



# Kindura: Cloud Storage OGF 31 / Taipei

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# Kindura Project

- 12 month **pilot** project in **JISC** Flexible Service Delivery Programme
- Centre for e-Research at King's College London
- Science and Technology Facilities Council (STFC), RAL+DL
- DuraSpace
  - Not for profit organisation
  - Specialises in open source technologies in the fields of digital repositories and clouds
  - Created in 2009 from a merger of Fedora Commons and the DSpace Foundation



# Objectives

- **Hybrid** cloud data management
  - iRODS (via a cloud interface)
  - NGS cloud
  - Commercial cloud providers.
  - Private cloud (e.g. Based on Eucalyptus)
- Real data from science and humanities
- Cost effective archiving
  - “Non-elastic cloud”
  - **Migrator**: knows when to move data
  - Based on **cost models**





# Kindura Services



Researcher



Storage services

Compute services

Common services



Integrated Rule-Oriented Data System



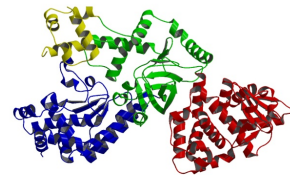
Science & Technology  
Facilities Council





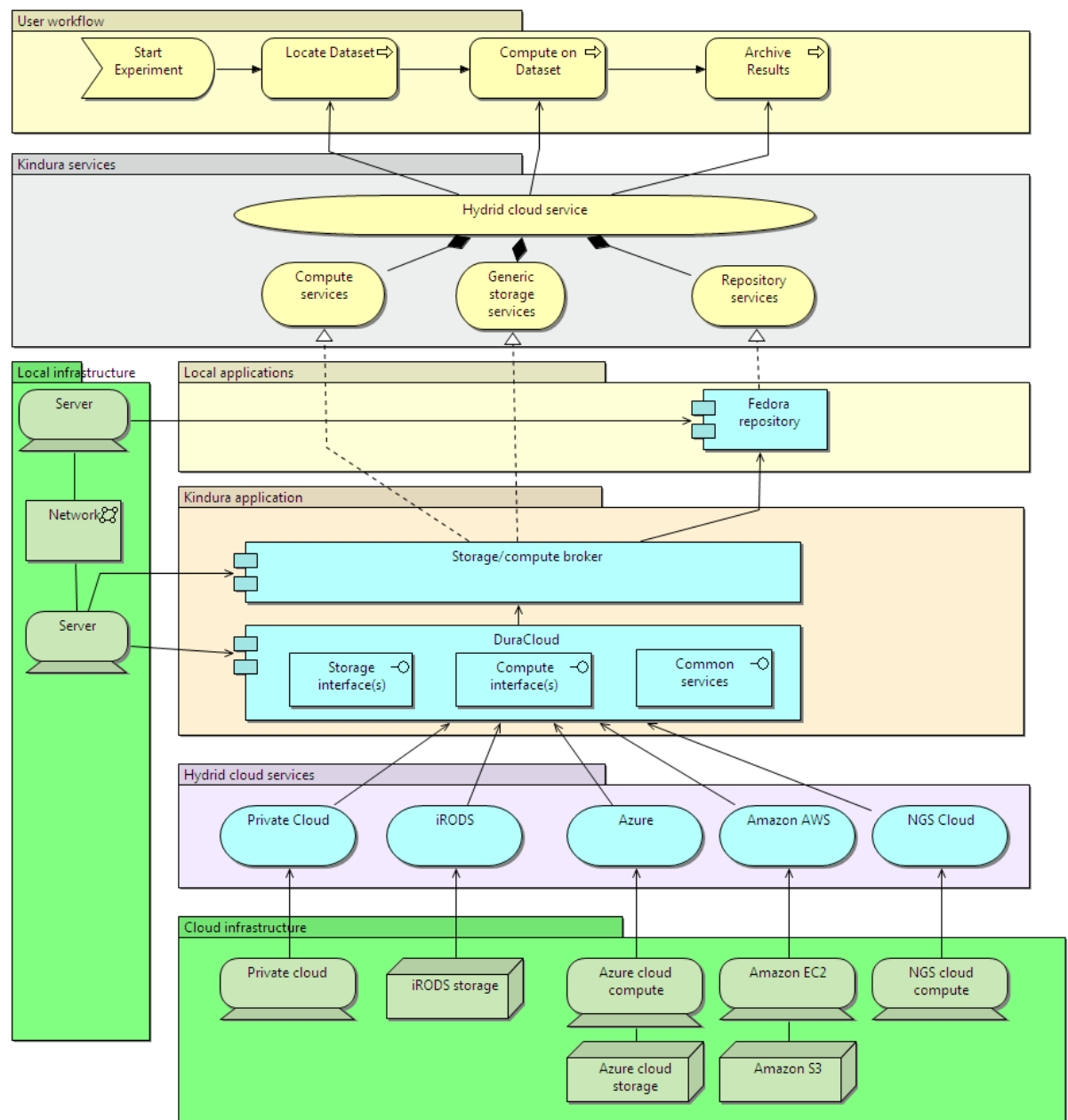
# Specific scenarios

- *Environmental Science*
  - monitoring and modelling of environmental change
  - e.g. remote sensing, real-time data feeds, and large scale simulations of environmental models.
- *Financial Mathematics*
  - execute complex mathematical models, for scenarios such as contract pricings or risk computation.
- *Biomedical sciences*
  - crystallography
  - nanoimaging (e.g. microscopy techniques for cell biology),
  - molecular neurobiology (e.g. determining factors influencing gene expression).
- *Humanities – textual scholarship*





