NGS
National Grid Service

The UK National Grid Service
Towards Sustainability

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EPSRC
MANCHESTER 1824 The University of Manchester
Science & Technology Facilities Council
National e-Science Centre
White Rose
JISC
oerc

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Overview

»What ?
»Why ?
»Where ?
»What next ?

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What is it?

- Integrated access to computation and data
  - Some core provision
  - Some Special or restricted services
  - Increasingly dominated by partner owned resources
- Access for UK academic researchers
- Funded by HEFCE + RCUK
- Service started in September 2004
  - ~£7 core funding over 6 years.
- Currently ~800 registered compute users
  - Over 3000 identities

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Why ?

Vision

To provide coherent electronic access for UK researchers to all computational and data based resources and facilities required to carry out their research, independent location.

- Providing integrated interfaces and infrastructure for research communities to access and share distributed resources
- Connecting computing services to researchers, collaborations and research computing
  - Sharing and driving best practice.
  - Sharing and driving value added developments
  - Sharing and driving novel developments
- Improved ongoing support for researchers

It is about common services and (open) interfaces

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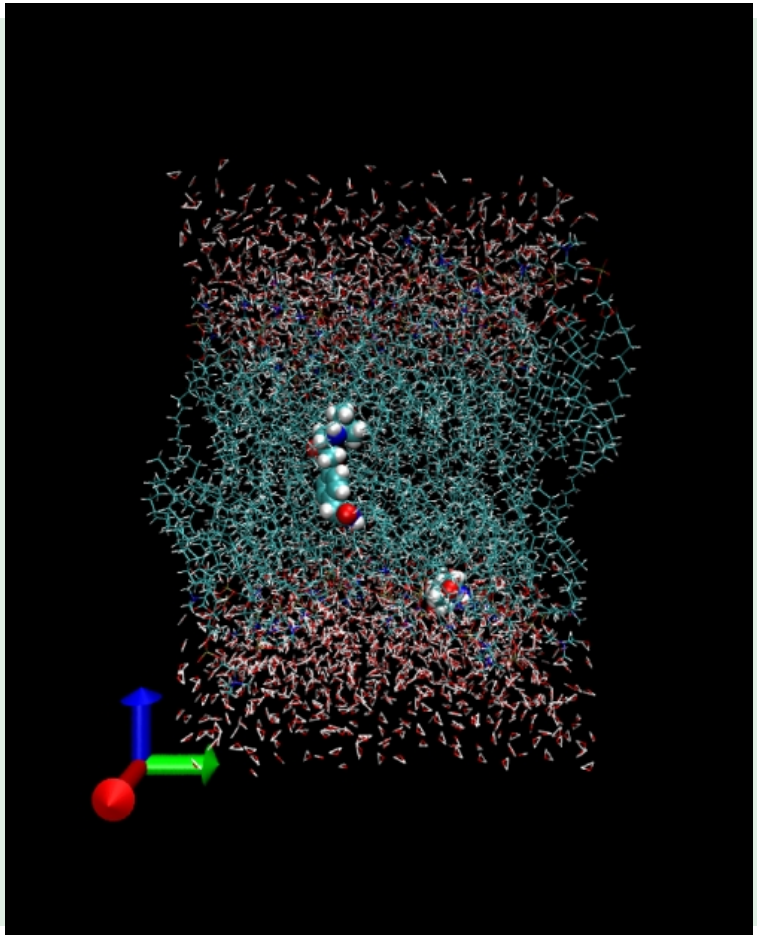
Simulation performed on the NGS of a drug permeating through a membrane

Name: Dr Brian Cheney
Institution: University of Southampton
Research: Membrane Permeation

Drs Brian Cheney and Jonathan Essex research membrane permeation of small molecules at the University of Southampton. They're interested in learning what physical and chemical features make a molecule a good or bad permeant, and in developing ways to quantify and estimate a molecule's permeability.



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Using the NGS to access geographically distributed astronomy databases

Name: *Helen Xiang*
Institution: *University of Portsmouth*
Research: *Astronomy databases*

Helen Xiang and Professor Robert Nicol at the University of Portsmouth have been working on Astronomy databases. They use software called OGSA-DAI to link up astronomy data that is stored on the NGS and at Portsmouth. This way they can retrieve the data from two places with one command.

