The eXtreme-DataCloud project

eXtreme DataCloud

Data Management for extreme scale computing

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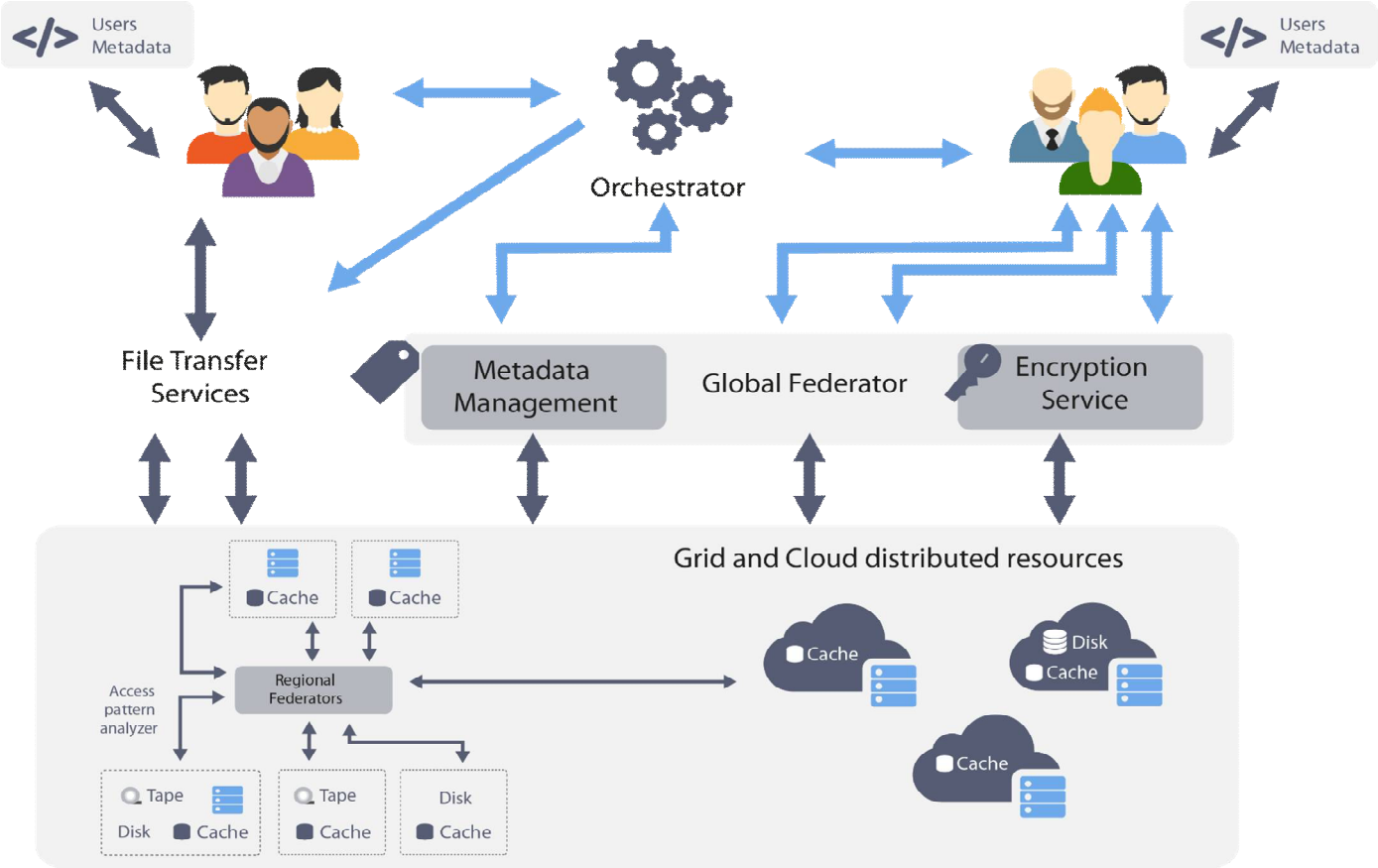
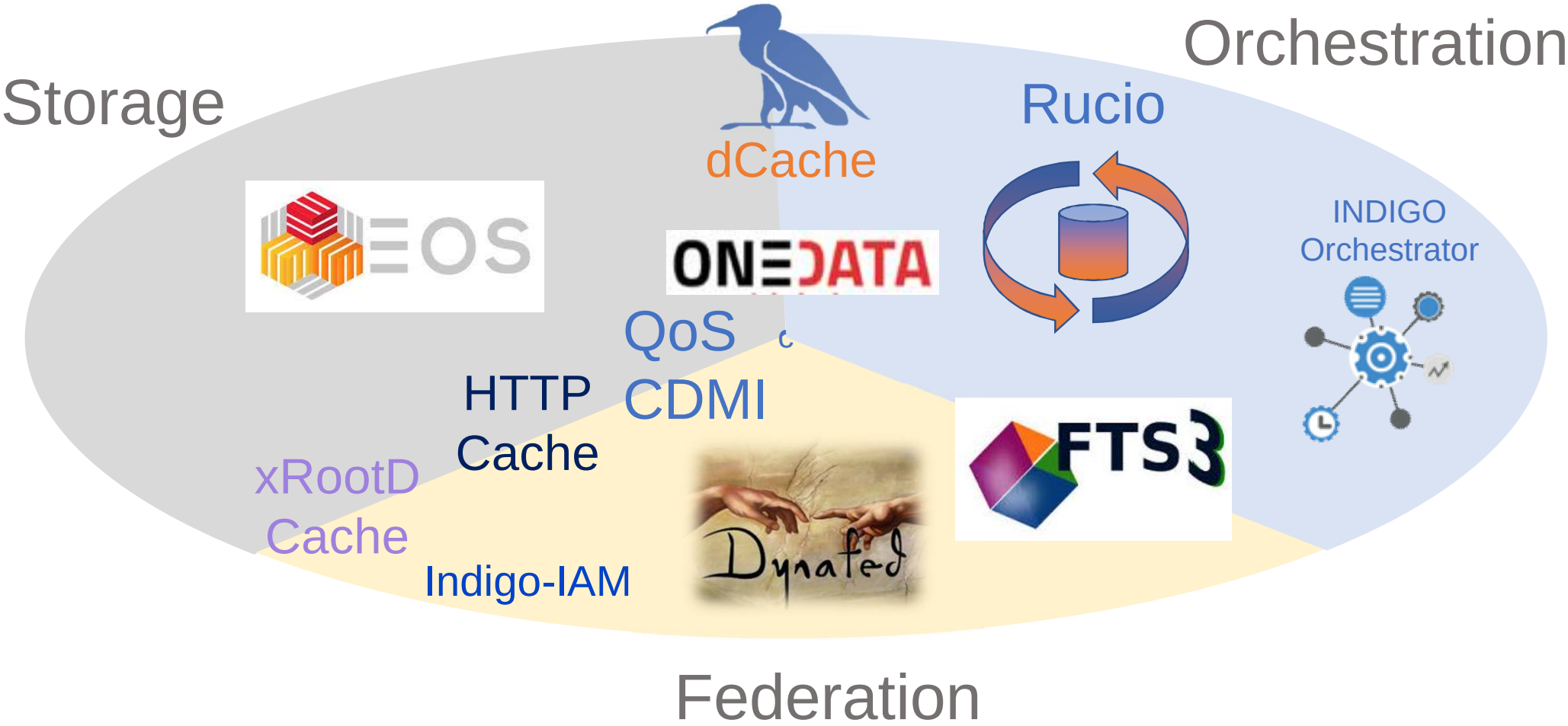
XDC Technical Topics

