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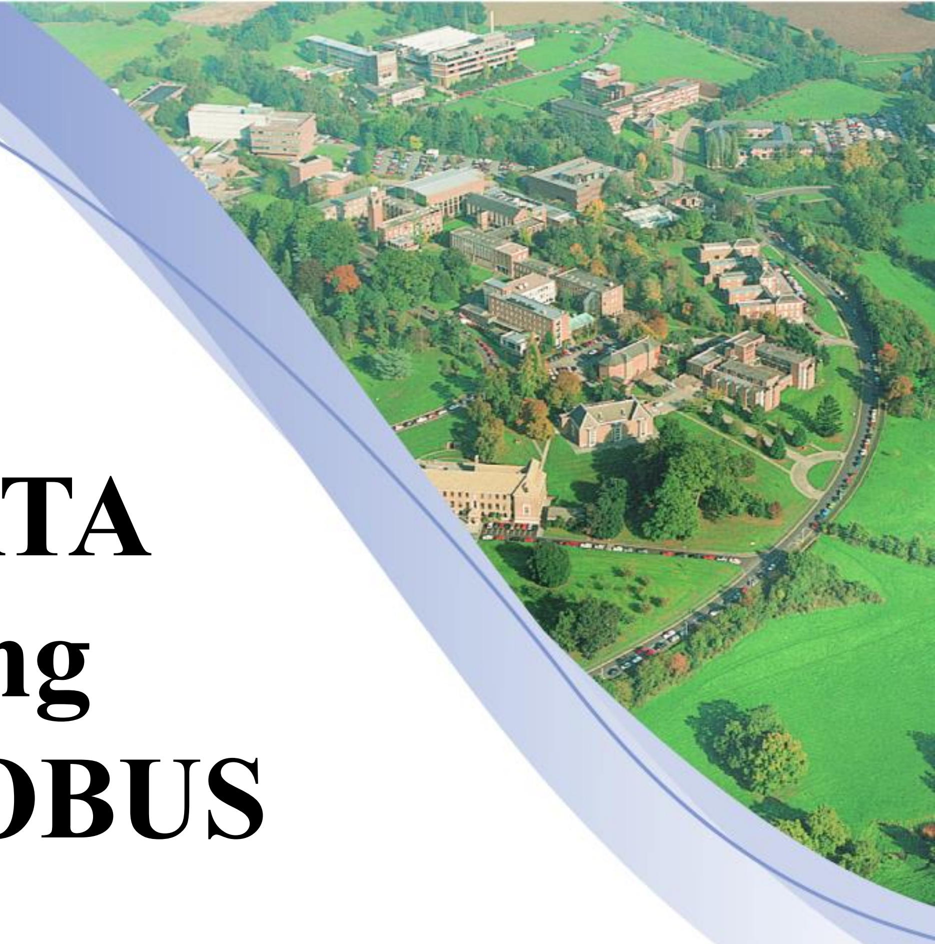

Moving BIG DATA Into DSpace using SWORD & GLOBUS

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Exeter Landscape 2011

- DSpace in use for three independent repositories
- A brand new ~£1M Petabyte data store established to hold all completed research data
- Huge demand but no obvious solution to ingest large data sets some of which of the order of TBs
- Some DSpace developer experience across IT but patchy and part time

OpenExeter Project

- 18 Month JISC funded project looking at Human Factors in Research Data Management
- Early findings suggested research data widely distributed & often on personal PCs off campus etc
- Technical strand focused on establishing Research Data Archive and pulling in the data to a new combined DSpace repository
- DSpace developer resource seconded 80% time

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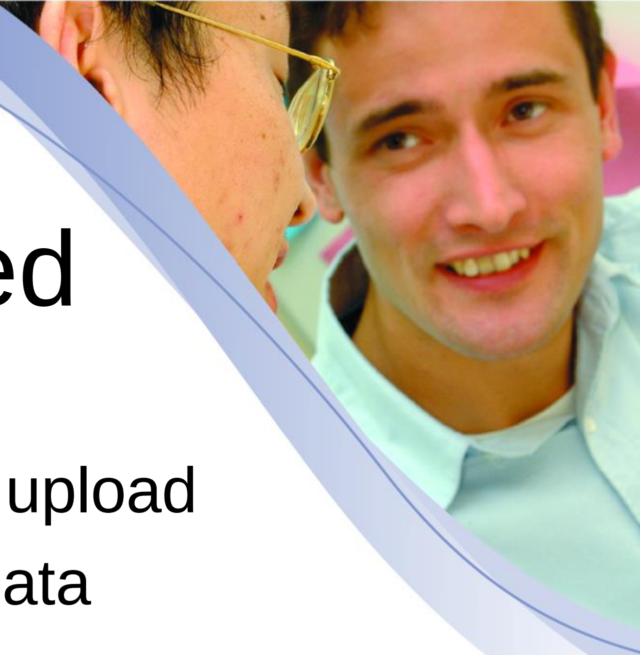
Dspace not really designed to take BIG DATA ?

