



NHS – HE Forum Scotland 23rd June 2014

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Research & Infrastructure

Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study



Karen Barnett, Stewart W Mercer, Michael Norbury, Graham Watt, Sally Wyke, Bruce Guthrie

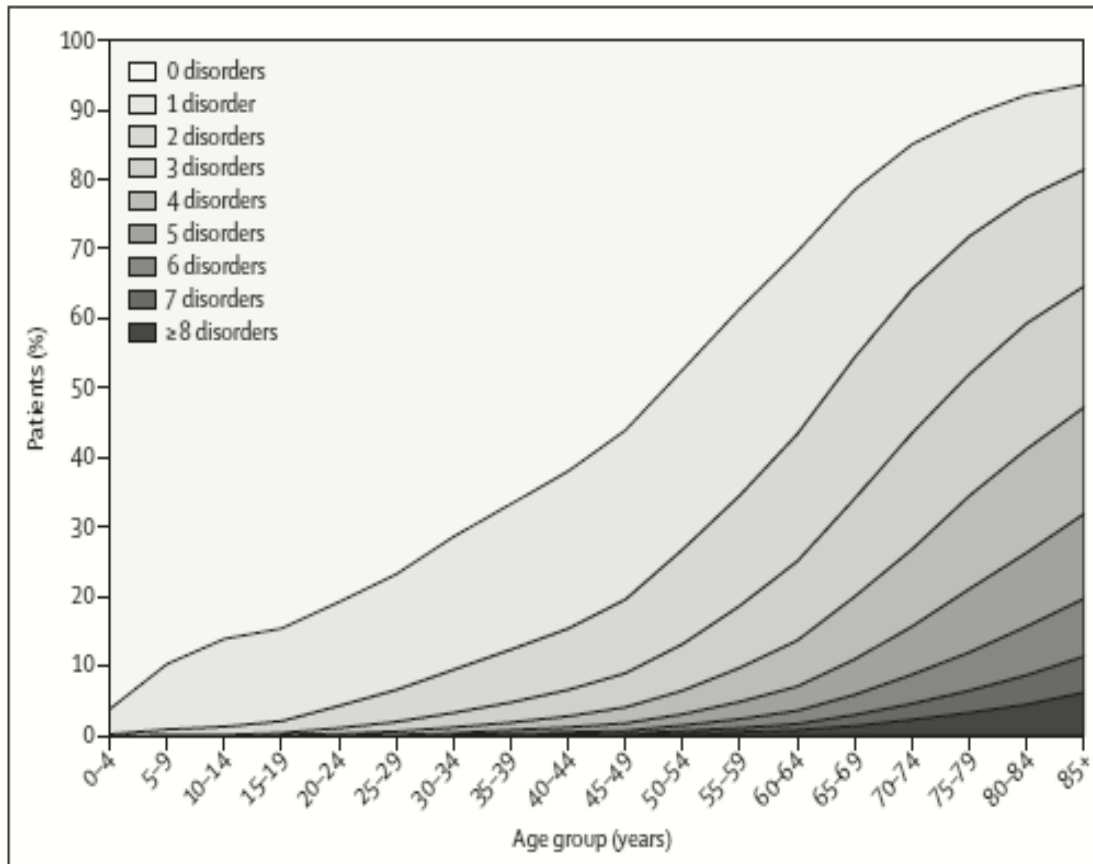


Figure 1: Number of chronic disorders by age-group

**Population-based study
1.75M people in Scotland
42.2% one or more CDs**

“Management of patients with several chronic diseases is now the most important task facing health services in developed countries, which presents a fundamental challenge to the single-disease focus that pervades medicine”

Data is the Key

- Data are recorded about individuals by many different organisations
- Linking of these data is essential for research
- Different types of health data:
 - Scottish Morbidity Records,
 - GP Data,
 - Dispensing Records,
 - Hospital Admissions
 - Lab Results
- Useful for
 - directing government policy,
 - finding subjects to recruit into clinical trials,
 - investigations of poly-pharmacy,
 - research into personalised medicine,
 - investigations into the efficacy of drugs,
 - progression of diseases
 - analysis of disease management

Our Vision



“To harness health data for patient and public benefit by setting the international standard in trustworthy reuse of electronic patient records and related linkable data for large-scale research.”