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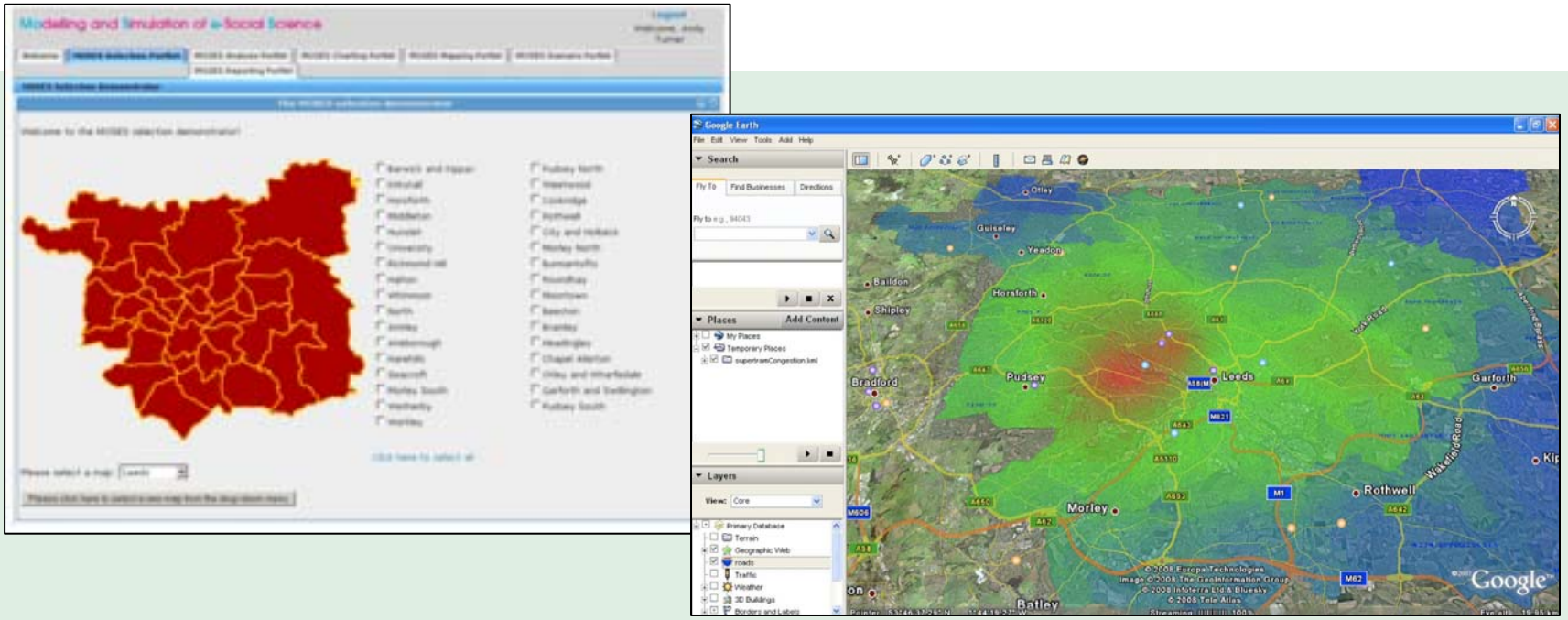
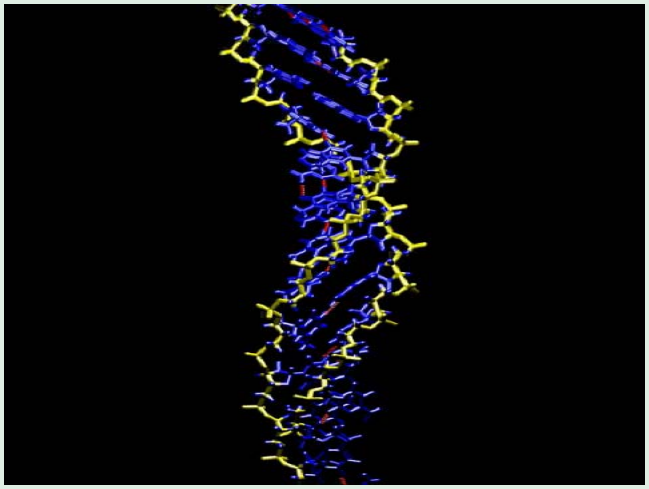
Demographic Modelling



