Managing Disaster Response through On-Demand Resource Federation

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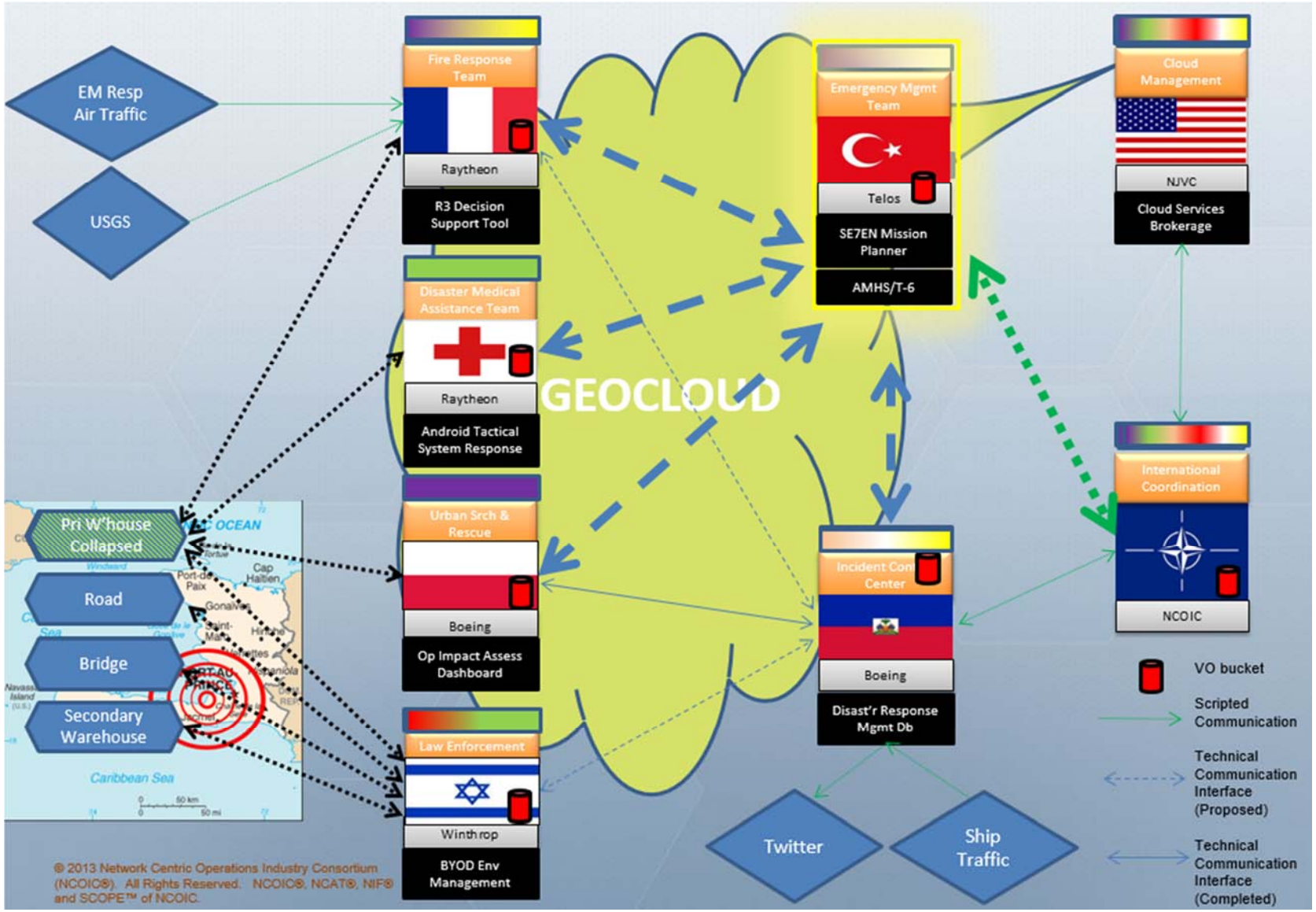
The Aerospace Corporation
(a California nonprofit corporation that operates a federally funded research and development center)