Our Opportunity

£19.5M Investment

- Undertake cutting-edge research in health informatics and development of e-health applications
- Build capacity in health informatics research

welcometrust

Arthritis
Research UK



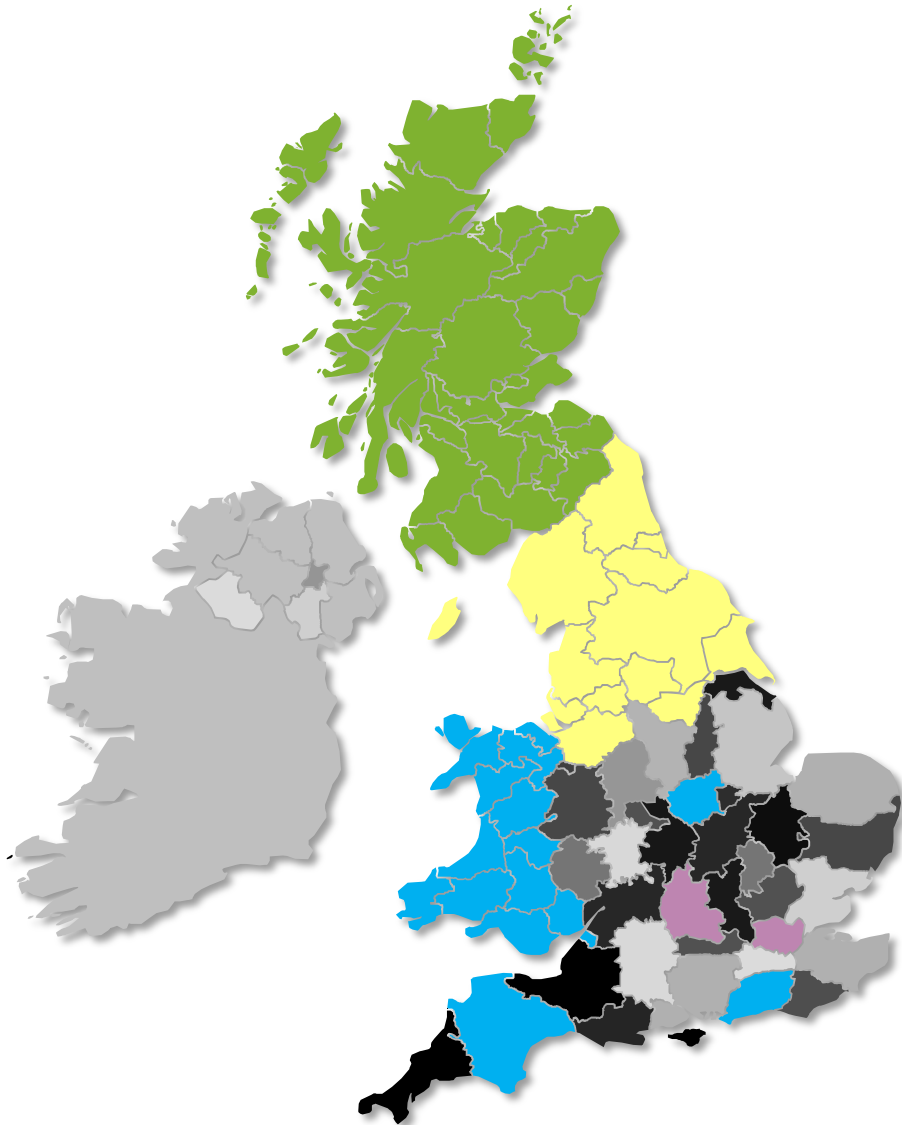
EPSRC
Engineering and Physical Sciences
Research Council

NISCHR
National Institute
for Social Care and
Health Research

NHS
National Institute for
Health Research



Health Informatics Research Centres



Map Source: www.m62.net

● Scotland

Dundee, Glasgow,
Edinburgh, St Andrews,
Aberdeen, Strathclyde,
MRC HGU, NHS NSS

● HeRC N8

Manchester, York,
Lancaster, Liverpool,
Sheffield, AHSNs

● CIPHER

Swansea, Bristol, Cardiff,
Exeter, Leicester, Sussex,
NWIS, Public Health Wales

● UCL Partners

UCL, LSHTM, Queen Mary,
Public Health England

Then came another £20M!
Five Key Areas of Capital Spend
to create a distributed Institute

- ***Physical centres***
- ***Safe havens***
- ***Digital e-infrastructure***
- ***New data access***
- ***Communications***



“Diseases are more easily prevented than cured and the first step to their prevention is the discovery of their exciting causes”

William Farr

Our Ten Key Activities



1. Collaborative Leadership.
2. Cutting edge Research
3. Public engagement.
4. Governance (safe havens)
5. Methods development
6. Meta Data and Enabling Datasets
7. Harmonised eInfrastructure
8. Partnerships
9. Training/ Capacity Building
10. Communications

To deliver impact nationally an internationally

Teams build success



www.ferrari.com

Things researchers probably should not be doing...

