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Leicester Cardiovascular Biomedical Research Unit

BRISSkit: Biomedical Research Infrastructure Software Service kit

http://www.le.ac.uk/brisskit

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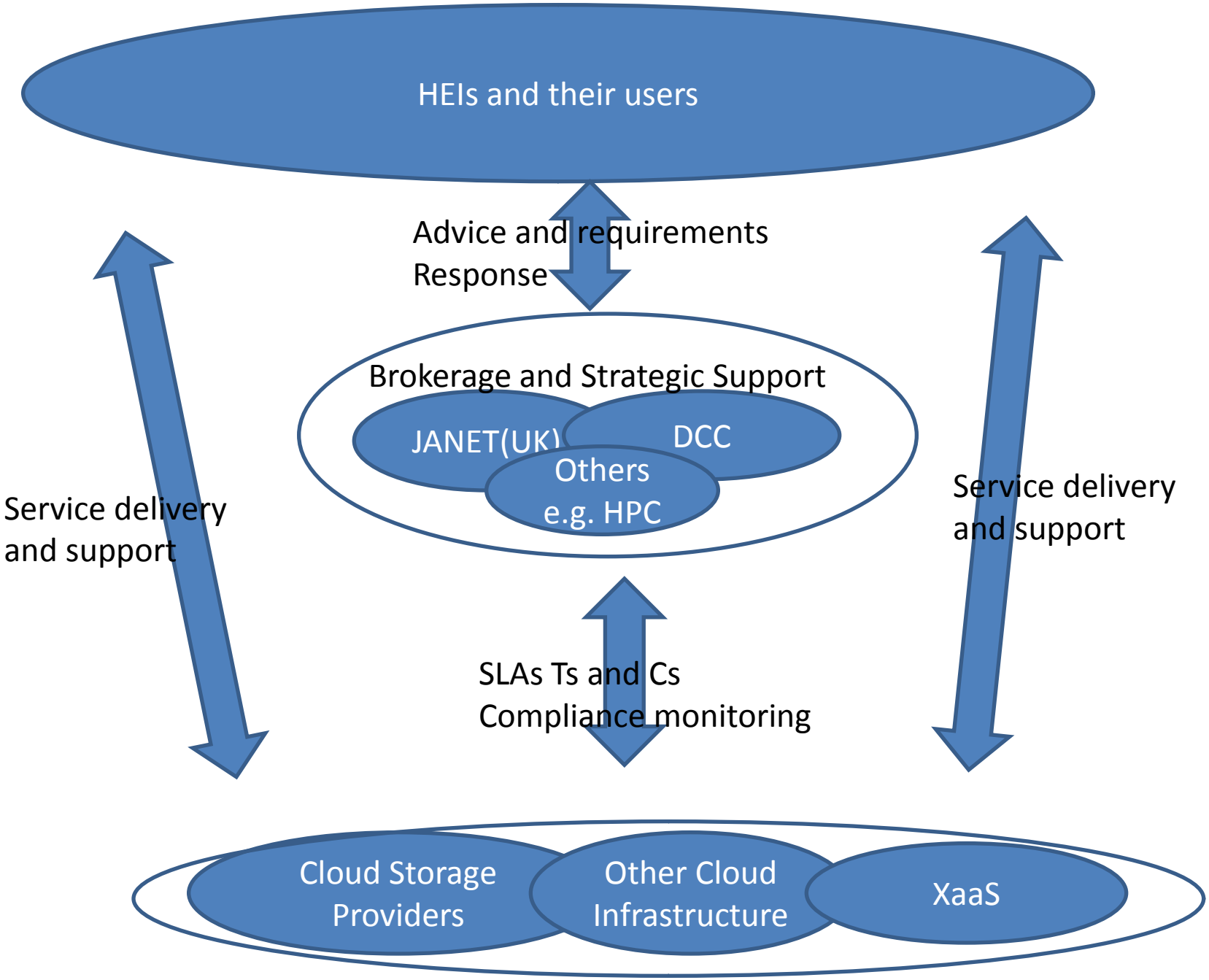
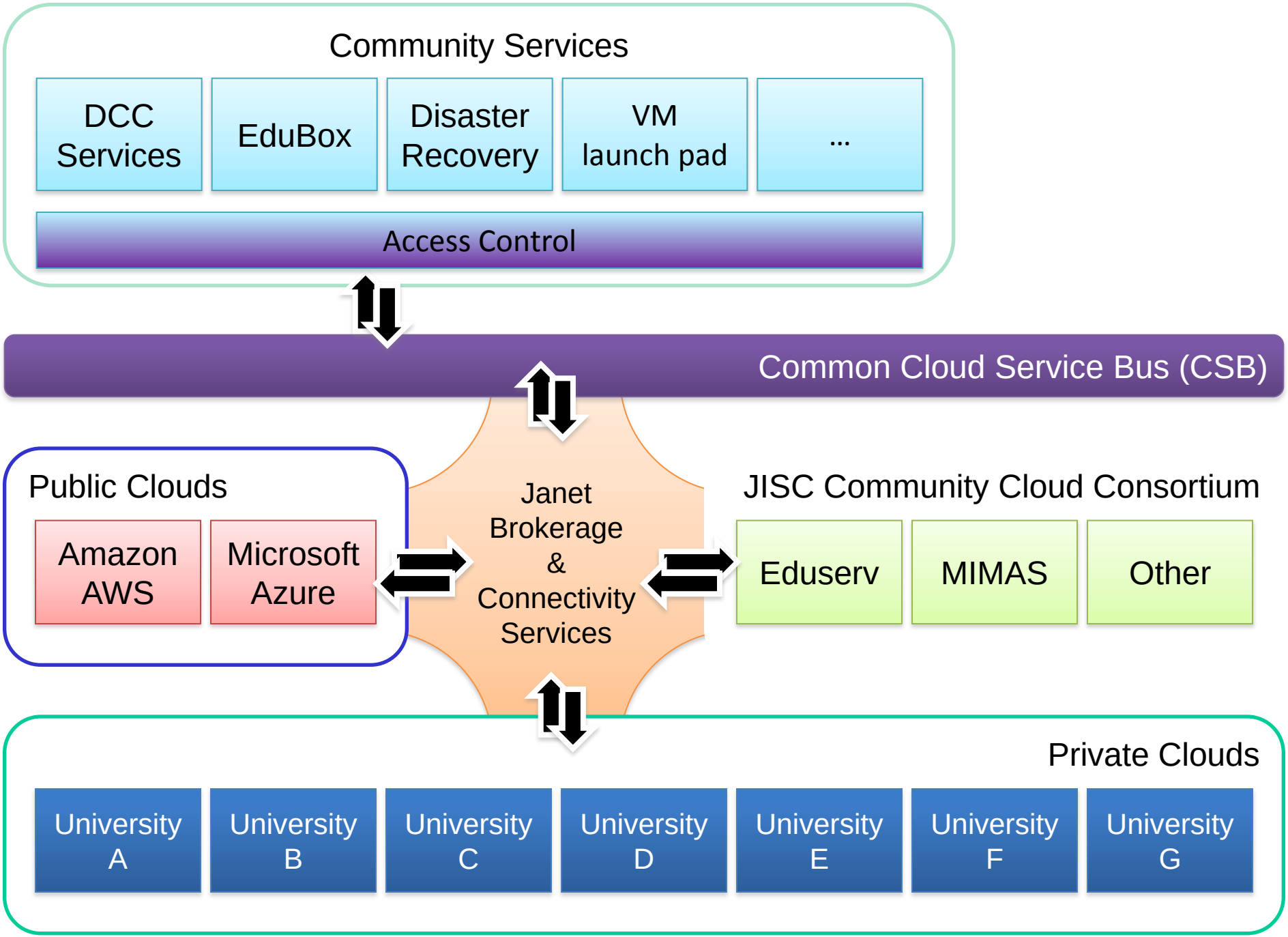
Nick Holden (LCBRU BRICCS)
Malcolm Newbury (GuildFoss)

