GORC-WG — Speaker questions and eInfra categories checklist

The International Virtual Observatory Alliance

This is a copy of the original doc found here:
https://docs.google.com/document/d/1xi8jVvppNYaOfga49fYCW81ZlnicnztIhpJCnfpLe0I/edit#heading=h.5g0pahzibax2

Speaker questions for all speakers 1

eInfra Categories Checklist 8

Speaker questions for all speakers

1. Do you feel like your organization/platform fits into the definition of a commons?
    - Commons: A global trusted ecosystem that provides seamless access to high quality interoperable research outputs and services.
    - Strapline: Digital research resources for the common good

   IVOA (https://www.ivoa.net/) mission is to define a *global trusted ecosystem* of **standards** that provide *seamless access* to astronomical data. It enables astronomical on-line data archives and services to provide *interoperable services* **and tools** to access the services and deal with the data.

   The IVOA defines an open framework: anyone can provide an IVOA-enabled data service or tool. **The quality of the resources is the responsibility of the resource providers.**

   The digital research resources enabled by the IVOA standards are made available *for the common good*. IVOA aim is to facilitate access and usage of astronomical resources and tools by the scientific and education communities, and by the general public interested in astronomy.

2. What are the roles/missions of your Commons?
    - What is the value added that comes out of your Commons? What is its purpose

   The IVOA defines the standards used to Find, Access and Interoperate astronomical data. It enables astronomical data to be seen and used as a single, global, interoperable data infrastructure accessible with interoperable tools.

From the IVOA web site:

> "The Virtual Observatory (VO) is the vision that astronomical datasets and other resources should work as a seamless whole. Many projects and data centres worldwide are working towards this goal. The International Virtual Observatory Alliance (IVOA) is an organisation that debates and agrees the technical standards that are needed to make the VO possible. It also acts as a focus for VO aspirations, a framework for discussing and sharing VO ideas and technology, and body for promoting and publicising the VO."

- When was the Commons established?

The IVOA was established in May 2002.

The first VO standard, VOTable (enabling the sharing of tabular data), was published in March 2002. It had been discussed in the framework of an international Working Group on Interoperability of the European OPTICON Network.

3. Is your research commons an example of an individual service or platform, or is it an aggregation of multiple disparate organizations/commons?

   The IVOA enables the aggregation of data and services from multiple/disparate organisations. It is a framework - could it be called a platform?

   - How are you managing integration? Both in terms of:
     i. adding new services to your Commons; How do standalone services become part of a commons?

   Anyone can declare a service in the IVOA Registry of Resources (e.g. http://registry.euro-vo.org/evor/#home). There are several 'Full searchable' (harvesting) registries which harvest each other and harvest 'Publishing' (harvestable) registries; the IVOA maintains a Registry of Registries http://rofr.ivoa.net/. It lists the Full searchable and Publishing registries, and also contains validation tools allowing people to check that their registry is compliant before it is registered in the Registry of Registries.

   The Full searchable registries are maintained by organisations as a contribution to the IVOA. E.g. the ESA registry was begun with support from a projet funded by the European Commission years ago, and they continue to maintain it.

   There are two ways to register a resource in the IVOA Full searchable registry: one can enter the resource in one of the general registries. People who provide a number of resources may prefer to maintain their own registry rather than entering or updating resources one by one in one of the general registries. For instance the CDS has more than 20 000 resources published in the IVOA (for instance 43 were added to the CDS collection during the week 17 October-23 October, they were published in

the VO a few days after). We maintain our own publishing registry. How to publish a resource in the IVOA is explained here: https://wiki.ivoa.net/twiki/bin/view/IVOA/GettingIntoTheRegistry. It also explains how to develop and run a publishing registry.

From 'Publishing data in the VO', section *Registry for VO data service discovery*:

> "**Q:** How does my service appear in Client Applications?
>
> **A:** Once you have a valid VO data compliant service (see section 1), you have to publish your service in a IVOA registry, the "yellow pages" of the VO, queried by user applications (and other things) when looking for services.
>
> To make this work, you need to provide a standardised service description (that's called "resource record" in VO language) and then push that into the big pool of existing registry records. Depending on how many data collections you publish and how often they change, there are various ways to do that, and GettingIntoTheRegistry discusses them."

ii. and in terms of integrating between services. Do you have plans for interoperable workflows between components of your commons.

