ISC11D011

Title:	**Network team service vision 2011-16**
Author:	Peter Andrews
Date:	14 October 2011
Circulation:	ISSC – 10 November 2011
Agenda:	ISC11A001
Version:	Draft v0.1
Status:	Open

Issue

To receive a draft of the service vision for the Network team.

Recommendation

The committee is asked to note the report.

Resource Implications

The creation of the vision itself has no resource implications, but implementations of recommendations contained in it may have resource implications.

Risk Implications

Not applicable

Equality and Diversity

Not applicable

Timing of decisions

Not applicable

Further Information

Iain Reeman, ICT Systems Director. Extension 2926. Email: i.reeman@uea.ac.uk

Background

This vision will contribute to the work being done on an IT strategy for the University.

Discussion

Doc. Ref. NetTeam Vision 2011-16   Date. 14-Oct-2011
Contact. p.andrews@uea.ac.uk   Author. P.Andrews, J Colam-French

Information Services
I.T. & computing

Networking Team
Service Vision 2011-16

Overall

The networking services, voice and data, provided by ISD into the university are intended to keep pace with, compliment and facilitate the delivery of objectives in the University's corporate plan, EST's Campus Development Plan and the Faculty Strategic plans. Where appropriate references are given in square brackets to the lines in the Network Team: Service > Product > Component map.

The networking team provide the following services (listed with a sample of products):

- JANET and offsite – internet access, links to SISJAC, EAFA, UEA London
- Campus wired connections – wall sockets and cross-campus communications
- Remote Access – VPN and dial-up
- Residences Network – broadband in the residences
- Telephony Infrastructure – desk phones, fax lines
- Wireless network – eduroam, BTopenzone

JANET and Offsite

The importance of the Internet connection for the main campus, and the services it provides to remote sites, means that it is imperative that we establish a second Internet connection to ensure service provision in case of incident [JAN-1]. Managed links [JAN-5] will continue to be monitored and grown as demand increases, including the primary Internet connection itself. Refreshing communications technology between university locations to improve efficiency is set for 2012/13 [JAN-6] with the management of bandwidth from self-registered equipment following-on in 2013/14 [JAN-7] when the growth of the existing solution has been exhausted. Security from the Internet is set for replacement in 2012/13 [JAN-3] although the features and format are subject to a wider security review.

JANET are changing their posture regarding service provision and being more inclusive (as far as EU regulation will allow) for more kinds of university activity, such as Business and Community Engagement (BCE). This may change our relationship with JANET and our approach to third parties on campus in the future. If costs increase or are pro-rata'ed on use then it may make out-sourcing of student residences more attractive, or may render cloud-based student services too expensive. There is a drive towards regional Public Services Networks (PSNs) – where academia work with local and central government to provide the national infrastructure – but this may not impact HEIs or, at least, not until the current regional infrastructure has completed its term.

Campus Wired Connections

The standards for connection to the desk [CAM-4] and across campus [CAM-7] has changed little in the past 10 years. Currently we see no requirements to increase the to-the-desk performance above the existing 100Mbit/sec [CAM-12] whilst cross-campus communication is at 1Gb/sec (1000Mbit/sec) [CAM-14] and server technology is at 4Gb/sec [CAM-15]. The only 1Gb/s client demand is within the e-science environment and is accounted for. Any server requirements are treated at 1Gb/s within the data centres. We currently have the potential to grow cross-campus connectivity to 10Gb/s but the costs of this mean we will do this on proven demand – based on exceeding existing utilisation thresholds. The convergence programme, moving services onto the network, has gone well with 100% convergence for CCTV and BMS (building management systems) with voice (telephony services) following that lead. We will continue to provide Power-over-Ethernet (PoE) – with complete campus PoE coverage projected for 2013/14. The new Internet addressing scheme, IPv6, is probably some 5 to 10 years off for the campus as a whole – that said, some preparatory work is required to ensure we are ready when the demand arrives [CAM-11]. This may occur early – depending on specific research projects and their collaboration requirements so the notice period may be very much

Information Services
I.T. & computing

reduced. It is likely we will need to adopt an IPv6 presence as part of our inclusion approach to potential students and collaborators too. We will maintain a watching brief regarding campus occupancy densities and their impact on network needs and the backend infrastructure.