Workshop - Thurs 19th January, Leicester BRU

JISC

- JISC University Modernisation Fund 2011/12
- Shared service in HE cloud
  - Eduserv UMF cloud platform for HE
  - Brokered by UK HE JANET network


HEIs and their users
Advice and requirements
Response
Brokerage and Strategic Support
JANET(UK)
DCC
Others
e.g. HPC
Service delivery
and support
Service delivery
and support
SLAs Ts and Cs
Compliance monitoring
Cloud Storage
Providers
Other Cloud
Infrastructure
XaaS


Community Services
DCC Services
EduBox
Disaster Recovery
VM launch pad
...
Access Control
Common Cloud Service Bus (CSB)
Public Clouds
Amazon AWS
Microsoft Azure
Janet Brokerage & Connectivity Services
JISC Community Cloud Consortium
Eduserv
MIMAS
Other
Private Clouds
University A
University B
University C
University D
University E
University F
University G

BRISSkit Generic Use Cases 1

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- *Researcher*
  - Designs study
  - Identifies potential patient profiles and authorises patient recruitment process
  - Authorises nurse and research informatics consent , tissue and data gathering activity
  - Analyses collected data and conducts study
  - Publishes study results
  - Transfers ownership of data BRU on completion of study

- *Research Informatics Lead*
  - Designs questionnaire and hospital dataset
  - Maps required ontology to dataflows
  - Authorises hospital informatics activities
  - Ensures readiness of questionnaires, samples and data gathering interfaces
  - Monitors patient consent to enable start/stop clinical data gathering and use of samples

