrkUzOZqF9NqSdSaQ6cUloGUFn-_cfVjiwH9G1_hK5BkYF4keptF6cOKB.d9SKIMb-cA857imj
Passcode: 8$*sFiJn

Meeting minutes:

- 2.0.1 release was recent
  - See GA4GH slack, general… when to do a .x release and when x.x release
- Conversation about TRS use by platforms
  - SBG import
  - Terra… click through “launch with” process using TRS
  - Programmatic use by scripts
- Future release of TRS
  - Jose, multiple systems supporting TRS

    - Kyle (Terra), worked with Dockstore so far… using TRS there… good to have more.
        - Want to update the version of TRS used
        - More TRS servers, likely to see compatibility issues
    - Denis mentioned DNAstack discovered differences between TRS in DOckstore and others.
    - “Apps” in the next version of TRS? Kyle asked about Kubernetes/notebooks.
        - → a potentially good topics for Connect? Hackathon topic?
- DRS Compliance Suite
    - Think about releases that match up with DRS releases
    - Think about validating schema vs. content… how to make this flexible
    - https://github.com/ga4gh/drs-compliance-suite
    - Think about Jenkins or similar CI/CB system … Yash said they are working on Docker images and Py package for this
- Connect topic ideas
    - Hackathon… can we use all 4 APIs together?... Could be a joint session or collaboration with FASP
    - Driver updates… can we check in with our driver projects?
    - DRS bundles deep dive, can we use the time to drive consensus on how bundles are replaced in 1.3 and 2.0?

2022-10-10: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , ,

3.	Sub-group Update (TES) Add status update callbacks to TES spec and implement end-to-end PoC with cwl-tes and TESK PR for TES specs Link for the slides	Suyash Gupta (3+2) mins
4.	Implement TES compliance testbed Slides	Lakshya Garg (3+2) mins
5.	Implement gateway TES service that relays incoming TES requests to an appropriate TES instance after injecting middleware (e.g., task distribution logic, security features, organization-specific policies) slides	Ayush Kumar (3+2) mins
6	TES status update v1.1 and discuss on feedback received	Alex / Kyle
7	Discuss about new co-chair for TES	Alex
8	Connect now in Nov - What do API champions want to accomplish ahead of Connect? - Nov 14-16th	
9	New GA4GH Website - Content review (DRS,WES,TES and TRS)	

Meeting recording:
https://us02web.zoom.us/rec/play/YWZkkxq1h2ks3Cacvebw49pPZBmt1UPhzJKUxvDBLV6bA1Agh-YQoNNte036gWIA1N2O52FAmB8adcVn.wMDm3CZryvx7RN7z?continueMode=true&_x_zm_rtaid=qhpO_djaToGyZ4NNL2c6Xw.1665418806832.acd9fe264f70bf476a3bf6dc82c50462&_x_zm_rhtaid=455

Meeting minutes:

- DRS 1.3 release branch:
  - For docs, see https://ga4gh.github.io/data-repository-service-schemas/preview/release/drs-1.3.0/docs/
  - We will be polling our driver projects shortly to seek approval for 1.3 being released before Connect in Nov.
- TES
  - 1.2 → the call back is going here
- We should have test suite 1) standardization and 2) automatic running via CI/CD in our Connect agenda
  - Opportunity for reuse
- TODO: put the Connect agenda for cloud here so others can add their ideas

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2022-09-12: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , Mike Conway (NIEHS), , , , , , , , , , , , , , , , , , Thomas Mooney (WUSTL), , ,Yash Puligundla (GA4GH) , , , , Chen Chen (GA4GH), , , , , , , , Michael Lukowski (U Chicago), , , , Jared Rozowsky (Seven Bridges), , Surya Saha (Seven Bridges), , , Justin Clark-Casey (EMBL-EBI), , , , ,Jilong Liu(gzlab, China),,,,,,,Yifan Chen(China) , , , , , , ,Patrick Magee(DNAstack) , , Michele Mattioni (Seven Bridges), , , , , ,Denis Yuen (OICR - Dockstore) ,Ben Busby (DNAnexus) , , Heidi Sofia (NIH),Reggan Thomas (GA4GH)

	Actions Arising	Assigned To	Deadline
1	Yash to show a demo of the DRS compliance test suite. Host on AWS maybe as well	Yash	TBD
2	Make sure we have docs built for each DRS feature branch		

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Agenda for 9/21 Working Session ● We have 2 hours ● We could dedicate time for each API, roadmapping for the next year ● We could also dedicate time to new APIs/standards needed in cloud e.g. “ephemeral workspaces” from NHLBI’s BioData Catalyst. PFB from U. Chicago.	
4.	DRS Compliance Suite - Update	Yash
5.	Sub-group Update (DRS) ● DRS 1.3 release branch is pending ● Let’s use the Plenary working session to work through key issues/PRs before merging into 1.3… goal for plenary to have the release branch ready for merge and announce time for driver projects to give feedback ● Open PRs of interest: ○ deprecating bundles (documentation changes only) #389 ○ Feature/issue 343 metadata endpoint #390 ○ fix typos in spec #387 → not for detailed discussion but thank you for fixing these typos!!	Brian

	○ Feature/issue 334 drs bulk requests #365 ○ *Call for other high priority PRs* ● Open Issues ○ *Call for high priority Issues*	
5.		

Meeting recording
https://us02web.zoom.us/rec/share/rOnw3ivhnqJFtHiB9QHI_mqrS6K9hKwPNkLcWiBdFeNxRT_S3aw4t4vbR00eCYPF.dlbfZAU-pZ_fRz-9?startTime=1663001942000
Passcode: kLT@$u5+

Meeting minutes:

- DRS Compliance Suite update
  - Yash and Emre are working on this test suite
  - DRS compliance suite… moved the custom code… using the JSON schema library from OpenAPI definition
  - Using a mock server for validation
  - Added basic, bearer, and passport auth now
  - Continuing to add
  - Planning in the coming weeks… /service-info and DRS objects endpoint… adding other endpoints in the coming weeks
    - Expand parameter
  - Question: do we allow “extra” values?
    - Flag as a compliance “warning” if extra fields are found

2022-08-22: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , , , ,Bill Clifford (ISB, IDC) , , , , , , , , , , , , , Yixue Li(gzlab, China) , , , Binam Bajracharya(UChicago), , , , , , , , , Michael Lukowski (U Chicago), , , , , , , , , ,Jilong Liu(gzlab, China),,,,,,,,,Yifan Chen(Volcengine, China) , , , , , , , José Mª Fernández (BSC, ELIXIR ES), , , , , , , , , , , , , Andrew Ponomarev (GenX),Venkat Malladi (Microsoft) , Heidi Sofia (NIH),Reggan Thomas (GA4GH)

	Actions Arising	Assigned To	Deadline
1	See spreadsheet for upcoming schedule		
2	Champions, please have your release branches open by the end of Aug	API champions	8/31
3	Next meeting is DRS, let’s review the open PRs and release branch then	Michael L and Brian O.	9/12

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Presentation - Jilong Liu	Jilong Liu/ 20 mins
4	A.O.B	5 mins

Meeting recording:

https://us02web.zoom.us/rec/share/Jj4iR9_yIxgTW8MBsTjGYTd_5STWW7m8TcugYXDOYNdSR1pURPP-Jt_o2FW5NkM.IoOEtK5AemA2EySu?startTime=1661200647000
Passcode: N2AyeC!W

Meeting minutes:

- Presentation GCBI use of GA4GH APIs
  - Yixue Li - director of GCBI
  - Jilong Liu
- Slides: <<can we get the link?>> Link embedded
- Guangdong-Hong Kong-Macao Greater Bay Area Center of Bioinformation (GCBI)
- Guangzhou National Lab (GZNL, gzlab) is the operator of GCBI
- Bio2S: Biomedical Big Data Operating System… cloud native infrastructure.
  - Hybrid cloud, public cloud
- Partner Volcengine… ByteDance's cloud service
- Jilong presented the API from Cloud
- Have implemented the APIs as test… planning to build TRS and DRS APIs in the future
- Miracle Cloud… built using WES and TES APIs… and Cromwell
- Projects using it… COVID, Camel Genome, HCC Pedigree, ICGC-ARGO
- Presented some difficulties
  - Problems with using workflows with GCP/AWS-specific params
  - Policy
  - Background of researchers on cloud
- Future plans
  - TRS and DRS in Miracle Cloud
  - Build Bio2S network
  - Open source Bio2S
  - Deploy more broadly
- Want to show distributed compute like NCPI in NIH
- Assistance needed
  - Become a driver

- Mirror workflows to China

GCBI

Contacts

- Yixue Li,
  - Director of GCBI
  - li_yixue@gzlab.ac.cn
- Jilong Liu
  - Project leader & executor of Bio²S in GCBI
  - liu_jilong@gzlab.ac.cn
- Yifan Chen
  - Implementor of Bio²S project in Volcengine
  - chenyifan.90@bytedance.com

GCBI

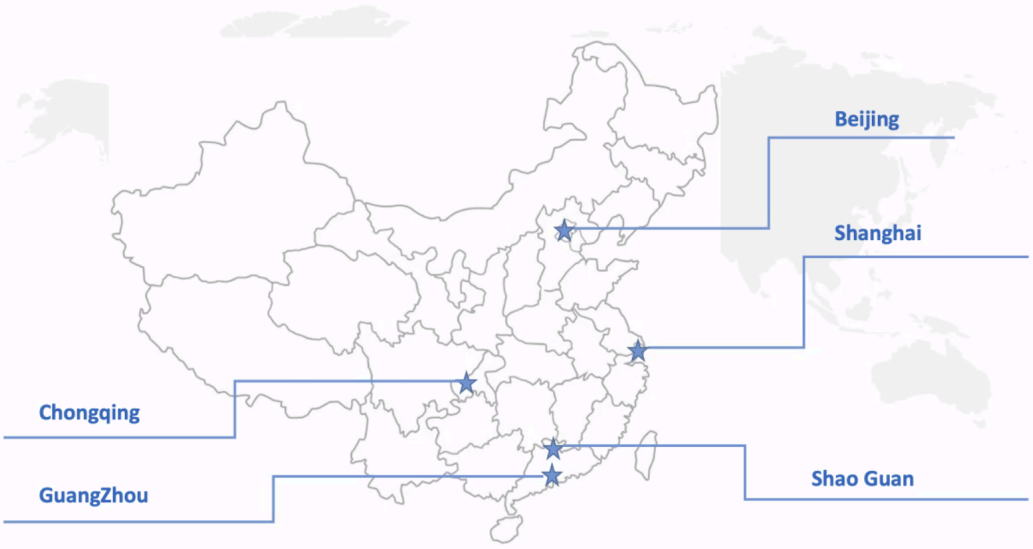
Our Goal



- Build reliable cloud infrastructure to support Chinese Genomics projects and bridge the gap with GA4GH community
- Register our Bio²S as GA4GH Cloud WS Driver Project
- Set up & maintain official mirror site in China for images and workflows under TRS (Dockstore)
- Promote GA4GH works in China

GCBI

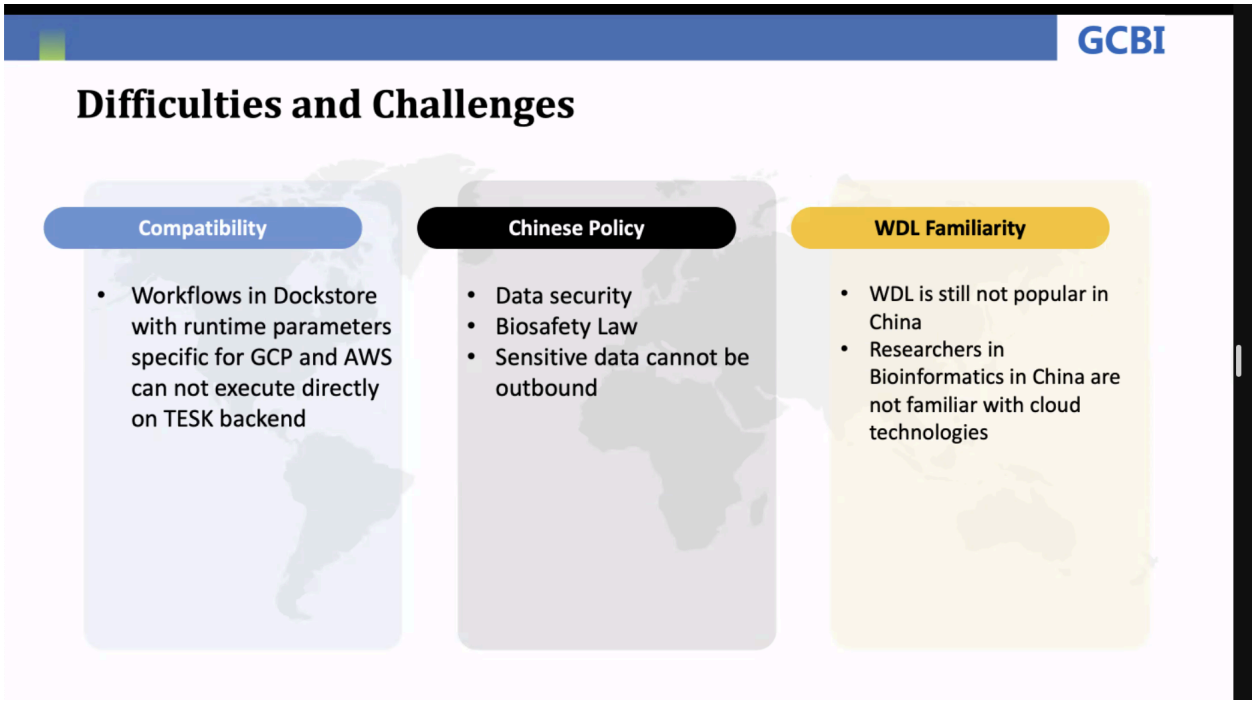
Where Bio²S will be deployed

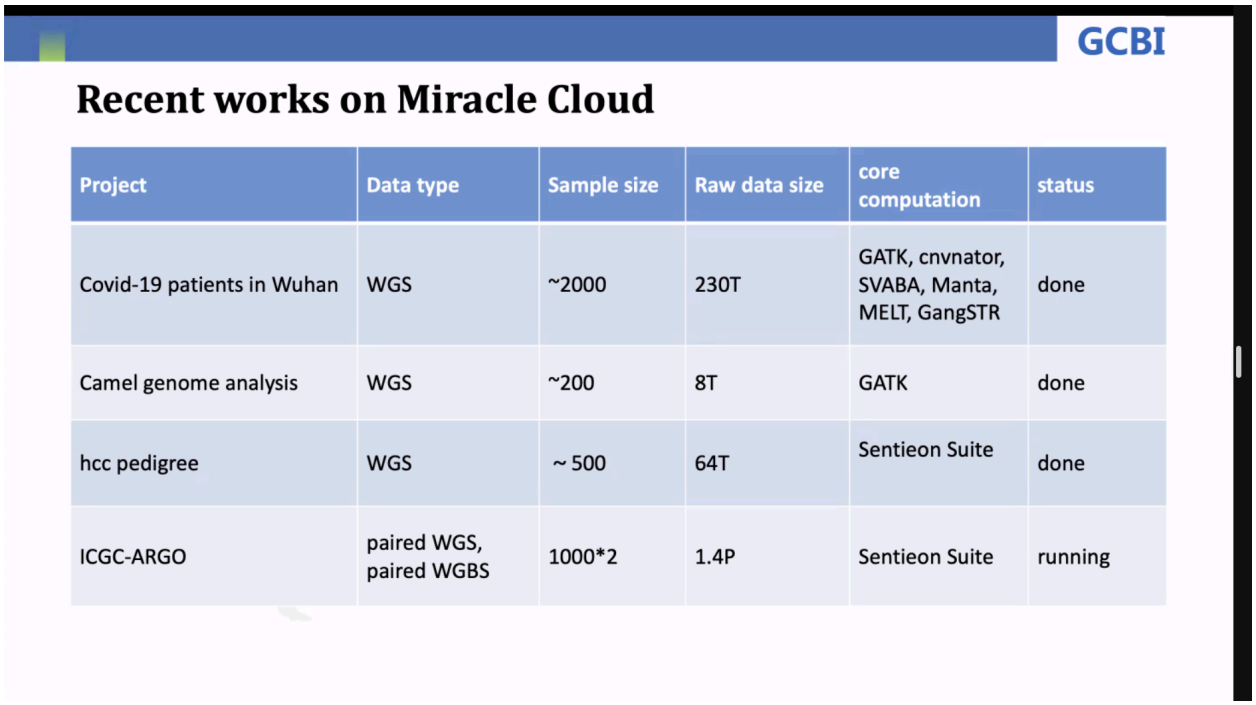


GCBI

Future plan

- Implement TRS and DRS services
- More deployments, Build Bio²S network
- Open source for Bio²S, Contribute to the Cloud WS community
- Promote Chinese bioinformatics community