- Key limitation of DSpace UI is real time upload of data via http – not feasible for TBs of data
- Some support for transfer of data direct to filesystem and link to submission metadata at an administrative level – “submit by reference”
- Look to exploit this feature by programmatically transferring data independently of DSpace and augmenting the built in submission method



The Globus Connection

- GlobusOnline is a free to use cloud based service for data transfer
- Developed by the University of Chicago & Argonne National Labs
- Based on proven GridFTP protocol and used by researchers worldwide for over a decade
- Highly efficient, resilient, secure, open API, “fire & forget”
- Data transfer is peer to peer and does NOT flow through Globus – it merely orchestrates transfer
- Globus 1 Minute Overview YouTube

Initial Globus Limitations

- All users must sign up personally to the Globus service but we did not want to manage user identities outside of the normal Exeter authentication and SSO systems
- Service needed to look & feel like it was part of our Exeter service
- By default all transfers are “owned” by the logged in user and could only be monitored for completion by this user

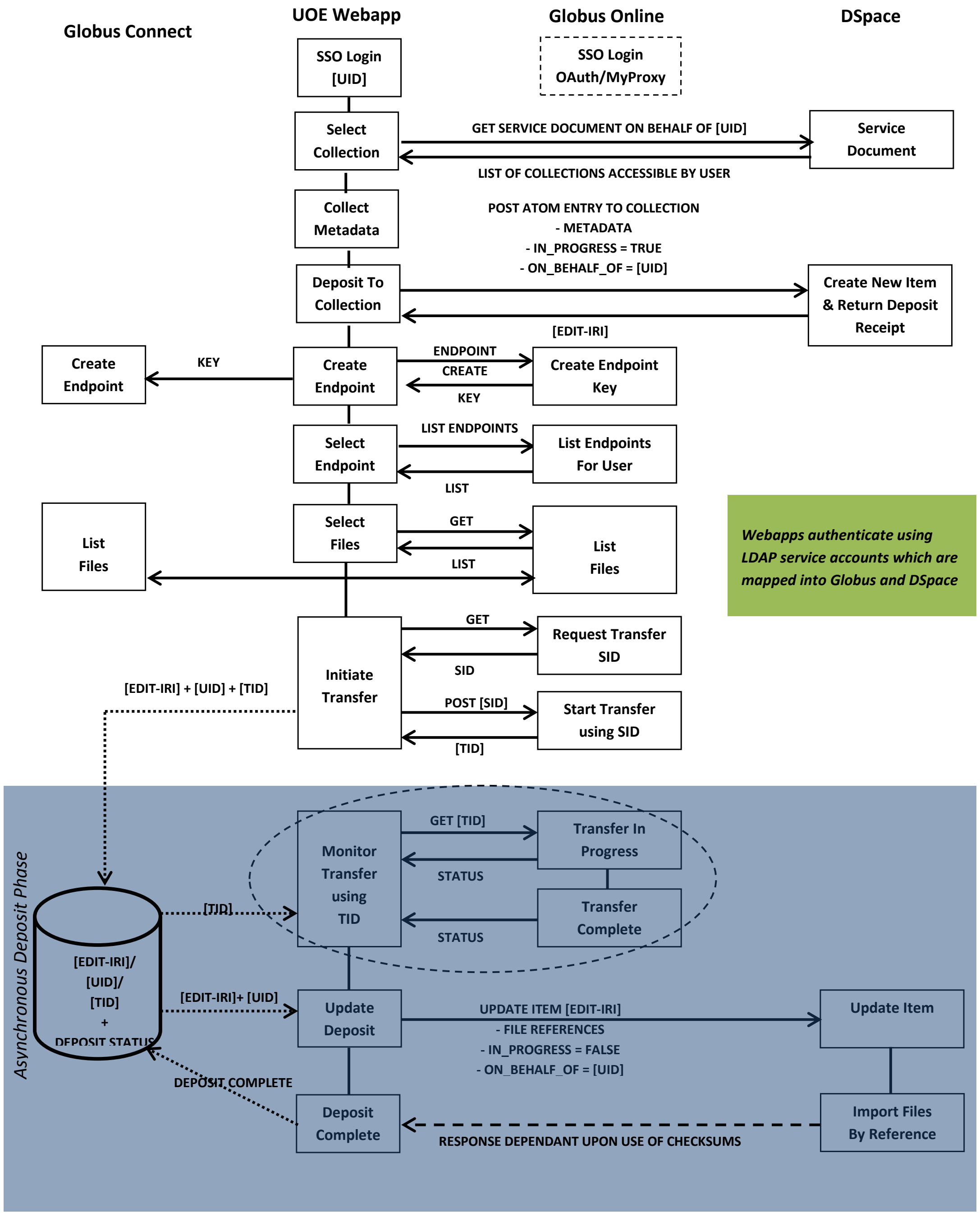
Solutions

- Globus worked with us from the start to understand our requirements and create new functionality where needed
- Authentication – key breakthrough with OA4MP and Exeter SSO system with a big helping hand from Jim Basney & the team at CILogon
- Globus provides us with a branded web site for sign up and general file transfer
- Modified model to allow owner of a destination endpoint to monitor transfers to that endpoint

SWORD Missing Link

- Engaged with one of SWORD authors, Richard Jones of Cottage Labs to update SWORD with capability to support “submit by reference” with DSpace
- With Richard’s help we mapped out what we were trying to achieve in a sequence chart and identified key elements for development