BRISSkit Generic Use Cases 2

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- *Patient*
  - Consents to participate in research/study
  - Provides data through questionnaires
  - Provides tissue samples
  - Provides data through clinical systems
- *Nurse*
  - Gains patient consent to participate
  - Supports patient completion of questionnaires
  - Takes blood and tissue samples from patient
  - Orders other clinical tests on patient
- *Clinical Informatics Lead*
  - Monitors existence of patient consent
  - Ensures readiness of clinical systems to share data
  - Initiates, monitors and closes sharing of patient data into research system for consenting patients

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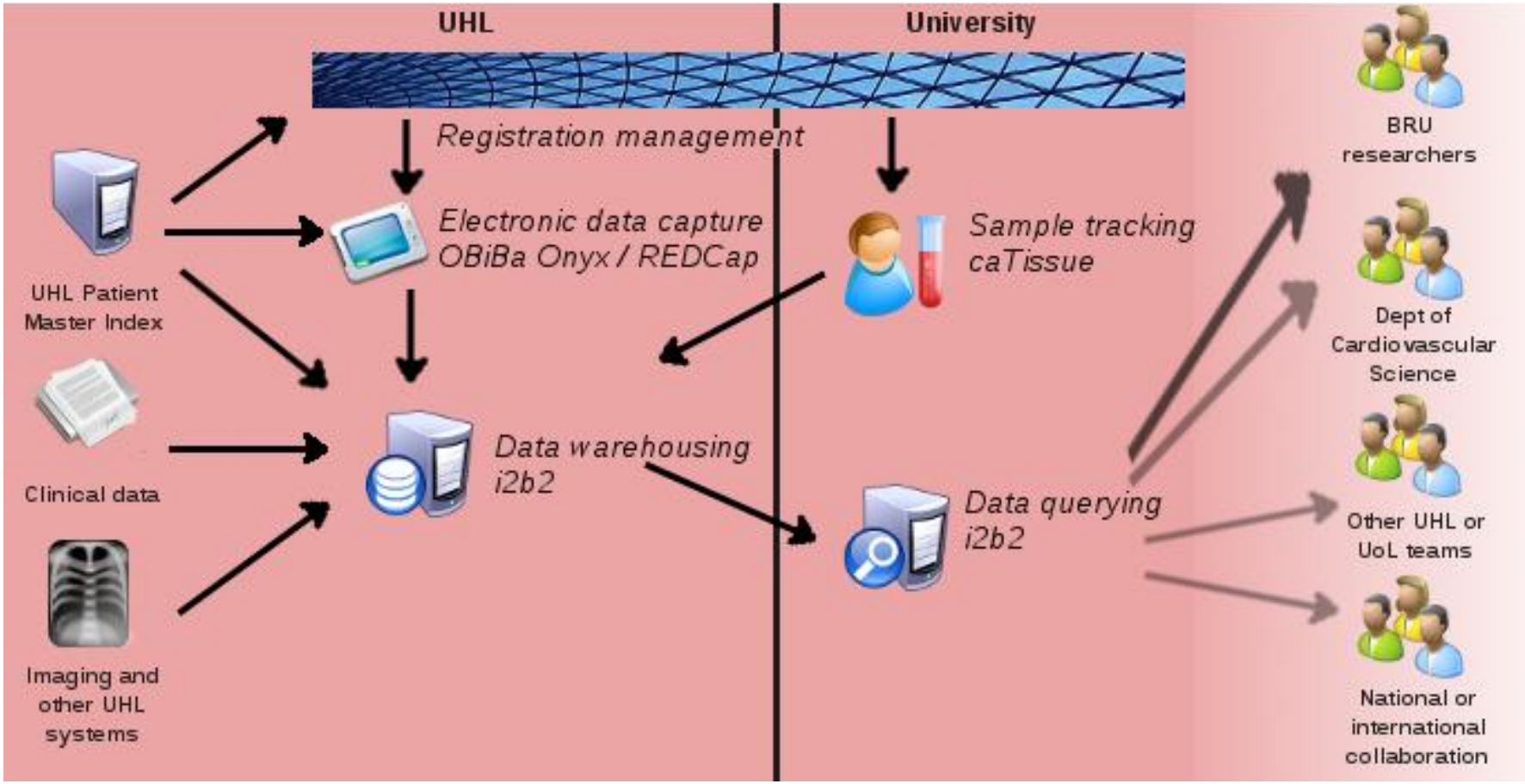
- Electronic Data Capture / questionnaire – *OBiBa Onyx / REDcap*
- Specimen Inventory / sample tracking – *caTissue*
- Cohort selection and data querying - *i2b2*



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- Prototype open source IT infrastructure for biomedical research Informatics – built on BRU BRICCS
- Web services – platform independent
- Bridge healthcare & research domains
    - *I4health & ITFoM EU initiatives*
- Host, implement, deploy biomedical research DBs
    - Remove duplication of highly skilled development effort via
        - *Design from scratch*
        - *Buy & administer*

