



Connecting UK Schools to JANET



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Outline

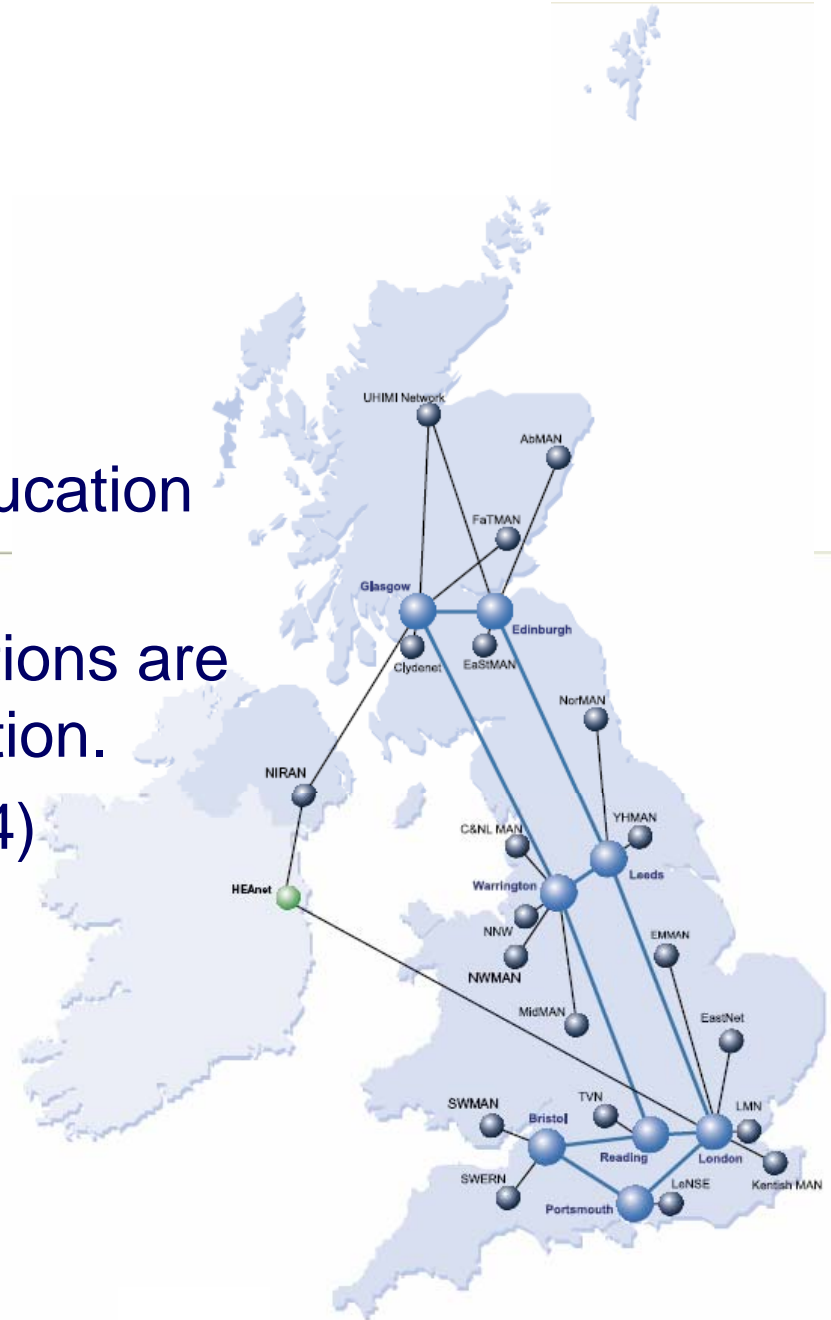
- JANET
- Needs of Schools
- Connecting Schools
- SuperJANET5 Requirements of Schools
- Issues facing UK Schools
- Other JANET Customers
- Further information



