ASPiS

integrating iRODS with Shibboleth and provenance engines

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iRODS Workshop @ CC-IN2P3, 2009

Outline

Project Overview

- Funded by JISC e-Infrastructure programme.
- Partners:
  - Centre for e-Research, King's College London
  - University of Liverpool
  - Science and Technology Facilities Council
  - (University of Reading - very helpful PhD student)
- Project Goals:
  1. access management in iRODS - integration with Shibboleth (and authorisation systems such as PERMIS).
  2. integration of iRODS with provenance capture systems.

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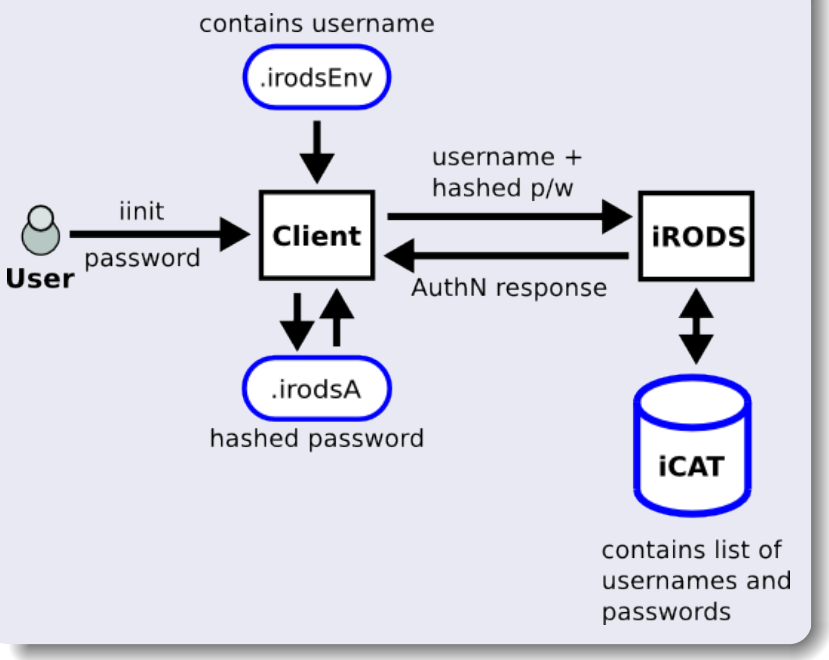
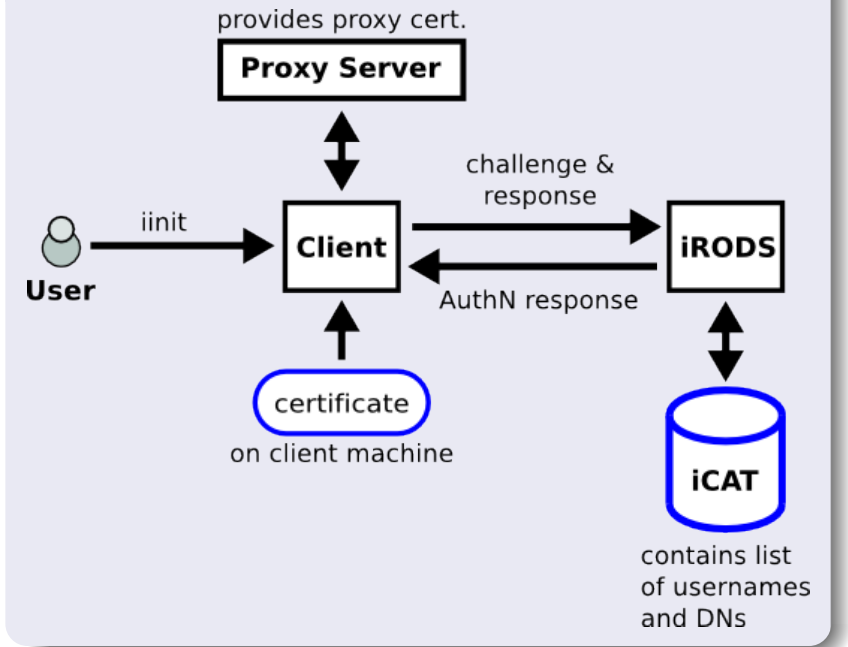
iRODS Authentication