- Networks
- Firewalls
- Intrusion Detection & Prevention
- Operating Systems & Patching Processes
- Storage
- Backup
- Archiving
- System Security Analysis
- Authentication
- ISO27001/27002 Accreditation

Farr Scotland Capital Spend

Farr@Dundee Building Refurb

Farr@Scotland
Edinburgh Bioquarter, 7 year lease



Enabling 3
New National Datasets –
Imaging data; Lab data;
GP data

5M Capital Fund

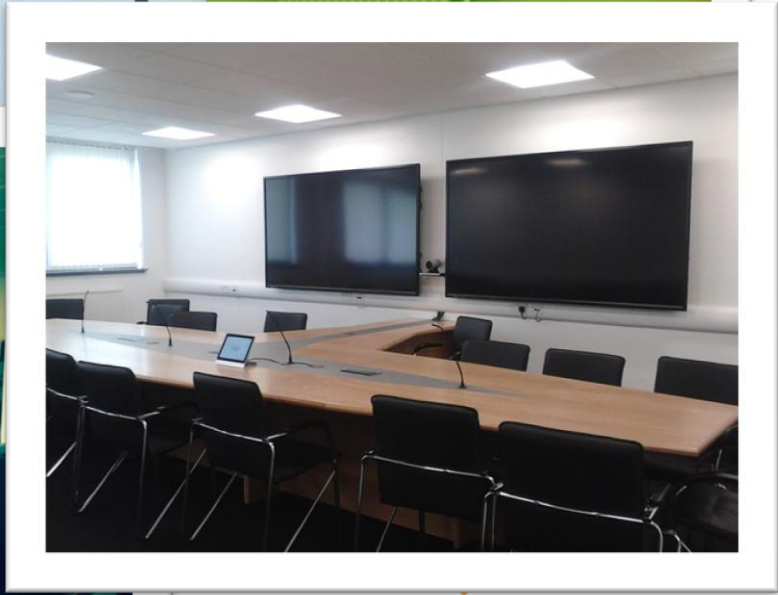
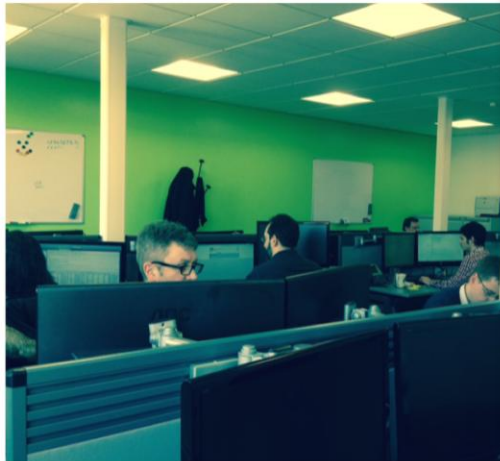
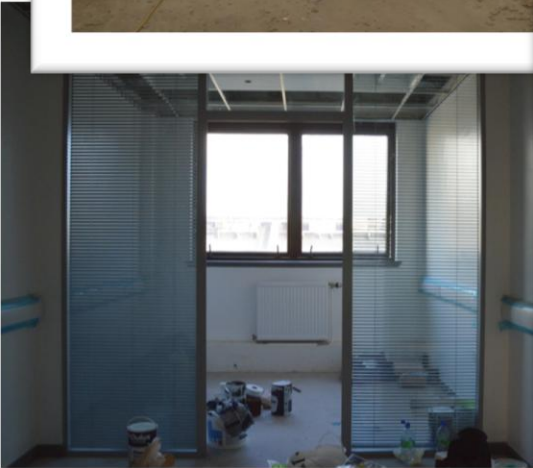