JANET

Joint Academic NETwork

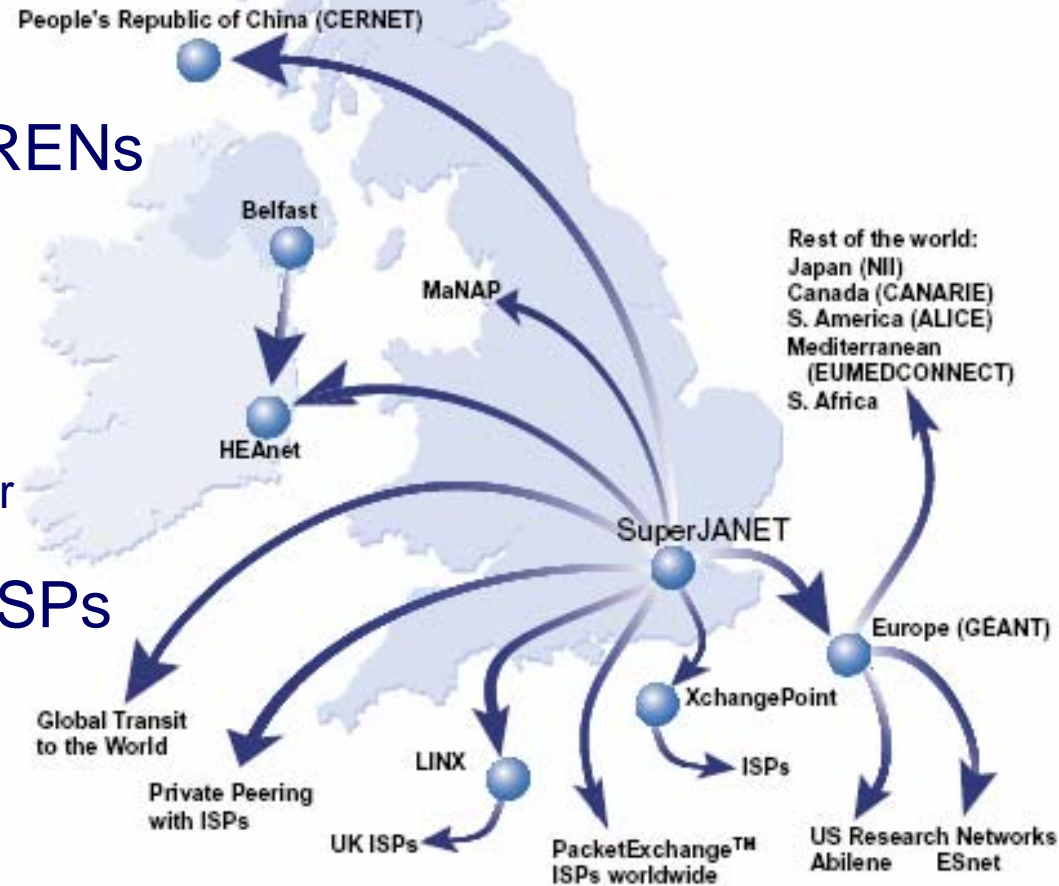
- UK National Research & Education Network (NREN)
- All UK educational organisations are eligible for a JANET connection.
- SuperJANET backbone (SJ4)
 - 8 Core Points of Presence
 - 10Gbps, 2.5Gbps to Regions
 - 20 Regional Network Operators
 - Transition to SJ5 in 2006





JANET Peering

- Peering with other NRENs
 - Ireland (HEANET)
 - China (CERNET)
 - North America
 - US Research (Abilene and ESnet)
 - Europe (GEANT) & other continents
- Private peering with ISPs
- External connections to the Global Internet





JANET Services



JANET Primary Connections

- Advisory Services
- DNS
- JANET-CERT
- Mail Services
- Network Status
- Networking Support Services
- Usenet News Services
- Videoconferencing Services
- Web Services

Content Services

e.g. Curriculum OnLine,
Pathé News Archive





Some Terms

- Local Authority (LA)
 - Might be a city, or part of a county (a borough)
- Local Education Authority (LEA)
 - Part of a Local Authority in England and Wales
 - In Scotland there is no concept of an LEA
- Regional Broadband Consortia (RBC)
 - Consortia of Local Education Authorities in each of the regions of England

In Wales and Scotland the LAs are connected to their national networks, which are Interconnected to JANET



Needs of Schools - Resources

Access to local, regional, national and global educational resources from school, by pupils and teachers

- Connection to the local authority
 - For local resources and support
- Interconnection to other schools, universities and colleges
 - For collaboration and access to resources
 - Via local, regional and national networks
- Connection to the Internet
 - For access to resources not available via the “Education Network”