Username + Password



GSI



iRODS Authorization

- iCAT stores information on:
  - Users
  - Domains
  - Groups
  - Access Control Lists (ACLs)
- Access managed according to:
  - Mode of access (read / write / delete / annotate)
  - By user, domain, group
- Information held centrally

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Observed Issues

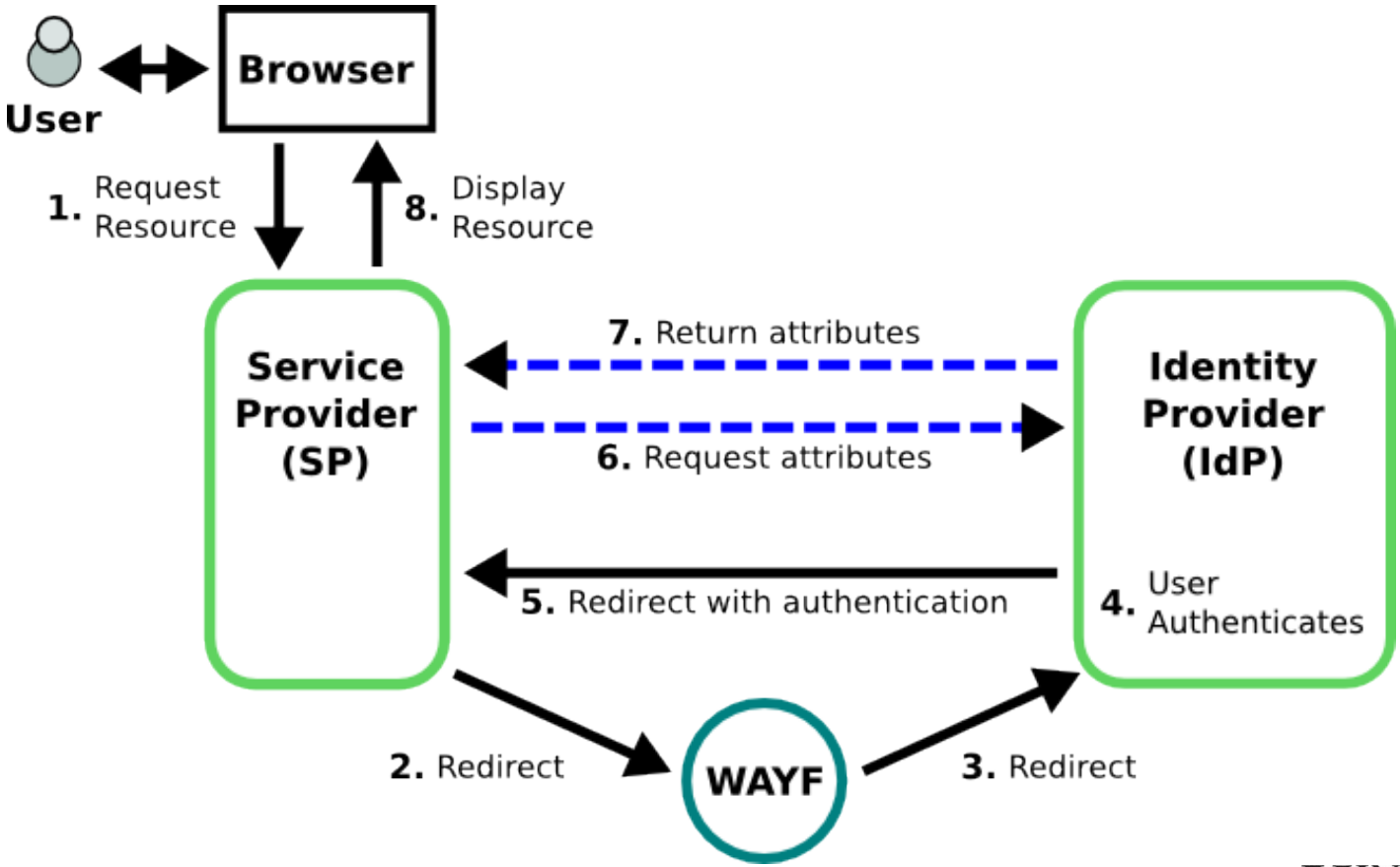
- Centralised management of user identities and access rights
- Doesn't scale well
- Different organisations cannot maintain their own lists of users in data grid - duplication, lists can get out of sync
- Inflexible authorisation system - no locally managed admin of access rights
- Certificates a barrier to uptake of grids in some communities

