



janet

Janet6

FROM PROCUREMENT TO DESIGN

We have gathered requirements from our diverse customer base and have fed these into the procurement for the components of the flexible transmission platform. This document describes the outcome of these activities, and the resulting design, technical specification and operational model of Janet6.



WHY JANET6?

The current Janet backbone - SuperJANET5 - has served us well since 2006 and enabled Janet to be among the first service providers in the country to deploy 40Gbit/s SDH* in 2008 and 100Gbit/s Ethernet in 2011. These developments have enabled Janet to retain its position as one of the most advanced networks in the world, something which is key in supporting the activities of the UK's world-class research and education sectors.

The move to Janet6, the new Janet backbone infrastructure, has been made to ensure that we continue to deliver value for money and to meet your ongoing requirements.

To achieve this, our procurement strategy involved selecting industry partners to build a specialist flexible transmission platform, and moving the management of this platform into the Janet Network Operations Centre (NOC). With these elements in place, we can ensure that Janet6 will not only meet your current needs but we can also plan for, and address, any future requirements.

WHAT WILL JANET6 DELIVER?

Janet6 will deliver the critical capabilities to meet your key requirements. Once operational, during 2013, Janet6 will offer a highly reliable, resilient and scalable network infrastructure that meets the needs of all of our users within research and education.

*Synchronous Digital Hierarchy

THE DESIGN OF JANET6

The foundation upon which Janet6 will be constructed is a national fibre infrastructure equipped with advanced wave division multiplexing optical equipment, Ethernet switching and IP routing equipment. This will enable us to scale the network to meet future requirements. Both fibre and network equipment have been procured separately by Janet and are exclusive to Janet6.

The management of the optical, Ethernet and IP equipment will be the responsibility of the Janet Network Operations Centre (NOC). This will enable us to provide you with a more effective, agile and tailored service.

The footprint of the Janet6 network ensures that we can provide coverage across the whole UK. At the heart of the network are a number of key locations where traffic will be routed between the Janet core, regional networks, and Janet's external links.

There are a number of major network hubs in London Docklands and one in Manchester. These provide the majority of Janet's external links to the general Internet and to GÉANT, the European research network backbone.

The interconnections between these key locations and the Docklands / Manchester hubs form a high-speed core. This will operate initially using optical channels of 40Gbit/s

and 100Gbit/s capacity, carrying both 10 and 100 gigabit Ethernet circuits, with the capability of upgrading to 400Gbit/s channels at a later stage. Each of these core locations connect to at least two of the other locations - providing a highly resilient network design.

In addition to the reliability offered by the design, the state-of-the-art wave division multiplexing optical equipment and the modern fibre infrastructure provides the core network with additional capacity for scaling to meet future needs. The network, supports 88 channels with a total initial operating capacity of 2Tbit/s.

"The move to a long-term fibre contract ensures that for the next decade we can provide maximum agility and scalability to meet customer demands, that will inevitably be unpredictable, as research and innovation takes place. The new operating model that we are embracing for Janet6 will allow us to do so very cost-effectively in these challenging times."

Tim Marshall
CEO of Janet



JANET6 AND REGIONAL DELIVERY

We reviewed our regional delivery strategy in consultation with users and operators of the Janet network in 2009.** It concluded that a more direct regional delivery model was needed, and that Janet needed to become more closely integrated with the day-to-day operations of the regional networks. We have therefore been negotiating the future of individual regional networks as they come up for re-procurement.

The programme of integration started in summer 2009, and completion is planned in 2014. This is continuing, as planned, in parallel with our plans for implementing the new national backbone, Janet6.

In Janet6, as in SuperJANET5, each of the Janet regional networks will have dual, diversely routed connections to the core network. These will either be:

- Via two point-to-point connections between each regional network entry point and separate locations on the core, or
- Via a collector arc, where the network routes through a number of regional network entry points, connecting to two different core locations.

Again this network design offers huge possibilities for scaling capacity, consistent with the core.

