

The EGI Cloud Federation

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- The EGI Cloud is a open **hybrid cloud federation**
 - Different levels of federation are possible offering various degrees of interoperability
 - All cloud providers pooling resources and data in a multi tenant model
 - Need to adhere to a set of common policies, procedures and processes for federated service management
 - Can join in by adopting the federation model that provides the interoperability needs of the target groups
 - Can choose among federated services offered by EGI in a modular way, while still relying on local tools and exposing own service interfaces to the federation, as applicable
 - Low barriers to join the federation

Services of the EGI Cloud Federation 1/4

- SSO for authentication and authorization across the whole cloud federation supporting the IGTF identify federation as well as other IdP federations through a credential translation service (pilot phase)
- Federated accounting system to collect, aggregate and display usage information across the whole federation: number of VM instantiated and consumed CPU wall time by user, user group, VO and cloud provider

- Federated information discovery allowing users and tools to have information about capabilities and services available in the federation
 - cloud compute and storage service end-points
 - the list of locally available VM images and flavors per cloud provider
- Information can be retrieved
 - by end users via the Application Database to instantiate VMs in the federations
 - by platforms via LDAP queries to gather information for brokering functions

Services of the EGI Cloud Federation 3/4

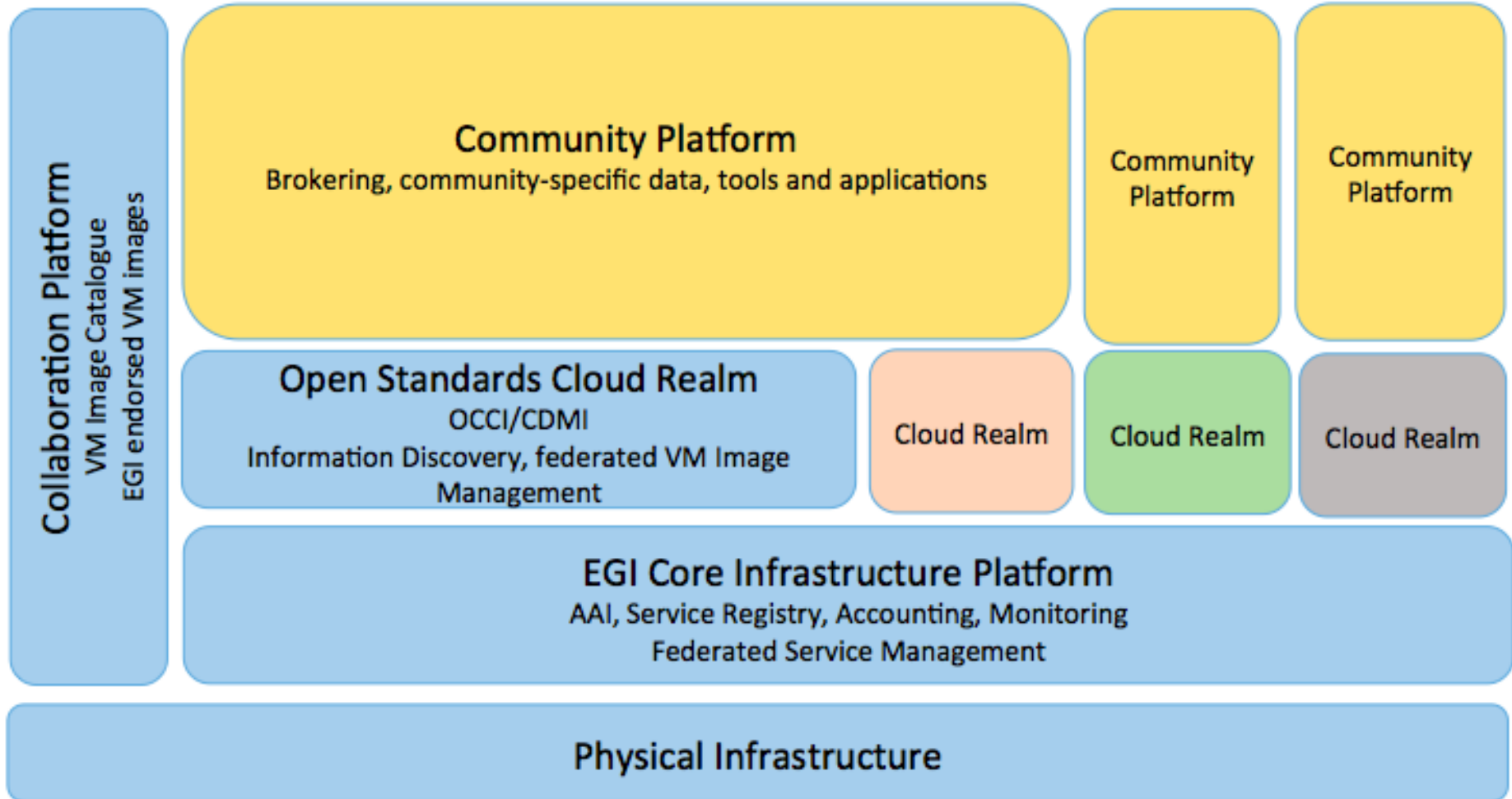
- **Federated monitoring** to perform federated service availability monitoring and reporting of the distributed cloud service end-points, and to retrieve this information programmatically
- **Service registry** for configuration management of the federated cloud services (GOCDDB)
- **VM image catalogue**: open library of virtual appliances (bundle of one or more VM images) for use on a cloud or for personal download, supporting VM image management operations like: registration of new instances, reuse of existing ones and contextualization. It uses the HEPiX image lists technology.