Private Cloud
HPC Infrastructure

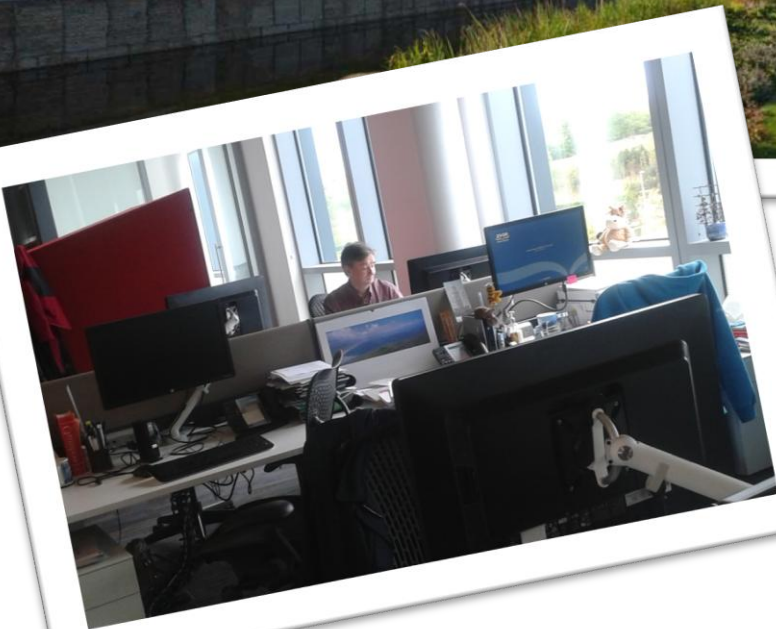
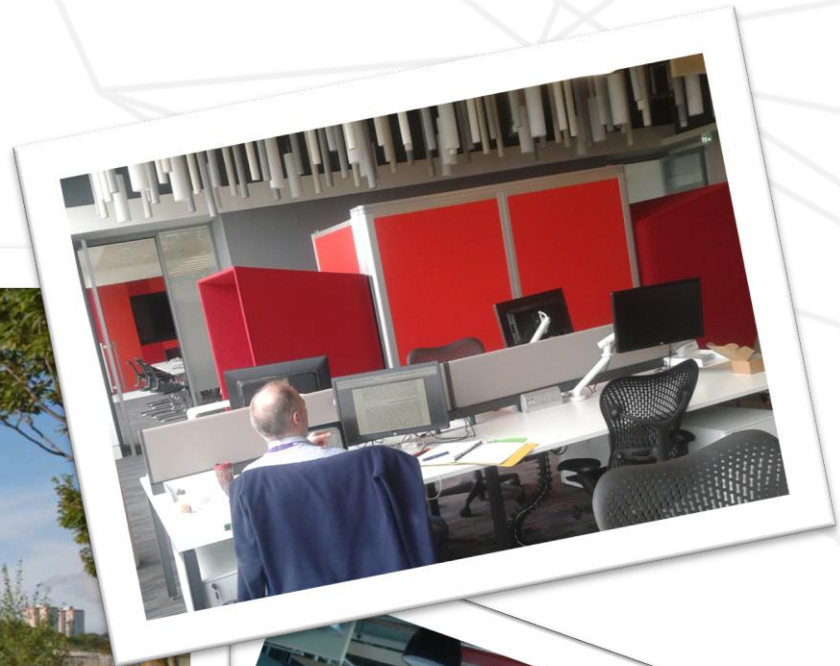
Telepresence Suites