The GeoINT Community Cloud Demo



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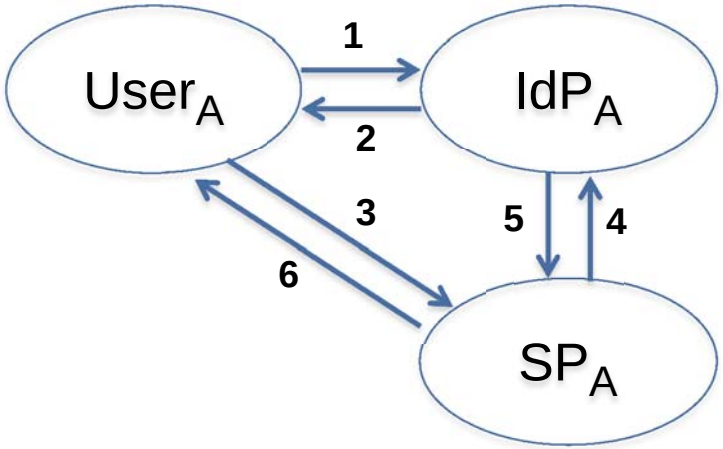
What Did We Learn From All This?

- While managing the sharing access to storage containers is a good first step, it was inadequate to facilitate the secure federation of arbitrary tools, i.e., arbitrary services
  - Managing federated access to *databases* and *RSS feeds* could have been used by GCC participants
- Federation management needed to be generalized to manage any type of service endpoint
  - Cloud infrastructure services (VMs, storage, SDNs) are just services, just like application-level services
- *How can the VO concept be generalized to manage general federations?*

Virtual Organization Abstract Concepts

- A VO is a security and collaboration context not exclusively associated with any one physical organization or site
  - *Participating partners agree upon structure, rules and processes*
  - *A VO partner can be a single person, a group or an entire organization*
- A VO has members that are assigned roles and/or attributes
  - *Membership roles or attributes grant specific capabilities within a given VO as determined by each resource/service provider*
- Partners participating in a VO contribute resources, i.e., data and services
  - *They retain complete control over their own resources!*
  - *Access by VO members can be modified or revoked at any time by both the VO administrator and the resource administrator*
- A VO Management System (VOMS):
  - *Maintains member identity attributes and authorization attributes*
  - *Enables resource (service) discovery*
  - *Enables validation of VO member authz credentials on service invocation*
- Many implementation options and choices necessary
  - *Centralized (third-party) and Distributed (P2P) implementations possible*