Services of the EGI Cloud Federation 4/4

- **EGI endorsed VM images:** a set of base images containing only the OS and already prepared to run in a cloud environment in a secure manner
- **VM image management** with a central registration point for virtual appliances which can be automatically and securely distributed to any resource provider
- **Federated service management system** of processes, policies, activities and supporting tools customized to the federated cloud

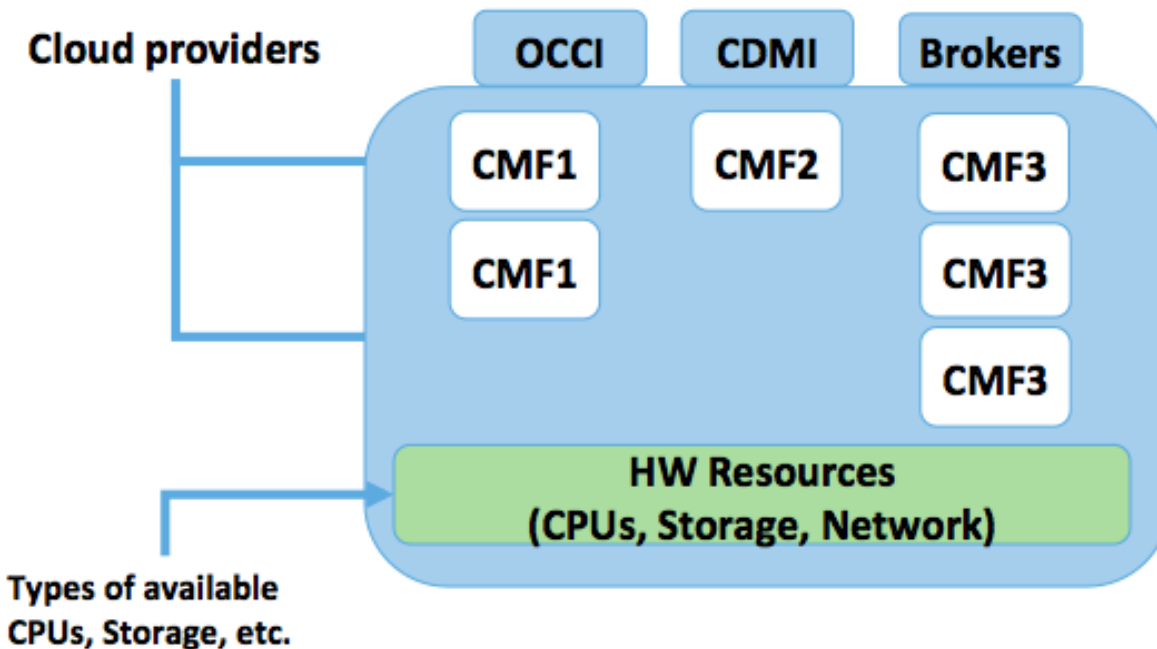
- EGI Cloud Federation
 - hybrid cloud (private, community, public)
- EGI Cloud Realm
 - subset of cloud providers exposing homogeneous cloud management interfaces and capabilities
 - the [Open Standards Cloud Realm](#) supports OCCI and CDMI for full interoperability across different CMFs
- Community Platform
 - Set of community-specific data, tools, applications and brokering solutions, which can be supported by one or more realms of the federation.