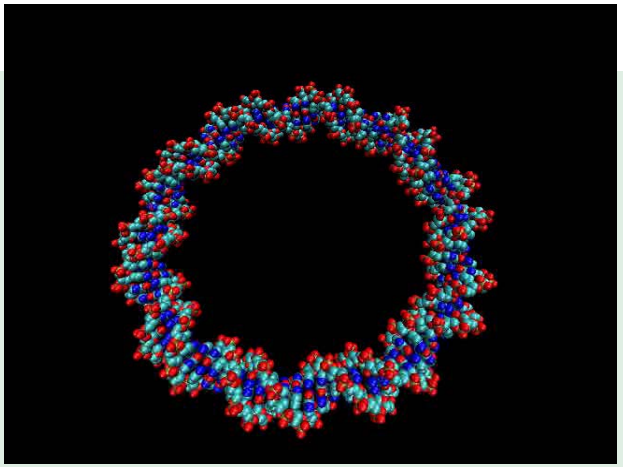
Dr. Andy Turner from Leeds run national demographic simulations. The results can be visualized in a variety of mapping tools, such as Google Earth..

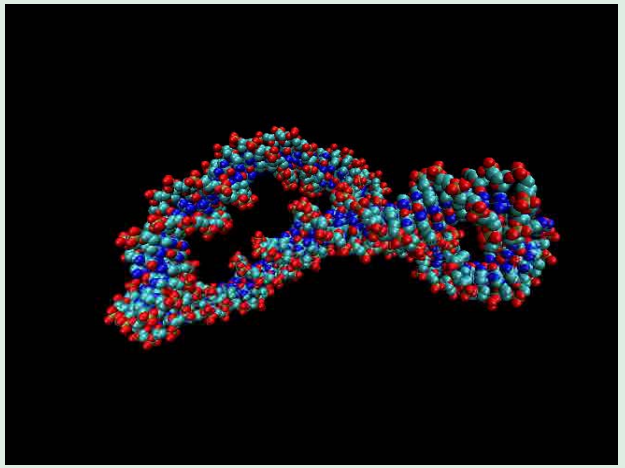
Simulating DNA Mechanics



Simulating DNA stretching

Overtwisted DNA circles





Work on the NGS done by Sarah Harris and Jon Mitchell, University of Leeds

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Where is it?

- NGS has four cores sites
  - Leeds, Manchester, Oxford, RAL
- Also has partner resources
  - Cardiff University; HPCx; Lancaster University; Queens University of Belfast ; University of Glasgow Computing (2) ; University of Westminster
- And affiliate resources
  - Edinburgh; Imperial College London; Keele University; University of Bristol ; University Of Oxford Particle Physics Department ; University of Reading ; University Of Southampton ; RHUL.
- Partners provide a range or resources
  - Compute, data, hosting, community portals ...

The NGS Core, Partners & Affiliates, Summer 2008

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Science & Technology Facilities Council
Rutherford Appleton Laboratory