2022-08-08: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: ,Michele Mattioni (Seven Bridges) , , , ,Yash Puligundla (GA4GH) , Bill Clifford (ISB, IDC), , , , , , , Emre Ferhatoglu (GA4GH), , , , , , , , , Michael Lukowski (U Chicago), , , , , , , Binam Bajracharya(UChicago), , Justin Clark-Casey (EMBL-EBI), , ,Surya Saha (Seven Bridges) , , , , , , , , , , , , Denis Yuen (OICR - Dockstore), , , , Mike Conway

Global Alliance for Genomics & Health

(NIEHS), , , , , , , , , ,Jilong Liu(gzlab, China) , José Mª Fernández (BSC, ELIXIR ES), Venkat Malladi (Microsoft),Reggan Thomas (GA4GH)

	Actions Arising	Assigned To	Deadline
1	Group, please comment on TRS PR #219 (and also look at issue #181 For WES).	group	Next meeting
2	We need a volunteer to work on a PR/Issue for TRS/DRS that describes how to resolve a compact identifier/hostname and looking up (via the GA4GH registry?) the actual API paths available. ● Michael L made a PR on DRS PR#7 https://github.com/ga4gh/fasp-clients/pull/7 ● Need a volunteer for TRS ● Watch this space for more info from Ian	Need a volunteer → Ian and Michael	Next meeting, check in
3	Group, take a look at the registry and give Yash feedback - http://registry.ga4gh.org/v1/standards - http://registry.ga4gh.org/v1/services - http://registry.ga4gh.org/v1/organizations - Alex: search and filtering would be useful… **Note (from yash):** After our last meeting, I realized that ga4gh registry is actually an implementation of service registry standard and most of the features discussed during last session like service monitoring, filtering of services by service-type are already documented as issues on the ga4gh-service-registry repo. If they are not, the ga4gh-service-registry/issues page might be the right place to create/vote on the topics to express your interest.	group	Next meeting

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (TRS) - Slides 1. Giving a brief update on TRS and poll what folks are working on 2. Go through outstanding issues that could use work and wrap up 2.0.1 3. Chat about some potential work/topics of discussion for TRS at the	Denis Yuen / 30 min

	upcoming GA4GH plenary 4. Other suggestions? https://github.com/ga4gh/tool-registry-service-schemas/compare/2.0.0...release/v2.0.1	

4.	Look at registry endpoints
	- Seek feedback on what should change
	  - New registration process?
	  - Changes?
	- See PR action item above for hostname/compact identifier → API paths
	- Endpoints:
	  - http://registry.ga4gh.org/v1/standards
	  - http://registry.ga4gh.org/v1/services
	  - http://registry.ga4gh.org/v1/organizations
	- Feedback
	  - Alex: search and filtering would be useful… ditto for Jose as well
	
	DRS Compliance Suite - Update
	- Github Repo
	- Planning Doc
		Yash/ 5 mins

5	A.O.B ● FYI: in-progress work on documenting bundle deprecation; expect an official PR in a week or two. (Note that, per prior discussion, this is documentation changes only; there's no change to the API spec itself.)	
	-	

Meeting recording:https://us02web.zoom.us/rec/share/Oe8vBC6djaUTatAH53n4I4G5SYJ4QMQLyub9G1O6jpCEZPws6HziLhND-_AQ8Fs5.WsL1KWDsJ101n-bz?startTime=1659977871000
Passcode: m4n2g@$6

Meeting minutes :

2022-07-25: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)": , , Bill Clifford (ISB, IDC), , , , , , , , , , ,Yash Puligundla(GA4GH) , Michael Lukowski (U Chicago), , , , , , , , , , , , , , , , , , , ,

	Actions Arising	Assigned To	Deadline
1	Reggan to discuss/schedule a future driver project discussion by Jilong Liu	Reggan	
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.	Sub-group Update (WES) - presentation	Sara Salahi
5	DRS testing tool - Update	Yash - 5 min
	-	

Meeting recording:
https://us02web.zoom.us/rec/share/rYSaxaYoRjvqo6u5htET_FTAG0PY2_wFF5cDjDUefTrm6zIWTRLPsfHiFexwdaJb.1bMUjnEViGXM5oTX?startTime=1658782533000
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Meeting minutes;

DRS compliance suite

- github repo: https://github.com/ga4gh/drs-compliance-suite
- active work on these branches:
  - https://github.com/ga4gh/drs-compliance-suite/tree/yp_add_tests_and_cases
  - https://github.com/ga4gh/drs-compliance-suite/tree/feature/mock-servers
- output report schema - https://github.com/ga4gh/ga4gh-testbed-lib/tree/main/schema

2022-07-11: Cloud WS

Chair: ~~Brian O'Connor,~~ David Glazer
Attendees “Name (Affiliation)”: , , , , , Emre Ferhatoglu (GA4GH), Charles Aylward (Illumina), , , , , , Michael Lukowski (U Chicago), , , , , , , , Binam Bajracharya(UChicago), , ,Bill Clifford (ISB, IDC) , , , , , Michele Mattioni (Seven Bridges) , Denis Yuen (OICR - Dockstore), , , , , , , Justin Clark-Casey (ELIXIR EMBL-EBI) , , , Surya Saha (Seven Bridges), , , , , , Thomas Mooney

(WUSTL), Reggan Thomas (GA4GH), , , , , , , , ,Patrick Magee, , , , Jilong Liu (gzlab, China), Andrew Ponomarev (GenX), , , , , Alexander Senf (AI Digital; Crypt4GH), Gerrit Botha (H3Africa, UCT), Mamana Mbiyavanga (H3Africa, UCT)

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	H3 Africa - presentation	Driver/Implementor Mamana / Gerrit Botha - 15 mins
4.	NCI GDC	Michael Lukowski - 15 mins
5	Sub-group Update (DRS) DRS Quick Dive	Brian/ Michael Lukowski - 15 mins
6	DRS Starter Kit Implementation - Discussion	Michele Mattioni - 10 mins
7	A.O.B	

Meeting recording:
https://us02web.zoom.us/rec/share/RlbJgnq5PllVVyFvVBYHuKqyx1MH6_G56ZFYPT6eJIx8JA8wcYUYnFfZJNHyZfcN.h0JmGJYSisKacSEZ?startTime=1657558211000
Passcode: 4^ZXspj@

Meeting minutes:

Mamana/Gerrit, H3Africa
limited use of Cloud APIs so far; looking into it

H3ABioNet Informatics Network
- provides biofx support for H3Africa
- second project – NIH DSI-Africa

building ODSP (open data science platform) – named eLwazi
ingest data, harmonize, provide to researchers
runs on AWS, Azure, local instances

have played with Azure CycleCloud, to run genotype imputation and 16s analysis workflow
can monitor costs

GWAS workflow does QC and analysis of genotype data
originally ran on local HPC
then used NextFlow batch to run on Amazon EC2, AWS Batch, Azure Batch

second workflow – TADA – amplicon diversity
AWS, Azure, GCP
found launching jobs on GCP was much more efficient

eLwazi cloud work
- access to Terra and Gen3 platforms
- investigating local setup of Gen3
- workflows to be hosted on Dockstore
- exploring GA4GH cloud APIs
- exploring Google Enterprise or NIH eRA Commons for auth[NZ]

Challenges
- diverse projects, poorly defined requirements
- strong preference to store data on the continent (AWS in Cape Town, Azure, in JBurg)
    - concerns about if/when data gets copied off continent
- moving data is slow (e.g. Cape Town to Uganda ~4MBps
- researchers not familiar with cloud tech, so slow adoption

Assistance needed
- expose researchers to GA4GH APIs
- assist with finding a solution / brainstorming of a federated analysis solution using GA4GH stds
    - e.g. the CINECA joint variant genotyping use case

federation
- we have data at different data centers
- might be able to do a scatter/gather approach
- different facilities have different on-prem infra
    - e.g. Ilifu (at UCT) OpenStack env (90 nodes, 32 cores each), 3.5PB usable storage

Q: tradeoffs between federation and doubling down on one of the cloud infras?
- second would be better, but hasn't worked out, so all decentralized and harder to handle
- be easier to stick to one central space, with central admins, better monitoring / control

Michael Lukowski
GDC is working on improving DRS with passports, metadata, post-bundle needs, etc.

want metadata added to DRS objects, that can be used with batch to “mock” a bundle

“official” GA4GH DRS Client

gen3/GDC has a metadata service they use with DRS
arbitrary info for objects – use the same DRS ID to query the metadata svc and get more object info
would like a PR to optionally include Metadata fields within DRS

Q: why combine the metadata method into DRS?
A: not every DRS instance needs metadata, but it still feels like part of the DRS standard, for someone who wants more information about the object beyond GetInfo
having a whole new standard just for metadata, when using the same IDs as DRS
Q: is there a mechanism to search by the metadata?
A: yes, you can search by those fields – that’s a query to the metadata service
Q: how does that compare to the Data Connect API?
A: haven’t thought that through

Q re #377: it looks like it has code changes, not just documentation?
A: it’s old; agree it should just be doc changes
dG: let’s create the new doc-only PR, and then probably close #377

Michele: some groups planned to use bundles – IDC group?
Bill: we’ve been working with them/DCF; won’t work w/o pagination anyway
we’re going forward with using compound objects to replace IDC bundles
Michele: also the DRS server for dbGaP?
dG: plan is still to deprecate bundles; there should be a PR to discuss soon, for any final comments

Michele, DRS Starter Kit
see lots of DRS adoption – good
but there’s high activation energy to create a DRS server
could be a validation service to check the validity of a DRS server

dG: see `drstest` notes from previous meeting

2022-06-27: Cloud WS

Chair: Brian O'Connor, David Glazer

Global Alliance for Genomics & Health

Attendees “Name (Affiliation)”: Susan Fairley, ,Emre Ferhatoglu (GA4GH) ,Yash Puligundla (GA4GH) , Alex Tsai (GA4GH), ,Bill Clifford (ISB, IDC) ,Ian Fore (NIH) , José Mª Fernández (BSC / ELIXIR-ES), , , , , , , , , , , Binam Bajracharya(Uchicago), Ania Niewielska (EMBL-EBI), , , Kyle Ellrott (OHSU),Denis Yuen (OICR - Dockstore, albeit late) ,Reggan Thomas (GA4GH) , , Jilong Liu(gzlab), Jonathan Tedds (ELIXIR), , , , ,

	Actions Arising	Assigned To	Deadline
1	BOC: start the feature branch for Ian/dG to make the documentation change for compound object support		
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	DRS Starter Kit Implementation - Discussion - Starter kit for new groups - Compliance testing for existing implementations	
4.	Sub-group Update (TES) ● List-filtering PR	Kyle

Meeting recording:
https://us02web.zoom.us/rec/share/lRa7oCmqziAeOoaRZfA1JY9gebJYIe49XcVD5OSRhy2hDegDyPhhbYliTOlbDJyJ.2crrjoSRZlPXRLb3?startTime=1656362119000
Passcode: .0!30sUy

Meeting minutes:

DRS Starter Kit and DRS deployment support

- Starter kit for new groups
    - What’s the communities experience here? What’s needed?

    - Easy way to implement
    - Use drstest to confirm it's working
- Compliance testing for existing implementations
    - How do we make it easy for people to implement DRS support?
    - How do we make it easy to confirm new DRS servers are spec-compliant?
    - both for people building their own impl and those standing up someone else's
- Proposal
    - GA4GH Dev Staff (Yash, Alex, Emre)
    - proposal: `drstest` test client (v1)
        - arg: DRS server path
        - arg: DRS id of "gold object" on your server
        - arg: which "gold object" you're testing
        - (where the "gold objects" are provided in the drstest docs)
    - behavior
        - drstest fetches the specified DRS id (using all specified access methods), checksums them, and compares to the known gold checksums
    - features
        - Listing of DRS objects to check
        - All documented in DRS Test readme… objects provided for testing… how to run DRS test
        - Needs a working DRS client
        - Tests compliance to DRS schema
        - Look at FASPscripts for a starting point
    - DRS compliance service (v2)-
        - DRS server in the registry
        - API key provided
            - Auth methods…
        - Test objects declared
        - Central testing at GA4GH, badge provided
    - Keys
        - Needs to be kept up to date, updated client
        - Needs to be run regularly
        - Needs to test many objects not just a handful
    - Yash Q: where does the tool run?
        - dG: v1 should be whatever's easiest – cmdline, service, web page, etc.
    - Yash Q: what about authentication?
        - dG: v0.5 can be public only, but I think that will be veyr limiting, so we should have a plan for supporting auth on day one
        - Ania: access control makes things a lot harder; we're dealing with this with TES right now
    - Q: what about Starter Kit?
        - dG: complementary – SK is an easy way to implement a server; drstest is an easy way to confirm your impl works, including your SK-based

implementation
- Brian: yes and … we can build a central compliance test suite around drstest
  - then we could run it on a regularl basis and report back your server's status, so you can badge your sever as certified compliant
- Susan:
  - design – keep it simple
  - eventually – go in the direction Brian described
  - yes to relationship between starter kit and drstest
  - START SIMPLE
  - and be aware of the DRS complexities we'll hit as it's implemented
- Q: what happened to westest?
  - no dedicated ownership
  - Susan: staff development team can be that dedicated owner (as we also are with Starter Kit), as long as we remain good partners with the Cloud API team
- TES 1.1
- 3 project : 1) Conformance test framework 2) Call back mechanism 3) TES federation tools
- Task list filtering - Ability to list jobs
- Completed job -
- Retention time
- Account with long history - job count could be large
- User able to add/key value tags to job during submission
  Filter pattern - Rules are softly defined in the specs

- Proposal - twin repeated parameter -
- 1) Tag_ key 2) tag_value
- Values zipped into dictionary
- Major question - Does this function overlap with other GA4GH specification
- DG : Question - Kyle, my quick reaction is that this seems reasonable from first principles, but not 'familiar', meaning I don't know of existing APIs that use this pattern. Have you looked into existing widely used APIs to see how others handle filtering of long lists?