Access to educational resources from home



Needs of Schools - Quality

But, all of these must be

- Safe
 - Content filtering
- Secure
 - Authentication and authorisation, *Shibboleth*
- Trusted
 - Approved quality resources
- Reliable
 - If the connections are not reliable, teachers will not use them
- Standard
 - To ensure technical interoperability and enable seamless collaboration



National Connection Target

- Most schools were connected by ISDN
- In November 2002 the Prime Minister set a target: that all schools would be connected to Broadband (IP) by 2006.
- DfES recommended bandwidths:
 - 2Mbps for Primary Schools
 - 8Mbps for Secondary Schools
- To be delivered by Local Authorities and Regional Broadband Consortia
- RBCs/LAs to be Interconnected via JANET



Regional Connection of Schools

Every UK Regional Network is different.

- However every region has an Interconnection to JANET.

There are three main regional models:

1. Regional Network
2. Region based on Local Authority Networks
3. Hybrid Region



Connection Technologies

- Digital Subscriber Lines (DSL)
- Leased Lines 2/34Mbps
- Short Distance Ethernet
- Long Distance Ethernet
- Satellite
- Wireless



JANET Interconnections to Schools

Scottish Schools Digital Network

- 2,780 Schools; 720,000 pupils; 32 Authorities
- *Scottish Executive Education Department; LTS*

Classroom 2000 (Northern Ireland)

- 1,280 Schools; 330,000 pupils; 26 Districts
- *Department for Employment & Learning; C2K*

Lifelong Learning Network for Wales

- 1,950 Schools; 500,000 pupils; 22 Authorities
- *National Assembly for Wales; Becta*

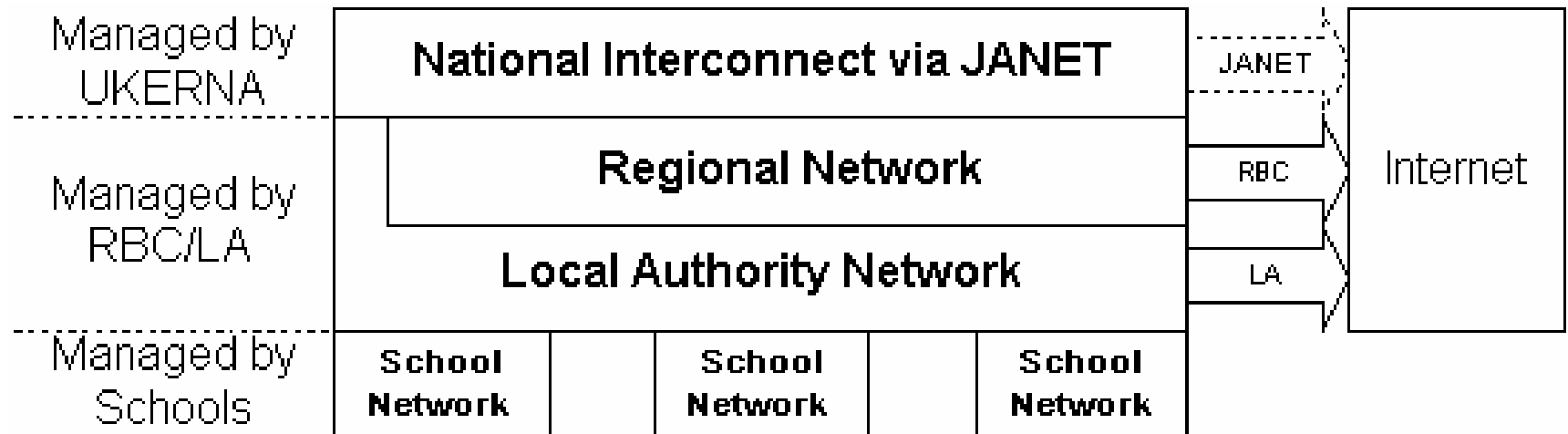
Regional Broadband Consortia (England)

- 23,500 schools; 7,500,000 pupils; 150 Authorities
- 10 Regional Broadband Consortia
- *Department for Education & Skills; Becta*