The IVOA Simple Application Messaging Protocol (SAMP) is a messaging protocol that enables astronomy software tools to interoperate and communicate.

From the standard abstract sentence underlined by me): "IVOA members have recognised that building a monolithic tool that attempts to fulfil all the requirements of all users is impractical, and it is a better use of our limited resources to enable individual tools to work together better. One element of this is defining common file formats for the exchange of data between different applications. **Another important component is a messaging system that enables the applications to share data and take advantage of each other's functionality.** SAMP supports communication between applications on the desktop and in web browsers, and is also intended to form a framework for more general messaging requirements."

- Are there any scoping boundaries in terms of data providers or data user participation?

The only boundary is disciplinary. The standards have specific aspects because they deal with astronomical resources. They were initially defined for multi-wavelength astronomy. They are being extended to include multi-messenger astronomy (eg gravitational waves), Solar System and Solar data. Resources with restricted access

can be declared in the system but to my knowledge the resources and tools are publicly available (except data under embargo period in the observatory archives).

- do you have a catalogue of services? Do you have a map of the data and services ecosystem for your commons?

The IVOA Registry of resources provides the map of the VO-enabled data services. More than 100 “authorities” have declared at least one service in the IVOA Registry.

- do you have a roadmap for the future of your Commons that the WG can review?

The Roadmap for IVOA development activities is discussed and updated at each IVOA Interoperability Meeting (every 6 months). It is managed by the Technical Coordination Group (TCG). e.g. 2021 between the May and Oct/Nov Interops

4. Which eInfra tags do you see applying to your Commons example? (see below)

   Comments included in the table below. The list is not well suited to Commons such as the IVOA.

   - What standards are supported by your Commons?

   The list of standards defined and maintained by the IVOA is here: IVOA.net

   The cover the fields of Applications (App), Data Access Layer (DAL), Data Models (DaM), Grid and Web services (GWS), Registry of Resources (RoR), Semantics, VO Events (VOE), and the IVOA Standards development process itself (STD)

5. Are you tracking any KPI or engagement metrics in your Commons?

   There is no formal tracking of KPIs or engagement metrics. The Registry of Resources enables one to track the engagement of the data provider community. The list of standards with their successive versions (https://www.ivoa.net/documents/) enables one to track the evolution of the standardisation work.

6. Are there any interfaces between your commons and other commons out in the world, or conversations at your commons about connecting with other groups or resources?

   The IVOA Registry of Resources is OAI-PMH compliant and the metadata schema includes the Dublin Core. This enabled for instance the IVOA Registry to be included in the B2FIND Registry maintained by EUDAT

(http://b2find.eudat.eu/dataset?q=IVOA). EUDAT also contains other items linked to the IVOA, e.g. the IVOA standards, the different registries, etc

IVOA Vocabularies are RDF compliant (https://www.ivoa.net/documents/Vocabularies/20210525/index.html). The standard summary states that “While the framework rests on the solid foundations of W3C RDF, provisions are made to facilitate using IVOA vocabularies without specific RDF tooling.”

The VO-enabled tools are used by the Planetology community, which also customizes some of the standards (Europlanet projects funded by the European Commission)

The concepts developed in the IVOA Registry of Resources were used by the RDA International Materials Resources Registry WG to develop their own registry of resources (WG final report and recommendations).

I was told recently that the IVOA Standards processes will inspire the FDO Forum.

- Things like setting standards, establishing/operating a catalogue, providing/organizing compliance activities, setting strategy for the commons, outreach/promotion of commons (to others)...

Setting standards shared by the global astronomical community, establishing/operating/evolving the disciplinary Registry of Resources, organising discussion about community needs, feedback on standards and tools, discussing adoption, are among the main IVOA tasks.

7. Some questions around social & organisational constructs:
   - Are there ‘rules of participation’ for the commons, is this implicit or explicit?

The rules of participation are summarized in https://www.ivoa.net/documents/latest/IVOAParticipation.html

   - Different takes/models/approaches to governance by different Commons. Could you describe the governance approach taken by your Commons?