Federation model



EGI Cloud Federation			
	Cloud Realm Capabilities		Peer Realms
	Open Standards Realm	Other Realms	
EGI AAI compliance	x	x	x
EGI federated service management (processes, activities and policies) adoption	x	x	x
Service registry	x	x	optional
Accounting	x	x	optional
Monitoring	x	x	optional
Information discovery	x	optional	optional
IaaS open standards compliance - OCCl, CDMI ¹	x	optional	optional
VM image catalogue	optional	optional	optional
federated VM image management	optional	optional	optional
CMW native interfaces	optional	optional	optional
EGI endorsed VM images	optional	optional	optional

Open Standards Cloud Realm

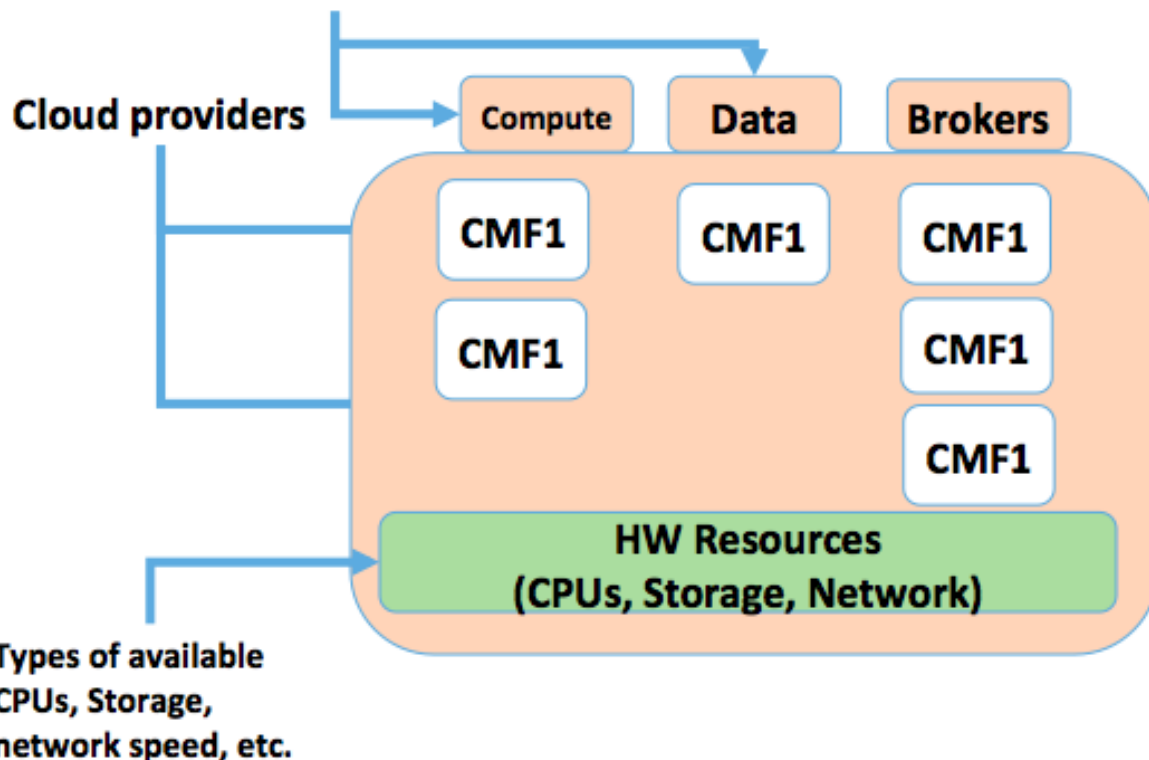


CMF: Cloud Management Framework

Services
SSO
Cloud service registry
Accounting and Monitoring
Information Discovery
OCCI and CDMI end-points
VM image catalogue
Federated image management
EGI endorsed VM images
Federated service management
Local cloud services - optional
Resources
Compute