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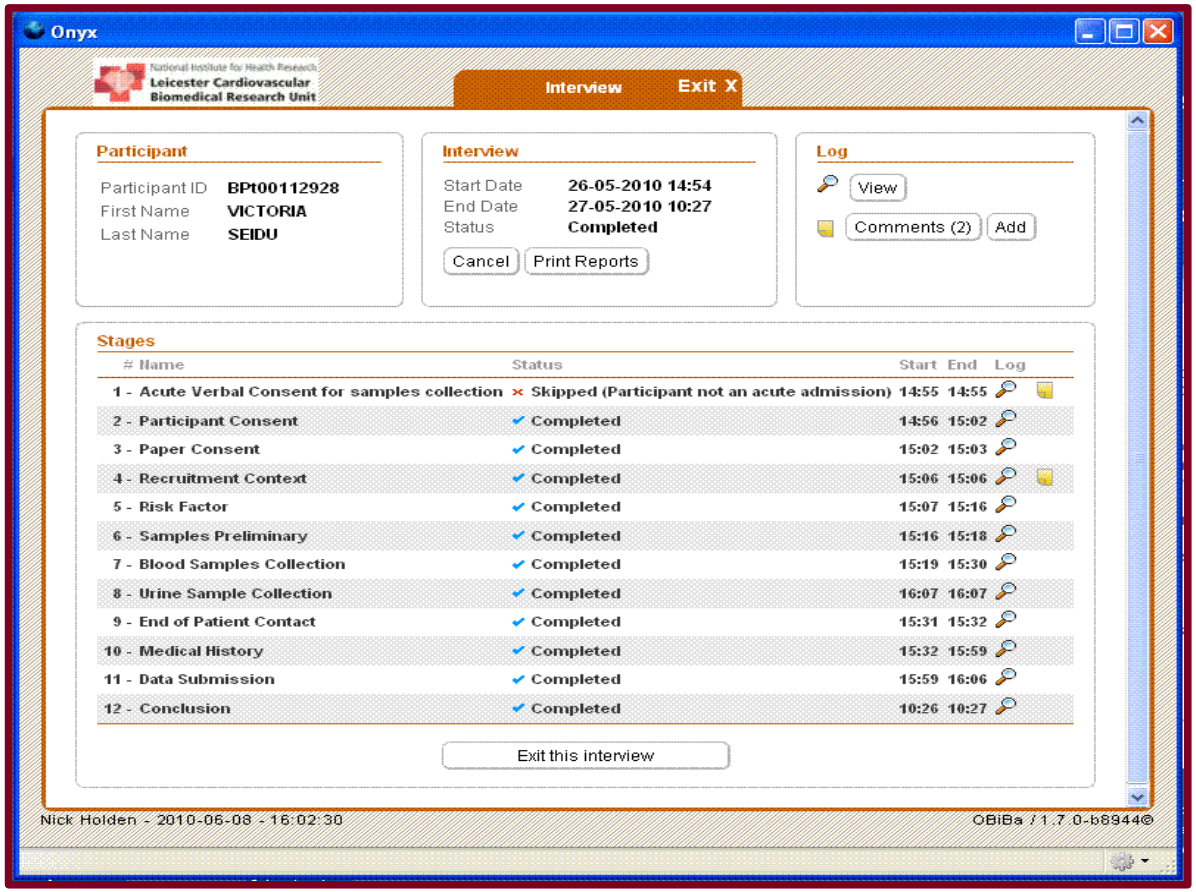
Electronic Data Capture



Onyx *- from the OBiBa Open BioBank suite of software tools - manages baseline interviews.*

Records participant consent, questionnaire data & primary specimen IDs.

Web-based, secure data entry by research staff. Used for all recruits to BRICCS prototype - mobile computing on wards and outpatient clinic

Ontario/Montreal/Perth (Aus)/East Coast US

Allows for integration with physical measurement devices, manages appointments, participant look-up to registry services or walk-in volunteers.

