

## INFORMATION STRATEGY GROUP

### Information Needs for Heslington East

At the meeting of the Information Strategy Group held on 25 January 2007, the Chair reported that Professor Janet Ford and Jon Meacock would be attending the next meeting of the Group in May for a discussion on the information needs for the Heslington East development. In preparation for the meeting, Janet has raised the following issues for consideration:

1. Future IT infrastructure and consequences of this for use of space? (e.g. primarily laptops and move around, or ranks of fixed PCs and PC labs.)
2. Direction of change in teaching and teaching technologies? We have assumed the continuation of lectures/seminars
3. Information requirements for visitors; knowledge transfer; embedded space businesses; licensing; identity management; charging etc.
4. Arrivals/Information points/communications and directions
5. Complex X is bringing together departments that currently have different networks e.g., Computer Science and TFTV.

Members of ISG and all sub-committees were subsequently asked to raise any issues that may be of concern. Issues raised were:

- network infrastructure
- Duplication of machine room facility currently being planned in HERC will be necessary, not just for capacity but also for resilience and business continuity.
- the avoidance of duplication of facilities and services
- internal communications between departments and students across the whole University
- the portal and the issue of networked and non-networked departments
- help and information support
- provision of a coherent experience for staff and students (geographical location should not have a bearing on service provision)
- student access to information regarding student support services (provision of student information points)
- for improved student access to services, an online appointments booking system would be required.

- the specification for teaching rooms would be the same across campus, but with the advent of new technology, upgrades may be required.
- the provision of appropriate learning spaces, supported by technology
- equipping of classrooms with network access and digital projectors, enabling the VLE to be used for teaching purposes.
- the provision of electronic whiteboards in classrooms and wireless access for group work.
- access to information resources
- access to research facilities, both physical and virtual access, and delivery of research information
- promoting inter-disciplinarity: mechanisms for facilitating meetings, perhaps thought the increased use of desktop-to-desktop audio and video links
- what, if any, library facilities will be provided on Heslington East and how will services be delivered?
- enhancement of existing library services
- internet café?
- Scalability: sufficient infrastructure would need to be in place to accommodate the increased traffic and data.
- Organisational infrastructure: collaborative tools
- Effectively working with new initiatives (academic departments, spin-offs etc), which evolve and grow over time, ensuring they are aware of the systems and support available, and the University aware of their needs.
- Whatever facilities are available on Complex X/Heslington East should be available for University-wide use and information about them well-disseminated.
- IT Learning spaces for staff would be useful, which could be commercially available if of a standard that allowed them to be sold (possibly to be located within a Conference Centre)
- use of facilities by non-University personnel (conference use, general public, commercial organisations)
- implications for information systems and strategy of having businesses embedded on the campus
- For collaboration between the University and businesses on Heslington East and the Science Park, we should aim to be the provider of choice,

otherwise external suppliers will be used; therefore a range of IT services need to be available.

It should also be noted that the Heslington East: Infrastructure Working Group has been reviewing the IT Infrastructure requirements for Heslington East and at its meeting of 21<sup>st</sup> March, 2007 the following was considered:

**Extract from minutes of meeting: 07/12 IT Infrastructure (M. 07/03 refers)**

“An updated scoping document was received together with an Overview of Proposed Utility IT Service Provision. It was agreed that these documents should be forwarded to the Information Strategy Group with a request that the Group endorse the principles contained.

**Action: RD**

With reference to the Proposed Utility IT Service Provision, it was noted that the principles reflect:

- The creation of one unified machine room space estimated at 140m<sup>2</sup> which allows for a certain amount of growth. Some guesswork is involved in the estimate of space required because of how technology may develop over the medium-term and ancillary facilities required, for instance cooling systems.
- That some IT facilities would be retained on Heslington West.
- An IT infrastructure requirement which supports the high technical activity of the departments to be based within Complex X.
- Two independent pathway cables between Heslington East and West which do not share ducting along the route: this provides additional resilience.
- That wiring centres can be placed in machine rooms. In order to prevent loss of reception, the maximum cable run is 90m in length.

With reference to telephony infrastructure, RD confirmed that John Mason and Peter Jarvis are preparing business models for the options available. It is evident that resource will be required to manage these systems in future.

**Action: Group Members asked to forward any comments on the scoping document and the paper on Utility IT Service Provision to RD “**

Key principles for a Heslington East IT infrastructure and the Heslington East Infrastructure Working Group Scoping Definition Document are attached.

**Teresa Gibbs  
Administrative Officer  
23 April 2007**

## Information Strategy Group, 9 May 2007: Key principles for a Heslington East IT infrastructure

ISG is asked to consider the following principles:

### Physical infrastructure

#### 1. University ownership and control of critical infrastructure assets

These include ducting, cable plant, network equipment, switching centres, server room. Management and operation of the core network for Heslington East will reside with Computing Service. This covers functions such as routing, security, DNS and DHCP.