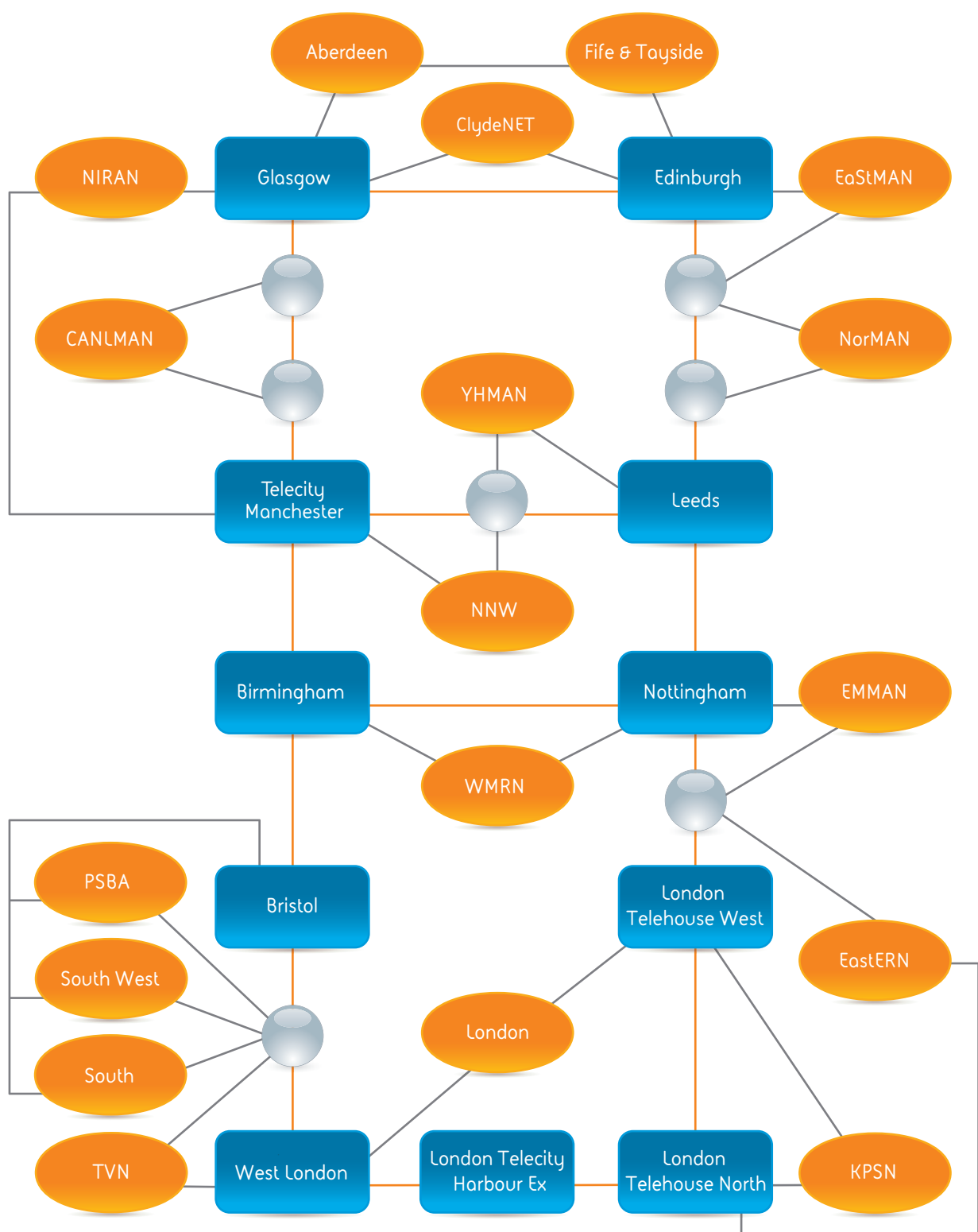
"I am delighted that the procurement of the Janet6 network has been successfully concluded. The Janet network is a key part of the UK higher education sector's research and teaching infrastructure. Securing this infrastructure on a long term basis allows the sector to plan for continued engagement with their research partners and commerce, and so further contribute to the economy."

Peter Tinson
Executive Secretary, UCISA



**Review of Regional Network Delivery: Improving the Janet Delivery Model

JANET6 BACKBONE OVERVIEW



JANET6 PARTNERS AND OPERATIONAL PLANS

UK-wide fibre infrastructure:

Scottish and Southern Energy Telecoms (SSET) has been awarded the contract to provide the fibre infrastructure for Janet6. This will run for 10 years and will provide 5,700 km of fibre, along with a number of Points of Presence (PoPs) for housing Janet network equipment.

The fibre topology has been designed with resilience in mind and is illustrated in the diagram on the previous page. The resilient design, which provides an additional east-west link between Birmingham and Nottingham that wasn't present in SuperJANET5, provides a core 'ladder' which ensures that if there is a problem with the network, then traffic re-routing can be minimised. It also provides two diverse paths into each of the Janet regional networks, a key design feature, which worked very efficiently for SuperJANET5.

Optical transmission equipment:

Ciena has been chosen to provide its ActiveFlex 6500 platform for Janet6. This is highly advanced and will enable the exponential growth of Janet to be supported for the foreseeable future – this will be key in enabling the adoption of faster circuit technology as it becomes available.