2022-06-13: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)": , , Bill Clifford (ISB, IDC), , , , , , , , , ,Surya Saha (Seven Bridges) , , , , Emre Ferhatoglu (GA4GH), , , , , , , , , , ,Bruno Grande (Sage Bionetworks) , , , ,Binam Bajracharya(UChicago) , , ,Michael R. Crusoe (ELIXIR-NL) , , Michele Mattioni (Seven Bridges),Ian Fore (NIH) , , , , Michael Lukowski (U Chicago), , , , Mike Conway (NIEHS), , , , Lee Pang (AWS), Reggan Thomas (GA4GH), , , , , , , , Thomas Mooney (WUSTL), , , , ,Denis Yuen

(OICR-Dockstore) , Charles Overbeck (UCSC- Dockstore), José Mª Fernández (BSC / ELIXIR-ES), Ania Niewielska (EMBl-EBI), Heidi Sofia (NIH)

	Actions Arising	Assigned To	Deadline
1	Follow up on bundles decision → David/Ian for content, Brian → for the base feature branch to hand to them	David → Brian	Next DRS focused 7/11
2	Merge PR for add authorization by Doug → merged	Brian	Done, discuss on the 7/11
3	CFDE feedback form NCPI ● Server/data issues ● DRS client issues (like support for compact identifiers) ● See upcoming session at FASP hackathon in July ● What's our plan for a conformance test? ● We have feedback that will come back to cloud, need to react to it and clarify spec	Brian and Others	7/11, let's discuss in the DRS-focused session
4	Need to feature branch - David/Ian to make documentation change		July 1st

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (TRS) https://github.com/ga4gh/tool-registry-service-schemas/pulls https://github.com/ga4gh/tool-registry-service-schemas/issues Slides: https://docs.google.com/presentation/d/14XN3GXDTpvKZAHCy1sB1CKyuQ11p6P5x1kORX3cqLOY/edit#slide=id.g9cd1975782_0_130	API Champion/ Denis Yuen (25 mins)

Global Alliance for Genomics & Health

Meeting recording:https://us02web.zoom.us/rec/share/PfJBgVf6326A8MRiwt-HsDRRyXWLSTb58n5SZ6Zsrnq17kYUHyZNGAX71b2DQg_M.59uUc-ptFIm6KeDh?startTime=1655139190000
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Meeting minutes:

- See above for notes on DRS feedback and future work that we need to address
- TRS
    - See presentation (bunch of notes taken there)
    - Some systems using V1, others V2
    - V2… from 2019… want to release 2.0.1 in time for plenary
    - New features
        - Workflow versions for languages… pull #219
            - Note from Michael Crusoe:
                - “for CWL, only the highest version is needed”
                - “and CWL v1.0.2 is the same as v1.0.0, just with more conformance tests. in fact, you'll never see "cwlVersion: v1.0.2" in a CWL document, on "cwlVersion: v1.0"”
        - Describe versioned TRS URIs… pull #202
            - GA4GH Registry compatibility? Ian asked about this
            - discussion of how clients can ask servers for the most current version that both know about, and how can use /service-info to get hints
            - Limit the PR to versioning issue… make other PRs for other issues… base path, versioning of API, percent encoding
        - Issue #160
            - Hyperlinks in the response
        - Issue #215
            - Adding new languages
    - GA4GH Registry
        - https://github.com/ga4gh/fasp-scripts/tree/master/notebooks/registry
        - https://github.com/ga4gh/fasp-scripts/blob/master/notebooks/registry/RegistryDemo.ipynb

2022-05-23: CANCELED

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , ,

1			
2			

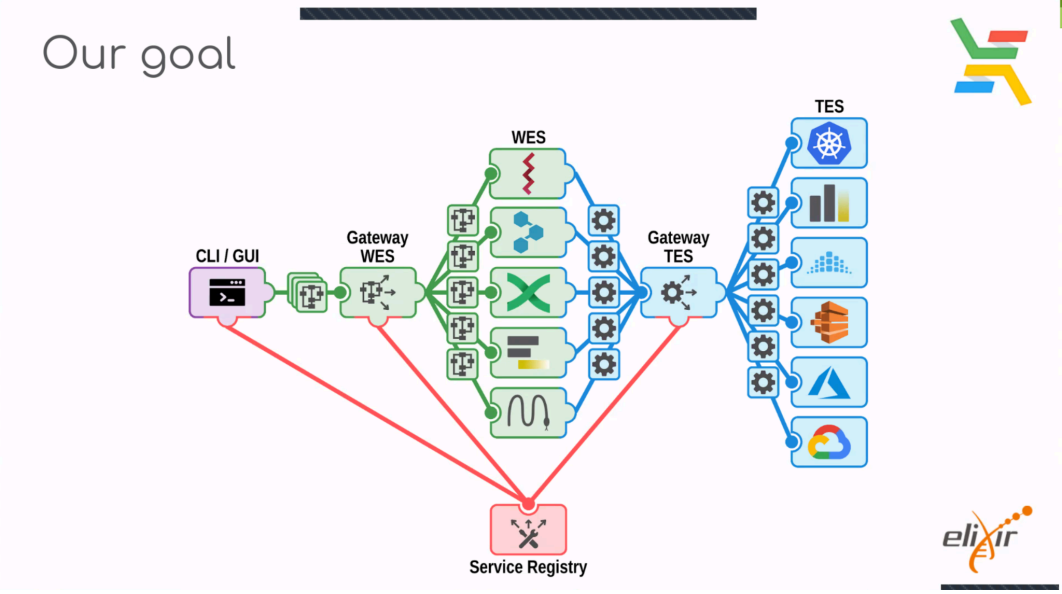
	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.		
5.		
	-	

2022-05-09: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: Jeremy Adams (GA4GH), Emre Ferhatoglu (GA4GH), José Mª Fernández (BSC / ELIXIR-ES),Ian Fore (NCI,NIH) , , , , , , , , Michael Lukowski (U Chicago), , , , , , , , , Thomas Mooney (WUSTL), Bill Clifford (ISB, IDC), ,Denis Yuen (OICR - Dockstore) , , , Kyle Ellrott (OHSU), , , , , , ,Lee Pang (AWS) , , , , , , Heidi Sofia (NIH/NHGRI),Reggan Thomas(GA4GH)

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	

3.	Elixir Cloud and AAI - slides
	Notes:
	- Mission: ”*Enable federated environments to deliver large scale workflow analysis across international boundaries*”
	- Strategy: adopt GA4GH stds; adopt auth & access control guidelines; implement core svcs and reference implementations
	- implementing Gateway WES / TES svcs that fan out to underlying impls
	  - allows injection of ‘middleware’ info and hints
	  - supports task distribution logic
		Driver/Implementor Alexander Kanitz - 15 mins

	- Q: how standard should the Gateway WES be, and how do we get there? - deploying EGC (Elixir GA4GH Cloud) registry of avlbl interoperable svcs - Q: auth to use it? - implementing TRS/DRS reference implementations, including shim over existing code - Q: how many of these have been deployed? how many once fully adopted? - GHGA (German Federated EGA) implementing DRS - Q: who will call it? 	
4.	Sub-group Update (DRS) 1. Bundles deprecation: report results of feedback (spreadsheet) and agree on next steps to make it so a. 2 groups voted to keep b. Most voted to deprecate c. Longer term…work with groups that voted to keep d. **TODO (Brian/Ian/dG):** create the PR (Brian to open; Ian/dG to populate) and open for group comment 2. Doug's PR #381 to add authorization: any concerns before merging? a. **TODO (Brian):** We will merge before the next meeting 5/23 is the deadline → Brian O. 3. PR #365 (Bulk Requests): get status and next steps from Brian	API Champions Brian / Michael

	a. Overdue… b. We will merge after Bill's comment is addressed… ASAP → merge by 5/12 c. **TODO (Brian):** address Bill's comment and merge → Brian O. d. Reconcile to selection object, we might need to do a future PR that adjusts to be compatible with the selection object. e. **TODO**: check if the "too big" error is in #365 4. Review roadmap, what's next? a. New PR on doc update for bundle deprecation → Brian O for making the feature branch, Ian/David for content i. Followup with Michele and Max on the documentation PR ii. The PR would include 1) note of deprecation and 2) discussion of compound objects best practice… see notes below in previous meeting 3/14 *iii. "The possibility to mark schemas and schema properties as deprecated was added in OpenAPI 3.0"* b. Pagination of large batch selection (Jeremy) → Jeremy to start that branch… maybe someone on the tech team to continue work… i. **TODO (Jeremy):** create new PR once PR #365 is merged, and find a new owner ongoing. 1. related issues #334 and #366 ii. Bill, bulk request limit on size is an option, will that be an option here? Should consider this iii. Ian, that is in the PR that should be merged… iv. **TODO**: check if the "too big" error is in #365 1. /service-info as an alternative c. #343 signed URL extra info → Brian O. 5. Plan to release DRS 1.3 (goal is August 15th)	
5.		

	Actions Arising	Assigned To	Deadline
1	Follow up on bundles decision		
2	Merge PR for add authorization by Doug		

Meeting recording:https://us02web.zoom.us/rec/share/U7TUVN0oWVTvaOqJSoz8exwNdE2oTiWCHwUg1eSqGn3I-PgXzi307DdgpL5xaycS.f_hbY3v1Ep9GW-G3?startTime=1652115487000

Global Alliance for Genomics & Health

Passcode: TF^Nv$k8

Meeting minutes:

2022-04-20: GA4GH Connect Implementers Workshop

See 4 - GA4GH Connect 2022 - Agenda - Implementers Workshop

2022-04-11: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: Max Barkley (DNAstack), , ,Kurt Rodarmer (NIH) , , Bill Clifford (ISB, IDC),Emre Ferhatoglu (GA4GH) , , , , , , , , , , , , , , , Michael Lukowski (U Chicago), Kyle Vernest (Broad), Danny Park (Broad), , , , , , , , ,Lee Pang (AWS) , , , , , , , , , , , , , , , Binam Bajracharya(UChicago), , , , , ,Michele Mattioni and Surya Saha (SBG) Denis Yuen(OICR - Dockstore), , , , , , , , , , , , ,

	Actions Arising	Assigned To	Deadline
1	Next DRS release date… June 1st for 1.3? Can we keep up momentum ahead of Plenary in sept?	Brian	
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Autism Sharing Initiative • slides	Driver/Implementor Max Barkley / 15 mins
4.	Sub-group Update (TES/WES/TRS/DRS) • slides • Giving a brief refresher on TRS and what it is for • Go through current users of the standard • Go through outstanding issues that could use work and/or whether we should release a 2.0.1 with what is currently already committed • TRS enabled services - extension	API Champion Denis Yuen / 30 mins

5.	- https://github.com/ga4gh/data-repository-service-schemas/pull/381	Michele Mattioni / 10 mins
	-	

Meeting recording:

https://us02web.zoom.us/rec/share/q7uFfNzeUQIQvOux99pNs97vt9B86KpwG5K6NKDzY2NJEVUPqGY7g9D5ak_JBtZB.NRfo0Z_SwCbdEBDb?startTime=1649696160000 (Passcode: mg08r!AF)

Notes:

2022-03-28: Cloud WS

- Chair: Brian O'Connor, David Glazer

Attendees “Name (Affiliation)”: Jeremy Adams (GA4GH), , Bill Clifford (ISB, IDC), , , , , , , , , , , , Patrick Magee (DNAstack),Ian Fore (NCI,NIH) ,Kyle Vernest (Broad) , Sara Salahi (Broad), Emre Ferhatoglu (GA4GH), , , ,Lee Pang (AWS) ,Ania Niewielska (EMBL-EBI) , , , , , , Michael Lukowski (U Chicago), Reggan Thomas (GA4GH), , , , , , , , , , Binam Bajracharya(UChicago), , , , , , , , , , , ,

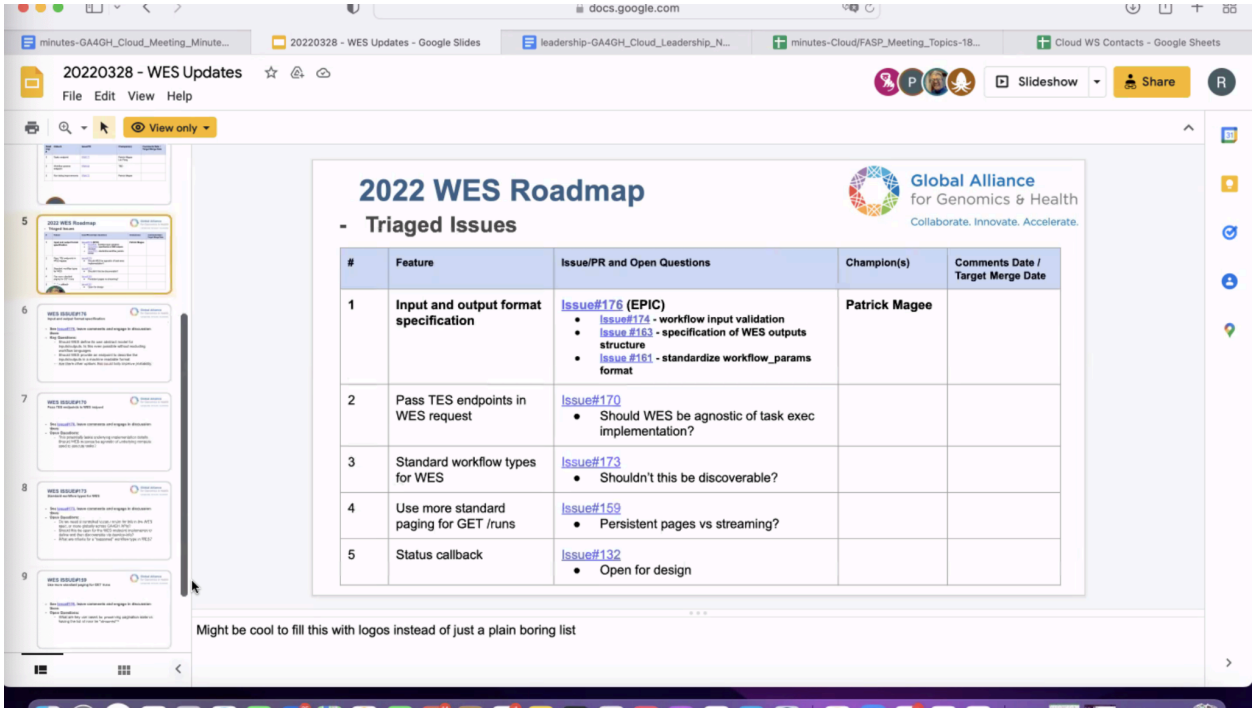
	• WES
	• Overview of Roadmap items and goal setting - https://docs.google.com/presentation/d/1hPuin0JBuM-9k8DTUW8tuXyfy-XIhNjYtLQFtgHJ-bE/edit#slide=id.g11edd69981e_6_0
	
	• Review of Open PR's
	  ◦ PR#177
	  ◦ PR#169
	  ◦ PR#172
	• Review and discussion of triaged issues
	  ◦ Should WES define it's Input/Output format **Issue#176**
	  ◦ Should WES allow passing arbitrary TES endpoints as a first class feature Issue#170
		(Patrick and Lee)

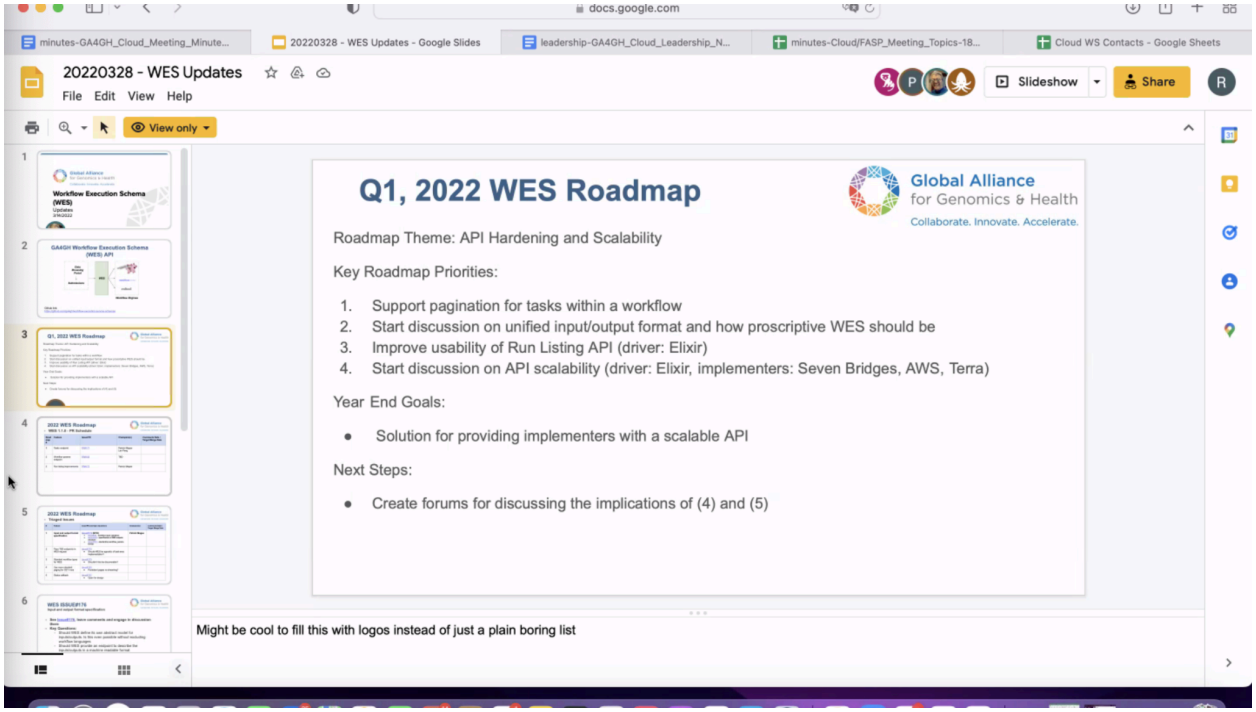
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Notes:

- WES… keys for roadmap for 2022
  - PRs
    - AI: take a look at the PR#177… pagination
    - AI: take a look at PR#169… workflow params… needs a champion… needs discussion on if we want to impose a format
    - AI: PR#172 run list
  - Issues
    - See below
    - Issue#176… big Epic…
    - Take a look at research objects, data modeling work in TASC team





- BRCA Challenge presentation notes
  - Goal: improve sharing of BRCA knowledge
  - How to classify variants?
  - Launched the BRCA exchange website
  - Federated analysis model

- Proof of concept with RIKEN
- See cell genomics publication
- Ongoing work… integrating with GA4GH starter kit
- GA4GH APIs and feedback
  - WES
    - Ian Fore
      - ran the BRCA container on 3 platforms… BDCat, Cavatica, CRDC… all SBG-based
      - Could get the results back… via DRS… the only platform that you can do that
      - Other systems have WES but not DRS to get the results back
      - A known issue with WES implementations. All but SBG don't provide DRS URIs… not necessarily a spec issue… would be good to explicitly call out DRS
    - Patrick Magee
      - Should look at design of WES with federation in mind
      - Can we do it within the spec?

