

# Business Plan

## Shared Services Data Centre

Universities of Salford, Derby and Sheffield Hallam



R e l e a s i n g   y o u r   p o t e n t i a l

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# 1 Executive Summary and Recommendations

This Business Plan represents the final part of this study considering the feasibility of creating a shared service data centre between Salford, Derby and Sheffield Hallam universities. The study is one of a number of studies commissioned by HEFCE to evaluate shared service opportunities in higher education. The Business Plan describes the financial model and options appraisal undertaken and the financial implications for the universities of implementing a shared service data centre. The financial options considered are as follows:

- Option A - Bring Existing Facilities to a Baseline Level and Meet Expansion Requirements
- Option B (1) - Pursue Individual Solutions - New Build
- Option B (2) - Pursue Individual Solutions - Co-location
- Option C (1) - Shared Service - 3 Institutions - New Build
- Option C (2) - Shared Procurement - 3 Institutions - Co-location
- Option D - Shared Services – Regional Institutions plus, potentially, other local partners

The following table sets out the results of the financial options appraisal and the potential costs of the different options. It should be noted that all the options require some level of additional investment by each university to meet their expansion requirements over the coming 10 years and to provide business continuity and disaster recovery facilities.

Option	Adjusted NPV '000s	Original Net Present Value '000s	Risk / Bias	Annual Cost over 10 years '000s	Average Annual Cost Per Institution '000s	Increase in Average Annual Cost Per Institution '000s	NPV relative to Option A '000s
Option A - Bring Existing Facilities to a Baseline Level and Meet Expansion Requirements	£49,357	£47,801	£1,556	£4,935	£1,645	£0	0
Option B (1) - Pursue Individual Solutions - New Build	£60,555	£58,256	£2,299	£6,055	£2,018	£373	£11,198
Option B (2) - Pursue Individual Solutions - Co-location	£55,471	£52,097	£3,374	£5,547	£1,849	£203	£6,114
Option C (1) - Shared Service - 3 Institutions - New Build	£47,579	£46,055	£1,523	£4,757	£1,585	£-59	£-1,777
Option C (2) - Shared Service - 3 Institutions - Co-location	£50,262	£46,138	£4,124	£5,026	£1,675	£30	£905
Option D - Shared Services - 3 Institutions within Local MANs	£47,441	£46,008	£1,433	£4,744	£1,581	£-63	£-1,915

### 10 Year Financial Analysis – Based on Retention of Current Facilities and use of SuperJanet Infrastructure

It should be noted, however, should institutions consider decommissioning existing facilities, then net savings could potentially be made against Option A. These potential savings are set out in Annex A.

This appraisal demonstrates that Option D is, by a small margin, the most financially advantageous option. However, the non-financial factors identified in the Feasibility Study suggest that Option C (1), building a new shared data centre between the three institutions in the Sheffield area, would be viable. Considering the small difference in

overall cost, and the significant benefits that a shared service would bring, it is recommended that the three institutions should proceed with Option C (1). However, each institution should also consider Option D and review whether other regional partners would offer additional non-financial benefits as part of the pre-implementation phase of the programme, before a final decision is made.

Whilst the co-location options, B (2) and C (2) have been included in the appraisal for completeness, it should be noted that the costs for these options have been based on average market rates using market intelligence, rather than by identification of specific data centre suppliers close to the universities. These co-location options may not be viable as a commercial provider in the required locations, with the required capacity, may not be found.

The Feasibility Study and this Business Plan considers the needs of Salford, Derby and Sheffield Hallam universities and its findings could be broadly applied to other institutions, depending on their specific requirements. However, this report does not address data centre provision for high-performance computing and further work will be necessary to examine the extent to which the findings from the existing feasibility study and business plan would be applicable to a shared data centre for high-end computing.

Also included in this report is a proposed Programme Plan which identifies the phases and high-level activities required to implement a new shared service data centre. This plan is based on the Managing Successful Programmes approach and incorporates staged decision points which will continue to test the validity of the Business Case and ensure that benefits realisation is actively managed throughout the programme.

The first phase of the programme will enable each institution to explore their partnership options, undertaken further consultation and financial analysis with their Senior Management Teams, secure funding and approvals and agree implementation arrangements with HEFCE. A final decision on whether to proceed with the proposed shared service should then be taken at the end of this phase in May 2008.

The degree of effort and commitment required to complete the first phase of the programme should not be underestimated as significant preparatory work is required. The activities involved in this initial phase of the programme are detailed in Section 8.3 of this report.

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## 2 Options Considered

The Outline Business Case identified five options available to the institutions to meet their individual data centre requirements for increased capacity, risk avoidance, improved M&E and business continuity needs:

- Option A - Bring Existing Facilities to a Baseline Level and Meet Expansion Requirements.
- Option B - Pursue individual solutions to current issues with infrastructure.
- Option C - Pursue shared service approach between the three institutions based on either a) use of existing facilities at one of the universities, b) development of a re-furbished / new build facility or c) shared procurement of third party data centre services.
- Option D - Pursue a shared service approach with other potential local partner institutions.
- Option E - Outsource the provision of all data centre services based on a shared procurement model.

Of these, Options A, B and E were discounted. Options A and B did not qualify as shared service options and therefore do not fall within the scope of this study. They have, however, been included in the cost-benefit appraisal of options for cost comparison purposes.

Option A includes the upgrading of existing facilities to a baseline level and makes provision for the institutions to meet their expansion requirements, it does not however, provide business continuity or tackle the fundamental power, cooling and space problems associated with existing provision. However, the inclusion of expansion costs within Option A ensures that both the data centre capacity and cost for implementing and running each option are comparable.