Management Layers





SJ5 Requirements of Schools

	National Service	Local Service	Large-scale	Small-scale	Comments
DNS Services	✓	✓		✓	Local service with a national fall-back.
IP Registry	✓				National standards, private/public addresses, National Schema for IPv6
Support for closed user groups (VPN)	✓	✓			Both local and national services could be offered. Emphasis is likely to be on the local though.
Support for disaster recovery	✓				Mirroring of content/data, optional service added to Co-Lo
Internet transit	✓	✓			Both local and national service
Transit to other NRENs	✓				JANET construction has both ISP and private peering (eg. BBC)
Support for content hosting	✓	✓	✓		Essential national service but priced/provided individually
Support for media streaming	✓	✓	✓		To enable suppliers to deliver on the national scale. Optional service



SJ5 Requirements of Schools

	National Service	Local Service	Large-scale	Small-scale	Comments
End to end fault management		✓			National standards/procedures which integrate with the local customer facing service.
Network monitoring	✓	✓			National standards – define range and method of monitoring. Some nationally provided data.
CERT	✓		✓		National service linked to local activity
Gateways to N3 etc	✓	✓			National and local services based on national standards
Directory services	✓	✓			National and local service based on national standards. (overlaps with authentication and videoconferencing)
Videoconferencing and gateway to ISDN	✓	✓			National and local service based on national standards. (overlaps with authentication and directory services)
QoS/class of service	✓	✓			National standards with compatible local implementations



Network Issues for Schools

- Network design
- Router management
- Network services
- Support services
- Advanced technologies
- Management framework
- Network security
- System security
- Content protection
- User education
- Incident response



Network Design

- Transmission Technologies
- IP Addressing
- Network Address Translation
- Wide Area Network Topologies
- Routed or Switched Backbone
- Schools' Local Network Considerations
- Separation of Administrative and Teaching Traffic



Router Management

- Edge Equipment
- Router Security Policies
- Firewall Features
- Remote Management
- Interface to the National Interconnect



Network Services

- Domain Name System (DNS)
- E-Mail
- Web Services
- External Access
- Location of Network Services
- Disaster Recovery



Support Services

- Technical Support
- Network Monitoring
- Information Dissemination and Staff Development



Advanced Technologies

- IPv6
- IP Multicast
- IP Quality of Service (QoS)



Management Framework

- Policies
- Resources
- Chain of Responsibility



Network Security

- Partitioning the Network
- Firewalls
- Measures to Protect Data, Communications and Systems
- Mobile and Remote Working
- Wireless Networks



System Security

- Responsibilities
- Privileges
- Configuration and Maintenance
- Access Control



Content Protection

- Virus Scanning
- Content Filtering



User Education

- Awareness and Good Practice
- Terms and Conditions
- Training and Updating
- User Support



Incident Response

- Reporting Process
- External Interference with a School's Network
- Abuse by Internal Users
- Content and Privacy Incidents
- Network Monitoring
- Information Dissemination



Issues for Rural and Remote Schools

Traditional rural/remote “Broadband” problems...

- Single supplier in some areas
 - Little or no competition, therefore costly to procure and maintain
- Low densities of population
 - Uneconomic for commercial suppliers to develop network infrastructure
- “Last Mile” of dedicated connection
 - Costly to develop, but can be sustained if provisioned for the future
- Small remote schools are often perceived as needing less rather than more bandwidth.

Rural and remote connections may need to be subsidised and/or the demand from different *sectors* aggregated.



Funding Issues

- Initial funding is often available
 - For a modest connection
- Recurrent funding is needed for sustainability
 - Sustainability needs to be built into local, regional and national strategies
- Majority of funding is given directly to schools
 - Almost all funding to be given to schools after 2006
 - Some schools may decide that they have other priorities



JANET – Other Customers

Adult and Community Learning Centres

- Some to have Primary Connections
- *Learning & Skills Council*

Specialist Colleges (not schools)

- All to have Primary Connections
- *Learning & Skills Council*

Museums, Libraries and Archives

- Some Sponsored connections
- Most are **not** connected to JANET
- *Department for Culture, Media & Sport*





Further Information

JANET Schools

www.ja.net/schools

Network Guidance documents for Schools

UKERNA & Becta documents

<http://getconnected.ngfl.gov.uk/index.php?s=network>

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