Outline

Shibboleth Overview

- Architecture for federated access to web based resources
- Based on circle of trust among organisations
- User identities managed locally to their institution
- Access to resources managed locally to the owning institution
- Adopted by JISC as a solution for managing access to distributed web resources

Shibboleth Information Flow



UK Federation

- **UK Access Management Federation for Education and Research**
  - Based on SAML (**S**ecurity **A**ssertion **M**arkup **L**anguage)
  - Provides a single access solution to online resources/services
  - Metadata based on the Internet2 eduPerson LDAP schema
- Core Federation eduPerson attributes
  - *ScopedAffiliation* → staff@kcl.ac.uk, visitor@stfc.ac.uk
  - *TargetedId* → idp.kcl.ac.uk!sp.stfc.uk!<opaque string>
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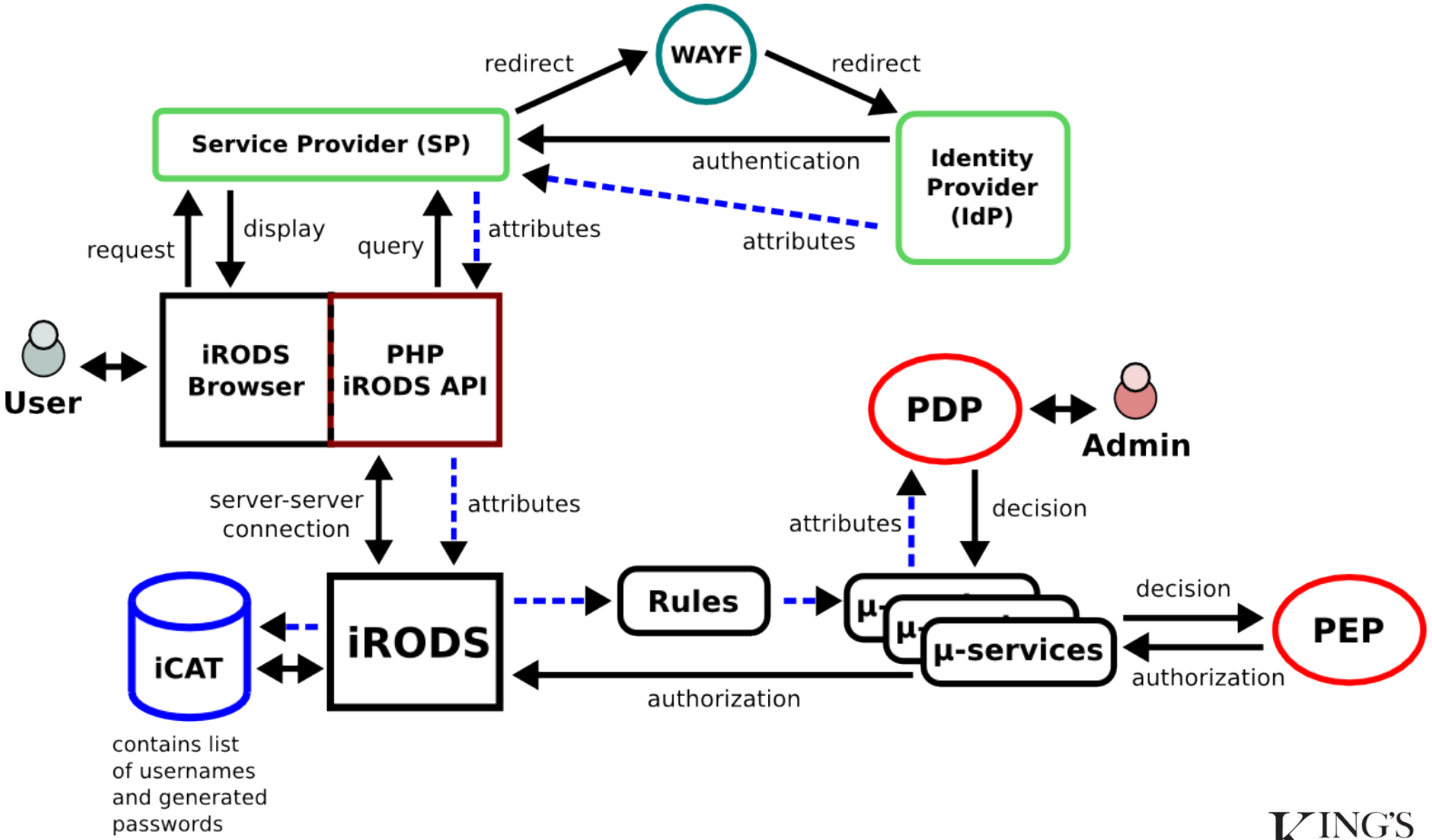
Access Control Requirements