Option E was discounted as it would preclude the use of existing data centre infrastructure and would have a significant impact on staff and operations. However, whilst outsourcing of data centre services was not considered a valid option, the institutions requested that analysis of a co-location option (rental of space within a commercial data centre) should be considered for both Options B and C.

The Feasibility Study concluded that the most advantageous approach to Option C was b) development of a re-furbished / new build facility. This approach has therefore been taken as the basis for the financial modelling of Option C.

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This Business Plan therefore considers the financial implications of the following options:

- Option A - Bring Existing Facilities to a Baseline Level and Meet Expansion Requirements
- Option B (1) - Pursue Individual Solutions - New Build
- Option B (2) - Pursue Individual Solutions - Co-location
- Option C (1) - Shared Service - 3 Institutions New Build
- Option C (2) - Shared Procurement - 3 Institutions - Co-location
- Option D - Shared Services – Regional Institutions plus, potentially, other local partners

### 3 Non Financial Analysis of Options

A non-financial analysis of the options is included within Sections Five and Six of the Feasibility Study. It was concluded that the best options based on non-financial factors are either Option C or Option D.

For Option C, the development of a new build data centre in the Sheffield metropolitan area offers the best potential to take advantage of new construction techniques to design and build an energy-efficient building. A new site will ensure that there will be power availability throughout the life of the data centre and gives the institutions involved in the shared service full control over design and operation of the building. A re-furbished building may preclude the use of renewable energy and may have some inherent scalability limitations, although this will depend on the particular site and building. However, when deciding on a specific location, it is recommended that the universities should consider both re-furbished and new build options.

Option D, the development of a new build data centre with other like-minded partners, potentially within the local MAN areas of each institution, offers the same advantages as those identified for Option C as well as the potential to minimise connectivity costs. It also offers the opportunity for partnering with other HE institutions, across the wider education sector, and with potential partners such as JANET (UK) and commercial data centre providers.

It is therefore appropriate that the institutions should consider both Options C (1) and D from a non-financial perspective. The first phase of the programme therefore recommends that the institutions proceed with an open mind and consider involvement of appropriate partners and organisations who can add value to the shared service.

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## 4 Financial Analysis of Options

The result of the financial analysis of options has been included in the Executive Summary and Recommendations. It is repeated here for ease of reference:

Option	Adjusted NPV '000s	Original Net Present Value '000s	Risk / Bias	Annual Cost over 10 years '000s	Average Annual Cost Per Institution '000s	Increase in Average Annual Cost Per Institution '000s	NPV relative to Option A '000s
Option A - Bring Existing Facilities to a Baseline Level and Meet Expansion Requirements	£49,357	£47,801	£1,556	£4,935	£1,645	£0	0
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### 10 Year Financial Analysis – Based on Retention of Current Facilities and use of SuperJanet Infrastructure

#### 4.1 Option A - Bring Existing Facilities to a Baseline Level of Service and Meet Expansion Requirements

Option A is not a truly viable option for any of the institutions but has been included in this Business Plan as a comparator for costing the other options. Derby and Salford do not have the infrastructure or capacity to maintain their existing services over the longer term due to a lack of space and power, have no means to meet their specific requirements for expansion and have no business continuity arrangements within their existing data centre facilities. Sheffield Hallam is able to meet existing needs but is projected to run out of space in 2011/12, whilst its business continuity provision is compromised by the proximity of its existing data centres.

Option A does not resolve these business continuity issues or tackle the fundamental power, cooling and space problems associated with existing provision. It only provides an equitable basis for comparing costs against other options, based on the use of temporary portable container units supplied and sited within the grounds of each institution and staffing for a 24/7 service. It is therefore strongly recommended that each institution pursue one of the other options to meet their future data centre requirements.

The total cost for Option A is calculated at around £49.5M over 10 years or an average of approximately £1.6M per institution per year. These figures are calculated at Net Present Values, in line with Treasury and HEFCE guidelines, and provide a baseline against which all other options can be compared.

#### 4.2 Option B (1) - Pursue Individual Solutions - New Build

Option B (1) represents the cost of each institution pursuing their own data centre needs and building a new facility in their local area to meet their own requirements for space and expansion, power and business continuity.

The total NPV for Option B (1) represents a cost of around £61M over 10 years or an average of approximately £2M per institution per year. This is around £11.5M higher than Option A over the 10 year period, an average of approximately £400k higher per institution per year. Whilst more expensive, this and all subsequent options, meet additional data business continuity and disaster recovery requirements and offer the opportunity, which has been factored in to costs, to reduce carbon emissions as well as developing and maintaining reliable, standards-based data centre services.

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#### 4.3 Option B (2) - Pursue Individual Solutions - Co-location

Option B (2) has been modelled to evaluate the costs of each institution separately renting space within an existing commercial data centre within their local area and retaining staffing within each institution.

The total NPV for Option B (2) is calculated at around £55M over 10 years or an average of around £1.8M per institution per year. This is around £5M higher than Option A, an average of approximately £200K higher per institution per year. This option does, however, provide the additional benefits associated with use of scalable, established data centre and will meet the institutions' expansion and business continuity requirements.

It is, however, contingent on increasing capacity, cooling and power being, and continuing to be, available within a selected commercial data centre. It is unlikely that the institutions will be able to find this capacity within their local areas and this option is therefore, unlikely to be viable over the longer term. Also, to secure, and contract for, this space on a long term basis, the institutions would need to be sure of their expansion requirements in order to avoid unnecessary space being reserved and paid for.

Compared to the new build option (B1), co-location represents a significant saving of around £5M for the three institutions over the 10 years, if a commercial provider can be found.

#### 4.4 Option C (1) - Shared Service - 3 Institutions New Build

Option C (1) presents a model where the capital and upfront costs of developing a new data centre are delivered through a shared service company. Running costs, specifically staff, management and power costs, are also met by the shared service company.