It is likely that changes in the data centre are going to have a major impact on the style and density of connectivity required in these locations. Whilst additional headroom is included in the network design for high density 10Gb/s capacity and availability of 40 and 100Gb/s equipment – demands may arrive ahead of funding, if they arrive at all.

Remote Access

We will push for the switching off of dial-up services [REM-3 and REM-4] as we develop clear key performance indicators (KPIs) around our services. Similarly, the legacy Checkpoint VPN solution [REM-2] lacks a number of features that makes the replacement F5 VPN solution [REM-1] more appealing. The F5 solution, in itself, is likely to flourish and there is considerable additional capacity that can be licensed if demand warrants it. The growth of this service is likely to be impacted by factors external to ISD, such as remote working for students on placement, any "work at home" green initiatives or outreach programmes – at this time we will monitor and respond accordingly. This service is also likely to be key to any major incident response akin to the 'flu pandemic planning undertaken a few years ago. An analysis of relative telecom capacities between wired voice, broadband and mobile phone coverage, however, may elicit a retention of some dial-up equipment – albeit for emergency use only.

Even after the loss of dial-up and the historical VPN client, it is possible that VPN, in its current form, may not be needed in the long term. Many of the end services are likely to be web-based and, thus, can be accessed from anywhere on the Internet without having to tunnel traffic back securely. VPN may find a new role in terms of securing sensitive data on campus rather than drawing in data from users on the Internet.

Residences Network

The residences network [RES-1] still accounts for the majority of the university Internet traffic through a combination of the rise in social networking and on-demand TV services together with a more network-savvy populous. The student expectation will be monitored, together with additional services over and above the existing IPTV solution [RES-3] already in place. We would expect the, technically complex, requirement for wireless in the residences to come to the fore within the next 5 years – reducing, equivalently, the current demand for wired services in this location.

Telephony Infrastructure

The pro-active approach of moving to VoIP (Voice-over-IP) [TEL-6] has put voice services on the front-foot moving forward. The overburdened legacy exchanges [TEL-4] are set for retirement once the legacy applications of: emergency phones, lift phones, disabled toilet alarms, accessibility phones (big button or hearing induction loop), alarm lines, fax machines, credit card machines and franking machines have been dealt with (2012/13) [TEL-21]. The benefit of the pick-up-and-move handset has been widely felt during the Admin Integration Project. We are looking to refresh the voicemail [TEL-16] and auto-attendant [TEL-15] features soon – with a wider review, as the original contract comes to an end, in 2014/15. Exhaustion of our existing Norwich DDI (direct dial-in) number range is expected by late 2014 – so a new numbering schema will need to be introduced over the next two years. Mobile phones are currently outside the remit of ISD but we are looking to form a closer relationship between mobile and fixed voice provision.

Whilst voice services are unlikely to diminish in their requirements, data services such as fax, credit-card machines, franking machines etc are expected to all but disappear within 10 years. It is still unlikely that video phone conversations will become the norm simply due to the social aspects that have prevented it from taking off to date. Flexibility and efficiency are likely to become key – with elements such as messenger, Internet VoIP gateways and mobile integration making communications more immediate and accessible. For Internet voice services - a critical mass of adoption or a short-term wide-spread JISC initiative would be needed to make the investment worthwhile, however.

Wireless Network

The considerable wireless infrastructure has been in place for a number of years. At its inception, for the BA Festival of Science, wireless was a niche player but has now firmly become main stream in terms of student and staff expectations. Coverage extends across all available academic buildings [WIR-1] – our experience as part of the Norfolk Openlink project has shown that external wireless is not viable. A new wireless technology is expected to market around 2013 although we predict it will do little to change how wireless is used – with the mobile device (phone or laptop/tablet) being a lightweight web browsing and Email device rather than bandwidth-intensive workhorse. We still expect that intensive performance requirements will be undertaken on a fixed-wired device which is as much for security and reliability as anything else. On the topic of security – the provision of unencrypted wireless networks are likely to be phased out within the next few years (in our case that's the UEA SSID [WIR-3]) – there is already considerable pressure to remove open wireless networks because of the opportunities they provide for illegal activity, and all new devices currently on the market can undertake security as a matter of course, hence the requirement for backward compatibility with unencrypted devices will be removed. This is also the case with older versions of the communication standard such as 802.11 or 802.11b – these are likely to disappear within the next two years. Our relationship with BT openzone [WIR-6 and WIR-7] has had many benefits for unofficial visitors to the campus and ensuring our commercial services are not disadvantaged – we will be looking to retain and develop this relationship and investigate cost savings in dealing with our commercial consumers.