Block Storage
Object Storage
Brokers and orchestrators

Cloud Realm

CMF1 Native Interface



CMF: Cloud Management Framework

Services
EGI AAI
Cloud service registry
Accounting and Monitoring
Federated service management
Local cloud services - optional
Resources
Compute
Block Storage
Object Storage
Brokers and orchestrators
SDNs

Value proposition - users

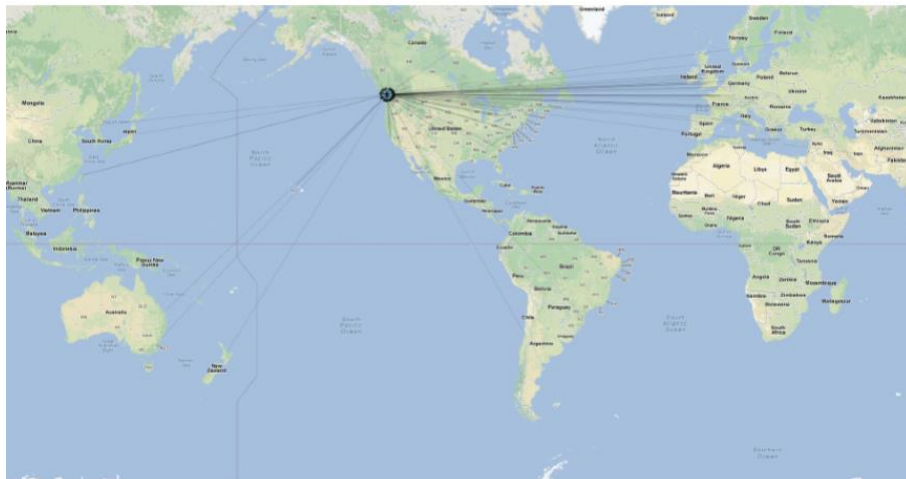
- SSO support for accessing the cloud federation
- Integrated accounting across the whole federation
- Contribute own tools to an open library of virtual appliances: registration of new instances, reuse of existing ones and contextualization
- Access the list of EGI endorsed VM images: a set of base images containing only the OS, and already prepared to run in a cloud environment in a secure manner
- Distribution of the VM images to the federation cloud providers
- Choose among different community platforms and softwares ported to the EGI federated cloud
- User support