- Intelligent & Automated Dataset Distribution
  - Orchestration to realize a policy-driven data management
  - Data distribution policies based on Quality of Service supporting geographical distributed resources (cross-sites)
    - QoS beyond disk vs tape: availability, reliability, durability, latency
  - Data lifecycle management
- Data (pre)processing during ingestion
  - Storage Notifications based on events
- Smart caching
  - Transparent access to remote data without the need of a-priori copy
- Metadata management
- Data management based on access patterns
  - Move to ‘glacier-like’ storage unused data, move to fast storage “hot” data
    - at infrastructure level
- Sensitive data handling
  - secure storage and encryption

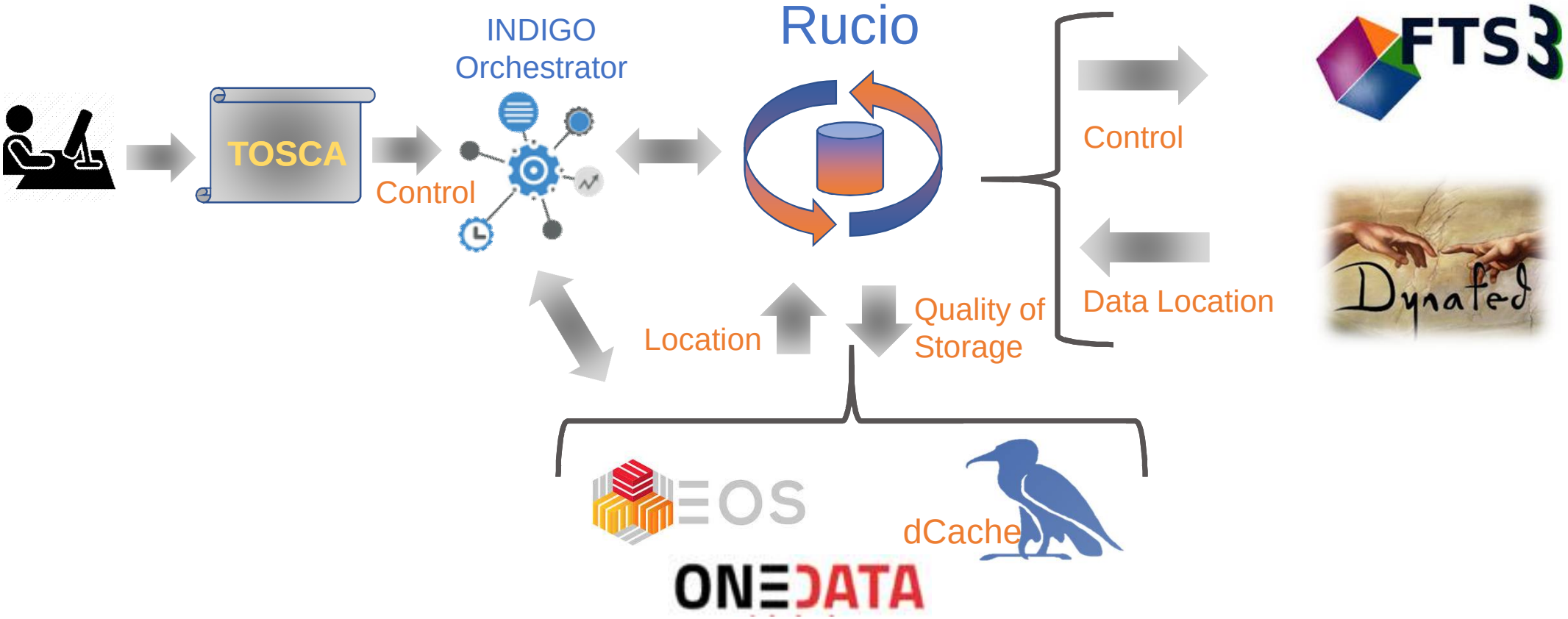
XDC high level architecture



XDC Toolbox


Orchestration
Storage
Rucio
dCache
EOS
ONEDATA
INDIGO
Orchestrator
QoS
CDMI
HTTP
Cache
xRootD
Cache
FTS3
Indigo-IAM
Dynafed
Federation