HPCx
CAPABILITY COMPUTING

BeSC
Belfast e-Science Centre

MANCHESTER 1824

CARDIFF UNIVERSITY

LANCASTER UNIVERSITY

University of Westminster

UNIVERSITY OF Southampton

University of Glasgow

KEELE UNIVERSITY

Imperial College London

University of BRISTOL

The University of Reading

UNIVERSITY OF BIRMINGHAM

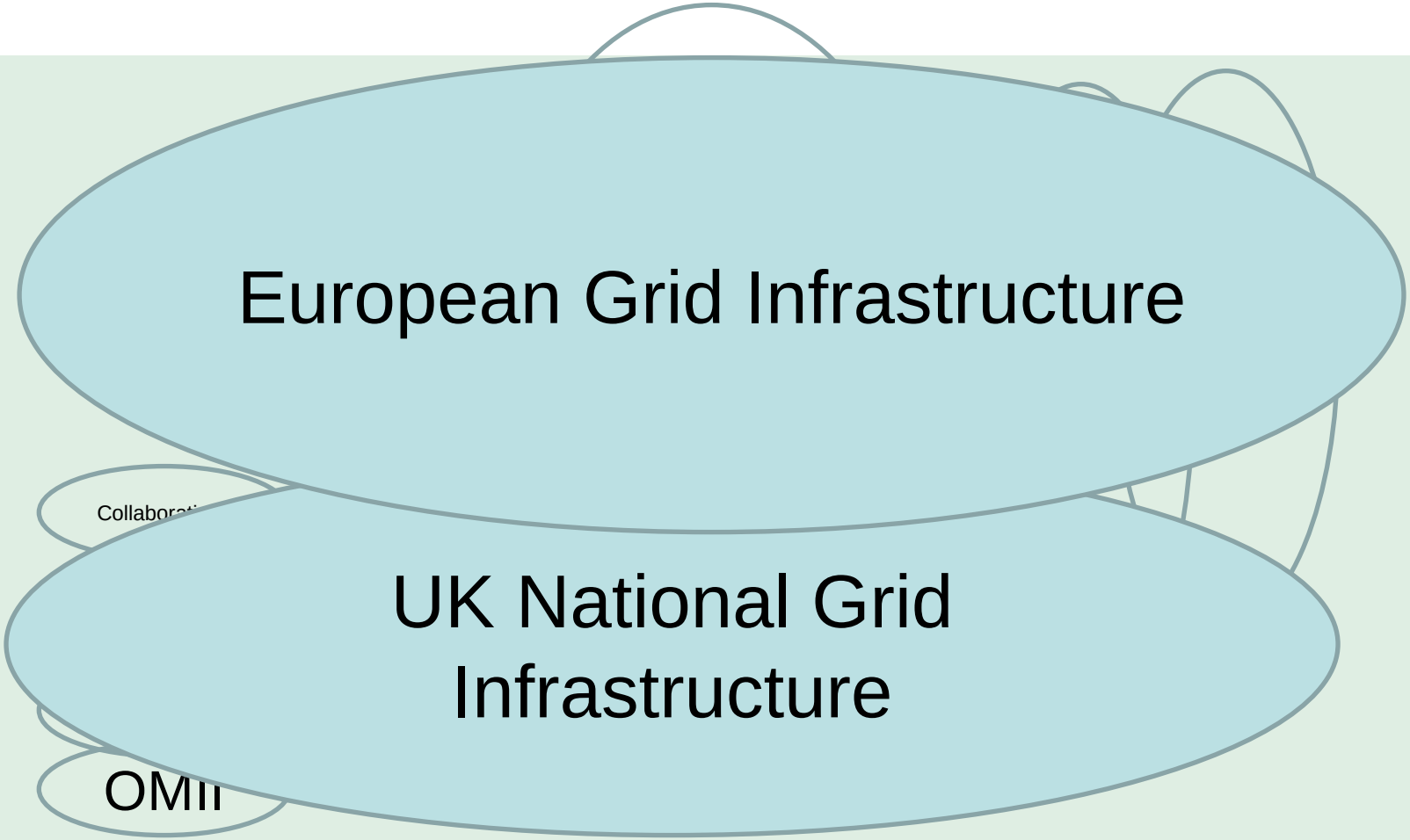
New Members in the pipeline

- NW-Grid
  - NW England regional grid, Manchester, Liverpool, Lancaster and Daresbury Lab.
- HECToR
  - UK National Supercomputer
- Brunel University
  - GridPP, Tier2
- Durham University
  - GridPP, Tier2
- Liverpool University
  - GridPP, Tier2
- Royal Holloway
  - GridPP, Tier2
- EDINA and MIMAS
  - National Data Centres
- Aberystwyth
- Aston
- Daresbury
  - CATS hybrid cluster
- Hull
- Plymouth
- RAL
  - Visualization Cluster
- WRGrid
  - NE England regional grid, Sheffield, York and Leeds
- DIAMOND
  - National Synchrotron resource

What Next

- Goals:
  - To enable a production quality e-infrastructure
    - Expand towards all Higher Education Institutes.
    - Continue to support research
  - To deliver core services and support
    - Collaborative research
    - Computation and Data.
  - Value added services and developments
  - Integrate with International infrastructures
  - Transition to a sustainable set of activities
- Must be embedded in the routine operations of UK HEI's and research organisations.
  - Expanded partner engagement, broader uptake of services and distribution of activities.

What Next ? :Context



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What Next?