Dundee Institute

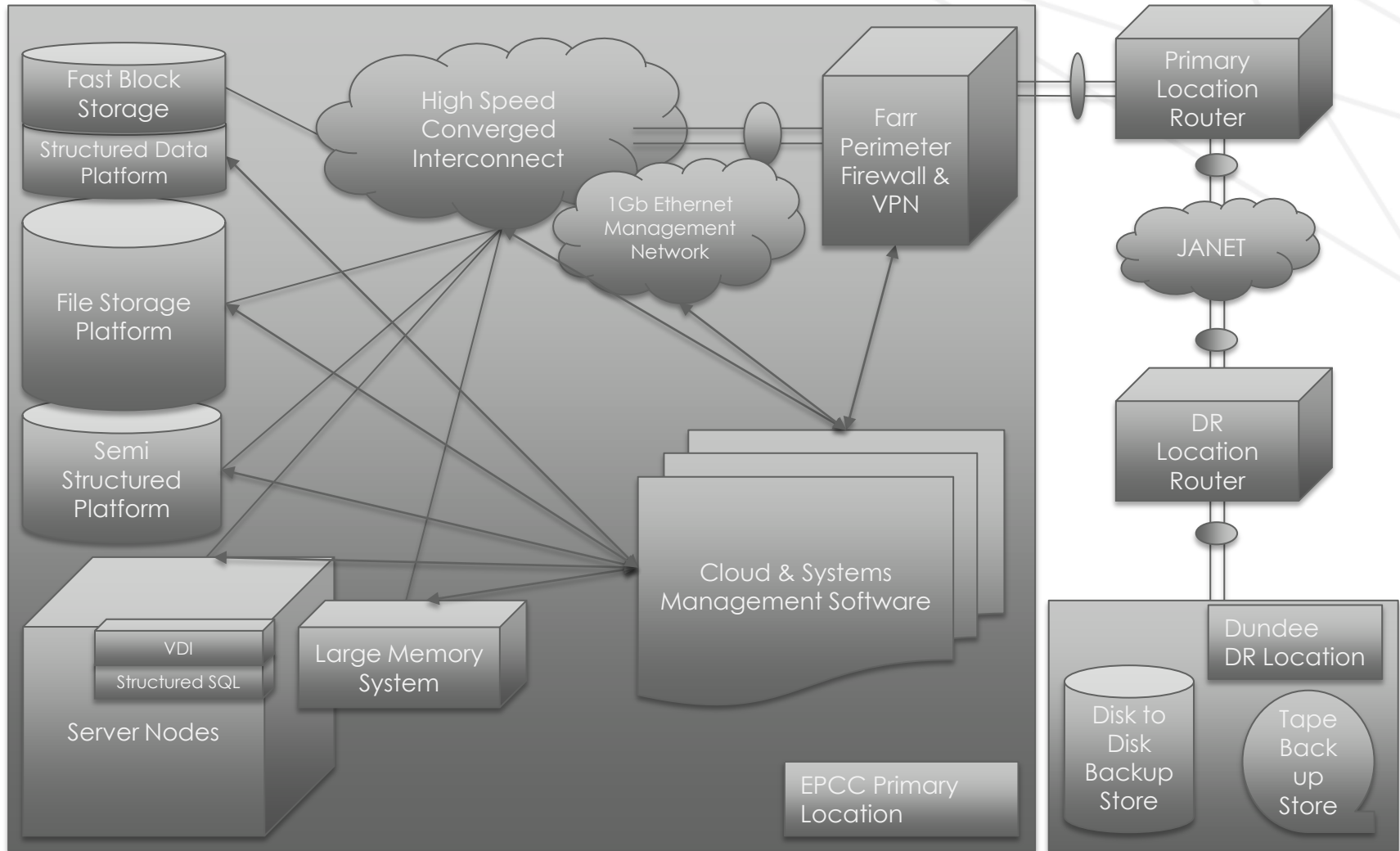


National Institute in Edinburgh



IT Infrastructure

IT Infrastructure Schematic

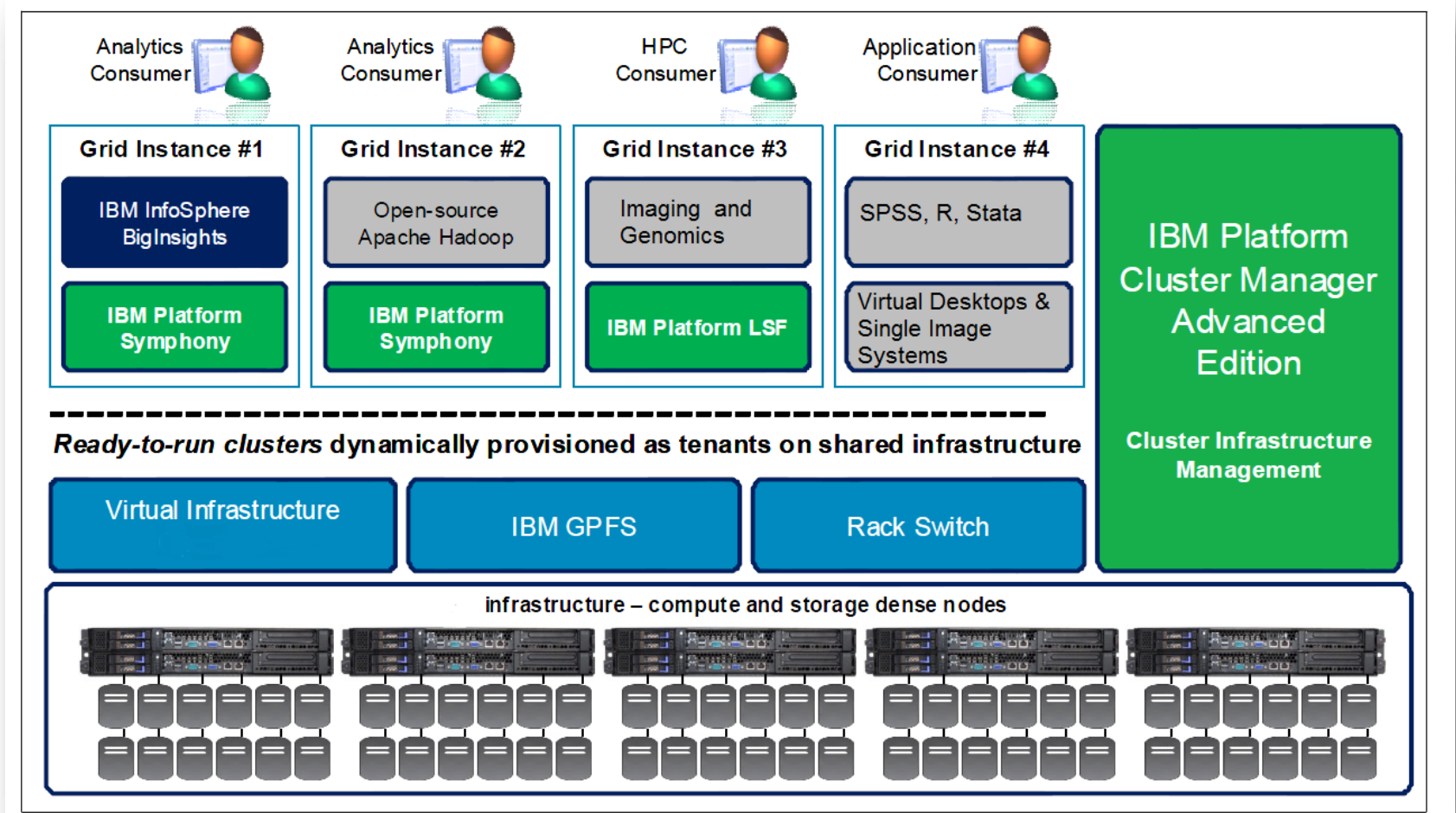


IT Infrastructure

- Partnership with 
- Scalable multi-tenant compute platform providing On Demand infrastructure
- Managed by IBM Platform Advanced Edition
- McAfee Next Generation Firewalls
- Citrix Remote Access and VPN
- 1PB of storage including multi site backup for imaging and large scale file storage
- IBM Big Insights Analytics Cluster



Sharing Resources



Next Steps

- Federated Network of Safe Havens
- Ja.net sponsored projects
 - Secure Network Layer
 - Sponsored federated authentication

Network of Safe Havens

Data Repository (DR)

- Secure Storage Environment
- Indexing
- Cleaning
- Pre-Processing
- Identifiable data stored separately or not at all
- Study specific datasets generated
- Accredited Staff

Analytics Platform (AP)

- Secure Analytic Environment
 - Remote Desktop
 - Secure Physical Location
- Receives and links Study Specific datasets
- Anonymised project identifiers
- Disclosure Control
- Accredited Staff & Researchers