Expected Control Flow for Orchestration and Policy Driven Data Management



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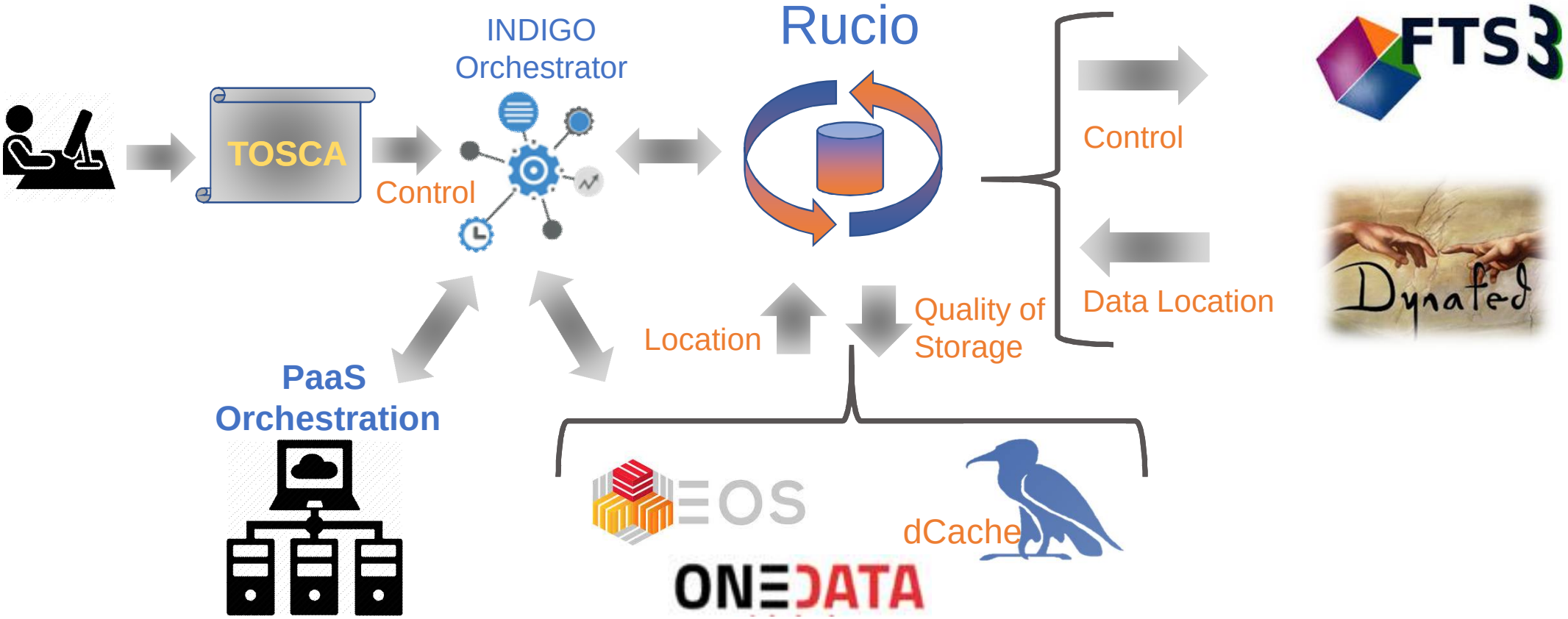