Janet Lightpath and IP services:

Janet's key connectivity services are the Janet IP service and the Janet Lightpath service. On the new Janet6 backbone, these services will be underpinned by Juniper T-series and MX-series routers. A further investment in the existing equipment will ensure that we continue to have the technology that meets the demanding requirements of Janet users.

Janet Network Operations Centre (NOC):

As well as continuing to manage the Janet IP and Lightpath services, the Janet NOC will also manage the optical equipment. We have chosen this strategy to enable us to provide you with a more effective and agile service. By taking this route, we are also able to enhance the world-class expertise of the NOC team, allowing us to continue to commission and manage leading edge services.

Rolling out Janet6:

The Janet6 infrastructure will be built between October 2012 and April 2013. We plan to transition from the current Janet backbone between May 2013 and October 2013 with a short break for university clearing in August / early September. We will ensure that you experience no service disruption during this transition.





MEETING USER REQUIREMENTS

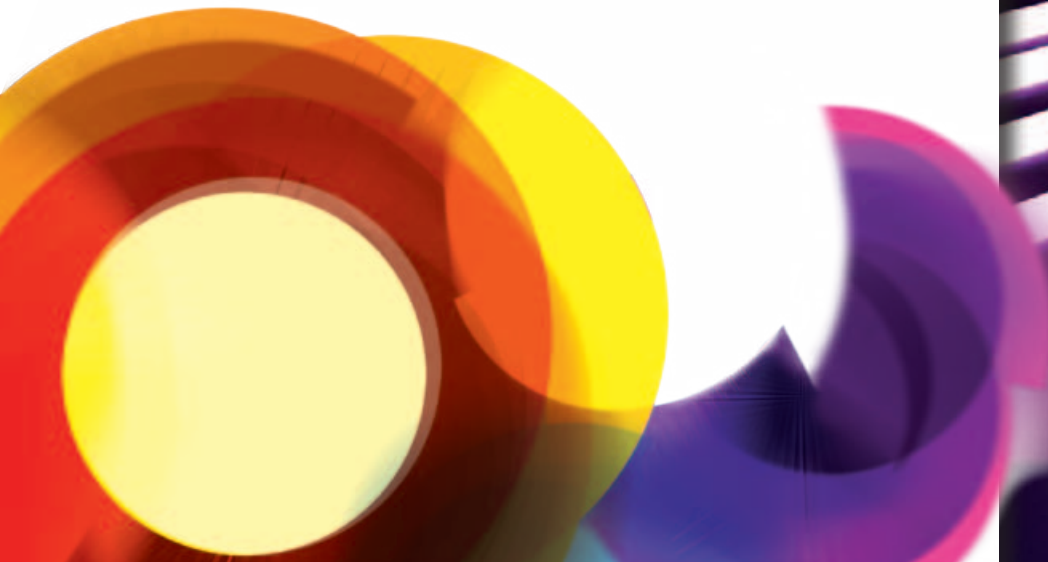
Throughout the planning and design stages of Janet6, we have always had one aim in mind, to meet the requirements expressed by our users.

Below are the key requirements you expressed and how Janet6 will respond to these:

- **To deliver a highly reliable and secure network**
This has been achieved through the careful design of the fibre topology, IP and Lightpath services, alongside the optical transmission, and the use of carrier class network equipment. Coupled with this, moving the network management to our world-class NOC team means we can deliver a highly reliable and secure network.
- **To provide a network that is flexible in meeting future demand**
The network design - using carrier class optical transmission on dedicated fibre infrastructure - means that from day one, the network will have a total capacity of 2 Tbits, which can scale as required.
- **To provide a network that is more agile in dealing with change**
By changing the operational management of Janet6 backbone to our Network Operations Centre, and working closely with our industry partners - SSET, Ciena and Juniper, we can deliver your requirements faster and more effectively.

“The Science and Technology Facilities Council (STFC) operate large-scale science facilities and supports science programmes for UK research communities to deliver world-class research and innovation. This activity is highly data intensive and whether using the Janet IP Service or the Janet Lightpath Service, the requirement for a robust, resilient and extensible national network is fundamental for STFC to maximise its impact for the benefit of the UK and its people”

Dr Robin Tasker
Head of Networks and Communications, STFC, Daresbury Laboratory



Further information

To keep updated on our progress with the Janet6 project, please visit: www.ja.net/janet6

To get involved, please join our community group: <https://community.ja.net/groups/janet6>

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Janet manages the operation and development of the network on behalf of JISC (Joint Information Systems Committee) for the UK Further and Higher Education Funding Councils. JISC also works in partnership with the Research Councils.

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