Community platforms - example

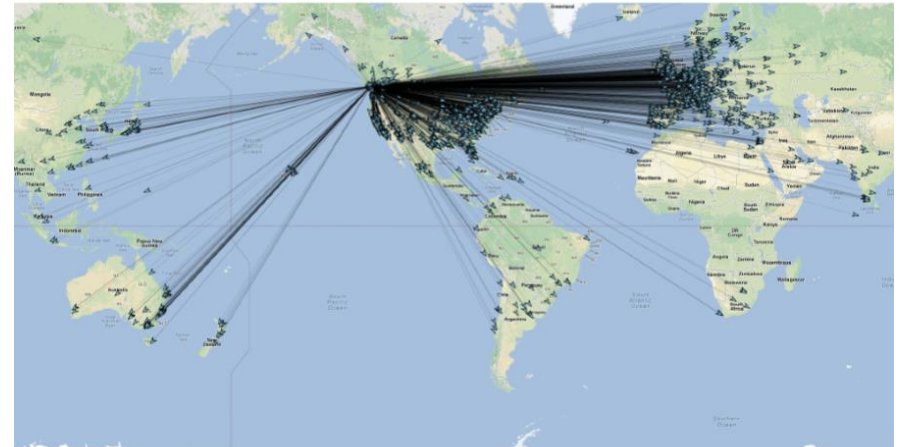
- VOSpace (Int. Virtual Observatory Alliance)
 - Access to federated distributed astronomical data repositories from survey projects
- Integration of the EGI Cloud Federation and CANFAR (Canadian Advanced Network for Astronomical Research)
 - Joint effort of EGI and INAF, and the Canadian Astronomy Data Centre
 - **Objective:** implemented a distributed international cloud for astronomers, with agreed policies for data replication of data collections from telescopes, most of the data is open (estimated data: 1 PB)
 - Capabilities: store and share of data, configurable VM management, interactive VMs, persistent VMs and batch processing with VMs

VOSpace – current status

Geography of VOSpace PUTs



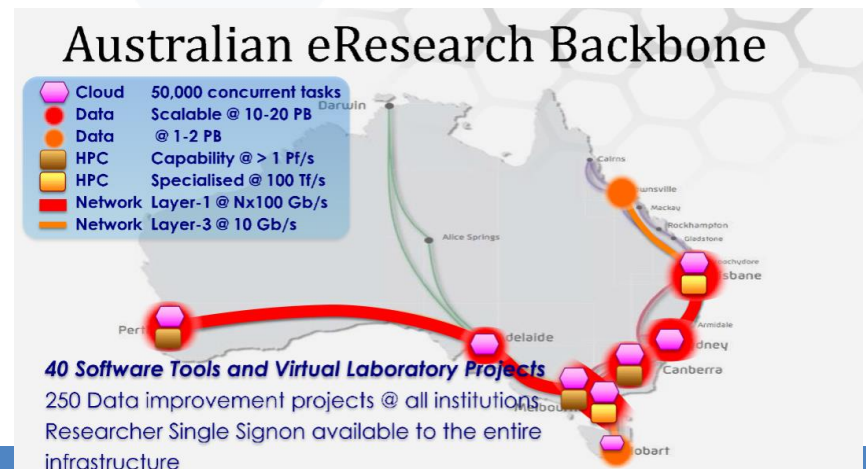
Geography of VOSpace GETs



(S. Gaudet/CADC)

Federating worldwide - NeCTAR

- Project supported by the Australian Government, 8 institutions and research organizations
- Part of the National Research Infrastructure of Australia (NCRIS)
- Offer: shared data, data storage, HPC, Virtual laboratories
- International collaborations of common interest
 - Data integration for neuroinformatics (HBP, Monash University), EMBL datasets, Astronomy
- Discussion in progress on the federation model and AAI integration
- Objective: share community tools and virtual laboratories, federate data



Other cloud integration efforts

- ELIXIR Compute Platform – EGI-Engage ELIXIR CC
 - GOCDDB features in place allowing the EBI IdP to be accepted
 - ELIXIR Compute Platform integration starting from sites in the Cloud WP of the EXCELERATE project
 - EBI, then by CESNET, Surfsara, CSC
- BBMRI private cloud, DARIAH...
- D4SCIENCE for operating Virtual Research Environments for freshwater and marine resources conservation research (iMARINE)

Thank you for your attention.

Questions?



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