The IVOA is an Alliance of VO initiatives (national and regional initiatives, international organisations). The governing board is the IVOA Executive Committee (IVOA Exec), which is composed of representatives of the initiatives. The Technical Coordination Group (TCG) coordinates the work of the Working Groups and Interest Groups. The Working Groups define the standards, the Interest Groups bring requirements and participate in the definition of the standards in particular to ensure that they fit the requirements. There is a Standing Committee for Science Priorities

and another one on Standards and Processes. All the IVOA components can be found from https://wiki.ivoa.net/twiki/bin/view/IVOA/WebHome

The IVOA does not have a budget and is supported by in-kind contributions from its members. Some of the members' contributions are partly supported by their participation in projects.

- What are the arrangements for partnerships between providers-users, provider-provider?

No formal arrangement for partnership. The IVOA "users" are the service providers and tool developers who implement the standards in their services and tools. They are invited to participate in the IVOA activities and to provide their feedback. The standards undergo a Request for Comment period, during which anyone can post comments.

- How is social trust obtained within the commons? (Trust in contributors, trust in brokers, trust in aggregators, trust in consumers of data, and data infrastructures)

The IVOA participants who discuss the needs and define and maintain the standards are members of the community, including people from respected stakeholders such as large ground- and space-based observatories or well established value-added data centres. Trust is built on the fact that the IVOA products fulfil the needs of the data providers and of the end users. Trust from the community is in fact trust in the whole ecosystem, including in the data and service providers.

- What are the organisational norms, community norms etc. that incentivise or dis-incentivise participating in the commons? Is this actively managed (or emergent)?

The main incentive for implementing the IVOA standards is that they increase the visibility and usability of one's resources, and make them part of the global astronomical data infrastructure. See eg the paper *Enhanced Data Discovery Services for the ESO Science Archive* published in 2018, https://doi.eso.org/10.18727/0722-6691/5073

Publishing a resource in the VO framework only requires to set up an 'interoperability layer' to be able to receive, understand and answer a VO-enabled request, and to declare the resource in the IVOA Registry of Resources. **This is built on top of the existing provider information system**, which means a minimal overhead and preservation of the legacy data providers' information system. In addition, more and more observatories are using VO standards in their own systems because they fulfill some of their needs and are robust.

End-users benefit from the VO framework but the access it provides to data is seamless. Python libraries are developed to facilitate the usage of VO-enabled resources and tools.

8. Do you have a roadmap or strategic plan for the future of your Commons?
    - What are your immediate goals? Long term goals?

   The Roadmap tracks the Working Group and Interest Groups development activities. The IVOA aim is to continue to fulfill the IVOA mission and to serve the community. The standards are maintained and when needed new standards are developed to take scientific and technical evolutions into account (eg in Europe the ESFRI projects, which include international endeavours such as CTA, ELT and SKA).

9. Is there a missing question to define what you're doing? Something we're not asking and should be?

   There could be a more explicit discussion about adoption by users (service providers, end users).

   Also, linked to the previous one: understand what are the criteria for success.

   The commons can be included in a wider ecosystem: The IVOA is included in an ecosystem with strong interfaces with the data providers and projects/initiatives providing eg training for service providers (https://indico.in2p3.fr/event/23987/) and end-users (eg https://www.euro-vo.org/scientific-tutorials/, https://projectescape.eu/events/first-science-interoperable-data-school). It enables a discipline-wide data infrastructure but only manages a Registry of Resources. The ecosystem includes the data, service and tool providers and also the regional and national initiatives which participate in the IVOA. For instance in France there is an active "Action Spécifique Observatoire Virtuel France' (Virtual Observatory France Specific Action) which gathers and support astronomy data services and tool providers.

   Include an item about where the Commons is with respect to its life cycle - the IVOA is a mature Commons.

   Establish a Commons typology and at a later stage discuss good practices relevant to the different types of common.

Follow up questions:

1. Does the IVOA include the SKA?

There is data from SKA pathfinders from different regions in the Virtual Observatory using IVOA standards (ASKAP, MWA, LOFAR, NENUFAR). This is important for the uptake of the VO standards in particular in SKA regional centres. The IVOA has a Radio Interest Group working on how best to include interferometric data in the VO, with the participation of people involved in the preparation of SKA so that the knowledge about SKA is available.