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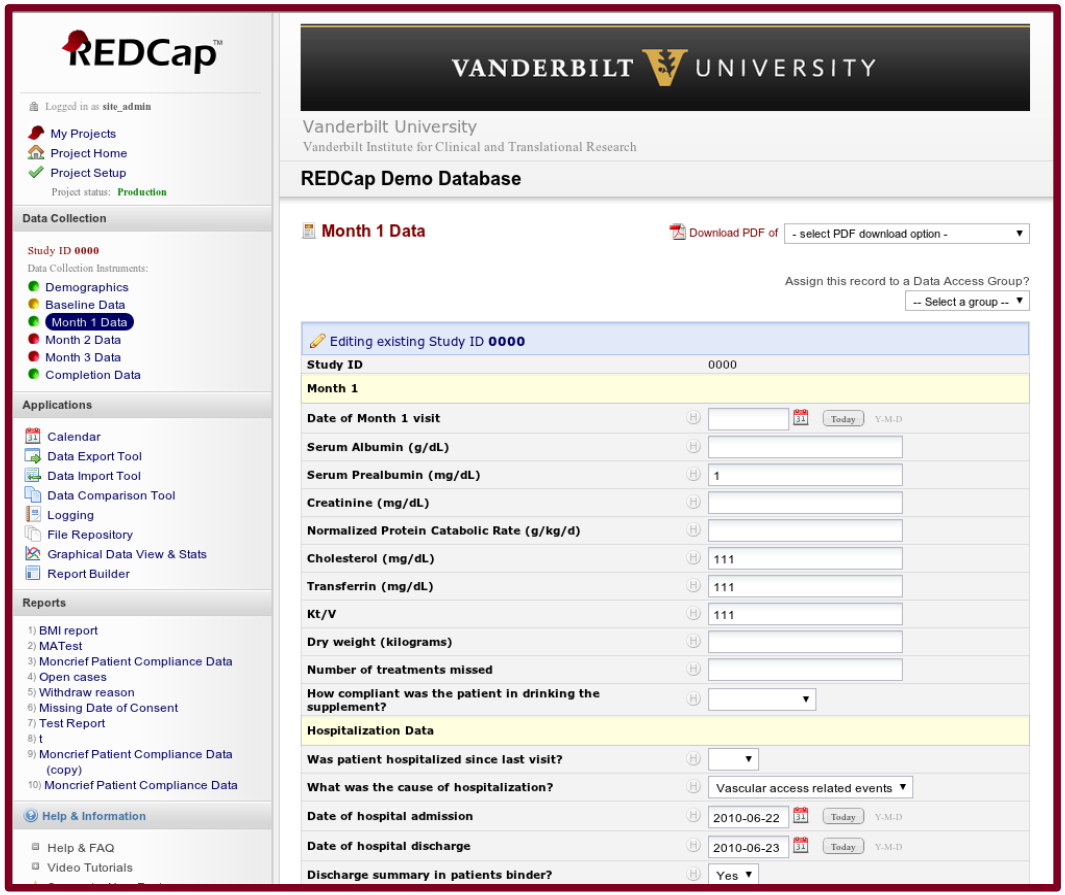
Electronic Data Capture



REDCap *allows for common data elements to be re-used in building and managing online surveys and databases.*

Create and design projects using your web browser using the Online Designer; and/or by constructing a 'data dictionary' template file in Microsoft Excel.

Both surveys and databases (or a mixture of the two) can be built.

REDCap provides audit trails for tracking data manipulation and user activity, as well as automated export procedures for seamless data downloads to Excel, PDF, and common statistical packages (SPSS, SAS, Stata, R).

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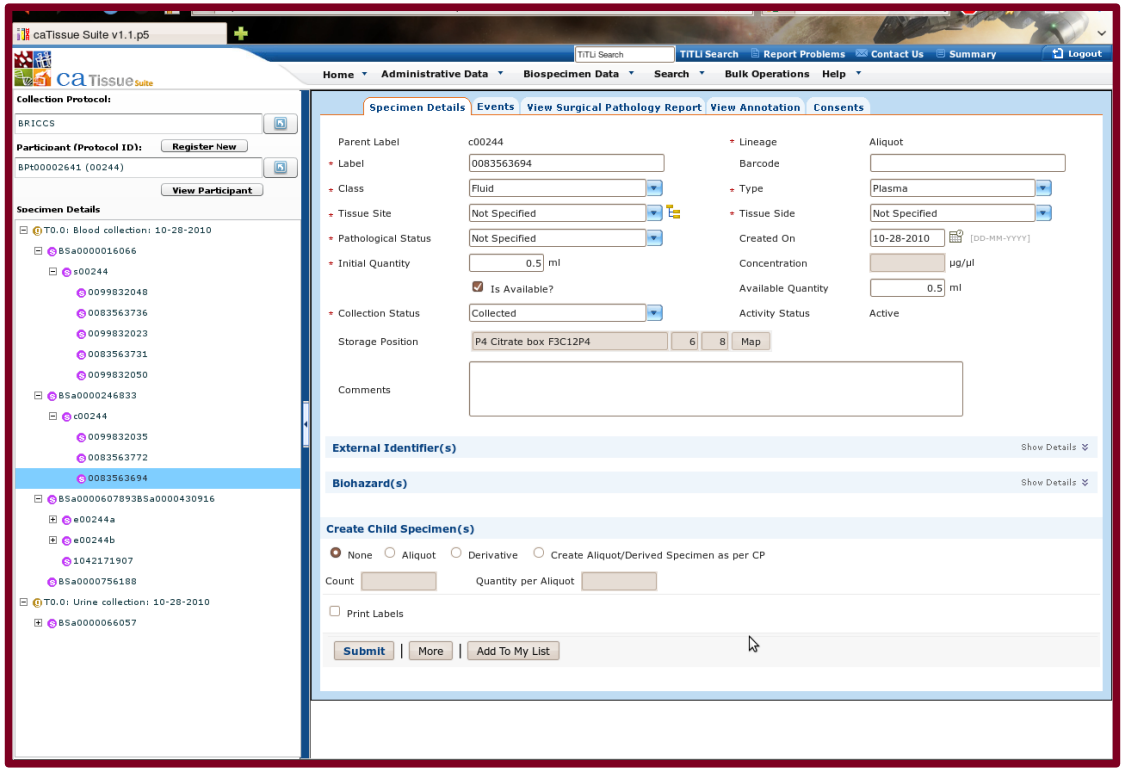
Specimen Management