- Devolve authentication service to user's home institution
- Common interface layer to decouple authorization services
- Access control allowing fine-grained access rights to be defined for roles, not just user identities
- No interference to iRODS core system

Access Control Architecture



Outline

Overview

- Provenance $\longrightarrow$ history of operation applied to a digital object
- Provenance is an important issue
  - Gives history of events
  - Allows to verify the authenticity of data
  - Determines quality of data
  - Supports researchers in many ways (e.g. re-executing experiments)

Provenance in iRODS

- iRODS does not capture changes made to data
- iRODS's metadata is not sufficient to capture workflows

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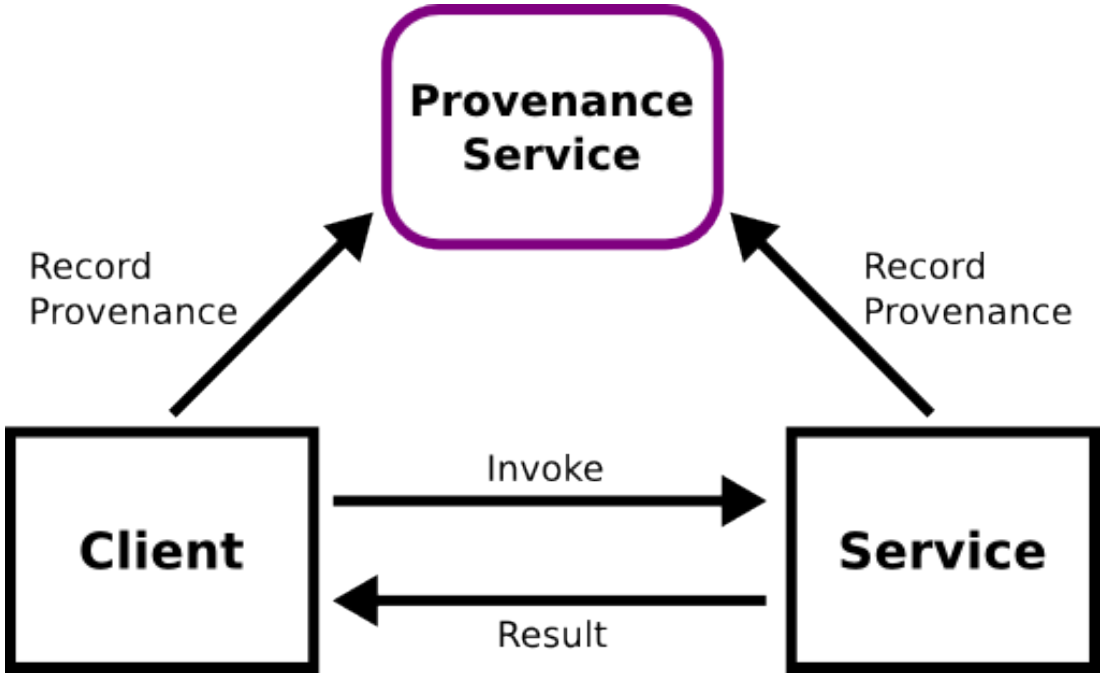
Key Requirements