Accomplishments and Next Steps

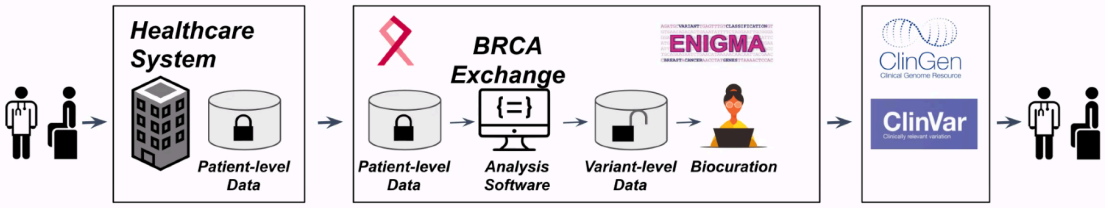
- Unified variant data from the major public repositories
- Presented unified data along with expert-selected variant evidence
- Pioneered approaches to gather evidence from siloed patient datasets

Next Steps

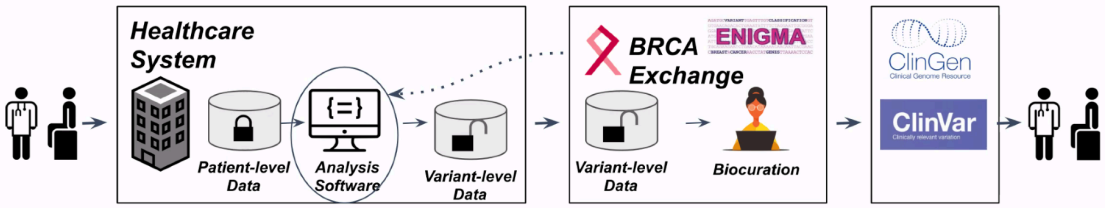
- Expanding federated analysis approach to more evidence types
  - Federated co-segregation and penetrance analysis
- Reaching out to underserved communities & patient populations
- Expanding the scope to additional genes
  - Additional hereditary breast ovarian cancer susceptibility genes
  - CDH1 and heritable stomach cancer

Privacy-preserving data sharing through federated analysis

Traditional Data Sharing

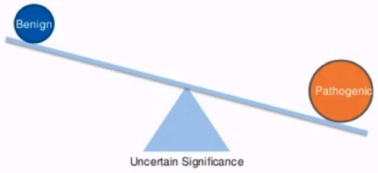


Federated Analysis



How do we classify variants?

- **Review multiple evidence types**
  - ❏ Population Frequencies
  - ❏ Computational Prediction
  - ❏ Clinical Patient Observations
  - ❏ Functional Assays



- **Assign weight for or against pathogenicity for each evidence type**
- **Combine data to assign final class**
  - ACMG/AMP classification criteria most commonly used (PMID: 25741868)
  - Gene-specific modifications by ClinGen: https://clinicalgenome.org/
    - * ENIGMA *BRCA1/2* Variant Curation Expert Panel: https://enigmaconsortium.org/
    - * Research consortium developing statistical methods for breast gene variants

ClinGen

ENIGMA

2022-03-14: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: Danny Park (Broad, PHA4GE), Jeremy Adams (GA4GH), Thomas Mooney (WUSTL), Emre Ferhatoglu (GA4GH),Bill Clifford (ISB, IDC) , Pierre-Olivier Quirion (McGill), , Ian Fore (NCI, NIH), Binam Bajracharya(UChicago), José Mª Fernández

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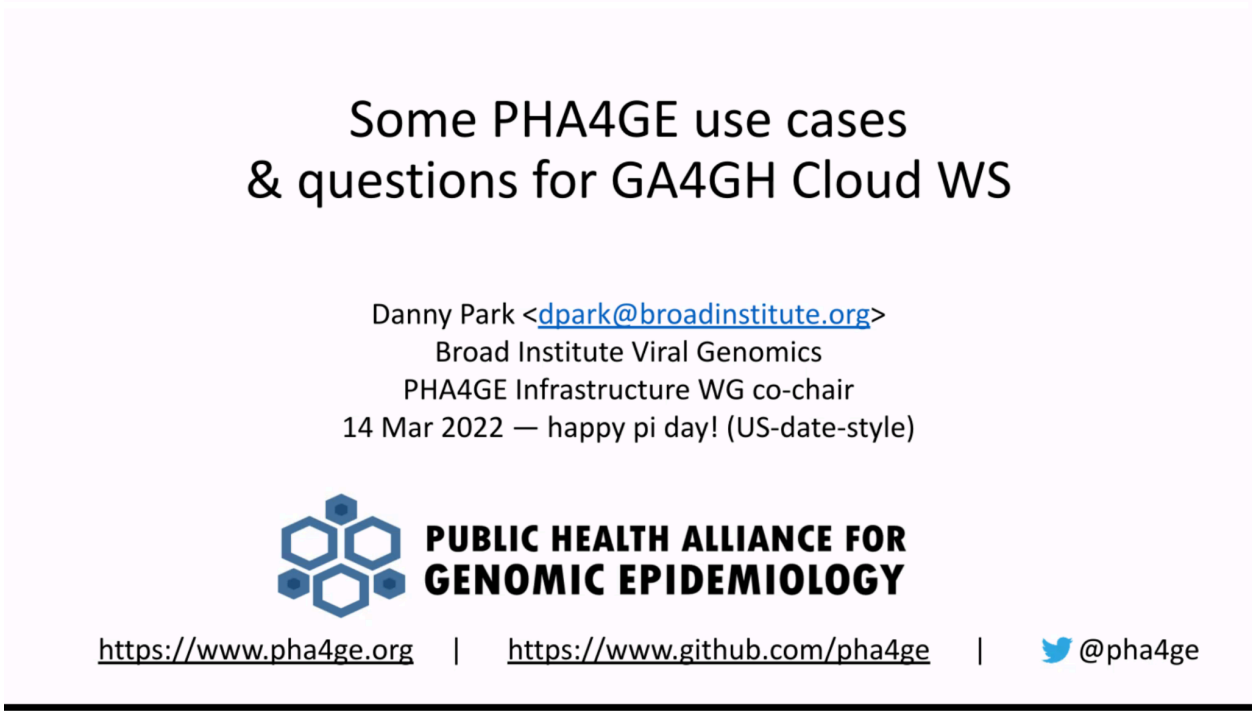
(BSC / ELIXIR ES), Laura Rodríguez (BSC / ELIXIR ES) ,Mike Conway (NIEHS) , Michael Lukowski (U Chicago), ,Patrick Magee (DNAstack) , , , , , Ania Niewielska (EMBL-EBI),Reggan Thomas (GA4GH) , , , , , , , Denis Yuen (OICR - Dockstore - likely to be permanently late for March, (timezones)), , , , , , , , , , , , , , , , , , , ,

	dG overview ● status ○ DRS is mostly low-level and deals with opaque objects ○ there's a clear need to handle compound objects (e.g. BAM+BAI pairs, DICOM images, 'all files for this study') ○ bundles were an attempt to represent compound objects, but break the opacity principle; we now think we have a better model (h/t Ian for prototyping it) ● recommended best practice for compound objects ○ clients and servers have to share an understanding of the semantics of compound objects – that's not a DRS responsibility ○ for any given compound object type, the 'right people' define and document its structure, and a way to represent that structure in a simple manifest file (e.g. JSON), with pointers to DRS ids of the underlying content objects ○ manifest files are stored in DRS repos and found/fetched the same way as any other objects ○ when a client fetches a manifest, it uses its understanding of the semantics to decide which of the content objects it needs, and to fetch them using standard DRS mechanisms ○ the in-flight work to support batch object requests with paginated responses helps optimize that flow	
6.	Review upcoming meeting schedule - Meeting spreadsheet - 3/28 - WES - Reggan is reaching out for driver presentations - **GA4GH Connect April 20-22** - **What sessions for Cloud?** - **Strawperson** - **Cloud-focused session** - **Cloud+Passports+FASP session** - Plenary - Sept 19-23 - We should target any API releases by Aug 19th - So we have ~5 months for API updates, PR merges, release - Other upcoming topics - Do we have other driver projects lined up? - We need to have a Passport use case meeting… TBD on timing. *Can we setup a joint Passports & Cloud meeting to work through PR#381 and Issue #351? I think this is going to start blocking groups soon.*	Brian, Reggan, David - 5 min

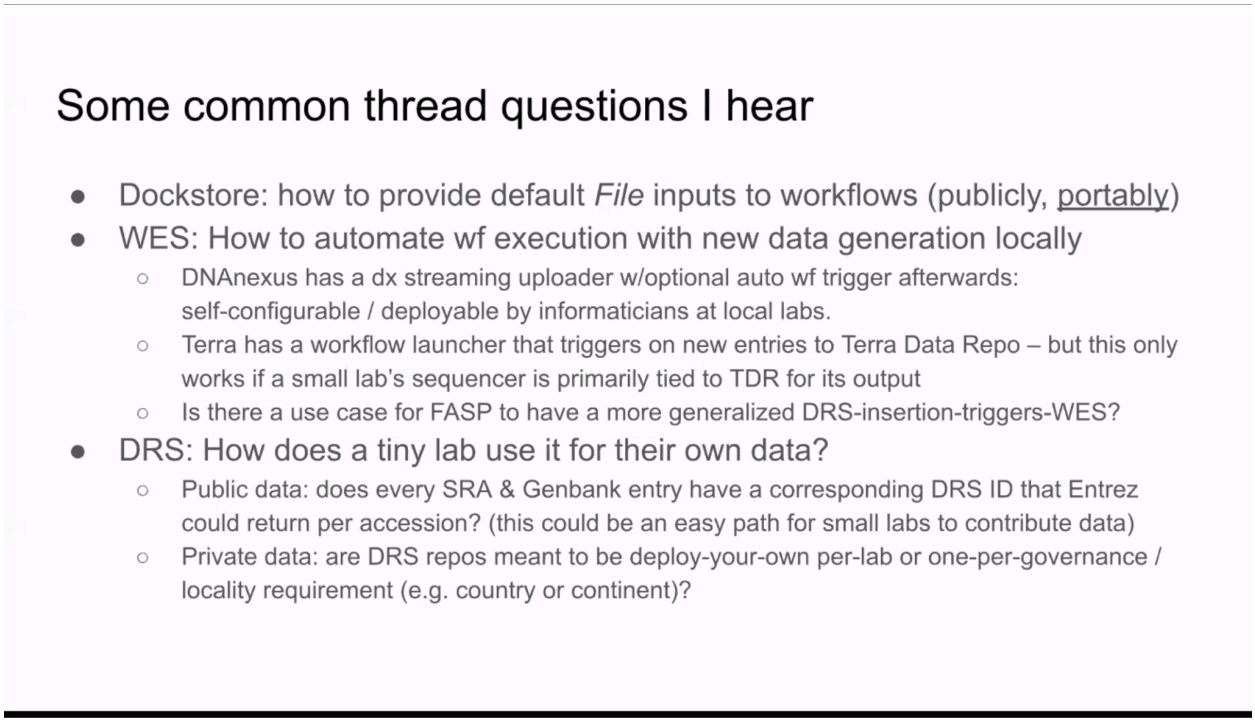
	- TES using Passports - DRS using passports	

Notes:

- PHA4GE Slides



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- GA4GH Connect April 20-22
    - …

Meeting recording - https://us02web.zoom.us/rec/share/eG0CaHUKgZoB-YXVcA2ZxVoxLRp4WkXJDKDfU2xyKv7esmlsxPD3_97ZBZmyf4Tc.TdTQkHlPsWSYAggb?startTime=1647280727000 (Passcode: nuB8U3P^)

2022-02-28: CANCELED

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , ,

1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (DRS/TES/WES/TRS) - DRS - touch base on 1) PRs	Brian and Jeremy
4.	Conversation on removing bundles	David
5.	Upcoming Agenda schedule/brainstorming	

2022-02-14: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: Ania Niewielska (EMBL-EBI),Jeremy Adams (GA4GH), , , , , , Michael Lukowski (U Chicago), , , , Binam Bajracharya(UChicago), , , , , ,

	new features/changes in TES for 1.1 - backend_parameters - PR #154 - input streaming - input/output type optional - ignore error (continue execution) - file globbing - a deep dive - Github Actions (again) • For this discussion, https://github.com/ga4gh/tool-registry-service-schemas/blob/gh-pages/scripts/remove-docs-for-deleted-branches.sh for deleting docs for old branches • https://github.com/ga4gh/cloud-best-practices/issues/1 https://github.com/ga4gh/tool-registry-service-schemas/pull/212 for validation, not a lot to this one but I can recommend it (it's just syntax validation) • - Passports for TES - Filtering • DRS (last cloud meeting was canceled, give brief update of the outcome from the FASP hackathon which had 3 DRS sessions) ○ Report back from FASP hackathon • Spreadsheet • Planning document/Notes • When do we wrap up feedback on PRs? ○ #376 → now? ○ #365 → next call in 2 weeks (2/28) ○ #367 → 2 weeks beyond that • When do we ask for a Driver vote? Are there any drivers we absolutely need to weigh in? Bar is low for "develop". ○ #376 → merge into dev now? ○ #365 → merge in 4 weeks? ○ #367 → merge in 2 weeks?	
4.	Upcoming agenda • 2/28 (late) - *Can we have a driver present on their work too? PH4GE? TBD. If we don't have a driver project scheduled, what other topics should we focus on?*	David/Reggan

	○ *List in TES followup to call on 2/14 – Ania* ● We need to have a Passport use case meeting… TBD on timing ○ TES using Passports ○ DRS passports ● 3/14 (early) - DRS - touch base on 1) PRs (Brian and Jeremy) and 2) conversation on removing bundles (David) ● 3/28 (late) - WES ● *What about TRS? Any other items for upcoming agendas?*	

Meeting recording - https://us02web.zoom.us/rec/share/4cKS4oosv9mr7ZShPN1s1qKZKRdzGysPqm05ls19SooDKl887j26Qu6XtEGkDLas.__2URJOvH3_m39h0?startTime=1644861489000 (Passcode: .WE8dFy0)

2022-01-24: Cloud WS – CANCELED

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)": , , ,

	3/14 (early) - DRS - touch base on 1) PRs (Brian and Jeremy) and 2) conversation on removing bundles (David) 3/28 (late) - WES	

2022-01-12: Cloud Champions Orientation Meeting

- Cloud meeting organization… how do we cycle between topics?
- How do we have Drivers come in regularly
- Sync patterns across repos? Like doc build system.
-

What do we think about the round robin system for meetings?