2. Are the IVOA services consumed by any other commons?
   The B2FIND registry of the EUDAT Collaborative Data Infrastructure harvests the IVOA registry. BB2FIND: http://b2find.eudat.eu/ The IVOA is one of B2FIND Communities:
   http://b2find.eudat.eu/group
   The IVOA standards are consumed by the "astronomy commons" such as the Astrophysics Data System, the reference bibliographic database maintained by NASA https://ui.adsabs.harvard.edu/
3. Do IVOA services consume any other stand alone services (PID services? Authentication/Authorization?)
   The IVOA does not have 'services' by itself except the Registry of Resource, which is openly available. AAI [Authentication and Authorisation Infrastructure] and PIDs are consumed by the data services available in the VO.
4. Does the IVOA has any standards related to cyber security, and how the manage security of their RoR?
   To FG's knowledge, there is no IVOA standard for cybersecurity. There are IVOA standards related to AAI but this is more about checking credentials. The cyber security aspects are managed by the people who maintain the different instances of the Registry of Resources.
5. We need to review The Roadmap for IVOA development managed by the Technical Coordination Group (TCG) (discussed and updated at each IVOA Interoperability Meeting every 6 months).

eInfra Categories Checklist

EOSC. (2021). Resource Category. Subcategory (and Supercategory). In EOSC Provider Portal—Resource Profile (v. 3.00). EOSC Portal - A gateway to information and resources in EOSC.

Mark (x) the yellow box next to the categories that apply to your Commons.

Supercategory	**Category** ***Description***		**Subcategory**	
1 Access physical & e-Infrastructures	1 Instrument & Equipment		1 Spectrometer	
	Access to instruments and equipment		2 Radiation	
			3 Microscopy	
			4 Laser	
			5 Geophysical	
			6 Chromatographer	
			7 Cytometer	
			8 Spectrophotometer	
			10 Digitisation equipment	
			11 Monument maintenance equipment	
			12 TBC	
			13 Other	
	2 Material Storage		1 Warehousing	
	Access to biological, chemical, historical, archeological, cultural, etc. storage. Includes the acquisition, preparation and processing of samples and materials in view of their preservation.		2 Fulfilment	
			3 Assembly	
			4 Sorting	
			5 Re-working	
			6 Packaging	
			7 Quality inspecting	
			8 Archiving	

			9 Disposal	
			10 Repository	
			11 Preservation	
			12 Other	
	3 Network		1 Direct Connect	
	Ultra-fast connectivity and access to eInfrastructures' resources and services		2 Virtual Network	
			3 Load Balancer	
			4 VPN Gateway	
			5 Exchange	
			6 Content Delivery Network	
			7 Traffic Manager	
			8 Other	
	4 Compute		1 Virtual Machine Management	
	High-performance computing resources and scalable cloud compute capacity for demanding job processes		2 Container Management	
			3 Job Execution	
			4 Workload Management	
			5 Orchestration	
			6 Serverless Applications Repository	
			7 Other	
	5 Data Storage		1 Data	
	Reliable, secure and scalable cloud storage for scientific data, apps and workloads		2 File	
			3 Queue	
			4 Disk	
			5 Online	
			6 Archive	
			7 Backup	
			8 Synchronised	
			9 Replicated	

			10 Recovery	
			11 Digital preservation	
			12 TBC	
			13 Other	
2 Sharing & Discovery	6 Data		1 Government and agency data	
	Vast range of data, datasets etc to facilitate research and scientific activities		2 Statistical data	
			3 Scientific/Research data	
			4 Online service data	
			5 Clinical trial data	
			6 Epidemiological data	
			7 Data archives	
			8 Other	
	7 Scholarly Communication		1 Preparation	
	Research findings available to the wider academic community and beyond		2 Discovery	
			3 Analysis	
			4 Writing	
			5 Publication	
			6 Outreach	
			7 Assessment	
			8 Other	
	8 Software		1 Software Repository	
	Software, platforms and tools offered-as-a-service or deployed-on-demand		2 Platform	
			3 Software Package	
			4 Libraries	
			5 Other	
	9 Applications		1 Communication	
	End-user applications (apps) offered-as-a-service or deployed-on-demand		2 Collaboration	
			3 Productivity	