- Manage data throughout its lifecycle
- Capture and record information about the data analysis
- Enforce ownership of data thoughout its lifetime
- Ensure data access is auditable
- Ensure infrastructure is robust and scalable

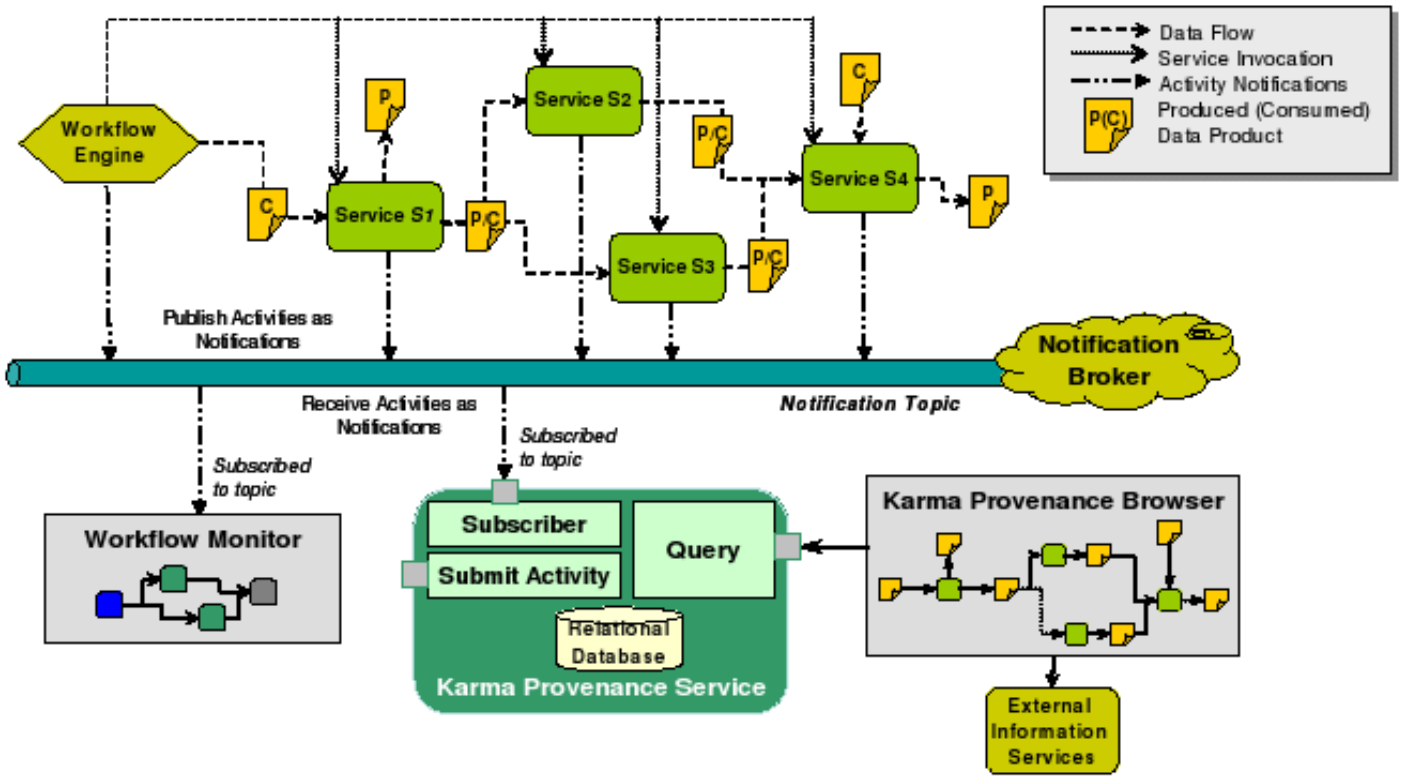
Outline

PASOA



- Independent protocols for recording and accessing provenance

Karma



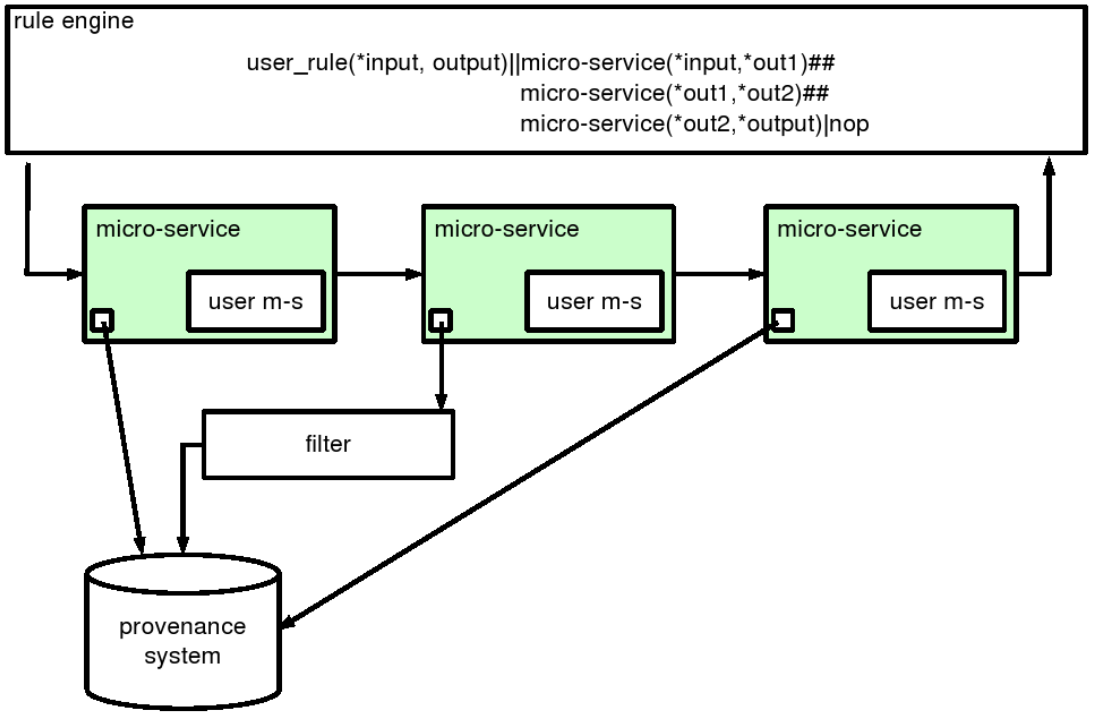
- Publish-subscribe notification protocol

Outline

Provenance System Requirements

- Meet provenance requirements
- No interference with iRODS core system
- Provenance system should be applicable for any other system
- Easy to use
- Eliminate single point of failure within PASOA and Karma

Provenance System Design Ideas



Microservice Wrapper

- Embed user microservice in provenance microservice
- Capturing all information
- User microservice has to be modified