General AuthN/Z



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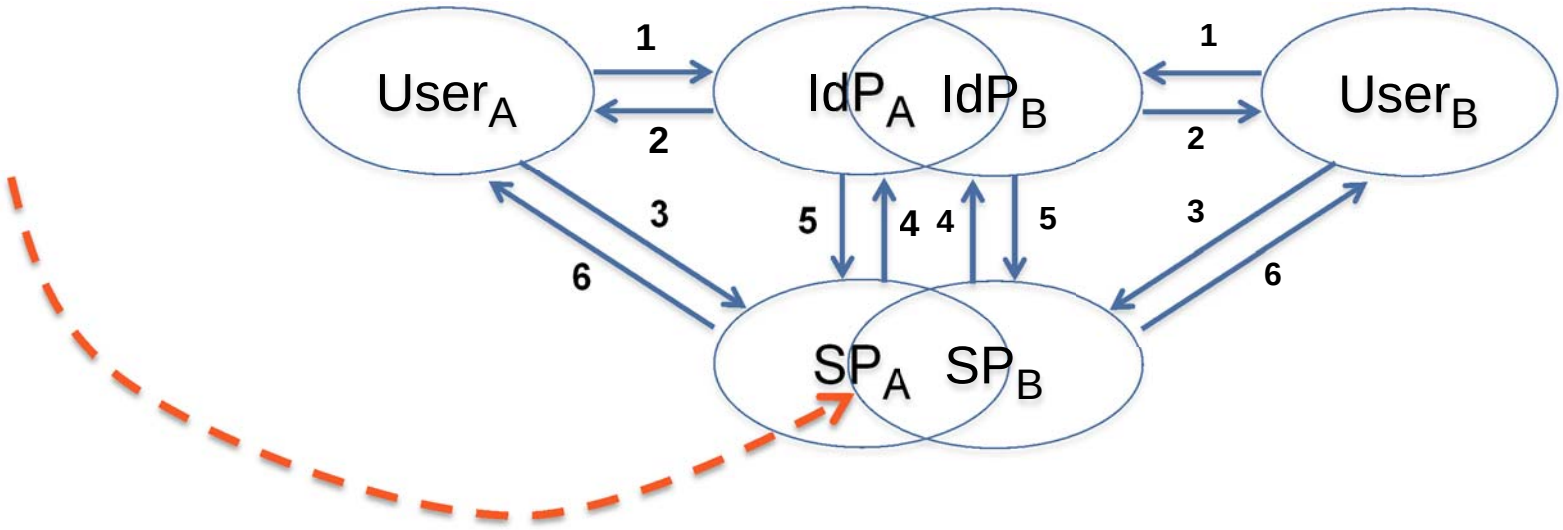
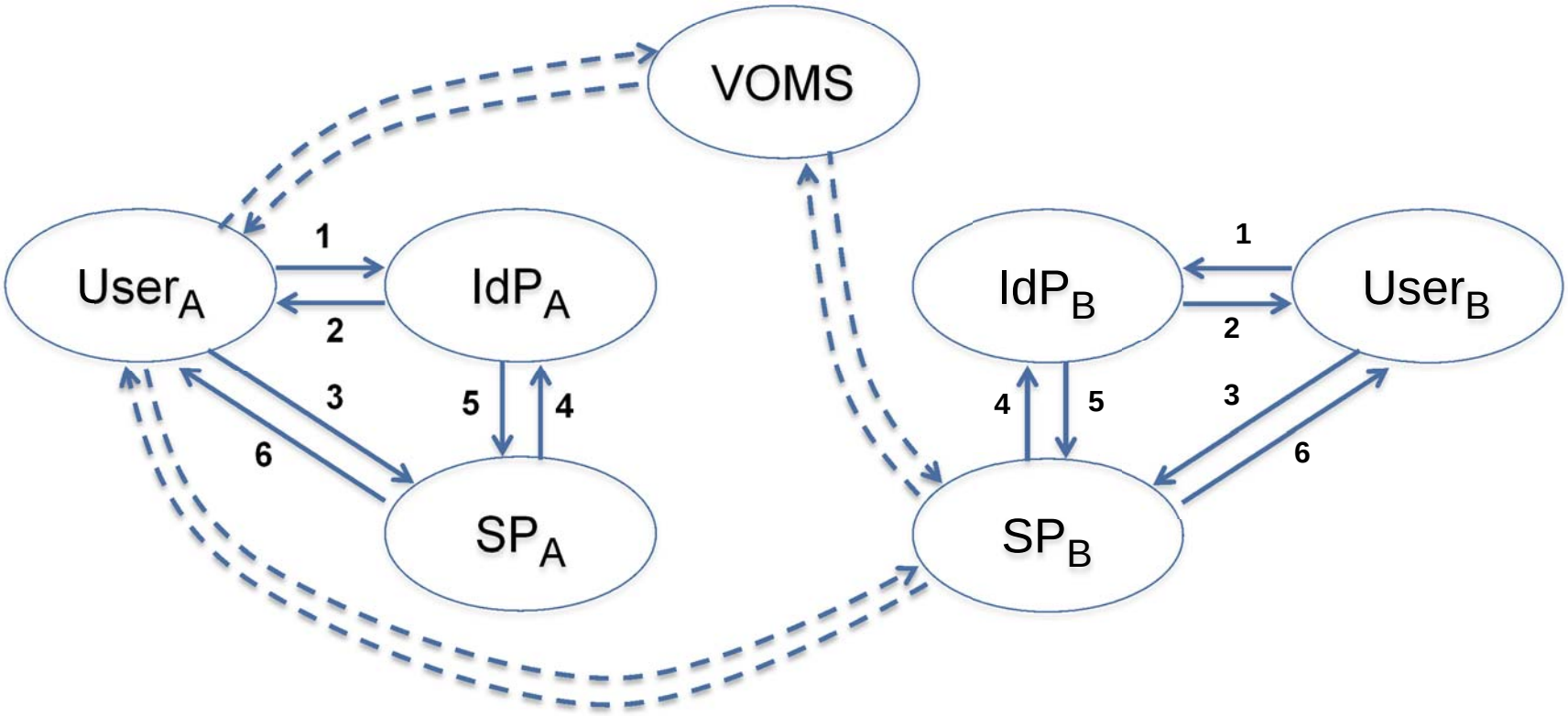
AuthN/Z in a Distributed Env