- Lee: +1 rotating meetings, 1 API per week
- Sara: +1, 1 API per week

What do we think about common practices across repos?

- Lee: Getting started manual?
- Ania: not across the work stream, just within the API repo (DRS), or no process in place
- Brian: e.g. contributing document (DRS) - how to use hub flow, name branches, submit PR, etc.
- Brian: we can't ask every driver for every issue

Do champions like the idea of common process across all repos?

- +1 Ania, Patrick, Brian,, Jeremy
- Patrick: lacked clarity on the development process, who raises issues, when are PRs ready/accepted
- Brian: it's true for other repos, e.g. DRS lots of issues/PRs just sit there. The round robin will help with this. Not a good process to move things along.
- Brian: idea: anyone can make issues/PRs, API champions make the decision about whether to allow the contribution
- Ania: having API champions make the decision about PRs is very practical, will move things along
- Patrick: same community-driven issues and OpenWDL, features lose momentum. What helps: Github labels to denote status of an issue, tagging milestones

Possible best practices:

- Labels in GitHub "ready for voting" vs. conceptual. Maturity of the issue can indicate how much time we should dedicate to talking about it.
- Milestones for grouping PRs/issues… and/or roadmap doc showing all PRs merged
- Doc build system

- Migrate to Github Actions for CI
- Contribute doc harmonized across repos
- Issue/PR templates to guide people how to make issues
- Triaging PRs coming in, verifying
- (CI) Linting, error checking of OpenAPI 3.0? (TES not failing on errors), use a public openapi validator to avoid syntactic errors
- Code generation from spec and push to libraries? Could make another 'build' repo for building a GA4GH Cloud WS client.
    - Patrick: run into issues with generated code, esp with auth, codegen app not enough features
    - Lee: codegen doesn't bring you all the way
    - Patrick: another idea: instead of publishing the code generated tools, we could just ensure that the spec allows code-generation, e.g. as a github action
-

- Brian: can each API champion investigate 1-2 possible best practices?
    - Denis: can check out linting since we already have github actions CI
    - Jeremy: github actions, doc build system

- Jeremy to create cloud WS best practices repo

Are champions happy with their 2022 roadmap?

- DRS
- TES
    - TES looks good but needs to be divided into stages/milestones
    - Kyle: minor incremental improvements are good, but larger integrations have not been addressed: e.g. passports
    - 6 PRs have already been authored but need more engagement
- TRS
- WES
    - WES Epic on input/output formats - how much do we specify the input parameter structure for each workflow language. Do we design something that could accommodate all workflow languages as a universal interface?
    - Lee: we push down to the engines as much as possible, with Cromwell we push parameters down. Nextflow does something similar

Passports and security: do we need to look at in synchrony across all 4 Cloud APIs?

- +1 Kyle

Do we also need to synchronize on **pagination** and **filtering**, e.g. filter on metadata tags

- +1 Jeremy

User testing, usability testing across APIs, how usable are the APIs?

- Should this be part of FASP?
- Conformance is a part of it, but we also want to test that specs are clear, developers can implement with little ambiguity

Upcoming schedule
1/24 (late) -DRS recap
2/14 (early) - TES
2/28 (late) -
3/14 (early) - DRS
3/28 (late) - WES

2022-01-10: First Cloud WS meeting

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , , ,Bill Clifford (ISB, IDC) , , ,Lee Pang (AWS) , , , , , , , , , , , Michael Lukowski (U Chicago), Denis Yuen (OICR - Dockstore), , , , Binam Bajracharya(UChicago), , , , , , , , , , , , , , , , , , Patrick Magee (DNAstack), , , , , Kurt Rodarmer (NIH), , , , , Surya Saha (Seven Bridges), , , , Ania Niewielska (EMBL-EBI),Venkat Malladi (Microsoft) , , , Kyle Ellrott (OHSU), , , , , , , Laura Rodríguez-Navas (BSC),José Mª Fernández (BSC), , ,Michele Mattioni (Seven Bridges) , , ,Jeremy Adams (GA4GH) Milan Danecek (CERIT-SC, CZ), Sara Salahi (Broad), Reggan Thomas (EBI)

	Actions Arising	Assigned To	Deadline
1	DRS conversion to GitHub actions from Travis CI	Jeremy	
2	TES convert to GitHub actions from Travis	Ania	
3	Bulk Operation PR, revise with additional information (including errors) in the return. See example in Jeremy’s comment and from Patrick	Jeremy/Brian	1/24

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	CI at Cloud WS - Travis CI vs Github Actions vs Others	Jeremy / 5

	● Might be useful https://github.com/ga4gh/tool-registry-service-schemas/commits/develop/.github/workflows (one PR to migrate, one to fix up token passing) ○ Jeremy for DRS ○ Ania for TES ○ Check in with WES Leads for WES	
4.	DRS API deep dive 1. Fix for POST endpoint (PR #376) → Doug 2. DRS Bulk operations (PR #365) → Brian a. https://ga4gh.github.io/data-repository-service-schemas/preview/feature/issue-334-drs-bulk-requests/docs/#operation/GetBulkObjects b. https://github.com/ga4gh/data-repository-service-schemas/pull/365/files c. Notes i. Feedback on more info in bulk return (see Jeremy's feedback) ii. Ian - seems reasonable as long as request is kept simple iii. Lee - concerns about bulk operations… expense of signed URLs… could not return in the timeout time, do we need to have async? iv. Kurt… bulk signing … will take more time to respond… pagination becomes important… signed URLs will time out… need to impose engineering bounds… so clients/servers can understand limits. Time limit and output with pagination. Should look for ways to report back how many results can come back (service info?) v. Ian… Can pagination be part of the request? Really key for both request and response to bulk operations vi. David G … ideally clients would not understand server limits… server responds with appropriate page size for it… client not needing to understand server limits… do it through pagination vii. Jeremy… language for the bulk response… 1. Loaded = available 2. Unloaded = unavailable viii. Patrick… other APIs… hand back "errors" array… could do an errors block with the error codes… look at Data Connect for an example ix. Patrick… listing of bulk operations… maintain order, extract objects into an error array x. Ania… would like to see object order preserved…	Jeremy, Brian / 45

	3. Contents array pagination (PR #367) → Jeremy a. https://ga4gh.github.io/data-repository-service-schemas/preview/feature/issue-366-bundle-contents-pagination/docs/#operation/GetObject b. https://github.com/ga4gh/data-repository-service-schemas/pull/367/files c. Notes i. This is about paging the "contents" array ii. We need to think about another pagination for selection object/bulk request pagination in a new PR (not this one) iii. Ian - how does this interact with bulk requests?… Jeremy, this particular PR is pagination of content array within a single object iv. Next steps 1. Please have discussion in the PR 2. Idea of having a new endpoint for contents? 3. U. Chicago to give feedback Let's establish a schedule for merging these into develop: ● When do we wrap up feedback on PRs? ○ #376 → now? ○ #365 → 4 weeks ○ #367 → 2 weeks ● When do we ask for a Driver vote? Are there any drivers we absolutely need to weigh in? Bar is low for "develop". ○ #376 → merge into dev now? ○ #365 → merge in 4 weeks? ○ #367 → merge in 2 weeks? ● When might the next DRS release land? 1.3.0? 6 months? That would give us time to address more issues/merge more PRs including those below without champions. Upcoming Issues/PRs we need help with: See the 2022 Cloud WS Roadmap. We need a champion for each of these… ● Pagination of large batch selections → Issue TBD ● Passports downscoping integration → Issue(s): #351 (see for sub issues #352, #353, #354) ● Signed URLs and Requester Pays → Issue(s): #343	
5.	Upcoming schedule ● 1/24 (late) -DRS recap ○ use a time for champions to meet ● 2/14 (early) -	

	• 2/28 (late) - • 3/14 (early) - DRS • 3/28 (late)	
6.	AOB	

Meeting link - https://us02web.zoom.us/rec/play/6n18OGFv3m36hkTewkLn9xuMGnhvOkiopJeFCx9ebuHI0cCsLIFMmOv2EA3P4aGstJcMPDqL2wWHHtDM.7OGCkBuockKG0MPl?autoplay=true&startTime=1641837519000

2021-12-13: Final Cloud Meeting of 2021

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , , , , , , , , Lee Pang (AWS), , , , Mike Conway (NIEHS), , Bill Clifford (ISB, IDC) , , , , , , , Michael Lukowski (U Chicago), , , , , , , , , , , , , , , Bruno Grande (Sage Bionetworks), , , , , , , , ,Michele Mattioni (Seven Bridges) , , Surya Saha (Seven Bridges), , , , , , Thomas Mooney (WUSTL), , , , , , Ania Niewielska (EMBL-EBI) , Patrick Magee (DNAstack), , ,Kyle Ellrott(OHSU) , Venkat Malladi (Miccrosoft Genomics), , , Jeremy Adams (GA4GH),,,,Milan Danecek (CERIT-SC), Sara Salahi (Broad Institute), Thomas Schaffter (Sage Bionetworks)

	Actions Arising	Assigned To	Deadline
1	Should we set up mailing lists for individual Cloud APIs?	Reggan	Done!
2	Schedule orientation for cloud champions, manager, and leads… we can refresh our processes and use of github issues etc.	Reggan	Done
3	Explore integrations between Cloud project board/repos with other channels (e.g. Cloud WS Slack channel, join here)	Reggan/Jeremy	ongoing
4	Add Seven Bridges to spreadsheet	Michele	DONE
5	Future discussion of “philosophy” of GA4GH and how it applies to WES generic vs specific. Could discuss in FASP or another place? Next WES meeting in Cloud WS should focus on this issue.	Reggan/Jeremy	New year → next WES focused session
6	EPIC needed for WES for philosophy of generic vs. self-descriptive	Patrick	Next WES meeting
7	Get runlog API: what happens if thousands of steps/tasks? Pagination would be needed here. Make a new issue for this	Lee / WES Leads	TODO → next WES meeting

8	DRS service info for extra metadata that may come back, like region… needs a ticket	Brian	TODO → post 1.3

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Welcome to Reggan, our new Cloud WS Manager	Jeremy / 5
4.	Announcement of new and returning subgroup leads for DRS/WES/TRS/TES ● Cloud WS Contacts	Brian, David, Jeremy / 15
5.	Review tentative 2022 Roadmap ● 2022 Cloud WS Roadmap (draft)	Brian, David, Jeremy / 35
6.	DRS sub-issues 1. DRS authorization pointing to the right iss (https://github.com/ga4gh/data-repository-service-schemas/issues/352) 2. Paging in DRS (https://github.com/ga4gh/data-repository-service-schemas/issues/325)	Michele / 5
7.	A.O.B.	

2021-11-08: Cloud WS -- **CANCELLED**

We're meeting with API champions and will loop back around on the call on 11/22 with the larger group

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)": , , ,

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.		
4.	Sub-group Update (TES/WES/TRS)	
5.	**Cloud Project Board update**	
	-	

2021-10-25: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”:, ,, Binam Bajracharya(UChicago), Jeremy Adams (GA4GH),Bill Clifford (ISB, IDC) , , Thomas Mooney (WUSTL), , , ,

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Connect Debrief (Notes) ● Confirm API champions → Jeremy/Brian ○ TRS → Alex Kanitz to check with Workflow Hub ○ WES: Patrick and Mia? ○ TES: Ania? → Jeremy will followup with Ania and Kyle. Alex can touch base with Ania as well. ○ DRS: Brian and David, open for new co-lead ○ What do they do? ■ Maintain roadmap for 2022 ■ Maintain github board ■ Get assigned champions for issues ■ Raise PRs that are ready to cloud leads and Jeremy for driver vote ● Roadmap translation… how? → Jeremy ● Driver checkin ○ Check to see if other drivers are on the call, fill out the table ○ Who want to give talks on this call? ■ TOPMed wants to talk about “apps” ● API open PRs and Issues ○ Try to identify issue champions ○ API champions… issue champion needs to be identified ○ New issues ■ Lee P. (AWS) Get runlog API: what happens if thousands of steps/tasks? Pagination would be needed here. Use Github pagination model (like DRS)? ■ Lee P.: TES: specifying architecture? Or at least explaining metadata about architecture via service-info. Available architectures ■ DRS: ● Passports continued ● Bulk ● pagination ● requester pays feature (Ian to explore) ● Issue #260… extra metadata ● Download vs. streaming… via signed URLs	

4.	**Cloud Project Board update** (only if time… I think we want API Champions to maintain this)	
	-	

Notes
Slides

Summary:

- API Champions: identified for 2022
- Driver Projects: identified those on the call and their interests for '22
- Implementers: identified those on the call and their interests for '22
- API roadmap planning: we went over the most key issues/PRs… and in many cases identified a champion to move those forward
    - WES
    - TES
    - TRS
    - DRS
- Next step: cloud leadership and API champions summarize our '22 roadmap and report back in the next cloud meeting

2021-09-27: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)":, ,, , Kurt Rodarmer (NIH),Bill Clifford (ISB, IDC) , , , , , , , , , , Binam Bajracharya(Uchicago), , , , , , Ben Busby (DNAnexus), , , , , , ,Bruno Grande (Sage Bionetworks), Thomas Schaffter (Sage Bionetworks), , , , , , , , , Michael Lukowski (U Chicago), , , , , , , , , , ,

3.	GHIF meeting Nov 16-17: call for presenters ● Register for GHIF ● Talk on Cloud standards ~15 min - contact lindsay.smith@ga4gh.org if you would like to participate - within 2 weeks	Lindsay / 5
4.	GA4GH Plenary and Connect reminder ● Plenary starts tomorrow: Sept 28th and 29th -> register ○ FYI, there will be a brief FASP demo that touches on many of our APIs!! ● Connect: Oct 12 - 14 -> register ○ Sessions of interest: i. Cloud Work Stream - October 12th at 21:00 UTC ii. Federated Analysis Systems Project (FASP) - October 12 at 22:30 UTC iii. Passports Implementation - October 13th at 12:00 UTC iv. Data Connect and Cloud - October 13th at 22:30 UTC v. Security Workshop - October 14th at 13:30 UTC	Jeremy / 5
5.	DRS 1.2.0 Release ● Built docs ● PR into develop, and master ● **Any issues raised with release 1.2????** ○ 'Expand' param in request body vs query string for POST endpoint ■ Issue, PR, docs	Jeremy / 10
6.	WES API feedback & discussion ● DNAstack WES feedback	Patrick / 40
7.	AOB.	