			4 Business	
			5 Education	
			6 Social/Networking	
			7 Utilities	
			8 Applications Repository	
			9 Other	
	10 Development Resources		1 Developer Tools	
	Developer tools, development kits, libraries, APIs		2 Software Development Kits	
			3 Software Libraries	
			4 APIs Repository/Gateway	
			5 Other	
	11 Samples		1 Biological samples	
	Collection, preparation and delivery of biological, chemical, environmental or other samples.		2 Chemical compounds library	
			3 Preparation	
			4 Characterisation	
			5 TBD	
			6 Other	
3 Processing & Analysis	12 Data Management		1 Mining	
	Robust, feature-rich and user-friendly data management services		2 Access	x
			3 Transfer	
			4 Registration	
			5 Persistent Identifier	
			6 Interlinking	
			7 Publishing	x
			8 Discovery	x
			9 Anonymisation	
			10 Preservation	
			11 Brokering	

			12 Annotation	
			13 Validation	
			14 Maintenance	
			15 Embargo	
			16 Digitisation	
			17 TBC	
			18 Other Interoperability	x
	13 Data Analysis		1 Machine Learning	
	Processes for data with the goal of discovering useful information, informing conclusions, and supporting decision-making		2 Artificial Intelligence	
			3 Forecast	
			4 Visualization (tools)	x
			5 Data extrapolation	
			6 Image/data analysis	
			7 Workfows(Python libraries)	x
			8 2D/3D Digitisation	
			9 Other	
	14 Measurement & Materials Analysis		1 Analysis	
	Processess and techiques for material analysis, characterisation and monitoring		2 Maintenance and Modification	
			3 Production	
			4 Testing and Validation	
			6 Characterisation	
			7 Validation	
			8 Workflows	
			9 TBC	
			10 Other	
4 Security & Operations	15 Security & Identity		1 User authentication	
	Protect [your] infrastructure and manage user identities and access against advanced		2 Identity and access management	

	threats across devices, data, apps, etc		3 Threat protection	
			4 Coordination	
			5 Tools	
			6 Certification authority	
			7 Single Sign-On	
			8 Firewall	
			9 Group Management	
			10 Other	
	16 Operations & Infrastructure Management Services		1 Accounting	
	Services for monitoring, scaling, creating, tracking and automating operations on [your] infrastructures and services.		2 Helpdesk	
			3 Monitoring	
			4 Analysis	
			5 Configuration	
			6 Utilities	
			7 Coordination	
			8 Billing	
			9 Order Management	
			10 Transportation	
			11 Other	
5 Training & Support	17 Education & Training		1 Online Courses	x
	Highly-specialized seminars and courses to help advance research knowledge and sharpen scientific skills *Not provided by the IVOA itself* *see eg https://www.euro-vo.org/scientific-tutorials/*		2 Open Registration Courses	
			3 In-house Courses	x
			4 Training Tool	x
			5 Training Platform	
			6 Other	
	18 Consultancy & Support		1 Consulting	
	Dedicated support, expertise, consultancy for a wide range of		2 Audit and Assessment	

	scientific disciplines and research activities		3 Application Porting	
			4 Application Scaling	
			5 Application Optimisation	
			6 Software Development	
			7 Software Improvement	
			8 Modeling and Simulation	
			9 Prototype Development	
			10 Testing	
			11 Certification	
			12 Calibration	
			13 Benchmarking	
			14 Technology Transfer	
			15 Methodology Development	
			16 Other	
6 Aggregators & Integrators	19 Aggregators & Integrators		1 Services	x
	Thematic, Regional and other Aggregators & Integrators		2 Services & Data	x
			3 Services & Applications	x
			4 Services & Software	x
			5 Applications & Data	x
			6 Software & Data	x
			7 Applications & Software	x
			8 Services & Applications & Data	x
			9 Services & Software & Data	x
			10 Services & Applications & Software	x
			11 Services & Applications & Software	x
			12 Services & Applications & Software & Data	x

			13 Other	
7 Other	20 Other		1 Other	