caTissue *is caBIG's biorepository tool for biospecimen inventory management, tracking, and annotation. This tool permits users to enter and retrieve data concerning the collection, storage, quality assurance, and distribution of biospecimens.*

caTissue Suite is scalable and configurable for deployment across biospecimen resources of varying size and function, and that manage multiple types of biospecimens (tissue, biofluids, nucleic acid).

Recording of biospecimen shipping and tracking events across repositories in a single caTissue installation.

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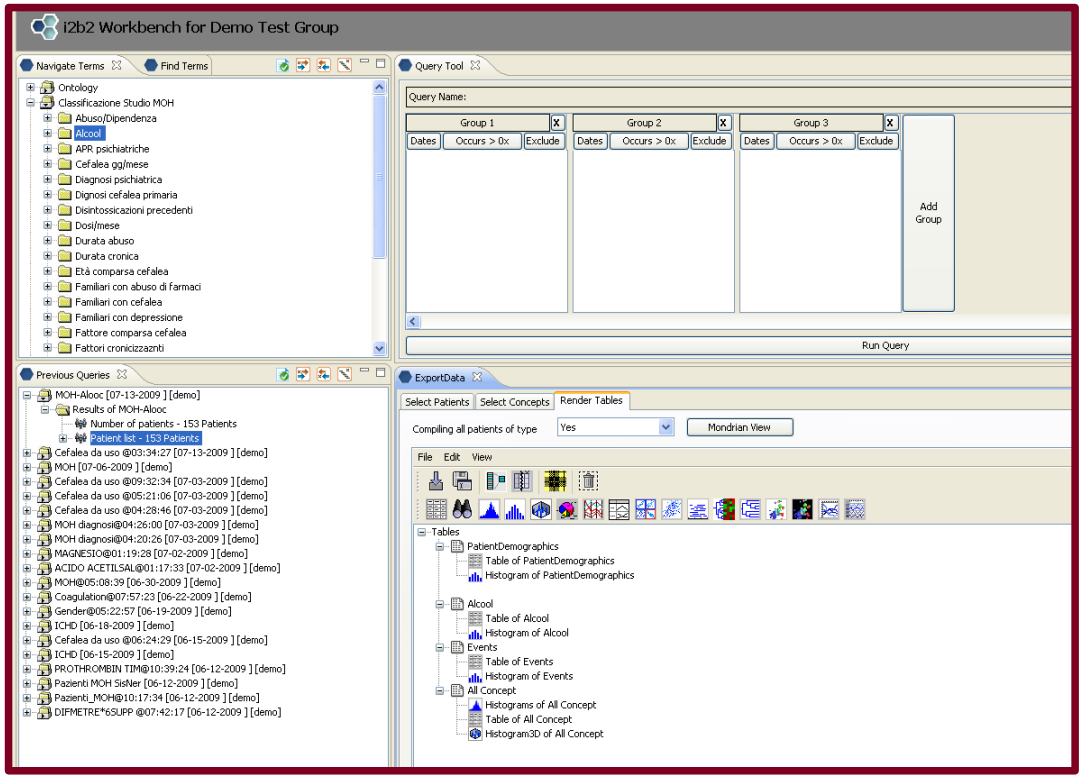
Translational Data Management



I2b2 *is a comprehensive software and methodological framework to enable clinical researchers to accelerate the translation of genomic and "traditional" clinical findings into novel diagnostics, prognostics, and therapeutics.*

Data from disparate sources can be loaded into i2b2 under a sophisticated mechanism of ontology building, allowing for complex searching and cross-referencing of data, visualisations and export.

Plugins allow for natural language processing and data visualisation.