These shared services costs are then charged back to the institutions through an annual service charge. Both capital and running costs specific to each institution, such as communication links between the university and the shared service data centre are met by each institution. This option assumes that long-distance communications infrastructure is provided through the SuperJanet network at no additional cost to the institutions involved. For a revised model of costs assuming the use of commercial dark fibre, see Annex B.

The total NPV for Option C (1) at around £47.5M over 10 years or an average of approximately £1.5M per institution per year. This is

approximately £2M less than implementing Option A. Option C (1) also has the benefit of meeting the business continuity and disaster recovery requirements of the three institutions, offering the opportunity to develop a shared service and to expand by offering services to other institutions and local businesses. It also enables the institutions to reduce carbon emissions and to develop robust and reliable services, based on industry best practise, and governed by tight well-defined SLAs.

Compared to Options B (1) and (2), this option offers savings of around between £8M and £13M over the 10 years. This demonstrates the implementation of a new shared service data centre is significantly more cost effective than pursuing individual solutions to meet capacity, expansion and business continuity and disaster recovery requirements.

#### 4.5 Option C (2) - Shared Service - 3 Institutions - Co-location

Option C (2) has been modelled to enable the three institutions to share procurement of co-located data centre space in the Sheffield area and the staff required to manage this facility. This option wraps up these running costs and recharges them through an annual service charge. All capital investment costs are met by each institution.

The total NPV for Option C (2) is calculated at £50M over 10 years or an average of approximately £1.7M per institution per year. This represents £1M over the 10 years more than Option A but provides the additional data centre expansion and business continuity requirements of the three institutions in common with Option B (2).

Whilst shared procurement and operation of a co-location facility is significantly more financial advantageous than pursuing individual data centre solutions, it does not offer savings over the shared service options C (1) and D. This is primarily due to the projected rising rental costs of commercial data centre space over the coming years.

Whilst this option potentially offers the additional data centre expansion and business continuity requirements of the three institutions, it is also constrained by the limitations identified in Option B (2), particularly the likely problems associated with finding appropriate co-location space in the Sheffield area.

#### 4.6 Option D - Shared Service - 3 Regional Institutions

Option D provides a similar model to Option C (1) but assumes that institutions partner with local institutions within their own metropolitan areas.

The total NPV for Option D is calculated at around £47.5M over 10 years or an average of approximately £1.6M per institution per year. This is comparable with Option C (1) and also offers the advantages associated with the creation of a shared services data centre.

## 4.7 Conclusions

The shared service options offer savings of between £8M and £13M over 10 years compared to each institution pursuing its own solution either through co-location or creation of a new data centre. All the shared services options are broadly comparable in terms of cost and represent an average investment by each university of approximately £1.6M per year over the next 10 years. This is a similar level of investment to that which will be required by each institution just to maintain existing services in their current state and to meet projected expansion requirements. However, the development of a shared service data centre will provide business continuity and disaster recovery facilities and offers the potential to migrate from current provision in the future, as well as delivering the non-financial benefits set out in the Feasibility Study.

We therefore conclude that the financial business case for developing a shared service, compared to individual institutions either developing their own data centres or co-locating, is compelling and should be pursued with vigour. The choice of shared service model and selection of partners will be contingent on securing SuperJanet connectivity, but should be primarily based on the non-financial factors set out in the Feasibility Study.

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## 5 Sensitivity Analysis

In line with HEFCE guidelines, some variables have been handled through sensitivity analysis, reducing the likelihood of significant risks and contingency requirements unduly skewing the financial model.

### 5.1 Migrating Existing Data Centre Provision

The three institutions included in this study have indicated that they wish to retain their existing data centre provision in the short term. This will enable them to each use the shared service data centre as either a primary or secondary site, providing both expansion capacity and business continuity and disaster recovery in conjunction with existing facilities. Each institution plans to model their own expansion and transition requirements to meet their own local needs and the decision whether to migrate existing facilities to a new shared service data centre is a decision that will be taken locally by each institution. The shared service data centre is, however, scalable to enable institutions to migrate as much, or as little, existing provision as is required.

If this study were to be replicated at other institutions, or if current requirements were to change at the institutions involved in the study, institutions may decide to de-commission their existing data centre facilities and reduce coverage and scope of their business continuity and disaster recovery requirements. This could be due to financial limitations or the need to free up accommodation, or because current facilities are genuinely not fit for purpose and the cost of re-development would be prohibitive.

In this situation, the financial model for the implementation of a shared service data centre is significantly different and is set out in Annex A. This annex shows that by decommissioning existing data centre services and moving to a shared service between institutions, there is the potential to save between £12M and £14M over a 10 year period compared with retaining existing facilities and meeting expansion needs within institutions' current infrastructure.

### 5.2 SuperJanet Communications Infrastructure

The options and costs set out in this report have been based on an assumption that the JANET (UK) SuperJanet infrastructure can be used to provide high speed communications links to the shared service data centre. It has also been assumed that HEFCE will fund this connection. Initial discussion and consultation with Janet (UK)

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indicates that this will be technically possible, although consideration will need to be made as to whether JANET (UK) would be willing to host high-availability synchronous data links to support a shared service data centre.

Should this communications link not be available, then the costs of the Options would be subject to the sensitivity analysis set out in Annex B.

The costs set out in Annex B are around £12.5M higher for Option C (1) compared to the SuperJanet funded model as the commercial cost of installation and ongoing rental of dark fibre between each institution and the shared service data centre has been included. This analysis demonstrates that the financial viability of the potential shared service between Salford, Derby and Sheffield Hallam is significantly more favourable if SuperJanet infrastructure can be used at no additional cost to the institutions.