Minutes

WES Feedback

- Auth information not included in the presentation, but it is very important
-

2021-09-13: Cloud WS - TRS and WES roadmap planning

Chair: Jeremy Adams
Attendees "Name (Affiliation)":, Pratik Soares (illumina),, ,Yash Puligundla (ga4gh) , , , , , , , Michele Mattioni (Seven Bridges), Charles Aylward (Illumina), , , , , ,Kurt Rodarmer (NIH) , Binam Bajracharya(UChicago), Bill Clifford (ISB, IDC), , , , , , , , , , , , Thomas Mooney (WUSTL), , , , , , Micahel Lukowski (U Chicago),Mike Conway (NIH/NIEHS) , , , Kyle Ellrott (OHSU), , , , , , , , , , , ,

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	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Jeremy / 5
2.	Previous Actions Review	
3.	TRS Roadmap Planning ● Current issues + next steps (meeting notes taken inside linked presentation)	Denis / 25
4.	DRS PRs ● Service-info - merged ● POSTing Passport tokens ○ Issue, PR, Proposed Docs ○ Open issues with this PR: ■ 'expand' query vs body param ■ Passport token labeling ● Batch (multi-id) request PR ○ Issue, PR, Proposed Docs ○ Work in progress, please comment/suggest changes on PR thread ● Pagination of bundles for a single object ○ No PR yet	Jeremy / 25
5.	WES - review feedback for next meeting ● Pratik Soares and Charles Aylward (Illumina) - WES feedback ○ ● Patrick Magee (DNAstack) - WES feedback	Jeremy / 5

Minutes:
WES feedback:

- PS: does server need to support all attachment/url scenarios
- CA: RO-Crate - specify file relationships

- JE: workflow version should be part of service info, implementation could route requested workflow to the right language version. Embedded versioning not always a requirement for certain languages, we needed the ability to explicitly have that version
- PS: does the WES endpoint use this to determine what endpoint to invoke?
- JE: correct, that's my understanding. Not sure how much this is being followed in different implementations
- CA: missing engine_version parameter. A future iteration of cwltool had a regression introduced. Might be useful to specify an engine_version
- JE: service info exposes which versions are available
- PS: specify the tasks that have completed since a certain point
- CA: make it so that client doesn't have to manage the state of the response
- JE: multiple configurations could potentially exist
- CA: a specific tool or step may be reused, if that happens then it's not clear which step is which in the task logs. Needs more information to uniquely identify which iteration of a specific step
- PS: if a client wants to visualize the workflow, it's unclear from just the task logs the execution order, etc.
- CA: need queued time, useful for end user to know it's been received and entered the queue, though execution hasn't started
- CA: initializing step is for downloading inputs, etc, need a corresponding finalizing step for uploading outputs. Finalizing as analogous to initializing
- CA: filtering and sorting options

2021-08-23: Cloud WS - TES Deep Dive

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)":, ,, , , , , , , , , , , , , , Thomas Schaffter (Sage Bionetworks), Michael Lukowski (U Chicago), Pratik Soares (illumina), Bill Clifford (ISB, IDC) , Binam Bajracharya(UChicago), Jeremy Adams (GA4GH), Matt McLoughlin (Microsoft),Yash Puligundla (GA4GH) , Brian Reilly (Broad), Kyle Vernest (Broad) , , , , , , , , , , , , ,

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1.	Welcome & Confirm Agenda	Brian/David 5 min
2.	Previous Actions Review	Brian/David 5 min
3.	DRS PR reminder ● /service-info PR: Issue #309, PR #362 ○ Open for comment period closes tomorrow ○ **Decision**: we will merge this tomorrow ● Passports PR: Issue #348, ~~PR #349~~ PR #363 ○ **Decision**: this will be merged by Sept 13th (unless we have a blocker comment come up)	Jeremy / 5 min
4.	TES Sub-group Deep Dive **Minutes:** ● Main goals: identify requested features for TES 1.1, and define schedule for passports integration ● **Backend_parameters**: PR #154 ● **Input Streaming** (no PR) ● **Make file type flag optional** (no PR) ● **Ignore Error** (no PR) ● **Port mapping/exposure** (no PR)	Kyle / TES team / 40 min
5.	Schedule reminder ● Schedule: ○ ~~Aug 9: DRS~~ ○ ~~Aug 23: TES~~ ○ Sept 13: WES + TRS ○ Sept 27: TRS… and also prep for Plenary… *conclusion on the vote on DRS 1.2 and any other releases* ● Plenary: Sept 28 - 29 Register ○ Plenary schedule ○ Want to report back releases and status of our APIs… where we are ● Connect: Oct 12 - 14 ○ Connect schedule ○ Want a roadmap for Cloud in time for Connect… where are we going	Jeremy / 5 min

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2021-08-09: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”:Ian Fore (NCI,NIH), ,, , , , Michele Mattioni (Seven Bridges), , Bill Clifford (ISB, IDC), , , , Thomas Mooney (WUSTL), , Elizabeth Janes (GA4GH) , , , Kurt Rodarmer (NIH),Mike Conway (NIEHS), Pratik Soares (illumina), , , ,

	○ Sept 27: TRS… and also prep for Plenary… *conclusion on the vote on DRS 1.2 and any other releases* ● Plenary: Sept 28 - 29 Register ○ Plenary schedule ○ Want to report back releases and status of our APIs… where we are ● Connect: Oct 12 - 14 ○ Connect schedule ○ Want a roadmap for Cloud in time for Connect… where are we going	
5.	DRS plans + deep dive ● OpenAPI3 PR merged - new docs (develop branch) ● v1.2.0 release plans: ○ Add **/service-info**: Issue #309, PR #362 ■ *What's missing from /service-info?* ○ Add POST method for existing endpoints to enable large **Passport** submission: Issue #348, ~~PR #349~~ PR #363 ■ *Is this done correctly in OpenAPI3? It seems to render OK in both the docs and editor.swagger.io* ■ *Is the AuthSchema done correctly?* ● Later release plans: ○ DrsObject batch request + pagination ○ Passport downscoping, selection auth	Brian, Jeremy / 45
	A.O.B.	

2021-07-12: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)":, ,Ben Busby (DNAnexus), , , , , , , , , , , , , , , , ,Michael Lukowski (U Chicago) , , , , , , , , , , , , , , Heidi Sofia (NIH/NHGRI), , Mike Conway (NIH/NIEHS), , , , , , , , , , , , Thomas Mooney (WUSTL), , , , , , Alex Kanitz (ELIXIR Cloud), , Elizabeth Janes (GA4GH), Denis Yuen (OICR - Dockstore) , , Kurt Rodarmer (NIH), , , , , , ,

	Actions Arising	Assigned To	Deadline
1			
2			

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	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	David / 5
2.	Previous Actions Review → Look at AIs from 6/14 meeting ● RO-Crate: Ian and Alex… still TBD… Alex said community has shared some ideas and he needs to communicate with Ian ● Deep dive w/ sub-teams, see below	Jeremy / 10
3.	DRS: OpenAPI migration + new docs build (#230) - now open for comment (until July 23) ● live docs - please review if interested ● PR - please comment here ● Future PRs after this lands ○ /service-info ○ POST passports ○ paginated responses (based on GitHub model) ○ batch requests ○ Passport support (“selection”)	Jeremy / 20
4.	Sub-group Update (TES/WES/TRS) - TRS (Denis): August 9 - TES (Ania/Kyle): Date? - WES (?): Date?	Various / 25
5.	Aug schedule… cancel the 23rd?	
6.	**Cloud Project Board update**	If time permits
	-	

2021-06-28: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”:Kyle Vernest (Broad Institute), Jeremy Adams (GA4GH), James Eddy (Sage Bionetworks), Jiaxin Zheng (Sage Bionetworks) , , , Thomas Schaffter (Sage Bionetworks), , , , , , , Bruno Grande (Sage Bionetworks), , , , , , , Michael Lukowski (U Chicago), Elizabeth Janes (GA4GH), Binam Bajracharya(UChicago), , , , , , ,

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1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sage Bionetworks: nlpsandbox.io	Thomas / 30
4.	DRS: OpenAPI migration + new docs build (#230) ● live docs ● PR - call for reviewers	Jeremy / 10
5	DRS: Hackathon outcomes: batch requests + paging (#342, #334) ● hackathon outcomes doc ● Batch Requests: ○ Gist ● Pagination ○ Gist ● Ready to open PR?	Jeremy / 10
6.	**Cloud Project Board update**	

NLP Sandbox presentation (Thomas Schaffter, Sage)

- nlpsandbox.io
- distributed ecosystem for assessing NLP tools using clinical data
- central model repository → sends models out to local sites → collect and compiles results
- first set of tasks are de-id
- Currently investigating WES API, as a drawback the current provider environment is bound to the same controller
- DRS API - enables others to interact with data, but we would not be able to make it available to the wider public
- currently only one data node up and running (at MCW)
- by end of Q3, hope to have 4 hospitals (MCW, Mayo, UW, UCSF)
- CD2H is driving (some of?) the requirements here

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2021-06-14: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”:, ,, , Alex Kanitz (ELIXIR Cloud), Jeremy Adams (GA4GH), ,Michele Mattioni (Seven Bridges) ,Bill Clifford (ISB, IDC) , , , Brian Reilly (Broad), , , Justin Clark-Casey (EMBL-EBI) , , , , Heidi Sofia (NIH), Michael Lukowski (U Chicago),Ian Fore (NCI,NIH), Binam Bajracharya(UChicago), Ania Niewielska (EMBL-EBI), Elizabeth Janes (GA4GH), , Thomas Mooney (WUSTL), Denis Yuen (OICR - Dockstore), , , Karl Sebby (Truwl), Kurt Rodarmer (NIH), Thomas Schaffter (Sage Bionetworks),Mike Conway (NIH/NIEHS) , , , ,

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	A.O.B. - Cloud Work Stream Animation (Stephanie Li, GA4GH Comms) - Next call agenda… focus on TES, WES, DRS, or TRS? Guest speaker?	

RO-Crate preso notes

- researchobject.org -- package research data together with metadata
- Spec: https://www.researchobject.org/ro-crate/1.1/
- self-descriptive packages
- RO package encapsulates content and external references, plus has its own metadata
- builds on schema.org and JSON-LD
- RO-Crate differences (from GA4GH Cloud)
    - storage-oriented (vs. action-oriented)
    - rich metadata (vs. minimum metadata)
    - general guidelines (vs. official specification)
- possible points of alignment
    - workflow descriptor: RO-Crate workflow descriptor <-> TRS entry
    - workflow execution: RO-Crate workflow <-> WES RunRequest
    - compound objects: RO-Crate profiles as a way to represent DRS compound object storage?
    - …
- RO-Crate more focused on knowledge than on …
- Workflow Testing profile, stacked on top of Workflow profile
- have talked about defining a profile focused on workflow execution, vs. on retrospective work -- Jose Maria Fernandez one of the people working on that
    - might need a different profile for inputs than for outputs
- Profiles are a (NEW) way to specify a template for a type of crate
- Profiles (https://www.researchobject.org/ro-crate/profiles.html)
    - Workflow
    - Describo
    - Paradisec
    - Concept is new
- JSON-LD based
- Possible areas
    - 1) describe workflows … TRS <-> RO-crate
        - Archive of workflows in zenodo?
        - See https://www.researchobject.org/ro-crate/1.1/workflows.html#workflows-and-scripts
    - 2) running workflows … RO-crate -> WES workflow run
    - 3) compound objects… representing compound objects in, say, DRS
- Tar/gz/zip… see workflow link above
- BioCompute and RO-Crate … some relationship exists
    - https://www.biocomputeobject.org
    - Similar to a profile
    - https://biocompute-objects.github.io/bco-ro-crate/
- Possible next steps
    - Conversion tools could be written

        - TRS → RO-Crate
        - RO-Crate → WES call
    - Could be served up by DRS… profiles in RO-Crate could support things like BAM+BAI file
    - **AI: one page, here's how we would recommend RO-Crate as the compound object approach for DRS → Ian Fore and someone from RO-Crate meeting**

2021-05-24: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”:,Ian Fore (NCI, NIH) ,Ben Busby (DNAnexus), Binam Bajracharya(UChicago), James Eddy (Sage Bionetworks), Brian Reilly (Broad), ,Kurt Rodarmer (NIH) ,Bill Clifford (ISB, IDC) , Ania Niewielska (EMBL-EBI) , , , , , , , , , , , , , , , , , Michael Lukowski (U Chicago), , , , , , , , , , , , , , , , , ,

    - if you're interested in taking part, add your name to the FASP sheet above
- DRS scaling (#342) discussion and next steps
    - re batch requests and pagination: see https://github.com/ga4gh/TASC/issues/29
    - re metadata -- see #336 for metadata discussion that could happen at the FASP hackathon
- WS Leads transition planning
    - FYI that Brian and I are working with Peter to change the guard
- Reminder of in-progress stuff
    - Jeremy on OpenAPI 3 and docs build
    - portable CNest
- Ian: NCI group on containers and workflows
    - interested in getting a WES update in September timeframe
    - Ian will intro when it gets closer
- Kyle on TES
    - have a GSOC project getting TES into Galaxy
    - organizing meetings with workflow providers (Nextflow, snakemake, etc.)
    -

2021-05-10: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees "Name (Affiliation)":, Ian Fore (NCI, NIH),, ,Bill Clifford (ISB,IDC) , Binam Bajracharya (UChicago), , , , , Kurt Rodarmer (NIH), , Daisie Huang (UHN), , Jeremy Adams (GA4GH), Elizabeth Janes (GA4GH),Denis Yuen (OICR - Dockstore) , , , , , , , , , , , , Michael Lukowski (UChicago), Justin Clark-Casey (EMBL-EBI), Brian Reilly (Broad), , Thomas Schaffter (Sage Bionetworks), Heidi Sofia (NIH, NHGRI),Mike Conway (NIH, NIEHS) , , , , Alex Kanitz (ELIXIR Cloud & AAI), , , , , , , , , , , , ,

4.	Updates to OpenAPI 3 (DRS), documentation, tooling	Jeremy
5.	Portable CNest workflow - meeting doc - Support for Nextflow in WES?	David/Jeremy
6.	FASP updates - path to DRS+Passports PR - epic ticket, #352, #353, #354 - summary doc, design doc - FASP hackathon June 21st - 25th - hackathon planning doc - [Kurt] see also https://github.com/ncbi/ncbi-drs, for a DRS server implementation that includes Passport support	Jeremy
7.	DRS scaling (#342)	
	Sub-group Update (TES/WES/TRS)	
	Cloud Project Board update	
	A.O.B. - Cloud Work Stream Animation (Stephanie Li, GA4GH Comms)	

Re #342, scaling:

- Jeremy will talk to CSO/TASC about a plan for the first task (batch requests and pagination for DRS)
- Ian/Kurt will come back with a proposal for a PR around the second task, compound objects (including the imaging use cases)
    - having the RO-Crate people present at one of our sessions will be helpful

2021-04-12: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”:, ,,Bill Clifford (ISB, IDC) , Ian Fore(NCI, NIH), Binam Bajracharya(UChicago), , , , Bruno Grande (Sage Bionetworks), , , , , , , , , , , , , , Micahel Lukowski (U Chicago), , , , Justin Clark-Casey (EMBL-EBI), Brian Reilly (Broad), , , ,Michele Mattioni (Seven Bridges) , , , , , , , , , , ,Ania Niewielska (EMBL-EBI) , Junjun Zhang (ICGC-ARGO),Kyle Ellrott (OHSU) ,Ben Busby (DNAnexus) Heidi Sofia (NIH, NHGRI), , , , , , , , , , , , , ,

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1	Comments on Cloud Animation document	group	4/19
2	Please take a look at PR #349, correctly done?	group	Next call
3	Issue #339: - Leave feedback on #339 based on DRS-Passport Token Handoff - Proposal Summary (happy to have you leave comments directly here) - Feedback doc, Kurt, Craig, Max, and others working on this - Prototype soon - Mini hackathon to be scheduled - Expect to review the proposal in 1-2 weeks… 4/26 we'll use this meeting to review ramifications for DRS	group	Next call
4	Issue #342 - Respond to comments in the Issue - Feedback on DICOM examples and bundles conventions	group	

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian / 2 min
2.	Previous Actions Review	No previous action items -- skip
3.	Cloud Animation ● Followup in this call on May 10th ● Please comment in doc by 4/19	Stephanie /2 min
4.	DRS Detailed Update ● DRS project board ○ **Issue #348**: Support POST'ing of Passports to DRS endpoints → Brian ■ PR #349 ■ Let's discuss ● Docs ● Swagger ○ Other issues on the project board, are any ready for PR? ○ **Issue #339**: Linking DRS with Passport Visa → Jeremy ■ Connect meeting worked on this ■ Documents for reference (for 339)	Brian, Jeremy, and Ian / 20 min total

	● DRS Passports token handoff - design document ● DRS-Passport Token Handoff - Proposal Summary ● … ■ Next steps, be prepared to update the DRS spec ○ **Issue #342**: DRS scaling concerns → Ian ■ Split it into two… see conversation from last meeting ■ Conversation on bundles vs. other documented approach ■ Look at research object crates… as part of this work ■ Priorities ● 1) Bulk Data Requests ● 2) Logical collections of objects ● 3) Bundle clarification ○ [no issue yet] new error code → Bill Clifford ● Brief update on our PR strategy → Brian ○ We want drivers to vote, minimize work for them ○ Two collections of PRs 1) Passport related (#348, #339) and 2) performance related (#342, #325, #286) ○ Should we target having these collections ready for drivers by mid July???? ● fyi: Galaxy GitHub issue: Initial Support for Consuming GA4GH DRS URIs #11819	
5.	Sub-group Update (TES/WES/TRS) ● TES ○ Reaching out to community stakeholders for workflow engines ○ Who for Cromwell ○ Who for Nextflow ● WES ● TRS	Champions/5 min each
6.	Let's discuss agenda topics for next meeting: ● WES, continued discussion? ● Driver project talk? ● Other topics? ○ 4/26 DRS focus on Issue #339, the team working on this should have a proposal ready for discussion ○ 5/10 ■ check in with Stephanie on animation ■ DRS focus on Issue #342… item 1) bulk data requests ○ 5/24 ■ TES, WES, TRS update ■ Driver project update/presentation	Jeremy/5min

	A.O.B.	