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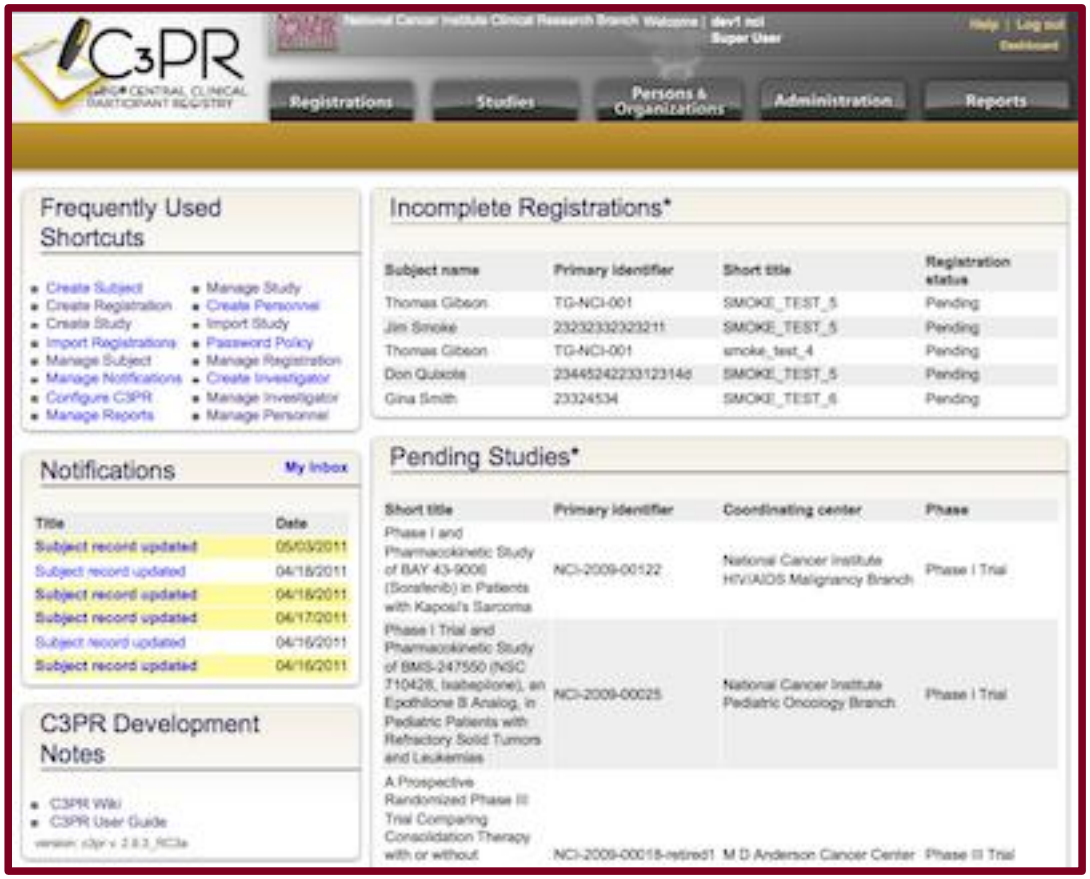
Central Participant Registration



C3PR - caBIG Central Clinical Participant Registry - enables efficient and streamlined registration of participants into studies. It can be used by an individual site, or by a multi-institutional organization with many, graphically dispersed sites.

C3PR helps to organize, and standardize a template for patient registration, informed consent, inclusion/exclusion criteria, stratification categories, and treatment arms.

The system tracks screening failures and enrollment statistics, and can be configured to alert study personnel when accrual thresholds are met.