If the institutions are unable to use the SuperJanet infrastructure, then further close consideration should be given to Option D, based on the use of local partners to minimise the overall cost of network infrastructure. This option would meet all expansion requirements and deliver all the non-financial benefits of a shared service at a cost of around £51M over 10 years. It would also be worth re-assessing bandwidth requirements and consider whether it would be possible to deliver the services, using asynchronous, lower bandwidth connections. This may enable the cost of connectivity using commercial providers to be reduced and for the shared service between the three proposed institutions to remain financially viable.

## 6 The Preferred Option

Whilst the financial appraisal show that the differences in cost between Options C (1) and D are insignificant, we would recommend that the institutions proceed on the basis of selecting Option C (1) and work together to establish a shared service data centre. The evaluation of the compatibility and commonality of requirements undertaken in Sections 4 and 5 of the Feasibility Study shows that the institutions involved in this study are broadly compatible and share a similar vision for the shared service.

This recommendation will need to be qualified by confirmation with Janet (UK) that they are able and willing to supply the bandwidth to support high availability services between Salford and Derby to the proposed shared service data centre site in the Sheffield area. If they are unable to provide, and deliver on, this commitment, then it is recommended that the institutions select Option D and initially seek suitable partners within their own local areas to keep the costs of communications infrastructure manageable. The selection of partners should be subject to evaluation against the selection criteria set in the Feasibility Study.

It is also recommended that this decision be ratified, in principle, by the institutions' governing bodies prior to development and implementation of the proposed programme plan. If the governing bodies have a preference for Option D, then we would recommend that further work be undertaken by each institution to select alternative partners following submission of the Feasibility Study and Business Plan to HEFCE.

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## 7 Evaluation of Risk and Contingency

During the course of this study, the initial approach to risk and contingency incorporated an optimism bias for each financial option. However, as the Feasibility Study progressed and the financial model has developed real risks to the implementation emerged and the optimism bias has been replaced by a risk register with contingency included within the financial model based on the likelihood and impact of risks.

The figure below sets out the risks identified to date and the impact and likelihood of them occurring. It also states the basis upon which the financial value of the risk has been calculated.

Table One - Risk Evaluation	Probability to affect options						Basis for estimating cost impact on university
	Option A	Option B (1)	Option B (2)	Option C (1)	Option C (2)	Option (D)	
<b>Land and Construction</b>							
Land cost is higher than anticipated	No	Medium	No	Medium	No	Medium	Total cost of land
Construction costs are higher than anticipated	Low	Medium	No	Medium	No	Medium	Total cost of construction
<b>Technical</b>							
Unable to use SuperJanet connectivity	No	Low	Low	Medium	Medium	Low	Impact considered in Sensitivity Analysis Estimated at £150k per institution
Cost of bringing forward and purchase of additional IT kit	No	Medium	Medium	Medium	Medium	Medium	
<b>Operations</b>							
Facilities unavailable due to disaster	Low	No	No	No	No	No	Estimated at £2,000,000 per institution
Co-location partners increase costs to meet legislation	No	No	Medium	No	Medium	No	
Operational/Setup problems cause cost overrun	No	Medium	Low	Medium	Low	Medium	50% of consultancy costs
Unable to recruit staff for shared service	No	No	No	Medium	Medium	Low	5% of shared service staff costs
Failure to meet operational standards	High	High	No	No	No	No	5% of total NPV - Option A and B
<b>Financial</b>							
Unable to secure funding for SuperJanet costs	No	Low	Low	Medium	Medium	Low	Impact considered in Sensitivity Analysis 50% of assumed grant discounted
Failure to obtain predicted level of grant funding	No	No	No	Medium	High	Medium	
<b>Management</b>							
Management Buy-in takes more effort than anticipated	No	High	Low	Medium	Medium	Medium	2% of total staff cost
Staff impact requires additional effort	No	No	Low	High	Low	High	4% of total staff cost

### Risk Evaluation across Financial Options

Once risks had been assessed, the financial value of each risk was calculated based on the assignment of a percentage value to the risk likelihood. These values were set at 10% for risks where the likelihood of them occurring is assessed as low, 25% for risks where this assessment is Medium and 40% where the assessment is High. The following diagram shows the resulting value of risk assigned across each option.

Table Two - Risk Impact on Financial Model	Financial Impact on Options						
	Option A	Option B (1)	Option B (2)	Option C (1)	Option C (2)	Option (D)	
<b>Land and Construction</b>							
Land cost is higher than anticipated	£0	£375,000	£0	£250,000	£0	£250,000	
Construction costs are higher than anticipated	£0	£562,500	£0	£250,000	£0	£250,000	
<b>Technical</b>							
Unable to use SuperJanet connectivity	£0	£0	£0	£0	£0	£0	Impact considered in Sensitivity Analysis
Cost of bringing forward and purchase of additional IT kit	£0	£112,500	£112,500	£112,500	£112,500	£112,500	
<b>Operations</b>							
Facilities unavailable due to disaster/failure	£600,000	£0	£0	£0	£0	£0	
Co-location partners increase costs to meet legislation	£0	£0	£2,875,858	£0	£2,875,858	£0	
Operational/Setup problems cause cost overrun	£0	£108,750	£7,500	£133,750	£7,500	£133,750	
Unable to recruit staff for shared service	£0	£0	£0	£150,000	£150,000	£60,000	
Failure to meet operational standards	£960,654	£1,036,220	£0	£0	£0	£0	
<b>Financial</b>							
Unable to secure funding for SuperJanet costs	£0	£0	£0	£0	£0	£0	Impact considered in Sensitivity Analysis
Failure to obtain predicted level of grant funding	£0	£0	£0	£375,000	£600,000	£375,000	
<b>Management</b>							
Management Buy-in takes more effort than anticipated	£0	£144,000	£36,000	£60,000	£60,000	£60,000	
Staff impact requires additional effort	£0	£0	£72,000	£192,000	£48,000	£192,000	
<b>Total Risk Allocation</b>	<b>£1,560,654</b>	<b>£2,338,970</b>	<b>£3,103,858</b>	<b>£1,523,250</b>	<b>£3,853,858</b>	<b>£1,433,250</b>	

### Financial Assessment of Risks

It is recommended that the institutions review the risk profile of each risk and identify additional risks during each stage of implementation. This will impact the financial model and will provide further assurance that the business case for the shared service data centre is sound.