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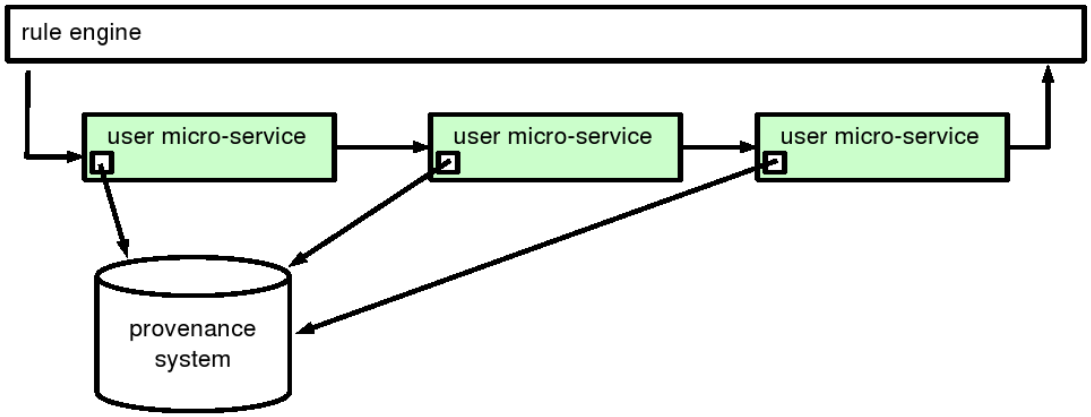
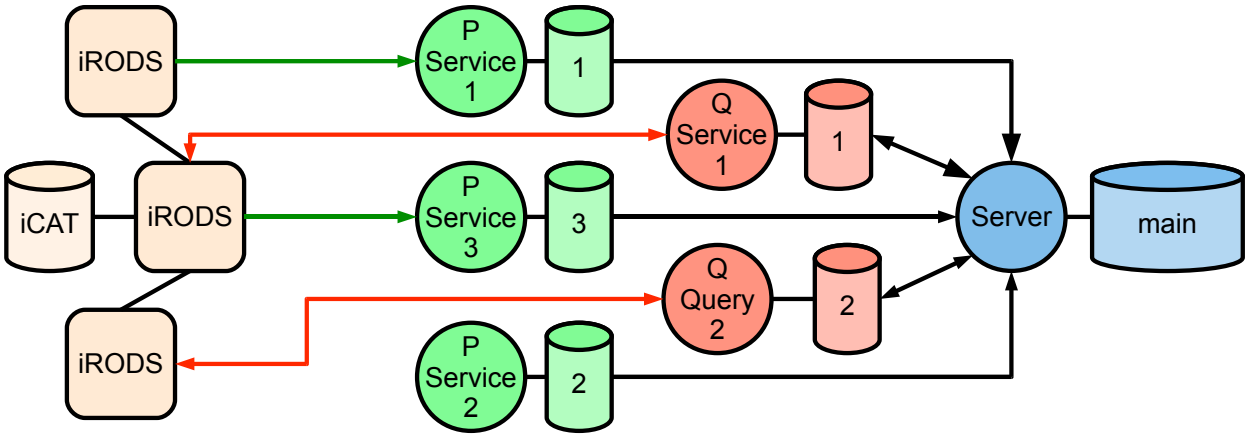


Microservice Chain

- Embed provenance microservice in user microservice
- Only specific data is captured
- User deals with capturing

A Provenance Framework



- Recording service (P-Service) + Querying service (Q-Service)
- Balanced distributed web service lookup system

Work so far & Future plans

Completed Work

- Liased with potential users and determined initial use cases
- Developed prototypes for iRODS-Shibboleth integration
- Developed prototypes for iRODS-Provenance integration

Future Work

- Refine prototypes of access control and provenance systems
- Integration of access control and provenance systems
- Testing with use cases

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