- Crucially we needed a new method within SWORD which allowed us to ingest independent of file transfer

UOE REPOSITORY SUBMISSION SEQUENCE CHART



Globus Connect

UOE Webapp

Globus Online

DSpace

SSO Login [UID]

SSO Login OAuth/MyProxy

Select Collection

GET SERVICE DOCUMENT ON BEHALF OF [UID]

Service Document

LIST OF COLLECTIONS ACCESSIBLE BY USER

Collect Metadata

POST ATOM ENTRY TO COLLECTION
- METADATA
- IN_PROGRESS = TRUE
- ON_BEHALF_OF = [UID]

Deposit To Collection

Create New Item & Return Deposit Receipt

[EDIT-IRI]

Create Endpoint

KEY

Create Endpoint

ENDPOINT CREATE

Create Endpoint Key

KEY

Select Endpoint

LIST ENDPOINTS

List Endpoints For User

LIST

List Files

Select Files

GET

List Files

LIST

Webapps authenticate using LDAP service accounts which are mapped into Globus and DSpace

Initiate Transfer

GET

Request Transfer SID

SID

[EDIT-IRI] + [UID] + [TID]

POST [SID]

Start Transfer using SID

[TID]

Asynchronous Deposit Phase

Monitor Transfer using TID

GET [TID]

Transfer In Progress

STATUS

Transfer Complete

STATUS

[TID]

[EDIT-IRI]/ [UID]/ [TID] + DEPOSIT STATUS

[EDIT-IRI]+ [UID]

Update Deposit

UPDATE ITEM [EDIT-IRI]
- FILE REFERENCES
- IN_PROGRESS = FALSE
- ON_BEHALF_OF = [UID]

Update Item

DEPOSIT COMPLETE

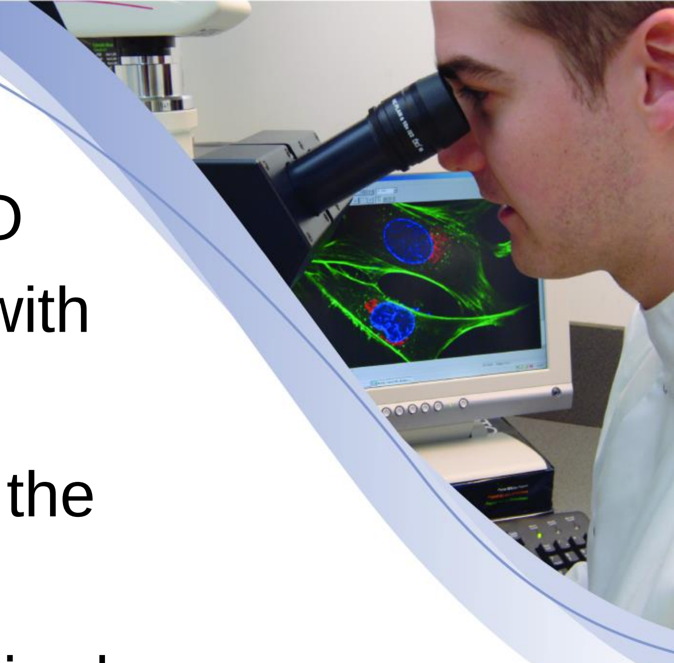
Deposit Complete

RESPONSE DEPENDANT UPON USE OF CHECKSUMS

Import Files By Reference

Basic Use Case

- End user logs into repository using SSO
- Starts a submission and must register with Globus if this is their first time
- Is automatically logged into Globus and the submission tool (SSO)
- Chooses a “Collection” and enters required metadata for that collection
- Creates a new Globus endpoint if required
- Selects any existing Globus endpoint
- Selects files/directories for transfer
- Logs out and is notified of progress via email