Treasury guidance recommends that specialist advice is sought to address taxation issues. We would strongly recommend that the institutions take professional taxation advice to reduce the risks of incurring additional or unforeseen tax liabilities. This should include considering how to manage capitalisation by debt, the transfer of property and assets to the shared services company, liability for stamp duty, corporation tax, accounting treatment and the management of losses.

## 7.1 Sensitivity Analysis

The financial impact of decommissioning existing data centre facilities in Year 3 has been handled through sensitivity analysis and the impact is included at Annex A.

The financial impact of not using SuperJanet connectivity, or having to meet the costs of doing so, has also been calculated using sensitivity analysis. The table in Annex B shows the impact of this risk on the financial model.

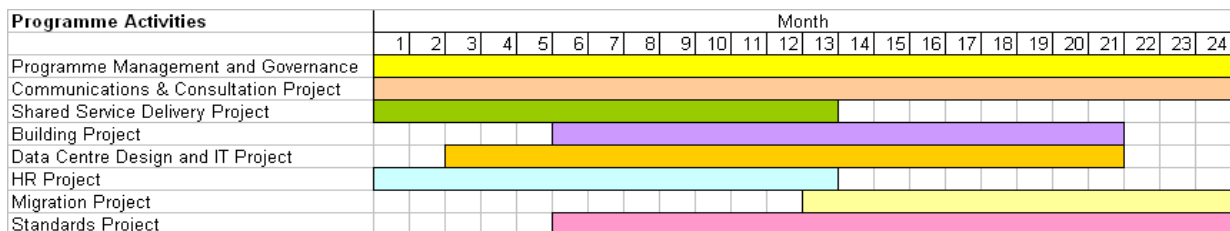
## 8 Programme Management and Monitoring Arrangements

### 8.1 Programme Management

The implementation of the shared service will need to be well managed and tightly controlled, this is especially important as there are three institutions involved with their own requirements and priorities. It is therefore recommended that the institutions use a recognised and widely-approved programme management methodology such as the OGC Managing Successful Programmes framework to provide this management and control. Adoption of a structured framework will provide an outcomes-based approach to business change and will help to deliver the success criteria and benefits associated with the programme.

It is proposed that the programme should be managed by a Programme Board, comprising of a Senior Manager from each institution and run by a full-time Programme Manager. A Senior Responsible Owner should also be appointed from one of the institutions who will be ultimately be accountable for the success of the programme and will act as the “champion” for the programme providing clear leadership and direction throughout its life.

The programme should be broken down into a portfolio of projects, co-ordinated through the overall programme management and governance structure. We have planned for full implementation of the programme over a 24 month period, although it may be possible to condense implementation by using best practise design and building techniques and by taking innovative approaches to partnering and procurement. The proposed portfolio of projects is illustrated in the figure below:



It is proposed that each project would be managed using the Prince2 project management methodology and that each would be run by a Project Manager and Project Board. It may be possible that Project

Managers may cover more than one project, although it is important that the delineation of project boundaries and outputs is maintained.

An outline Programme Plan is included at Annex C.

## 8.2 Programme Phases and Transition

The overall programme should be broken down into a number of distinct phases. This will allow staged decisions to be taken by each institution and enables the Business Case to be formally re-validated at the end of each phase. This reduces the overall risk to the programme by ensuring that the Business Case remains valid and that control over delivery of the programme is managed and visible within each institution.

The outline programme plan identifies the following phases:

- Phase One – Validation and Approval
- Phase Two – Programme Initiation
- Phase Three – Shared Service Definition
- Phase Four – Procurement
- Phase Five – Design
- Phase Six - Build
- Phase Seven – Implementation

There will be a financial cost associated with delivering the programme, and we would recommend that a provision of £300k should be made in budgets to enable each university to undertake preparatory work, to put in place the necessary collaboration needed to define the requirements of the data centre and to develop an outline design. This provision will also enable additional consultancy to be procured as required. Further developmental costs associated with transition will be incurred throughout the programme, but these will be defined during development. However, we have included provision for these costs in the financial business case.

## 8.3 Phase One - Validation and Approval

It is recommended that Phase One of the programme should contain the following activities:

- Develop programme/transition plan in more detail (Phases 2 to 7) and identify resource requirements.
  - Investigate local potential partners - private, public and education sector.
-

- Define and agree scope of services to be delivered by the shared service in more detail.
- Refine financial model to meet individual institution needs and drill down to prepare cashflow, NPV and 3 year budgets for each institution.
- Undertake initial applications portfolio audit at each institution. Review bandwidth requirements for each application.
- Review funding options and submit grant applications as appropriate. Potential funding avenues from HEFCE include the Strategic Development Fund, the Capital Investment Fund and the Revolving Green Fund.
- Undertake detailed discussions and negotiations with SuperJanet(UK) and MANS to agree roles and possible company structures.
- Review HEFCE input and response to Feasibility Study and Business Plan.
- Develop a Stakeholder and Communications Plan.
- Review internally at institutions and gain approvals by Governing Bodies before moving to next Phase.