Network Registration (DNS, DHCP and NetReg)

The migration of DNS and DHCP services to the networking team are still in progress [MAN-1] and, as such, there is little understanding or profiling that is available to project future demand. It is, however, possible to state that we are expecting that networked devices that don't need an Internet presence, such as VoIP phones, cardax etc, will be moved out of the public IP address range and onto private numbers to both enhance security and free-up allocations for those devices that do require external connectivity. Again, security is likely to draw through demand for port authentication (802.1x) which may mean that NetReg-style pre-registration for campus and self-registered equipment is no longer required by the end of the 5 year period (akin to the current 'eduroam' wireless provision that authenticates at the point of connection). DNS-SEC also falls in at this point, the concept of signing the machine directory to ensure that hostnames and IP addresses have been resolved officially. It should be noted that security matters are subject to policy and aren't driven by the technology. The IPv6 element mentioned in Campus Wired earlier will require similar registration and directory services as the existing IPv4 addressing schema – which is one of the featured benefits of the new solution.

Network Security

The 7Safe security audit made some recommendations for security improvements that will directly impact on the network strategy, some of these recommendations come with significant cost and will be subject to review as part of the wider development of an IT Strategy.

Assumptions

In creating this 5 year vision document the following assumptions have been made:

Political - external:

- That current tax (including VAT) levels will continue to apply
- No centrally applied academic standard contracts regarding the procurement of equipment or services are introduced
- No requirement to comply with central government Impact Level (IL) assessments (which are likely to be part of any membership of a PSN)
- Maintain university existing profile – does not have additional spotlight with respect to IT security alerts or contentious research
- JISC will continue to fund JANET for Internet services across HE.
- No war or aggression regarding essential resource such as energy or raw materials (incorporating known demands such as China's continued draw of cable-grade copper in building and construction)

Political - internal:

- Existing Security Project does not find any high risk elements that require change in approach not already scoped.
- No step change in provision requirement (such as additional sites, move to remote working or distance learning etc)
- Continued broad brush support across the university for all departments (no subject or area push or withdrawal)

Economic – external:

- Exchange rates relatively stable
- External suppliers remain in business or are in keeping with existing contracts if firms are taken over by rivals

Economic - internal:

- Current and projected funding levels available

Sociological – external:

- No new 'fashionable' technology will appear
- No new medical or environmental incident will occur (ash cloud, flu pandemic, localised flooding) which will incur a rapid change in delivery model or capacities

Sociological – internal:

- Continuation of existing service trends in relation to capacity and usage (no major step change)

Information Services
I.T. & computing

- Overall acceptance of range of existing IT services meeting customer needs – including all those supported by other teams over the network

Technological – external:

- Existing hardware and software solutions are not irreversibly compromised by being found to have an security flaw (e.g. Playstation network) or patent infringement (e.g. Forgent Networks over the JPG standard in 2002)

Technological - internal:

- The university requirements for emerging technologies will be:
    - IPv6 – 5/10 yrs
    - 802.11n or 802.11ac – 5/10 yrs
    - Multicasting – 5/10 yrs

Legal – external:

- No change in EU contract legislation
- No change in network management legislation (requiring greater degree of monitoring and logging)
- Health and Safety guidelines do not become stricter – e.g. in areas of wireless network radiation, manual handling (or equipment installations). Note that we have already coped with deploying compliance with 802.11h EU legislation regarding non-interference with RADAR stations.

Environmental – external:

- Environmental impact is still permitted to be defined as part of, not the major factor, with respect to procurement

Environmental - internal:

- Existing equipment and packaging disposal processes will continue.