- Proposal to HEFCE/JISC in October08
  - Work towards long term embedding/support
  - Focus shifts away from “core hardware”
  - RCUK proposal to support specific initiatives
- UK EGI consultation: October 3rd
  - Broad research coverage
  - Good support
    - European Collaboration - Local control
    - Enabling research - Ease of use
- Proposal that HEFCE leads on EGI integration
  - Existing UK JRU for EGEE
  - Integration of Grid/HPC/Data is a user requirement

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Conclusions

- UK NGS in operation for 4 years
- User focused
- Strong support for a sustained infrastructure
- Strong support for an integrated European Infrastructure

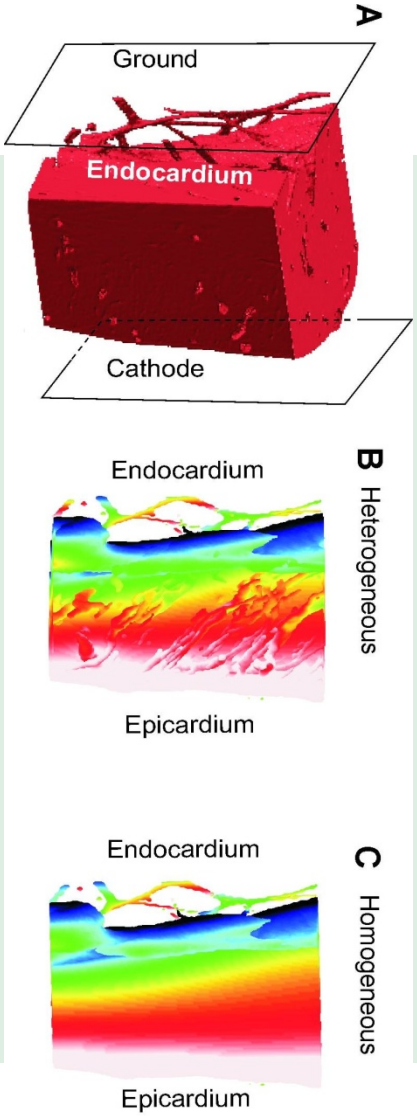
Backup Slides

Integrative Biology Project

Name: Thushka Maharaj
Institution: University of Oxford
Research: The effects of defibrillation on the heart

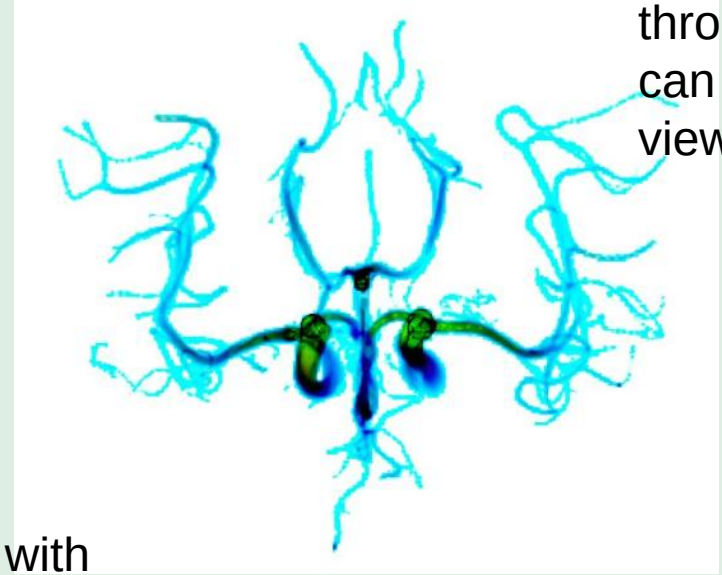
Thushka Maharaj is part of an international collaboration studying the effects of applying an electrical shock to both healthy and diseased hearts, in an attempt to understand exactly how defibrillation works.

"We use parallel code with around a million nodes." explains Thushka. "But we can get 20ms of animation in 20 minutes using 32 CPUs on the NGS. And the benefits of services such as the Storage Resource Broker are immense - it's fantastic to be able to share data with colleagues all over the world so easily."



GENIUS project

Demonstrations at AHM 2007, SC2007



Real-time visualisation of blood flow through the brain. The simulation can be steered by input data and viewing angle.