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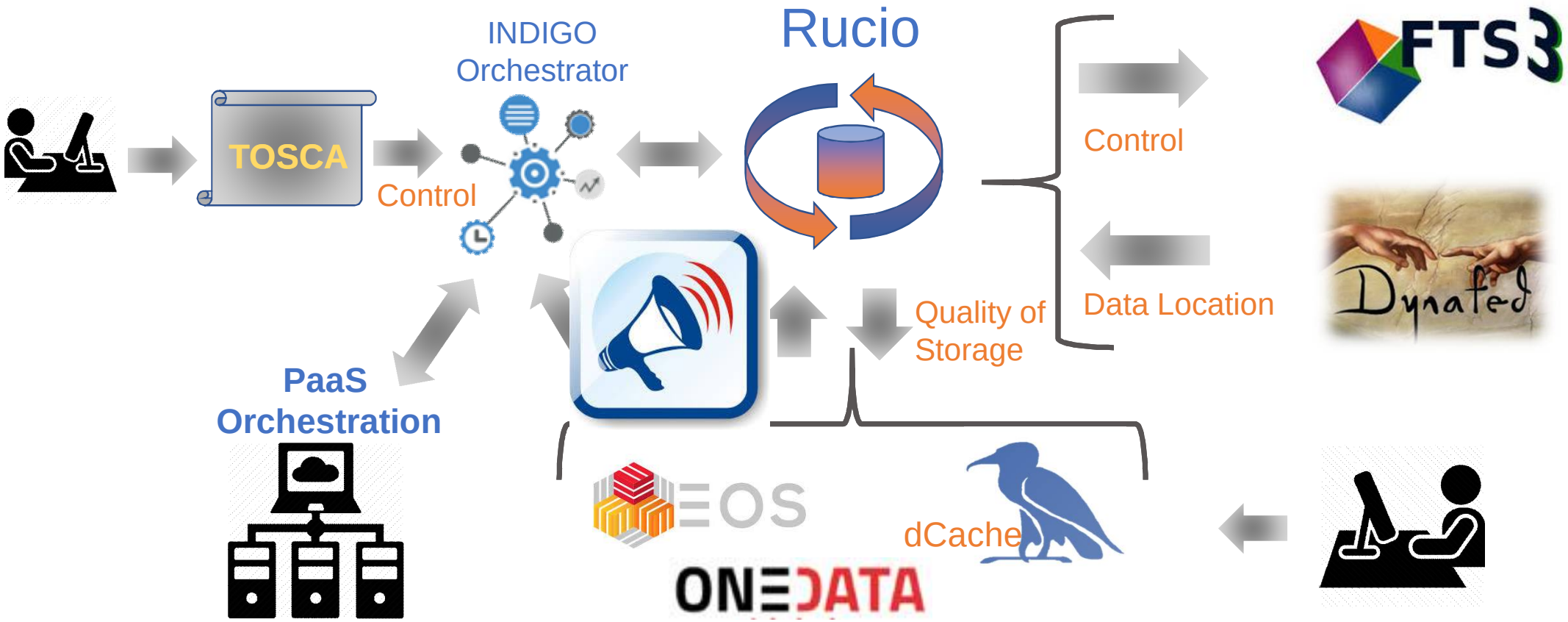
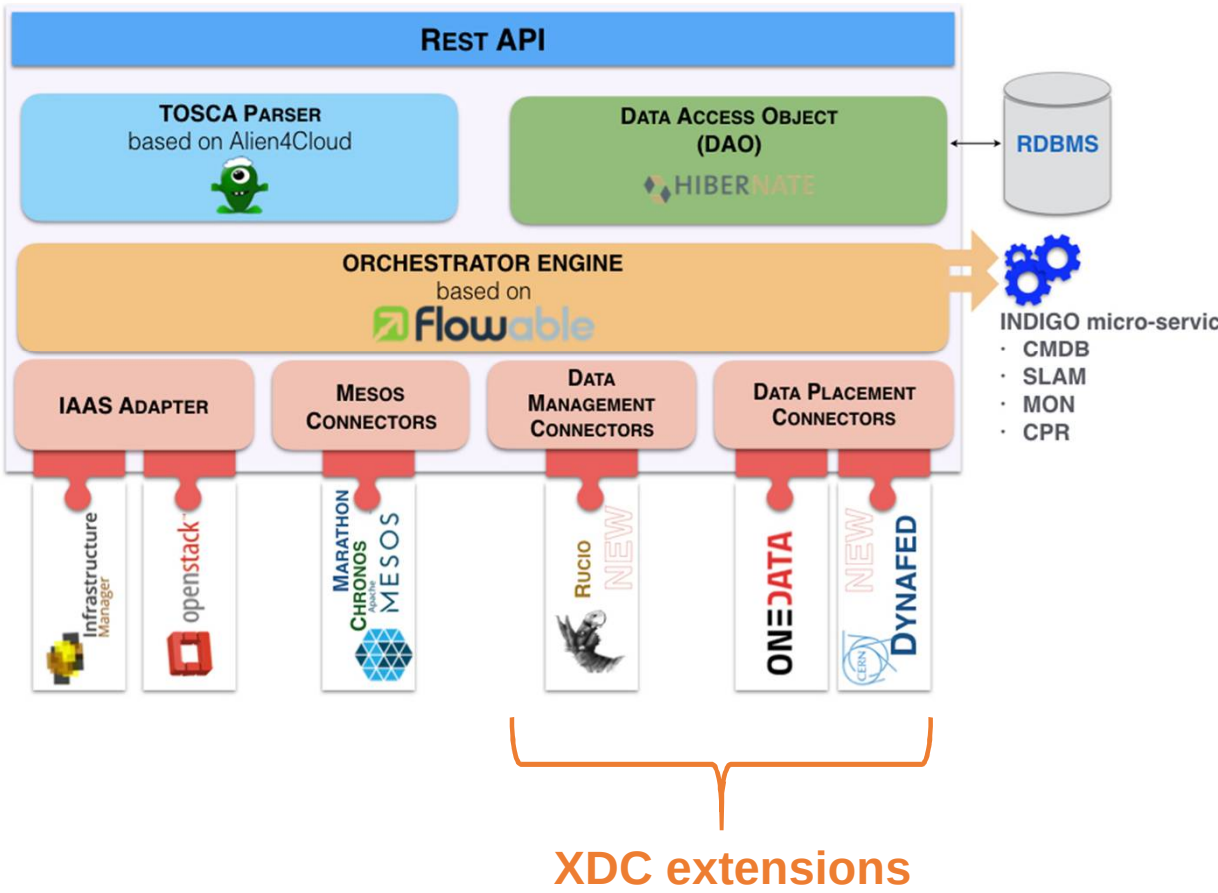