- RO-Crate and Cloud APIs (TRS, WES, maybe DRS) → Alex Kanitz

2021-03-22: Cloud WS

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”:, ,,Bill Clifford (ISB, IDC) , Oliver Hofmann (AGHA) , , , , , Michael Lukowski (U Chicago), Binam Bajracharya(UChicago), David Pot (GDIT), , Alex Kanitz (ELIXIR Cloud), , , , , ,

    - top-down option: DRS doesn't understand logical structure; we work with other teams (e.g. those defining the Search API) to define the repository of record for logical connections between objects
- Ian suggests that, in all cases, we want DRS mime-type to return an actual semantic type (e.g. "this JSON is a DICOM object")
    - then you know what to do with the object when you get it back
- Q: how would you handle DICOM objects in DRS?
    - maybe "push DRS ids" into a complex DICOM object?
    - maybe …
    - BillC: at IDC, we have DRS blobs for individual DICOM slides; we have a DRS bundle for each DICOM series (containing blobs); a DRS bundle for each DICOM study (containing series)
        - mostly works; adding a type that describes the semantic type of each blob/bundle would help
- Q: how would you handle "deep zoom" image pyramids in DRS?
    - format is one file for each tile; series of levels each with tiles; filename encodes the level and the x/y tile offset
    - Ian's notebook example created a JSON manifest that points to all the tiles in a pyramid. Has one DRS blob for manifest, plus DRS blob for each JPG tile.
    - COULD also put all those blobs (manifest + leaves) into a bundle, but it's not clear it's needed?
    - note: if you did create a bundle, you could give it a DOI, and have it known as a checksummed persistent object. *(dG: but do you need the bundle? couldn't you just have the DOI point to the manifest blob?)*
- generalizing the pattern:
    - assume you have a complex object made up of a logically related set of files
    - define a manifest (probably in JSON) that encodes that logical structure, with pointers to all the 'leaf' files
    - store each leaf file as a DRS blob, and store the DRS id in the manifest
    - store the manifest as a DRS blob, and use the DRS id to represent the object as a whole
    - do *not* (typically) pass around DRS ids to the leaf files -- they're typically only useful in the context of the manifest
    - TBD: is there any reason to also create a DRS bundle of all those objects? (maybe if you want to be able to fetch all the files at once?)
- what about pagination?
    - Bill: if I fetch a huge bundle with expand=true, I need pagination
        - less relevant if we don't have big bundles (per the bullet above)
    - but -- see #334 -- pagination is also useful for bulk requests, e.g. to expand the results of a search query
- TODO: respond in #342 about next steps, attempting to move towards closure on proposals. ⇐ DONE

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2021-03-08: Cloud WS

Chair: Jeremy Adams
Attendees “Name (Affiliation)”:, ,, , , Justin Clark-Casey (EMBL-EBI), ,Bill Clifford (ISB, IDC) , , , Ian Fore (NCI,NIH), Ania Niewielska (EMBL-EBI) ,Anne Deslattes Mays (Science and Technology Consulting),Binam Bajracharya (UChicago), , , Thomas Mooney (WUSTL), , ,Ruchi Munshi (Broad) , Thomas Schaffter (Sage Bionetworks), Alex Kanitz (ELIXIR Cloud), Daisie Huang (CanDIG/UHN), , , ,

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2021-02-22: Cloud WS

Chair: Brian O'Connor, ~~David Glazer~~
Attendees “Name (Affiliation)”: , Ania Niewielska (EMBL-EBI),Bruno Grande (Sage Bionetworks) , ,Kyle Ellrott(OHSU) , Thomas Schaffter (Sage Bionetworks) , , , , Michael Lukowski (U Chicago), Binam Bajracharya(UChicago), Ian Fore (NCI, NIH), , , Kurt Rodarmer (NIH), Anders Leung (GA4GH), Junjun Zhang (ICGC-ARGO), , Alex Kanitz (ELIXIR Cloud & AAI), James Eddy (Sage Bionetworks), , , , ,

	■ DRS alignment with Beacon and Search on March 3 @ 22:30 UTC agenda	
4.	**Update on DRS+Passports** ● #339 ● design document ● This will be discussed during Connect at the DURI WS meeting	Jeremy / 10 min
5.	**Brian for Driver update (TOPMed)** ● Slides ● Template for future driver project updates... ● A brief update on how GA4GH APIs are being used on BioData Catalyst	Brian / 20 min
6.	**Sub-group Update (TES/WES/DRS/TRS)** ● Super quick round robin from champions if time permits ● TES ○ Press release ○ 1.1 features: custom resource attributes (Azure interested in this), specify desired VM specs ○ Can WES provide similar metadata? ○ TES client implementation for snakemake - can we add to registry ● WES ○ Ticket for passing filesystem credentials - deep dive for Mar 8 - link ● TRS ○ Looking at services soon (“apps”), signing, pagination	10 min
7.	**Schedule out next several meetings** ● 1/25 - round robin from API champions ● 2/8 - ○ Planning for GA4GH Connect ○ Deep dive: DRS scaling concerns - #342 - Ian ● **2/22 - TODAY** ○ Driver presentation -> Brian for TOPMed ○ API update ○ Deep drive: DRS+Passport walk through (outcome of FASP hackathon) - #339 - Jeremy ● 3/8 - ○ Driver presentation -> ~~TBD~~ Elixir ○ Recap of GA4GH Connect ○ Deep dive on WES passing credentials for file access -- Ruchi to lead? ● 3/22 - ○ API updates + special topic <- ??? see below	

	○ Deep dive on DRS IDs used in the API response? -- Ian to lead? ● 4/12 - ○ Deep dive on TRS… outstanding issues like services (“apps”), signing, pagination -- Denis to lead?	
	A.O.B.	

Notes:

- ...

2021-02-08: Cloud WS - Preparation for Connect 2021

Chair: ~~Brian O'Connor~~, David Glazer
Attendees “Name (Affiliation)”:,Bill Clifford (ISB, IDC) , Justin Clark-Casey (EMBL-EBI), Junjun Zhang (ICGC-ARGO), Kyle Vernest (Broad) ,Ian Fore (NCI, NIH) , , , , , , , , , , Thomas Mooney (WUSTL), , , , , , , , , , ,Julian Mazzitelli (BioBox) , , , , , , Alex Kanitz (ELIXIR Cloud), , , , , , , , , , , , , , Michael Lukowski (U Chicago), Jiaqi Liu (UChicago), Heidi Sofia (NIH, NHGRI), , Daisie Huang (CanDIG-UHN), Alessandro Riccombeni (Amazon Web Services) , Thomas Schaffter (Sage Bionetworks) ,Denis Yuen (OICR -Dockstore) , , , , , , , , , , , , , , ,

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Cloud WS @ GA4GH Connect 2021, proposal (Mar 1st - 4th) Goal: finish Connect with open PRs for high-profile items and active DP engagement Ideas for sessions: - 1) DRS + Passports Cross WS (may overlap with FASP) - driver projects who need this now: CRDC (yes), Elixir (yes) - champions: Kurt R, Alex K	

	- other WSs: Identity, FASP - Who to socialize this with? Gen3, - see also: working doc, #339 - 2) Boundary between Search and DRS (may overlap with FASP) - deliverable is (at least) a doc of principles for the division of labor - e.g. “How do you get metadata about a DRS ID?” - champions: Ian F, - also interested: Kurt R, - also related: SRA use case, bundling use cases, pagination - other WS’s: Search, FASP - 3) WES support in Terra (and other DPs) - driver projects who need this now: Terra (for several; maybe), - champions: Kyle V? Max B? - see also: https://github.com/ga4gh/fasp-scripts/issues/11 - also interested: Ian F - Other session ideas (potentially for future Cloud WS meetings): - [Alex] Strategy for promoting TES for adoption by compute infrastructure developers (k8s, Slurm etc.)? - GA4GH-wide pagination approach, throttling (TASC? Chief Standards Officer) - Jeremy to see if GA4GH would be ready for a pagination session - What is a DRS id? See issue for one aspect of this. What is the access id in DRS? (See this notebook for one approach) [same for TRS ids]	
4.	Sub-group Update (TES/WES/TRS) - TRS: more thought going into pagination - Pagination through tools, tool versions, more models, etc. - Dockstore interested in GA4GH-wide standardized pagination approach	
5.	**Cloud Project Board update**	
	A.O.B.	

2021-01-25: Cloud WS

Chair: Brian O'Connor, ~~David Glazer~~
Attendees “Name (Affiliation)”:, ,Ruchi Munshi (Broad), Thomas Schaffter (Sage Bionetworks) Ian Fore (NCI, NIH), Bill Clifford (ISB, IDC), , , , , Binam Bajracharya(UChicago), Lynette Lilly

(UChicago), Matt McLoughlin (MSFT), Heidi Sofia (NIH, NHGRI), Thomas Mooney (WUSTL), Jeremy Adams (GA4GH), Anders Leung (GA4GH), Alex Kanitz (ELIXIR Cloud & AAI), Ania Niewielska (EMBL-EBI/Elixir), , , , , , , , , , , , , , ,

	Actions Arising	Assigned To	Deadline
1	High-level DRS ticket discussing relationship between multiple related tickets #342	Ian	DONE
2	Translate WES Github issues onto Project Board	Ruchi, Brian	

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	Brian - 1 min
2.	Previous Actions Review	Brian - 10 min
3.		
4.	Sub-group Update (TES/WES/TRS/DRS) ● Do we have tickets for our major milestones/tasks? ○ DRS ■ Highest priority tickets #339 and #342 (brings together multiple tickets), assigned Jeremy and Ian as champions today ■ DRS paging #325 - Bill and Jiaqi to champion ○ WES ■ Highest priority WES tickets: ● Issue #124 remove workflow_attachment ● WES issue 18, closely related to DRS + passports (#339) ● PR #160 execution location ■ To send survey to DPs about which tickets are most needed - we could expand this for all Cloud APIs i.e. DP touch base ○ TRS ○ TES ■ Expansion of metadata for task execution, specification of cpus, memory, etc. ■ Propagation of access credentials e.g. from passports ● How to raise an issue and get it translated onto the project board? Central place for issue tracking?	API Champions - 10 min each

	○ Anyone can currently submit an issue, champions moderate and move it onto the project board based on what is highest priority and actively worked on ○ Good to discuss how/where to submit ● Do we have a point person per ticket? ● Do we want to have labels for quarters? ● Do we have labels for priorities?	
5.	● **Schedule out next several meetings** ○ TODAY - 1/25 - round robin from API champions ○ 2/8 - ■ Driver presentation -> Brian for TOPMed ■ Planning for GA4GH Connect ■ Deep dive: DRS scaling concerns - #342 - Ian ○ 2/22 - ■ API update ■ Deep drive: DRS+Passport walk through (outcome of FASP hackathon) - #339 - Jeremy ○ 3/8 - ■ Driver presentation -> TBD ■ Recap of GA4GH Connect ○ 3/22 - API updates + special topic <- ??? see below ● What are the upcoming important GA4GH meeting dates? ○ FASP hackathon - 1/19 - 1/22 - DONE! ○ GA4GH Connect - March 1st - 4th ○ GA4GH Plenary - October	Brian - 10 min
	A.O.B.	

	Previous Actions Arising	Assigned To	Deadline
1	Approach Driver Projects to see which are 1) active in 2021 and 2) which want to give an update on the GA4GH Cloud call.	David and Brian	Jan 2021
2	API Champions (Denis - TRS, Brian/David - DRS, Ania/Kyle - TES, Ruchi/James/Walt - WES) please clean up the Cloud Board… all tickets labeled and Ready or In Progress assigned a lead.	API Champions	Jan 2021
3	TES Approval (20th Jan) -- DONE		DONE!

4	2021 deep dive topics for cloud -> will discuss today ● Jeremy for repository of known implement, tutorial in 2021 on registration of known inputs -> did this during FASP hackathon, we can repeat in Cloud ● Bundles and search deep dive ● Cold storage, disappearing content deep dive ● Passport/OAuth2 deep dive ○ Link between DRS and info on authorization endpoint and visas required ● Common output formats for WES and TES deep dive ● FASP and testing our APIs, plans for 2021 ● GA4GH On Ramp implementations… opening up GA4GH to more institutions. What does Cloud need to do to support this? ● 2021 roadmap… as individual APIs goals become more clear let's schedule out releases and give a roadmap on our website	Brian, David, Angela	Schedule out in Jan for Q1 and beyond
5			

2021-01-11: 2021 Cloud Work Stream Planning

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”:, Justin Clark-Casey (EMBL-EBI), Ania Niewielska (EMBl-EBI/Elixir), Paul Grosu (Northeastern U.), Ben Busby (DNAnexus) , Bill Clifford (ISB, IDC), James Eddy (Sage Bionetworks), , , , , , , , ,Joris Vankerschaver (Enthought Ltd) , Thomas Schaffter (Sage Bionetworks) , , , , , , , , , , , , , , , Thomas Mooney (WUSTL), Jason Walker (WUSTL) ,Jiaqi Liu (UChicago) , Lynette Lilly (UChicago), , , , , Michele Mattioni (Seven Bridges), Kaushik Ghose (SB), , , Kurt Rodarmer, , Heidi Sofia (NIH, NHGRI), , , , , , Michael Lukowski (U Chicago), , , , , , , ,Denis Yuen (OICR- Dockstore) , , Junjun Zhang (ICGC-ARGO),Ian Fore (NCI, NIH) , , ,
Shaikh Rashid (CanDIG - UHN)

	Actions Arising	Assigned To	Deadline
1	Approach Driver Projects to see which are 1) active in 2021 and 2) which want to give an update on the GA4GH Cloud call.	David and Brian	Jan 2021
2	API Champions (Denis - TRS, Brian/David - DRS, Ania/Kyle - TES, Ruchi/James/Walt - WES) please clean up the Cloud Board… all tickets labeled and Ready or In Progress assigned a lead.	API Champions	Jan 2021