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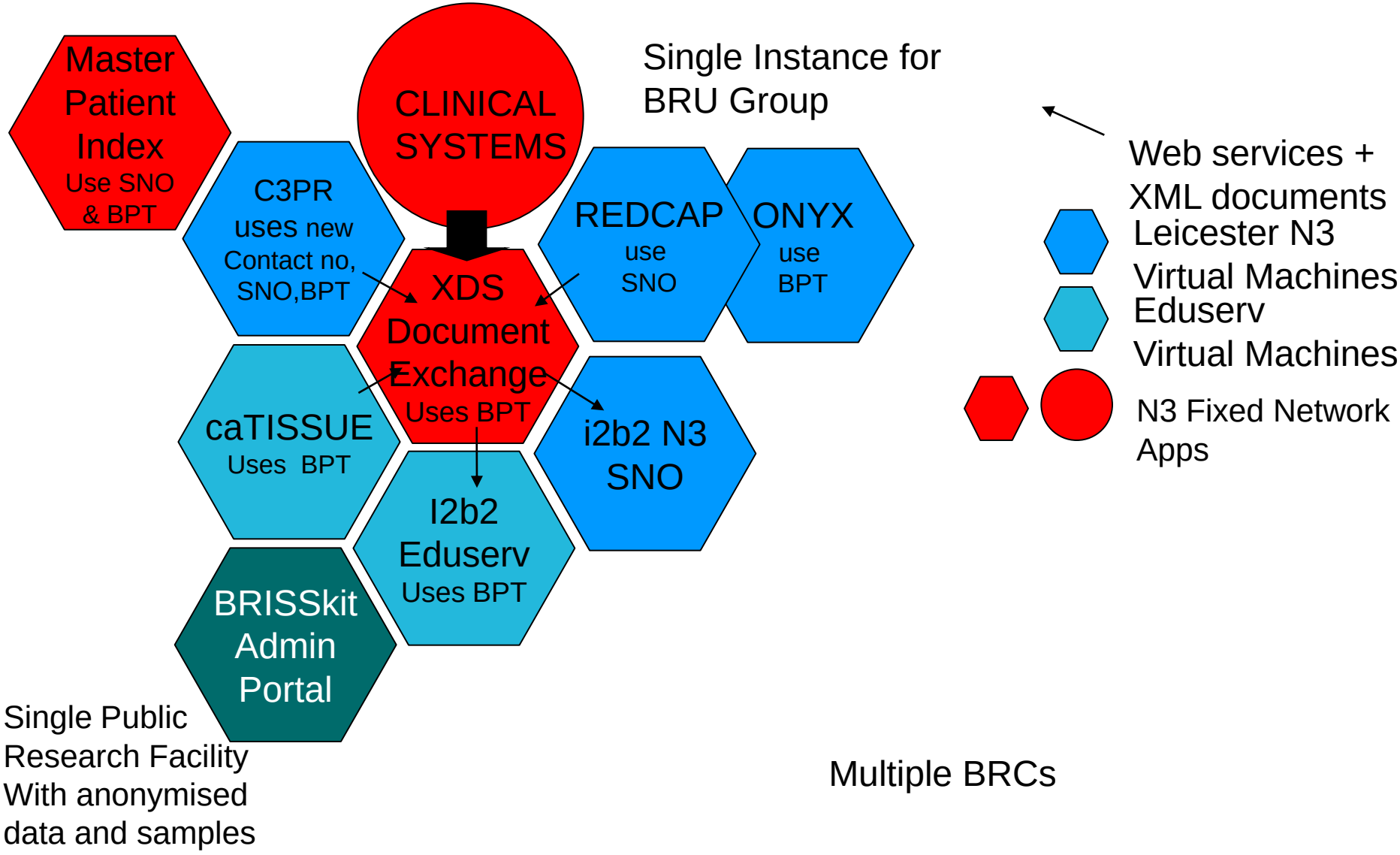
BRISSkit VMs



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BRISSkit Key Requirements

- Global admin portal
- One mySQL server and Oracle server per customer
- One application config and database schema per customer
- Each application is a BRISSkit Plugin architecture
  - XDS and management layer sit on same VM
  - One VM per application
- Ontology is a user problem, we just provide tools (ontology management cell)
- 3 levels of control, global, customer, user
- Customer (e.g. BRU) determines own admin roles . . .
- Patient identities managed my customer and linked to XDS Global
- Ontology changes – how do we handle

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Theme	Core Components	Lead
Service Design	Detailed project plan (1.1) Engagement with key stakeholders (UoL / UHL / NHS / JISC / JANET / Eduserv / International) Revised project plan (1.2) Provision of Workshops (9.1, 9.2-9.5)	Jonathan Tedds (UoL) / Malcolm Newbury (GuildFoss)/ Chris Greengrass (UHL BRICCS) / Nilesh Samani (UoL Cardiovascular)/ Tony Brookes (UoL Genetics) Paul Burton (UoL Health Sciences) Peter Knight (NIHR)/ Kevin Harris (UHLT)/ Kevin Schurer (UoL PVC Research)/ JISC / JANET / Eduserv / HEFCE
Technical development	Generic deployment infrastructure VM Test facilities (2.2) caTissue API client (4.2) Data generation tools (5.4) Data warehouse application (7.3) UK customisations (7.1) Integration of caTissue / i2b2 (8.1)	Nick Holden (UHL)/ Jeff Lusted (UoL)// Debadutt Goswami & team (UoL)
Return on Investment	Baseline – NIHR BRU / BRC Baseline – non NIHR Biomedical Research Groups Model cost savings and develop Business Plan	Charles Beagrie Consultants / JISC / JANET / Eduserv / HEFCE UoL Business Development

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BRISSkit Sustainability – OS engagement

- *OS* community engagement
  - *standards compliance*
  - *service vision*

- *Cross-enterprise Service Architecture*:
  - how to join & use service for new groups & partners
  - Definition of service vision, organisational & service components
  - all relevant standards & tools which Brisskit partners will be expected to use and comply with

- *OS Community Engagement Charter*
  - defining engagement with existing & new OS communities
  - including adoption & code commitments

BRISSkit – meeting a challenge?

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Is there value in delivering cloud-based applications as a service to researchers?

- Ease of deployment, administration and archiving
- Cost of computing can be scaled to projects
- Model lends itself to distributed projects and teams
- Infrastructure can be geared to integration
- Enhanced basis for data sharing and federation

- Need to ensure sustainability of the service
- Confidentiality and governance

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