INDIGO Orchestrator Overview

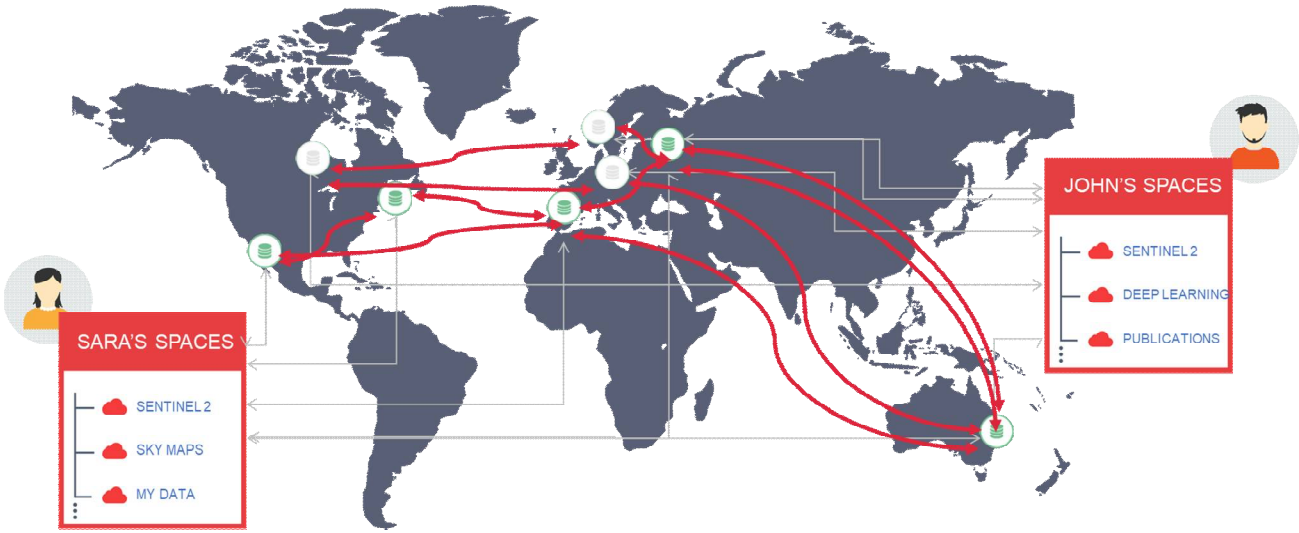
- The Orchestrator accepts TOSCA requests
- It can run three main workflows in the PaaS:
  - Deploy
  - Undeploy
  - Update
- The Orchestration layer is being extended in order to address the new requirements:
  - move data between distributed storages
  - specify different QoS for replicas
  - launch and monitor user defined processing jobs at ingestion time



Data in Hybrid Cloud Environments: Onedata

- ONEDATA is a storage federator that allows to use resources backed by providers worldwide
  - Providers deploy *Oneprovider* services near physical storage resources
  - Users use *Onezone* web interfaces
    - APIs available
    - Local mounting on users machines available
  - Storage is organized into **Zones**
    - federations of providers
    - enable the creation of closed or interconnected communities

https://onedata.org



XDC – Release 1

Release date 31/10/2018

Component	XDC functionalities
EOS	- Caching with xcache for geographic deployment: Xcache deployed at a remote centre to accelerate its local CPU - External storage adoption (Through an S3 or a WebDAV interface) - External data adoption (Data already present on a system described above can be incorporated into EOS)
dCache	- New QoS types integration, aggregated QoS for storage federations - OpenIDConnect support in dcache_view - dcache storage events (SSE notifications): Allow non-dCache agent to get notified that something of interest happen inside dCache
FTS+gfal	- QoS support: can now accept a QoS job - OpenIDConnect support - QoS in gfal (gfal with basic cdmi client) – python bindings available
Dynafed	- Integration of OIDC authentication
Caching infrastructure based on xCache or http	- deployment receipts for geographically distributed caches (via xcache) - deployment receipts for scalable local caches (via xcache and http)
PaaS Orchestrator	- Implementation of Dynafed plugin – interaction via INDIGO IAM oauth2 token - Enhancement of ONEDATA plugin
ONEDATA	- Performance and stability improvements - new RADOS driver

XDC Contacts

- POSTERS:
  - 4: Water Quality monitoring and forecasting with eXtreme-DataCloud
  - 5: CTA use case for XDC solution
  - 21: The adoption of the HTTP/XRootD protocols for a new data caching architecture in WLCG experiments
  - 32: dCache events driving data management at the European XFEL: Evaluating event-driven cloud computing and storage management
- Website: www.extreme-datacloud.eu
- **@XtremeDataCloud on Twitter**
- **Mailing list: info<at>extreme-datacloud.eu**