3	TES Approval (20th Jan)		
4			
5			

	Agenda Item	Person/Time
1.	**Welcome & Confirm Agenda**	David & Brian / 5 min
2.	**Previous Actions Review** *We can skip the recap today since we'll discuss the previous action items in the topics below...*	David & Brian / 5 min
3.	**Priorities for 2021** *How do we stay focused and have concrete accomplishments quarter by quarter?* ● Last time we discussed what are the top features for each API in 2021 ○ *Key thing for 2021* ○ *What will you do for 2021* ● **Can we organize these into the Cloud Project Board**? ○ Do we have tickets for our major milestones/tasks? ■ DRS ■ WES ■ TRS ■ TES ○ Do we have a point person per ticket? ○ Do we want to have labels for quarters? ○ Do we have labels for priorities? DG: what's one thing you'd like the Cloud WS to accomplish in 2021? What's one thing you plan to do in 2021? ● Kurt: 1) pull together passport + DRS and 2) to introduce selection object ● Justin: 1) how does DRS incorporate passport support (e.g for Elixir) 2) see existing projects looking at and adopting GA4GH, do analysis of whether things can be picked up (e.g. Galaxy) ● Ania: 1) TES 1.0 happens!! 2) proof of data access (passport/DRS), how it works in the real world ● Bill: 1) Paging design for DRS responses, e.g. bundles of DICOM objects 2) ● Kaushik: 1) update the DRS standard, get it productionized, metadata and	Group / 20 min

auth 2) clinical metadata in DRS, and with auth

- Joris: 1) tbd, 2) implement current DRS standard and see how it plays out. Looking at similar standards in GeoPhysics.
- Denis: 1) like to see TRS become more robust and useful, PRs to refine, avoid scope creep 2)
- Jiaqi: 1) paging design for DRS and 2) passport + DRS for RAS/NIH integration
- Heidi: 1) broader and deeper adoption of GA4GH standards, 2) Broad grant for GA4GH… setup NIH staff participation for this coop agreement
- Michele: 1) DRS integration with Passports, issue is well commented; connection of DRS with clinical metadata, ie. go back to metadata connected with a file 2)
- Ben: 1) WES+TES sandbox, this would be great to see if workflows work 2) like to implement WES compliant workflows on DNAnexus. Nextflow and snakemake… PR to help compatibility
- James: 1) more focus on docs, reusability and discoverability, build and deploy work. Making sure people can work with our APIs effectively 2) Implement WES and DRS
- Lynette U. Chicago: 1) see Jiaqi's feedback 2)
- Thomas: 1) wider adoption of the standards 2) trying to implement DRS at Wash U.
- Shaikh: 1) more implementations of GA4GH Cloud APIs being available to DPs and community; passport and DRS integration 2)
- Paul: 1) DRS has streaming, would be nice to see a federated option for analysis with data streaming, more than just pagination 2)

- Junjun: 1) passport integration, WES 2) SOP for workflows for ICGC Argo… standard way for sharing … relates to TRS
- Jason: 1) adoption, better integration, 2) use case at Wash U… WES and TRS implementation… need a DRS implementation
- Anne: 1) workflow languages like nextflow, integration with SRA tools, coordination with ELIXIR and internationalization of projects, understanding what it means to be GA4GH compliant in DRS, TRS, etc. 2)
- Ian: 1) yes and! DRS + passport. Would also like to see WES + passport as well. Selection/cart in DRS; clinical cases; Cloud should stop trying to take on the world and solve all problems (e.g. Selection may be suited to discovery). Work with other WS's
- Kyle: 1) how to increase adoption of DRS, DRS streaming 2)
- David: 1) happy driver projects 2) focus for the group
- Brian: 1) registered DRS, WES, etc implementations. Hearing from Drivers 2) helping to determine current datasets accessible via DRS…

	how many PB of data on NIH repos for example? ● Jeremy: 1) tech group 2) on ramp project for implementing lightweight version of standards	
4.	**Upcoming Meeting Topics** *Let's spend some time brainstorming how to structure our meetings in 2021...* ● Dedicated upcoming meetings per API ○ Current implementations ○ Open issues/feedback ○ Plans for next version ● Dedicated upcoming meetings for updates from Driver Projects and also users of systems ○ What Driver Projects are currently active? ○ What APIs are they currently using/supporting? ○ What are their plans for 2021? ○ What do they need from the Cloud Work Stream? ○ Will you participate in FASP? In building On Ramp implementations? ● Dedicated meetings for special topics (from previous meeting) -> see above brainstorm as well!! ○ Jeremy for repository of known implement, tutorial in 2021 on registration of known inputs ○ Bundles and search deep dive ○ Cold storage, disappearing content deep dive ○ Passport/OAuth2 deep dive ■ Link between DRS and info on authorization endpoint and visas required ○ Common output formats for WES and TES deep dive ○ FASP and testing our APIs, plans for 2021 ○ GA4GH On Ramp implementations… opening up GA4GH to more institutions. What does Cloud need to do to support this? Possible Driver/User presentations: Anne: bringing visiting scientist perspectives, how are these tools being used in real science, stories Junjun Z: would be interested in doing an ICGC update, provide feedback, we are exploring TRS more Jiaqi L: can share where they represent DPs, they are one part of a large consortium of institutes, would be good to bring on those institutes as well Michele M: represent multiple DPs as well, happy to give updates and feedback KR: can submit updates as well IF: can put CRDC on list Upcoming calls: BO: round robin updates from each of the sub groups? (WES, TRS, etc.) from	Group / 20 min

	API champions. Need to schedule BO: FASP hackathon - do we want a Cloud WS hackathon as a dedicated time for working through tickets? IF: we need DURI to address questions of who gets passports? E.g. social questions BO: lean into FASP hackathon ● **Schedule out next several meetings** ○ 1/25 - round robin from API champions ○ 2/8 - Driver presentation ○ 2/22 - API update + special topic ○ 3/8 - Driver presentation ○ 3/22 - API updates + special topic ● What are the upcoming important GA4GH meeting dates? ○ FASP hackathon - 1/19 - 1/22 ○ Do we want a Cloud hackathon??? Not for now, focus on FASP hackathon ○ GA4GH Connect - ??? ○ GA4GH Plenary - ???	
5	**TES** Notes ● 20th Jan 7pm UTC for steering committee meeting ● Ania will present at the committee … will send it around	5 min
	A.O.B.	

	Previous Action Items	Assigned To	Deadline
1	Can we gather our issues for each API and ping our Drivers to get help prioritizing? I think we need our Project Board updated accordingly -> we have time to look at the board today	API Champions	Early Jan 2021
2	2021 deep dive topics for cloud -> will discuss today ● Jeremy for repository of known implement, tutorial in 2021 on registration of known inputs ● Bundles and search deep dive ● Cold storage, disappearing content deep dive ● Passport/OAuth2 deep dive ○ Link between DRS and info on authorization	Brian, David, Angela	Schedule out early in Jan for Q1 and beyond

	endpoint and visas required ● Common output formats for WES and TES deep dive ● FASP and testing our APIs, plans for 2021 ● GA4GH On Ramp implementations… opening up GA4GH to more institutions. What does Cloud need to do to support this?		
3			

2020-11-23: Last of 2020, TES Update

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: , ,Bill Clifford (ISB, IDC) ,Ruchi Munshi (Broad), Ian Fore (NCI) , Kurt Rodarmer(NIH) , , , , , , , , , , , , , , , , , , Denis Yuen (OICR - Dockstore), Justin Clark-Casey (EMBL-EBI), Binam Bajracharya(UChicago), David Pot (GDIT, NCI ISB-CGC, CDA, IDC), Jiaqi Liu (UChicago), , , , , , , , , , , , , , , , , , ,

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1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Sub-group Update (TES/WES/TRS/DRS) ● What are the top tickets/features for each API in 2021? ● DRS ○ Themes for 2021: DRS and Search, DRS and Passports, enhancements of core DRS features ● TES ○ update on the approval process ● WES ● TRS ○ Feedback from multiple implementations and users ○ Approval process for PRs	API leads
4.	GA4GH On Ramp discussion -> tentative: update on what's been discussed and next steps ●	Brian/David
5.	Upcoming Cloud WS calls ● 11/23 - *last cloud call of 2020* - WES, DRS, TES, TRS meeting, 2021 plans ● 12/7 - FASP call - feedback on cloud APIs in FASP, see agenda spreadsheet ● 12/14 - cloud call cancelled ● First meetings of 2021… dive into big ticket items for each API ○ Ongoing process to respond to issues as they come up Today is the last call of the year, Rishi's last cloud call!! Thank you Rishi!!	Rishi
6.	**Cloud Project Board update** -> defer to new year	defer
	A.O.B.	

2020-11-09: TES Report

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”: Ania Niewielska (EMBL-EBI/Elixir),John Cheadle (BDC) ,Ian Fore (NCI, NIH) , , Michael Lukowski (U Chicago), Michele Mattioni (Seven Bridges) ,Ben Heavner ,

(BDC) ,Bill Clifford (ISB, IDC), Thomas Schaffter (Sage Bionetworks), Heidi Sofia (NIH), Denis Yuen (OICR - Dockstore), Anne Deslattes Mays (Science and Technology Consulting LLC, JAX), Alex Kanitz (ELIXIR CH), Thomas Mooney (WUSTL), Binam Bajracharya(Uchicago), , David Pot (ISB-CGC), Charles Aylward (Illumina), Mike Conway (NIEHS/NIH) , Kurt Rodarmer (NIH) , Justin Clark-Casey (ELIXIR EMBL-EBI), Shaikh Rashid(CanDIG - UHN)

	Actions Arising	Assigned To	Deadline
1	● WES, TRS, TES, and DRS sub-group leads ○ Sentence for Cloud Work Stream update -> Rishi ○ Prep for call on 11/23… what are the priorities for each APIs in 2021… ideally point to GitHub issues we want to tackle		
2			

	Agenda Item	Person/Time
1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	TES Product Approval Status *"The first PRC meeting has taken place and this document details the changes requested to the specification. Each item is a section in the document, please add Thoughts to the Response section for items.* *The public comments have returned an extensive public comment report from the developers of eHive, a distributed scheduling system used by Ensembl. This I think is mainly about 'can TES be adapted fit into their system' but let me know your thoughts."*	Ania, Kyle
4.	Cloud Work Stream updates newsletter - deadline tomorrow (2020-11-10) Can have updates from sub-groups? Any calls for input from other groups?	Brian, David
5.	Cloud APIs for FASP? can select a slot on the spreadsheet ● 12/7 - feedback on cloud APIs Upcoming Cloud WS calls? ● 11/23 - WES meeting, 2021 plans ● 12/14 - DRS meeting, 2021 plans -> cancel this one ○ Themes for 2021: DRS and Search and DRS and Passports ○ Do we cancel this one and try to cover DRS on the 23rd too?	Brian, David

	○ TRS slot in either of those. ● First meetings of 2021… dive into big ticket items for each API ○ Ongoing process to issues as they come up	
6.	TopMed/BDCat Driver Project Feedback: metadata URLs in DRS key/values. ● Issue: https://github.com/ga4gh/data-repository-service-schemas/issues/336 ● Metadata: ○ Provenance of who submitted ○ FHIR endpoint ○ Subject, specimen, etc is out of context? ● Next steps	Ben Heavner, J Cheadle
	A.O.B.	

2020-10-26: 8th Plenary Report / Process for New Features

Chair: Brian O'Connor, David Glazer
Attendees “Name (Affiliation)”:
Walt Shands (UCSC)
Ania Niewielska (Elixir/EMBL-EBI)
Kyle Vernest (Broad)
Denis Yuen (OICR)
Michael Lukowski (U Chicago)
Bill Clifford (ISB IDC)
Karl Sebby (truwl)
Oliver Hofmann (Uni Melbourne/AGHA)
Ian Fore (NCI, NIH)
Shaikh Rashid (CanDIG, UHN)
Anne Deslattes Mays (Science and Technology Consulting LLC, JAX, Georgetown)
David Pot (GDIT (NCI: ISB-CGC, CDA, IDC))

	Actions Arising	Assigned To	Deadline
1			
2			

	Agenda Item	Person/Time

Global Alliance
for Genomics & Health

1.	Welcome & Confirm Agenda	
2.	Previous Actions Review	
3.	Plenary Review & Outcomes (Cloud WS Agenda and Notes) - growing interest in GA4GH and standards - growing need for APIs to work together in real world; hence lots of interest in FASP work	
4.	Sub-group Update (TES/WES/TRS) - TES has been submitted for approval - TRS has gotten a few good new enhancement requests - pulled together artifacts to track user stories: Suggested Process for new features - user story document + spreadsheet	
5.	APAC updates - Australia Genomics focus is on data storage, biocommons, how get to something approaching ElixirAI, etc. - starting to explore the (early) experimental support for WES/TES in snakemake and nextflow and other places, while waiting for public WES endpoint support - nextflow support is early -- it can be made to work - would like to use the TES coming std to drive stds compliance	
6.	DRS Bundles - DRS and Bundles… what's learned from NCI GDC/CRDC drivers when implementing DRS bundle support - for GA4GH we need to discuss 1) pagination of bundles, 2) adding new access methods (e.g. DICOM webservice). Is there a registry for this? Need to bring this up. 3) bundle or file object, is there a way to check if a given DRS ID is one or the other. - questions about create timestamp and mime type for bundles, what's the right way to use these in a bundle? - have an accession number, get a bundle, use it to get a bunch of files - DRS has no manifest to tell you what's in the bundle -- you can look at filenames and extensions; NCBI DRS service is an example - then DRS would have to handle manifests, and the v1 spec isn't sufficient there - maybe use the Research Objects std? - other approach: do a search, get back a single DRS 'file' ID. So you say "I want the BAM file" or "I want the index file", and get an unambiguous	

object.
    - doesn't need any DRS enhancements (as long as it's okay for DRS not to understand object types)
    - e.g. from https://github.com/ga4gh/fasp-scripts/blob/master/fasp/scripts/FASPScript14.py: SELECT s.su_submitter_id, drs_id FROM thousand_genomes.onek_genomes.ssd_drs s join thousand_genomes.onek_genomes.sra_drs_files f on f.sample_name = s.su_submitter_id where filetype = 'bam' and mapped = 'mapped' and sequencing_type ='exome' and population = 'JPT' LIMIT 3
    - note that if this works. you wouldn't necessarily need bundles at all. (Except for other use cases.)
- this NEEDS to be discussed cross-APIs (which is why Ian filed it as a TASC issue)
- root question is what use case we're trying to solve with bundles -- it might be that most use cases are addressable with rich Search
    - one case: two aspects of a single logical thing (e.g BAM+BAI, tumor+germline)
    - one case: a DICOM-like object
    - one case: a "folder" of many objects you want to think of together (e.g. all the experiments in a project)
    - one case: performance optimization of resolving 10,000 DRS IDs (vs. having to make 20K DRS calls)
- dG: one way to address -- keep DRS very simple, so Bundles aren't needed
    - DRS takes an object id and helps you get bytes
    - higher layers (e.g. Search API) are where all higher-level structure lives
    - (analogy to the transport layer of the networking stack)
- current Search API requires SQL -- is that too heavyweight?
- dG brainstorming:
    - maybe Search should be able to return a Bundle (using roughly the current DRS Bundle spec)?
    - maybe we could define a .bundle filetype, that can be returned as a single DRS object, and is a manifest pointing to many other DRS objects with their metadata?
    - maybe we could suggest a best practice of storing manifest-like files in DRS, that describe the structure of a bunch of other DRS ids
- Ian: we could use SchemaBlocks to represent the model
- Kyle: DRS Bundles can help with scaling -- e.g. for 10,000 samples we hit the DRS server 20K times; a bundle would let us resolve all the URIs in one call, and pass it on

	- Jiaqi: also have the use case; difference between bulk resolution use case and the true 'logical bundle' use case -	
.	**Cloud Project Board update**	
	A.O.B.	

Previous Minutes

Cloud @ GA4GH 8th Plenary
Cloud WS Minutes 7th-8th Plenary
Cloud @ GA4GH 7th Plenary Report (Boston, USA)
Cloud WS Minutes 6th-7th Plenary (2018-2019)
Notes from Cloud WS Meeting at GA4GH 6th Plenary Basel
Cloud WS Minutes 2018 (pre-GA4GH 6th Plenary)
Cloud WS Minutes 2017

WES Subgroup Minutes 2020

The Cloud Technical Work Stream was repurposed from the Containers and Workflows Task Team. Click here to view the minutes of Containers and Workflows Task Team 2017.