Request to SP_B with IdP_A credentials?

Federated AuthN/Z Using a VOMS



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General Federation Mgmt Design Requirements

- Client-Side: *Federated Authentication & Service Discovery*
- Server-Side: *Federated Credential Validation & Authorization*
- Centralized, Trusted, Third-Party VOMS
- Proxy VOMS
- Distributed, Trusted, P2P VOMS
- Trust Federations

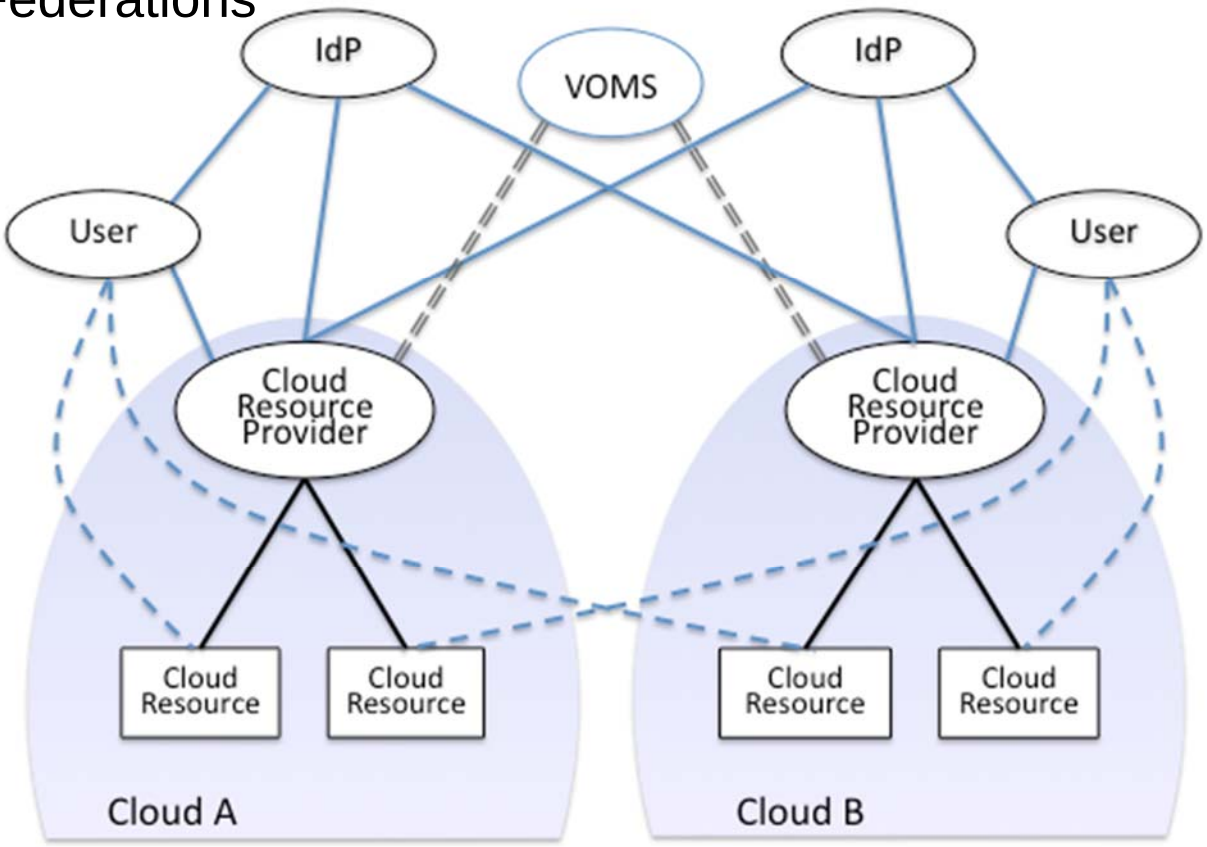
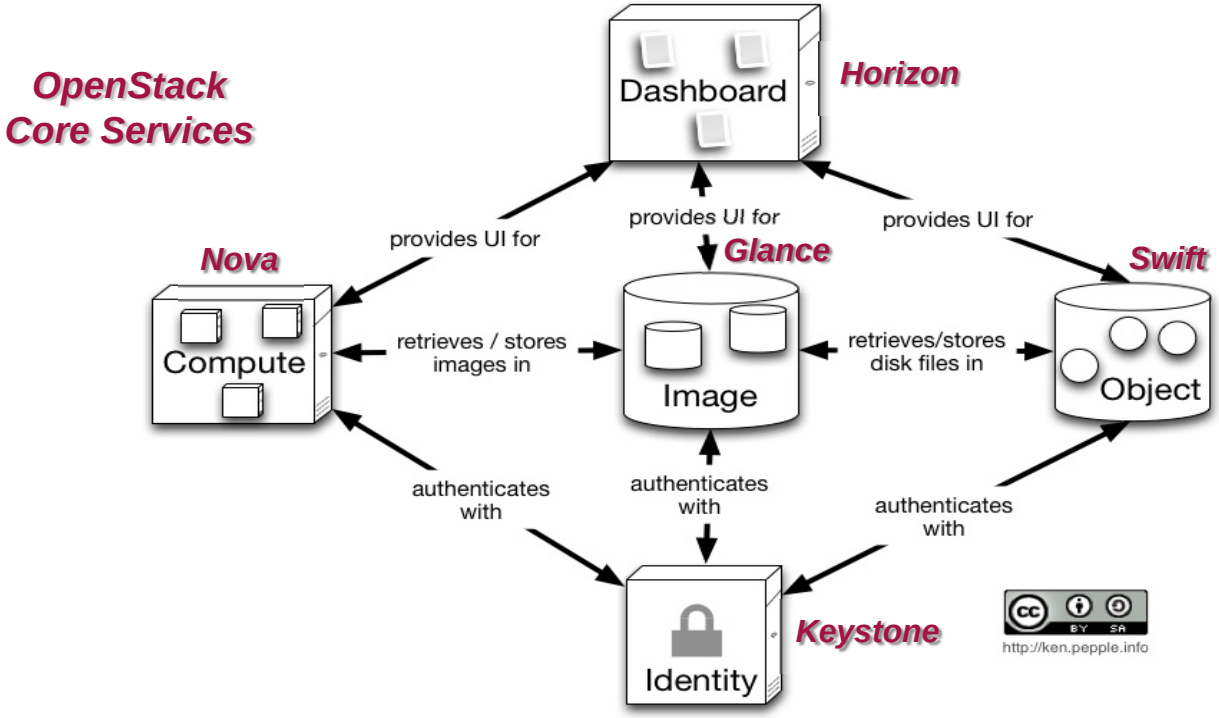


Diagram illustrates an external, third-party VOMS.