#### 2. Holistic approach to machine room provision

A unified secure machine room serving several clients could deliver economies of scale in terms of construction and running costs, eliminating duplication of expensive resources such as air conditioning, UPS and fire suppression. A facility of sufficient size and flexibility could also provide secure on-site hosting services for spin-offs or embedded partner companies.

#### 3. Incorporation of secure locations for switching centres into building design

The days of the re-purposed broom cupboard are over. Switching centres on Heslington East will house equipment supporting data, telephony, CCTV and other services. They will need to be secure, larger, power protected, and probably environmentally controlled.

#### 4. Wired connectivity as default to fixed asset locations

In the context of total fit-out cost models data cabling installation represents a marginal cost. Cabling offers a useful life of at least ten years plus uncontended bandwidth well in excess of that achievable by wireless. The performance of wireless networks depends critically on the design and construction of buildings and can often be difficult to determine other than empirically.

#### 5. Pervasive wireless coverage

Informal or recreational spaces, teaching and learning spaces, benefit from the flexibility of wireless. The proliferation of new standards and the volatility of the marketplace mean that additional care in product selection and deployment is required.

#### 6. Management of the wireless spectrum

The establishment of a campus-wide wireless spectrum management group is essential. Failure to do so could result in spectral congestion giving rise to degradation of services.

#### 7. Establishment of a commercial Internet PoP

Regulatory restrictions mean that connection to the York network and thence to JANET and the Internet may not be permissible for all organizations sited on Heslington East. The establishment of a commercial point of presence, probably delivered via a business partner, could enhance the Heslington East proposition for some companies and potentially simplify operational boundaries.

## Service delivery and new modes of working

### 8. Flexibility of service delivery

Widespread use of consumer technology, particularly mobile products, will require a more customer-driven, flexible approach to service delivery. The Computing Service will need to be increasingly agnostic with regard to the client devices which attach to services.

### 9. Learning spaces

Flexibility will be key to Heslington East learning spaces where the balance between the traditional fixed asset PC classroom and more informal modes of working, possibly using students' own computing devices, is likely to shift over time.

### 10. Adoption of an enterprise-wide identity management platform

IDM is essential to allow the mapping of University members, partners and affiliates onto role-based, differentiated services. This builds on work already being undertaken by Computing Service.

### 11. Expansion of Student Network Service

SNS should be extended to cover all new student accommodation on Heslington East.

## FM services

### 12. Development of a multi-service network

The opportunity should be taken to develop a multi-service network which supports services such as telephony, security and building management in addition to data. This will require appropriate risk management to focus on areas such as business continuity planning and out-of-hours cover.

## Sustainability

### 13. Re-cycling of waste heat

The opportunity to recycle waste heat from the machine room should be explored with architects and planners.

### 14. Use of thin client technology

The adoption of thin client technology should be encouraged where appropriate. Thin client devices offer significant benefits in terms of cost of ownership and carbon footprint.

### 15. Server consolidation

Current initiatives to reduce the number of servers through consolidation using virtualization technology should be developed and incorporated into Heslington East planning. The need to constrain power, cooling and space requirements for the server estate will become more critical during the next 5-10 years.