Completion of these activities will provide a firm basis for implementation of the shared service data centre. They will, however, require significant effort from the institutions to complete and will require funding and support from both within the institutions and externally. This effort will include input from Finance, HR, Facilities and IT as well as significant programme management and co-ordination. The degree of effort and commitment required to complete the first phase of the programme should not be underestimated as this provides the grounding for the remainder of the programme and will validate the business case.

It is recommended that each institution should therefore appoint an internal member of staff to act as their lead on the programme on a full-time basis and that their substantive post be backfilled. It is also unlikely that the universities will have the resource, or available skills, to fully complete Phase One internally and consideration should therefore be given to securing additional consultancy support to ensure that the foundations for ongoing implementation of the programme are secure.

## 9 Assumptions and Variables

### 9.1 Common Assumptions and Variables

The following high-level assumptions, which are common to all options, have been made when developing the financial model:

- Existing provision at each institution will be maintained. The new shared service data centre will provide secondary business continuity provision at Sheffield Hallam and will provide either primary or secondary data centre services at Salford and Derby.
- All options provide costs for meeting the expansion requirements of the three universities over the coming 10 years and for maintaining existing services.
- The cost of power will rise at 5% above the rate of inflation.
- The cost of co-location rental costs will rise at 10% above inflation. Whilst it is difficult to accurately assess the future rate of increase, all co-location data centre providers will need to meet future environmental standards and, where additional capacity is required, will need to make capital investment to meet additional M&E costs. 10% therefore represents a conservative estimate over the period.
- The costs for transition to the new data centre and the cost of servers are high level estimates. The Business Case will need to be updated to reflect more accurate costing during the pre-implementation phase of the programme.
- The cost of ongoing rental of communications links are discounted based on the use of SuperJanet connectively funded by HEFCE. The availability of bandwidth and JANET (UK) acceptance of the use of their network for high availability services will be a key constraint on the use of this service. An alternative model with the cost of using commercial communications infrastructure has been included at Annex B.
- Net VAT impact is included based on the assumptions stated in Scenario Three of Sub-section 7.2 of the Feasibility Study.

A full list of detailed financial assumptions and variables for each of the options has been included of the Assumptions and Variables tabs of the Business Case spreadsheet which supports this report. The following variables have been agreed as initial estimates, although it is recognised that they will need refinement in subsequent phases of the programme, by each institution:

Estimated number of staff required at each institution to run 24/7 operation at baseline service level.	12
Assumed that Year One is financial year 2010/11, starting 1 August 2010	2010/11
Estimated annual on-cost of running existing services at each institution: facilities charges, etc.	£20,000
Number of staff required by shared service structure to run operation based on the service scope.	24
Total staff required to run existing facilities at each institution and to run and manage the shared service if existing services are maintained.	27
Total staff cost per annum (including oncosts).	£50,000
Cost of Power increase above inflation.	5.0%
Cost of Co-Lo increase above inflation	10.0%
Net Present Value discount Factor (based on Treasury Green Book).	3.5
Assumed net vat payable on goods and services procured from 3rd party - after discounting partial exemption.	16.8%
Assumed net vat payable on goods, services and staff procured through Shared Service vehicle - after discounting partial exemption.	19.5%
Number of servers contained in a rack at a co-located facility.	5
One off cost of installing a rack in a co-located facility.	£900
Annual cost of running a rack at a co-located facility.	£12,000
Power - No of Kwatts used per server per hour	0.5
Power - Current price per Kwatt (in pence)	10
Power - Assumed multiplier to equate Kwatt per server cost to total power cost for DC, based on use of pre 2005 standards facility. This assumes that full M&E is in place in existing facility.	3
HEFCE and other grants available to pump prime shared service provision. Assumed these will not be repayable.	£3,000,000
Assumed Capital Cost (for Option A) of bringing existing accommodation to baseline level - Salford.	£500,000
Assumed Capital Cost (for Option A) of bringing existing accommodation to baseline level - Derby.	£1,000,000
Assumed Capital Cost (for Option A) of bringing existing accommodation to baseline level - Sheffield Hallam.	£250,000
Assumed annual revenue cost (for Option A) of bringing existing accommodation to baseline level - Salford.	£50,000
Assumed annual revenue cost (for Option A) of bringing existing accommodation to baseline level - Derby.	£100,000
Assumed annual revenue cost (for Option A) of bringing existing accommodation to baseline level - Sheffield Hallam.	£10,000
Assumed additional capital cost (for Option A) of enabling existing accommodation to meet expansion requirements - Salford.	£1,500,000
Assumed additional capital cost (for Option A) of enabling existing accommodation to meet expansion requirements - Derby.	£4,500,000
Assumed additional capital cost (for Option A) of enabling existing accommodation to meet expansion requirements – Sheffield Hallam.	£4,500,000

Assumed annual revenue cost (for Option A) of maintaining existing accommodation based on expanding requirements - Salford.	£150,000
Assumed annual revenue cost (for Option A) of maintaining existing accommodation based on expanding requirements - Derby.	£450,000
Assumed annual revenue cost (for Option A) of maintaining existing accommodation based on expanding requirements - Sheffield Hallam.	£450,000
Annual savings generated from re-use of existing accommodation based on transition of existing services- Salford	£20,000
Annual savings generated from re-use of existing accommodation based on transition of existing services- Derby	£10,000
Annual savings generated from re-use of existing accommodation based on transition of existing services- Sheffield Hallam	£20,000
Annual savings generated from improved services to users as a result of more capacity, better standards, zero outtages, improved SLAs, etc. - included in all Options except A - Salford.	£20,000
Annual savings generated from improved services to users as a result of more capacity, better standards, zero outtages, improved SLAs, etc. - included in all Options except A - Derby.	£100,000
Annual savings generated from improved services to users as a result of more capacity, better standards, zero outtages, improved SLAs, etc. - included in all Options except A - Sheffield Hallam.	£20,000
Assumed cost for each institution of migrating existing server estate to new facility. Will need validation in pilot phase.	£300,000
Assumed cost per server purchase and installation both to meet additional expansion requirements and also if existing DC facilities are migrated. Will need validation in pilot phase.	£0
Cost of Borrowing (figure used by finance department when conducting investment appraisals).	7.0%
Deflator (figure used by finance department when conducting investment appraisals).	3.0%

In addition to these variables, each option has been based on a number of specific assumptions as detailed below.