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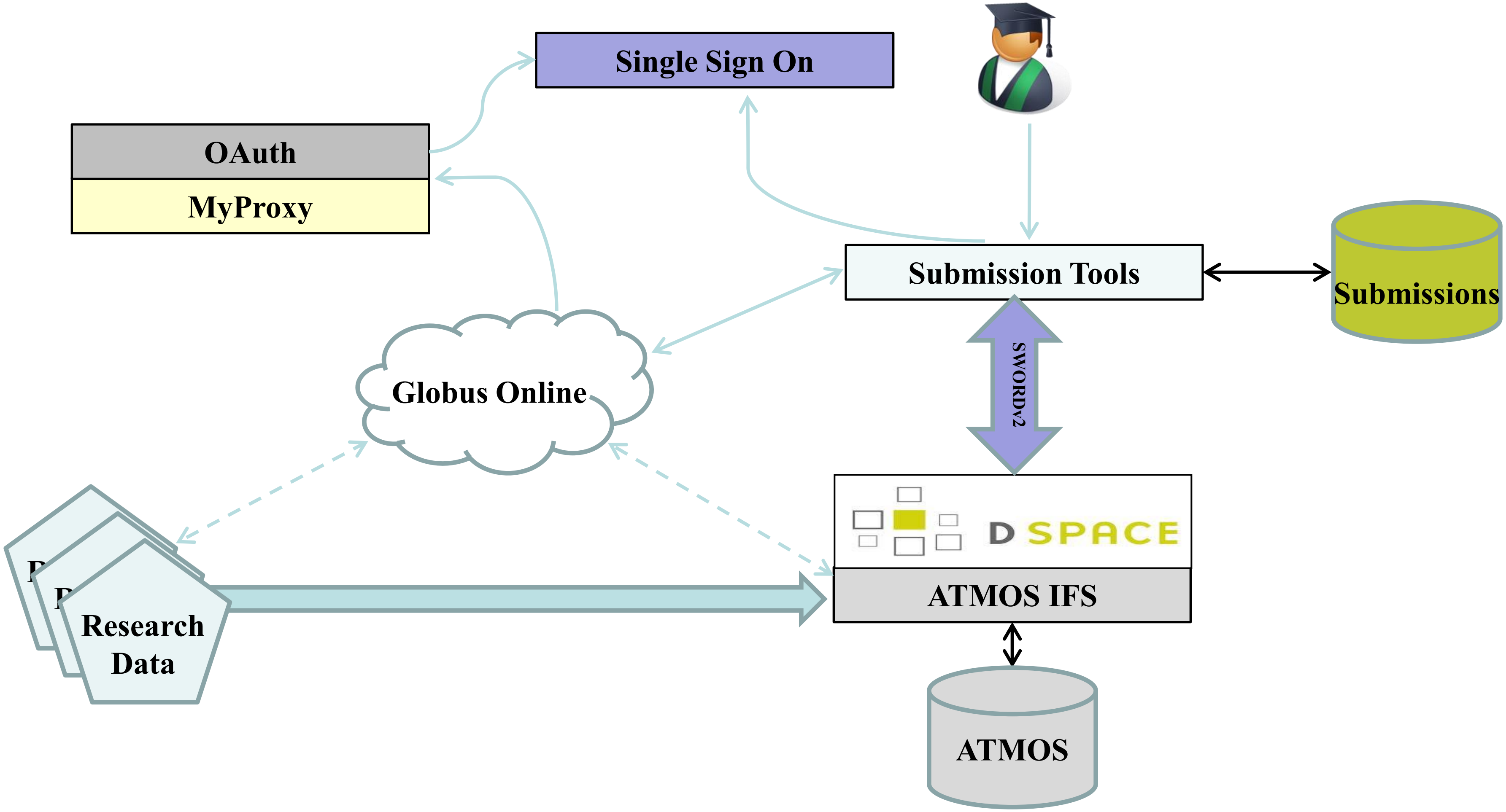
High Level Architecture



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Thanks for your attention

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Time for quick demo ?