## Heslington East Infrastructure Working Group Scoping Definition Document (version 2.1, 1 May 2007)

Infrastructure Working Group -	IT Subgroup	Function -	Data Services
<p><b>Policies and Principles</b></p>			
<p><i>In Place at Present</i></p>			
<p>Physical Infrastructure</p> <ul style="list-style-type: none"> <li>⊗ University ownership and control of critical IT infrastructure assets.</li> <li>⊗ Management and operation of core network resides with Computing Service. Permission to connect to campus infrastructure managed by Computing Service.</li> <li>⊗ 70% of critical server infrastructure currently housed in Computing Service with remainder in small DR facility.</li> <li>⊗ Single mode fibre now used on all new building interconnects.</li> <li>⊗ Investment in fibre infrastructure justified for the foreseeable future</li> <li>⊗ Reduction of TCO by shift from maintenance contract to lifetime warranty where appropriate</li> <li>⊗ New build equipped with cat5e/6a structured cabling. Wired connectivity as default to fixed asset locations but expanding WiFi coverage with 100+ wireless access points already deployed and more planned</li> <li>⊗ Phased rollout/incremental growth rather than big bang – appropriate scaling.</li> <li>⊗ Standards-based interoperability wherever possible</li> </ul> <p>Service delivery</p> <ul style="list-style-type: none"> <li>⊗ Equality of service provision across campus</li> <li>⊗ Centrally managed PC teaching and study areas embedded in colleges</li> <li>⊗ Teaching rooms based on fixed asset University-managed desktops</li> <li>⊗ Computing Service core support hours do not cover evenings and weekends</li> <li>⊗ Computing Service “front of house” in single location</li> <li>⊗ Logically separate IT infrastructure delivers network services to all study bedrooms on campus</li> <li>⊗ Grid computing not a centrally managed service</li> </ul>		<p><i>Changes Required for Heslington East</i></p> <p>Physical Infrastructure</p> <ul style="list-style-type: none"> <li>⊗ Holistic approach to machine room provision. A unified secure machine room with segregated areas allocated to different clients. This approach could deliver economies of scale in terms of construction and of associated running costs, eliminating duplication of expensive resources such as air conditioning plant, UPS and fire suppression.</li> <li>⊗ Incorporation of secure locations for switching centres into building design.</li> <li>⊗ Pervasive wireless coverage based on <i>de facto</i> standards</li> <li>⊗ Central management of the wireless spectrum for both campuses is essential to avoid degradation of service.</li> </ul> <p>Service delivery and new modes of working</p> <ul style="list-style-type: none"> <li>⊗ Flexibility of service delivery – this may include the decoupling of the desktop client from the services provided, and the establishment of a utility, on-demand computing framework.</li> <li>⊗ Evaluation of student laptop programme to supply each student with a standard University laptop for a fixed period. Partnership with vendors to be explored.</li> <li>⊗ Review of Computing Service user support model in light of more distributed constituency</li> </ul> <p>FM Services</p> <ul style="list-style-type: none"> <li>⊗ Migration to a multi-service model rather than a pure data network requires more stringent risk management and more robust business continuity measures. A consequence of the model is the need for switching centres to be secure, larger, power protected, and probably environmentally controlled.</li> <li>⊗ Staffing resource for critical services running over IT infrastructure, including out of hours cover, will need to be assessed and costed</li> <li>⊗ Technology assessment of the “intelligent building” examining product maturity, future developments and potential benefits.</li> </ul>	

	<ul style="list-style-type: none"> <li>⊙ Review plans for an e-Science infrastructure. Grid computing to be incorporated into broader e-Science infrastructure planning</li> <li>⊙ Policy framework for connection of “embedded” and partner organisations to University IT infrastructure. This potentially complex interface requires careful definition and management.</li> </ul> <p>Funding</p> <ul style="list-style-type: none"> <li>⊙ Move away from opportunistic development of infrastructure towards tighter integration at the planning stage. Establishment of baseline funding level to support critical infrastructure components.</li> </ul>
<p><b>Function Inputs</b></p>	
<p><i>In Place at Present</i></p> <ul style="list-style-type: none"> <li>⊙ Computing Service representation at early stages of new build projects</li> </ul>	<p><i>Changes Required for Heslington East</i></p> <p>Physical infrastructure</p> <ul style="list-style-type: none"> <li>⊙ Close liaison with architects and planners at initial design stage to agree ducting routes and space requirements</li> <li>⊙ Assessment of electrical power requirements – with particular focus on protected supply, UPS capacity and the case for emergency generation capacity.</li> <li>⊙ Design and specification of machine room(s) based on client space requirements and assessment of risk.</li> <li>⊙ Early appraisal of likely phase 1 occupancy levels and facility mix to permit capacity planning. Initial campus interconnect bandwidth of 10Gbit/sec. Typical wired edge connections are likely to operate at 100Mbit/sec, but some areas such as Creative Technologies Hub may well require higher speeds for specialist applications.</li> </ul> <p>Funding</p> <ul style="list-style-type: none"> <li>⊙ Identification of funding streams. It should be noted that recurrent costs must be taken into account. This might mean the establishment of a sinking fund.</li> </ul>
<p><i>Key Measures</i></p> <ul style="list-style-type: none"> <li>⊙ Business plans to detail TCO for new service delivery models</li> <li>⊙ Logical and sometimes physical Segregation of service network infrastructure e.g CCTV, access control, specialist servers from rest of University data network</li> </ul>	

**Function Outputs**

<p><i>In Place at Present</i></p>	<p><i>Changes Required for Heslington East</i></p> <ul style="list-style-type: none"> <li>⊙ Multiple pathway single mode fibre interconnects to Heslington West in secure ducting. Installation will involve wayleaves as interconnects will need to cross the public highway. This should be built into the design process.</li> <li>⊙ Comprehensive network of secure and robust ducting to agreed standards is essential on the new campus. Ducting must have adequate environmental protection (flood, tree roots, rodents). Jointing chambers to be of solid construction and with heavy-duty lids secured to prevent unauthorised access.</li> <li>⊙ Agreed dedicated space allocation for server rooms and switching centres. This should include some provision for hosting equipment owned by partner organisations co-located on Heslington East</li> </ul>
<p><i>Key Measures</i></p>	<ul style="list-style-type: none"> <li>⊙ Risk assessment of Heslington East network design. Multiple pathway resilience will be important as construction work likely on site for many years.</li> <li>⊙ Agreed parameters for space allocation within new build on Heslington East to accommodate IT infrastructure components</li> <li>⊙ Clear guidelines and standards for Heslington East contractors covering all aspects of cabling installation</li> </ul>