KeyVOMS: A Keystone-based VOMS

- KeyVOMS is a centralized, third-party VOMS
- Re-purposed instance of the OpenStack Keystone v3 service
- Keystone maintains a Service Catalog
  - Used in KeyVOMS as the *VO Services Catalog* for service discovery
- Keystone v3 Object Model very close to what's needed



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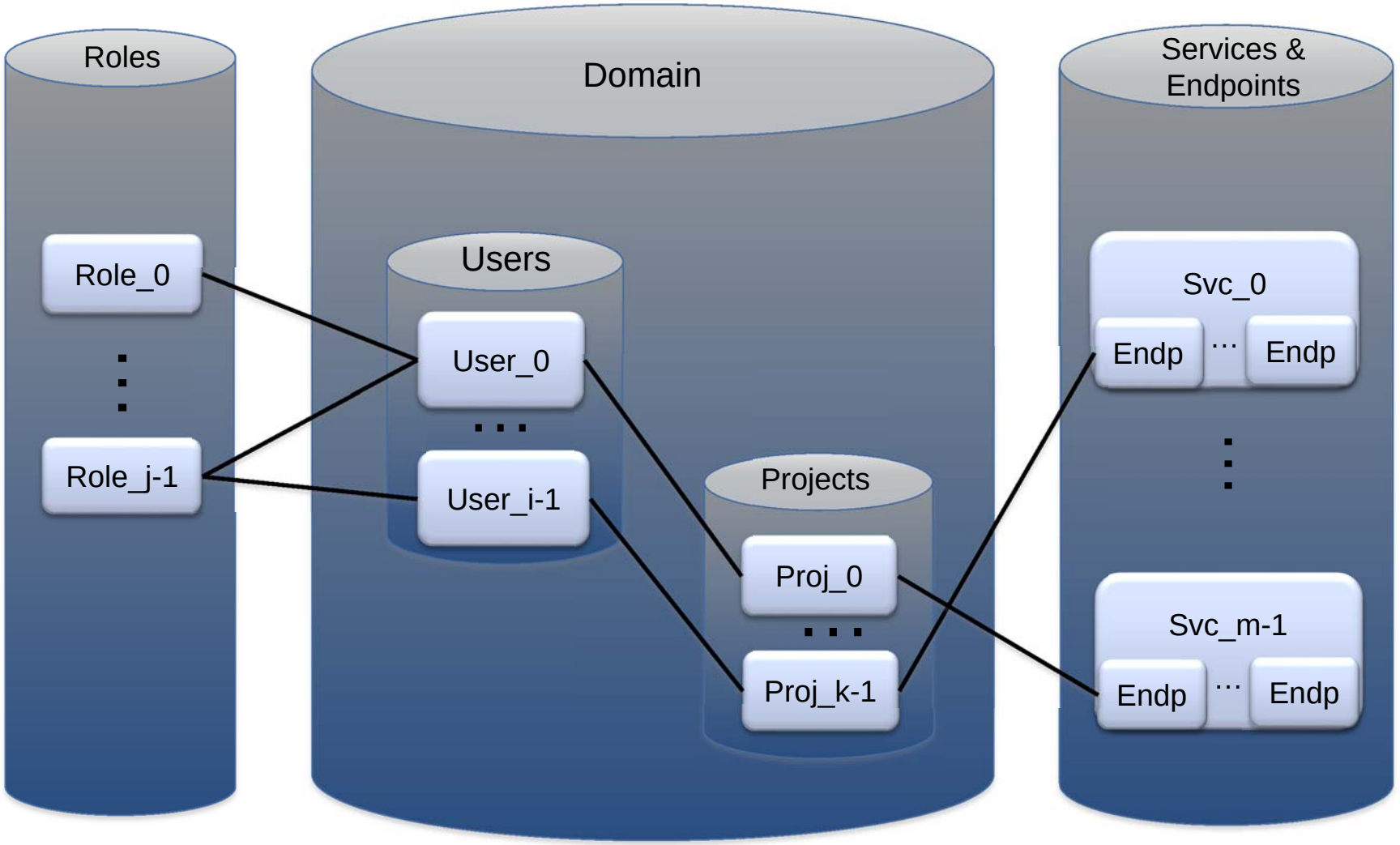
Current Keystone v3 Object Model

with representative object associations (assignments)



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