# Architecture





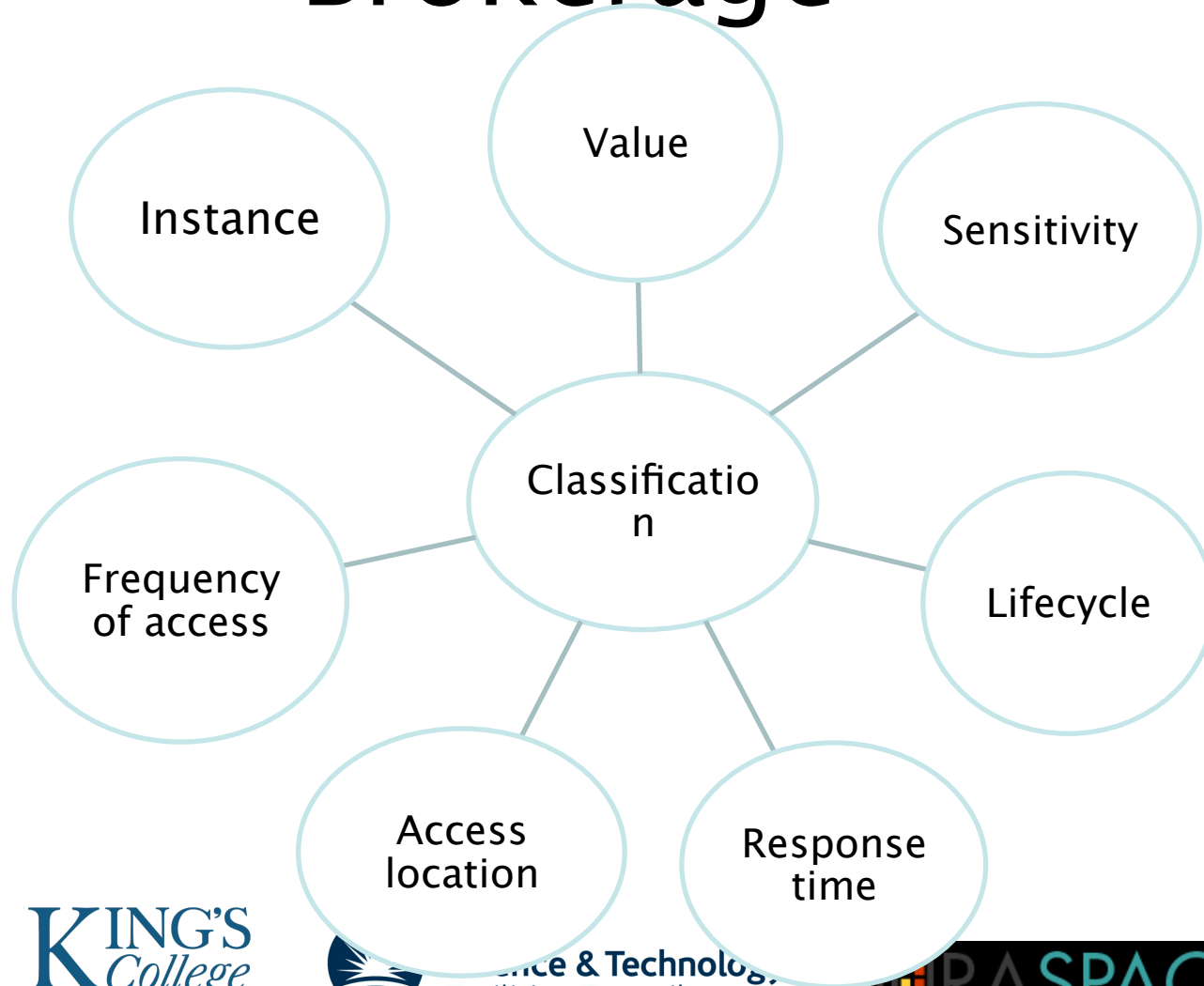
# Technical Approach

- **DuraCloud**, developed by the DuraSpace organisation.
  - Available as a service or software download
  - Java open source software
  - Provide a common REST API to multiple cloud providers.
  - Pilot programme – Kindura is the only UK participant .
  - Common services (runnable in the cloud)
    - Replication
    - Bit integrity checking
    - Format conversion
- **iRODS**, with a cloud interface
- **Fedora Commons** repository
  - Open source repository.





# Brokerage







# Emerging standards

- *OGF OCCI*
- Provides standard CRUD interface
  
- *SNIA CMDI*
- SNIA – Storage Networking Industry Association
- Cloud Data Management Interface (CDMI) enables interoperable cloud storage and data management.
- Standardises notion of container
- (cf. Monday's session: GSM–CG)





# Outputs

- Pilot infrastructure
  - “Non-elastic cloud” – based on iRODS
  - Migrator, glue (eg AAA)
- Use cases for targeted areas
- Cost model for clouds (user view)
- Evaluation





# Conclusion

- Cloud interface to federated iRODS
- “Less-elastic” storage for cost effective archiving
- Federated access via DuraCloud
- <http://kindura.cerch.kcl.ac.uk/>