**Tasks**

<p><i>In Place at Present</i></p> <ul style="list-style-type: none"> <li>⊙ Development of Network Access Service (NAS) allows mobile computing on campus using wired and wireless technology. This solution is being widely adopted by departments for visiting academics, <i>ad hoc</i> research workgroups and intermittent connectivity.</li> <li>⊙ Development of remote management and diagnostic tools for managed desktop systems</li> <li>⊙ Computing Service “People Project” under development to allow the mapping of University members, partners and affiliates onto role-based, differentiated services</li> <li>⊙ Pilot project with Security for IP-based CCTV coverage of Kings Manor began March 2007.</li> </ul>	<p><i>Changes Required for Heslington East</i></p> <ul style="list-style-type: none"> <li>⊙ Incorporation of Heslington East into overall business continuity planning of the University.</li> <li>⊙ Location of second YHMAN point of presence to provide additional resilience to external connectivity. (External funding should be available via YHMAN.)</li> <li>⊙ Flexibility in the design of learning spaces where the balance between traditional fixed asset PC classrooms and more informal modes of working is likely to shift over time.</li> <li>⊙ New business model to fund IP telephony rollout</li> <li>⊙ Review of software licencing arrangements to take into account increasing use of facilities by non-University personnel</li> </ul>
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<ul style="list-style-type: none"> <li>⊙ Pilot implementation of IP telephony in Helix House (~50 extensions), based on open-source Asterix platform, deployed November 2006.</li> <li>⊙ Pilot project for web-based application delivery began September 2006 using site-licensed Sun Secure Global Desktop (SSGD) platform.</li> <li>⊙ Evaluation of thin-client devices such as SunRay.</li> </ul>	<ul style="list-style-type: none"> <li>⊙ Formulation of coherent service delivery framework to accommodate increasingly diverse customer base. This would cover a range of facilities from individual user access rights to University e-resources to the connection of servers to the campus network infrastructure</li> </ul>
<p><i>Key Measures</i></p>	

**Interdependencies with Other Infrastructure Groups**

<ul style="list-style-type: none"> <li>⊙ Utilities/landscape/building programmes – ducting, electrical power, space to house equipment</li> <li>⊙ Security – access control, alarm systems</li> <li>⊙ Building management</li> <li>⊙ Telephony</li> </ul>
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**Key Decisions for Heslington East**

<ul style="list-style-type: none"> <li>⊙ Confirmation of the principle of University ownership and control of critical IT infrastructure assets [ISG]</li> <li>⊙ Identification of routes for campus interconnect and core network ducting. Planning decisions are required with regard to wayleaves.</li> <li>⊙ Identification of secure locations for server room(s) and switching centres. A decision will be required as to whether it is appropriate to co-locate such facilities with departments or to consider purpose-built structures to house critical equipment. [ISG/HE Steering Group/Estates Committee]</li> <li>⊙ Development of multi-service network [ISG/HE Steering Group]</li> <li>⊙ Extension of current SNS to new accommodation blocks on Heslington East [ISG]</li> <li>⊙ Will learning spaces be co-located in colleges/departments or in purpose-built structures? [ISG/Teaching Committee/HE Colleges Working Party]</li> <li>⊙ How will the required IT infrastructure be funded? Which external funding opportunities might be exploited? Which, if any, services might lend themselves to joint funding and partnership arrangements? [ISG/Research Committee/Enterprise &amp; Innovation Office]</li> <li>⊙ What level of service can be provided to non-University organisations which may be located on Heslington East? This might include the provision of a commercial ISP point of presence not subject to the restrictions applied to JANET connections via the UKERNA AUP. [ISG]</li> </ul>
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### Sustainability Opportunities for Heslington East

#### Positive factors

- ⊙ Server consolidation may constrain the demand for power, cooling and space (but see below).
- ⊙ Adoption of thin-client technology offers significant benefits in terms of cost of ownership and carbon footprint.
- ⊙ The “intelligent building” may offer opportunities to pursue a green agenda in terms of energy management
- ⊙ It may be possible to recycle waste heat from the machine room for use elsewhere on site

#### Negative factors

- ⊙ Industry research suggests that power and cooling requirements in the data centre are likely to increase over the next ten years despite the periodic introduction of mitigating technologies. This is likely to produce a saw tooth effect on demand but with an overall upward curve.

*RLD*

*1 May 2007*