Secure Data Transfer

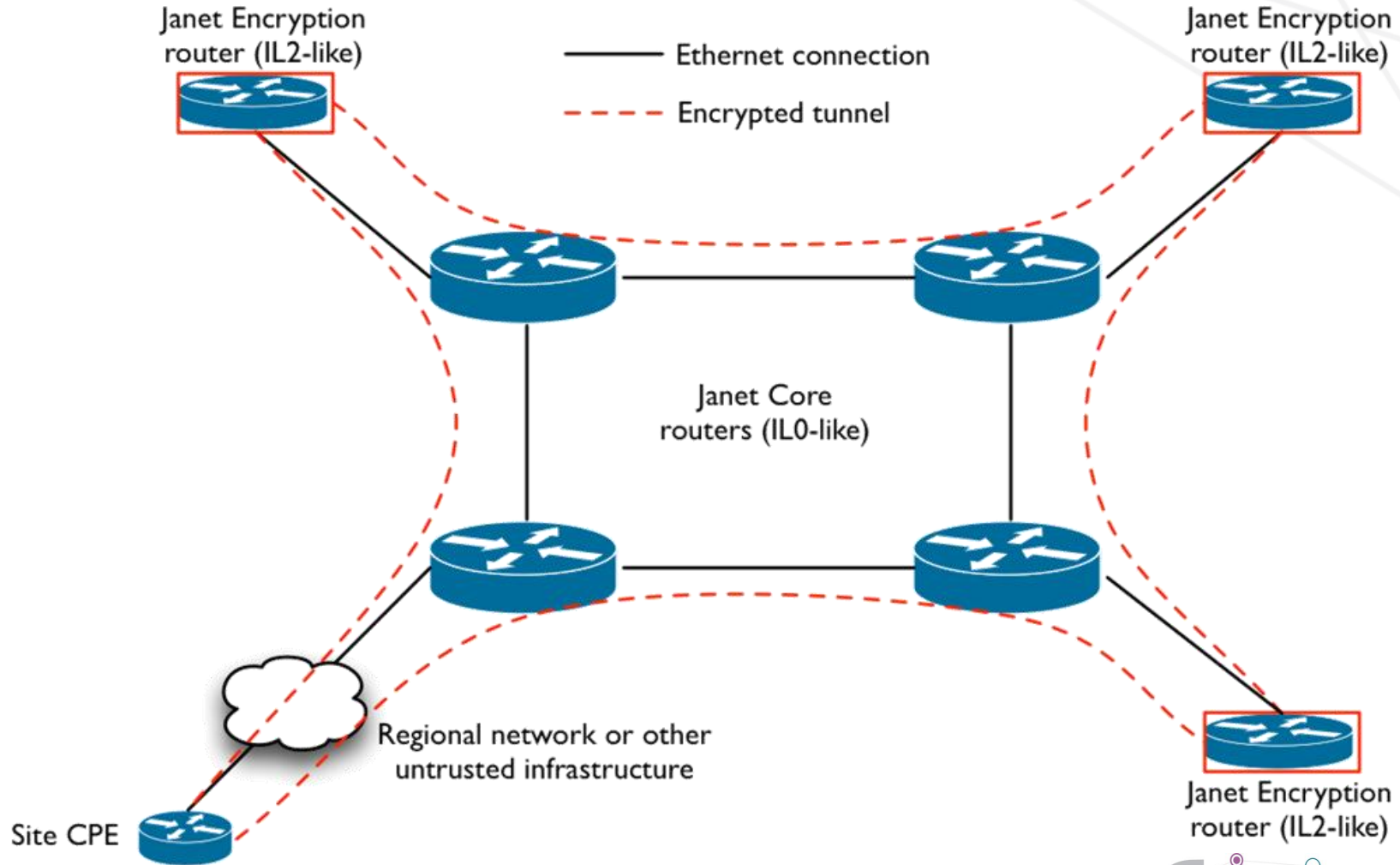
- Managed File Transfer
- Secure Web Services

Farr & janet

- Farr eInfrastructure group and Janet met in autumn 2013 to discuss how to
 - Implement secure networking layer
 - Set up AAI user management system
- With announcement of ADRC and Medical Bioinformatics funding we quickly realised these projects need same solutions
- Series of meetings and workshops to bring these groups together
 - UCL, Crick, Manchester, Leeds, Dundee, Swansea, Oxford, Southampton, Sanger,.....

Secure Network Layer

janet



AAA/IDM

- Authentication – I can prove that I am who I say I am (probably twice!)
- Authorisation – Yes, you can use this.
- Accounting – Who used what, when?

- Identity Management
 - Federation
 - SAML/Shibboleth
 - Moonshot

Meeting the Big Data challenge

- Being able to access data securely
- Being able to share data safely
- Being able to work together collaboratively
 - Solve the problem once for everyone
- Pilots identified
 - #1 is to share data-sets between the Manchester and Dundee data centres in a research project asking the question “Do diabetic drugs cause cancer?”
 - #2 researchers can use their home credentials to access the N8 HPC, HeRC and DiRAC facilities
 - build on existing work within the Janet Moonshot pilot
 - Subject to funding