## 9.2 Option A Assumptions

Option A has been calculated by taking a baseline estimate of the CAPEX and OPEX costs for each institution delivering their own data centre services operating on a 24/7 basis and expanding these to meet future requirements. This option does not include provision for additional Business Continuity or Disaster Recovery facilities.

As this is a baseline, it does not represent the current cost of running the existing data centres at the institutions. It should not therefore be taken as an assessment of existing budgetary provision.

The costs associated with this Option have been based on the following set of assumptions:

- Sheffield Hallam is already at the baseline and will therefore need no capital or revenue growth to continue to operate their data centre services. The notional costs for Option A are therefore based solely on meeting their expansion requirements over the coming 10 years and providing 24/7 services.
- For Derby and Salford, an allowance has been made for bringing the existing data centre provision to a baseline. This includes some provision to allow expansion based on the use of temporary pre-fabricated containers but does not fully factor in the costs of re-building existing facilities to a 2007 standard. This option also requires suitable onsite accommodation to be found and released.
- Option A includes provision for 12 notional staff at each institution. This notional figure does not represent the true number of staff providing data centre services at each university but provides a comparator for the other options assuming provision of the following services:
  - 24hr service based on a 3 shift pattern.
  - Shifts provide perimeter and building security
  - All rack and server (in SS, pod and shell) monitoring (red/green - on/off basis)
  - Upkeep and maintenance of M&E
  - Problem notification and incident management.
- This estimate excludes applications management, maintenance and monitoring, server and maintenance and operating systems support.
- An additional £200,000 per annum at each institution is included to cover notional facility costs associated with running the data centre, this includes notional corporate recharges, overheads and support service costs. Power, as a significant cost element, is accounted for separately based on the existing number of servers and future expansion needs at each university.

### 9.3 Option B (1) Assumptions

This option includes provision for the purchase of a 2,000sq metre site by each institution in their local area, with costs based on building a new data centre on fully serviced land with B1c, B2, B8 planning consent including legal fees and taxes. It also includes an estimate of the cost of transition and the M&E infrastructure required to operate a fully-compliant tier-2 data centre to 2007 environmental standards. Allowances have also been made to cover the cost of providing dark

fibre connections to the main university campus and the associated cost of re-configuring existing communications infrastructure. Provision is included for additional devices at the new data centre.

Running costs are based on the same staffing levels and facility costs as Option A with allowances made for communications infrastructure and dark fibre rental costs, as well as the repayment of capital costs over the 10 year financial model.

#### 9.4 Option B (2) Assumptions

This option assumes that data centre space will be available within the area local to each university to meet expansion requirements. The capital costs associated with this option are limited to transition design and implementation costs, provision for some additional devices at the data centre, dark fibre connectivity back to the university main campus, plus new communications infrastructure.

Co-location rental costs are based on a rack density of a maximum of 5 servers or 1.5kw per rack (approx current density). Current rack rental costs of £1000 per month have been assumed based on three example providers.

Running costs comprise of the rental of space within the data centre, communication line rental plus staffing costs at the same staffing levels and facility costs as Option A plus the repayment of capital costs over the 10 year financial model.

#### 9.5 Option C (1) Assumptions

All shared service options assume that the shared service and existing services at the institutions are operated by a total of 27 staff. These will be a mixture of retained staff at institutions, staff seconded to the shared service and staff employed directly by the shared service.

Staffing for all shared service options has been costed on a secondment basis and will be charged at cost to the shared service company. This will then be recharged to the institutions as part of an annual service charge.

Capital costs in Options C (1) and D have been reduced by £3M to reflect assumed funding by HEFCE.

The shared service data centre in Options C (1) and D has been scaled to allow expansion of the shared service to accommodate existing provision at each institution, proposed growth over the coming 10 years, plus provision to allow the service to expand to other institutions or elsewhere.

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## 9.6 Option C (2) Assumptions

This option assumes that data centre space will be available within the Sheffield area to meet all three institutions' expansion requirements. The capital costs associated with this option are limited to transition design and implementation costs, provision for some additional devices at the data centre, dark fibre connectivity back to the university main campus, plus new communications infrastructure.

Running costs comprise of the rental of space within the data centre, communication line rental plus staffing costs at the same staffing levels and facility costs as Option C (1) plus the repayment of capital costs over the 10 year financial model.

## 9.7 Option D Assumptions

The assumptions stated in Option C (1) are common to Option D. The only significant difference is the exclusion of commercial dark fibre connectivity as detailed in Annex B in the Feasibility Study.

## 10 Applicability to the wider HE Sector.

The options included in the Business Case offer a comparison between the development of shared services between institutions and the costs of developing or procuring data centre services individually. The three institutions involved in this study intend to use the proposed shared service to provide additional capacity to meet increasing demand and to create business continuity and high availability services.

This particular set of requirements has driven the development of this Business Case. In other circumstances, and with other institutions, there may be no requirement to provide high availability services or the same degree of business continuity. In which case, the table included at Annex A shows the financial impact of replacing existing provision at each institution with a shared service data centre, based on a similar set of assumptions. This table shows that there are significant financial savings to be made by pursuing a shared service approach and migrating from existing unsuitable data centre facilities.