Working closely with researchers at University College London to get NGS supporting the Genius project this year

Real-time visualisation done using ray-tracer in HemeLB algorithm to avoid data transmission and pre/post processing stages

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Developments

- Shibboleth integration
- Accounting framework
- Co-scheduling
- Linking to campus grids
- Lightpath data access
- National file system

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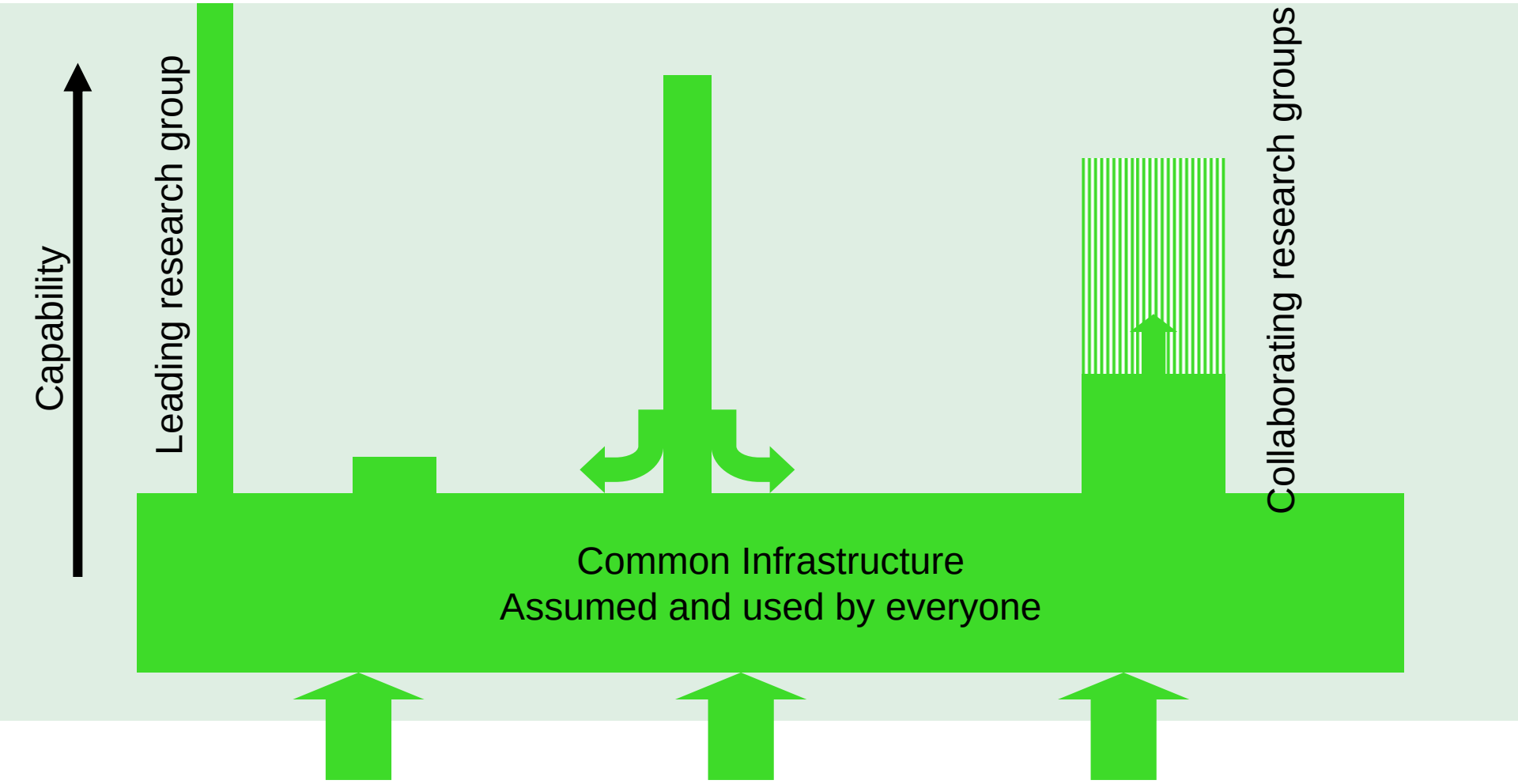
Vision Revisited



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Some value added services

- Common interfaces
- Distributed virtualised data storage and access
- Monitoring and sysadmin support
- Resource brokering
- Application Hosting
  - Traditional
  - Web service
  - Application Portal
- International gateway
  - EGI
  - International electronic identity