It is recognised that other institutions will have specific data centre requirements, including the need for high-performance computing, and that these have not been addressed by this study. The financial model set out in this report should not be used in its current form as a Business Case for any other particular set of circumstances or institutions. It does, however, demonstrate the potential costs and savings associated with creation of a shared service data centre in these particular circumstances. It also suggests that the implementation of shared services data centres offer the opportunity to reduce expenditure and improve services. However, local circumstances and needs will require the model to be adjusted and the costs and savings identified are likely to be significantly different for other groupings of institutions.

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## Annex A - Sensitivity Analysis - Impact on Financial Model of disposing of existing Data Centres and replacing them with Shared Service.

Option	Adjusted NPV '000s	Original Net Present Value '000s	Risk / Bias	Annual Cost over 10 years '000s	Average Annual Cost Per Institution '000s	Increase in Average Annual Cost Per Institution '000s	NPV relative to Option A '000s
Option A - Bring Existing Facilities to a Baseline Level and Meet Expansion Requirements	£47,291	£45,776	£1,515	£4,729	£1,576	£0	0
Option B (1) - Pursue Individual Solutions - New Build	£48,428	£46,129	£2,299	£4,842	£1,614	£37	£1,137
Option B (2) - Pursue Individual Solutions - Co-location	£65,824	£62,450	£3,374	£6,582	£2,194	£617	£18,532
Option C (1) - Shared Service - 3 Institutions - New Build	£35,452	£33,928	£1,523	£3,545	£1,181	£-394	£-11,839
Option C (2) - Shared Service - 3 Institutions - Co-location	£61,136	£57,012	£4,124	£6,113	£2,037	£461	£13,845
Option D - Shared Services - 3 Institutions within Local MANs	£33,604	£32,171	£1,433	£3,360	£1,120	£-456	£-13,686

### 10 Year Financial Analysis – Based on Disposal of Current Data Centre Facilities and use of SuperJanet Infrastructure

## Annex B - Sensitivity Analysis - Impact on Financial Model of using Commercial Dark Fibre connectivity.

Option	Adjusted NPV '000s	Net Present Value '000s	Risk / Bias	Annual Cost over 10 years '000s	Average Annual Cost Per Institution '000s	Increase in Average Annual Cost Per Institution '000s	NPV relative to Option A '000s
Option A - Bring Existing Facilities to a Baseline Level and Meet Expansion Requirements	£49,357	£47,801	£1,556	£4,935	£1,645	£0	0
Option B (1) - Pursue Individual Solutions - New Build	£64,258	£61,958	£2,299	£6,425	£2,141	£496	£14,901
Option B (2) - Pursue Individual Solutions - Co-location	£59,173	£55,799	£3,374	£5,917	£1,972	£327	£9,816
Option C (1) - Shared Service - 3 Institutions - New Build	£60,219	£58,695	£1,523	£6,021	£2,007	£362	£10,862
Option C (2) - Shared Service - 3 Institutions - Co-location	£62,902	£58,778	£4,124	£6,290	£2,096	£451	£13,545
Option D - Shared Services - 3 Institutions within Local MANs	£51,144	£49,710	£1,433	£5,114	£1,704	£59	£1,786

**10 Year Financial Analysis – Based on Retention of Current Data Centre Facilities and use of Commercially Supplied Communications Infrastructure**

## Annex C - Outline Programme Plan

Programme Phase	Programme Project Streams							
	Programme Management	Comms & Consultation Project	Shared Service Delivery Project	Building Project	Data Centre Design and IT Project	HR Project	Migration Project	Standards Project
Phase One (2mths) - Validation and Approval	<p>Develop programme/transition plan in more detail and identify resource requirements.</p> <p>Initial Consultation with Governing Bodies</p> <p>Refine financial model to meet individual institution needs and drill down to prepare cashflow, NPV and 3 year budgets for each institution.</p> <p>Review HEFCE input and response to Feasibility Study and Business Plan.</p> <p>Staged Decision Point - Conduct Detailed Investigation</p>	<p>Development of Comms / Consultation Plan</p>	<p>Undertake detailed discussions and negotiations with SuperJanet and MANS to agree roles.</p> <p>Selection of Institution Partners</p> <p>Investigate local potential partners - private, public and education sector.</p> <p>Define and agree scope of services to be delivered by the shared service in more detail.</p> <p>Review funding options and submit grant applications as appropriate.</p>		<p>Initial applications portfolio audit - review bandwidth requirements.</p>			



	<b>Staged Decision Point - Approval to go to ITT</b>		Appoint Directors Establish SS Governance and Management					
<b>Phase Four (4mths) - Procurement</b>	Update Business Case and Review Affordability <b>Staged Decision Point - Appoint Contractors</b>	Ongoing Stakeholder Consultation	Issue ITT(s)  Evaluate Tenders Select Contractor(s) Appoint Contractor(s)			Formal Staff Consultation  Appoint Staff to SS		Refine Standards Refine SLAs
<b>Phase Five (2mths) - Design</b>		Ongoing Stakeholder Consultation		Purchase Land / Buildings	Design Data Centre		Plan Migration	
<b>Phase Six (6mths) - Build</b>		Ongoing Stakeholder Consultation		Build Infrastructure  Fit-out Data Centre	Procure IT  Install and Test IT			
<b>Phase Seven (3mths) - Implementation</b>		Ongoing Stakeholder Consultation					Migration	Implement Standards

	Lessons Learned Shared with Sector						Live Running	Implement SLAs
Overall Programme Close								SLAs Reported
Estimated Total Programme Length = 24mths								

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