

ABERDEEN CITY COUNCIL

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<b>COMMITTEE</b>	Corporate Policy and Performance
<b>DATE</b>	4 <sup>th</sup> March 2010
<b>DIRECTOR</b>	Stewart Carruth
<b>TITLE OF REPORT</b>	ICT Technical Strategy 2010 - 2015
<b>REPORT NUMBER</b>	CG/10/039

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**1. PURPOSE OF REPORT**

To present to Members the proposed ICT Technical Strategy 2010 – 2015 that will determine the effective planning across all Services for the future requirements of ICT functionality.

**2. RECOMMENDATION(S)**

It is recommended that Members approve the ICT Technical Strategy 2010 - 2015.

**3. FINANCIAL IMPLICATIONS**

The implementation of the strategy will create revenue and capital implications. These will be quantified and evaluated prior to any implementation approval. The funding for the implementation will be derived from the revenue budgets of Corporate Governance as well as the revenue budgets of other Services, as appropriate, and from the Non Housing Capital Programme. Therefore implementation of the strategy will be partly determined by the parameters set by the Council's revenue and capital budgets.

**4. SERVICE & COMMUNITY IMPACT**

Information Communications and Technology (ICT) are integral to the day to day operation of the Council. So, while ICT in itself does not have a direct impact on Service and Community, each and every objective contained within the Community Plan, the Single Outcome Agreement and Vibrant, Dynamic and Forward Looking, is possible because of, or made easier to achieve by, the integral role of ICT to service delivery across the Council.

**5. OTHER IMPLICATIONS**

The implementation of any strategy will have extensive implications in respect of legal, resource, personnel, etc., and those implications will be managed properly and in accordance with the relevant council policies as they arise.

## **6. REPORT**

- 6.1 All services of the Council utilise ICT functionality on a day to day basis. That utilisation is expanding in terms of volume and in terms of the technology being introduced to the Council. It is therefore a necessity that there is a corporate approach to all aspects of the utilisation of ICT functionality currently and into the future to ensure overall efficiency.
- 6.2 The corporate approach to ICT functionality is encapsulated in the ICT Business Strategy, previously approved by committee in December 2008; the ICT Technical Strategy which this report presents for approval; and the Management of ICT Security policies which are revised regularly and the latest revision was included in the Information Bulletin of the last meeting of the Corporate Policy and Performance committee.
- 6.3 The outcome of these core strategies and policies is an agreed way forward in determining how and when to adopt new ICT functionality or to develop existing ICT functionality, in the context of ensuring good technical practice pertinent to the context of operating and providing that functionality.
- 6.4 The focus of this report is the ICT Technical Strategy 2010 to 2015. The strategy is provided as appendix A to this report.
- 6.5 The development of the ICT Technical Strategy has been undertaken with due regard to the ICT industry and in particular the successful participants, in various roles, within that industry; and to the future development of ICT within Aberdeen City Council that the Strategy will be core in guiding and developing, which is encapsulated in the ICT Options work. The ICT Options work is a review of the various ways in which the ICT Service required by the Council can be delivered. Without knowing the technical requirements the viability of the options for the future service provision options cannot be properly evaluated.
- 6.6 The preparation of the ICT Technical Strategy was drawn from reviewing current and known future ICT requirements; benchmarking with industry standards and other practitioners; the extensive involvement of ICT staff to build in the detail of the technical requirements of the Service's clients and the input of Services in indicating what their future requirements would be in respect of using technology to support service delivery.
- 6.7 Specifically in relation to benchmarking with the industry standards and other practitioners there was dialogue with large and medium sized external vendors such as IBM, Atos, Bull, BT, Dimension Data, OCSL, Amor and Capito who were able to identify the emerging trends. There was research through various online sites of manufacturers such as EMC, IBM, HP, NETAPP, Novell and VMware. Also there was a review of the strategic plans of other local authorities. This was then supplemented by comparing the potential future with the known requirements of the user base in the Council. It was from the extensive pool of knowledge that key principles of Virtualisation, Automation and Consolidation were drawn up.

All of the information collated from this work has been held as part of the audit trail of the preparation of the strategy.

*There is a glossary of terms at the end of the report.*

- 6.8 There was also benchmarking undertaken with those local authorities that were working with the industry vendors that had been consulted with to verify that the intent and the reality were aligned. To this end benchmarking with peers was carried out with Dundee City Council, a site visit; by online research with Bristol Council; and by dialogue with Barnsley Council re their work with Bull, with Edinburgh Council re their work with Capito and South Shields Council for their work with IBM.
- 6.9 The strategy was extensively consulted on within the ICT service initially. This consultation took place at a number of different stages ranging from each area being reviewed by the technical experts on a number of occasions until the draft was completed. This produced the draft strategy which once a complete document was reviewed by all levels of management within the ICT Service first and then provided to all staff in the ICT service to review. The changes that this produced were incorporated in to the strategy and then it was provided to the key ICT users across the council for then to review. Changes from the client perspective arose and were incorporated into the strategy.
- 6.10 The move to formal consultation saw the draft strategy provided to all Services and the Trade Unions. A significant number of comments were received, to which a collated response was issued to all who had raised a comment. The collated response detailed the issue raised and the response from ICT. Many of the comments were for clarification but where the issues raised were advantageous to the strategy they have been included in the final version, as attached to this report.

#### **6.11 Summary**

**The ICT Technical strategy sets out the Information and communications technologies (ICT) technical vision that will enable the Services of the Council to attain improved and fit for purpose use of technology to fulfil their business requirements.**

**The ICT technical strategy provides the computing foundation for the data and applications architecture required to support all Aberdeen City Council Services.**

**The ICT Technical Strategy has an overarching vision that all Services in delivering their operational requirements should be supported by technology that is flexible enough to allow them to access and use all necessary data in a 24/7 working environment**

**The ICT Technical Strategy provides Aberdeen City Council with an overarching technical architecture which will deliver benefits such as the use of common standards, improved resilience, cost**

effectiveness, improved customer satisfaction and will reduce the ICT carbon footprint.

In the ICT Technical Strategy sections 3.1 to 3.4 are the technical detailing. They shall be included as an appendix in all future ICT tender documents so that vendors can align any proposals they make with the Council's technical ICT strategic direction.

**7. REPORT AUTHOR DETAILS**

Peter Esson  
IT Analyst  
Service Design and Development, Corporate Governance  
Email: [pesson@aberdeencity.gov.uk](mailto:pesson@aberdeencity.gov.uk)  
Tel: (52)2458

**8. BACKGROUND PAPERS**

Watt, Ian. Corporate Online Strategy 2008 – 2009, Version 1.1. May 28<sup>th</sup> 2008.  
Guild, Robert. ICT Management of ICT Security, Issue 7. April 21<sup>st</sup> 2009.  
<http://thezone/nmsruntime/saveasdialog.asp?IID=13460&SID=4281>  
Gale, Jacqui. Customer Service Strategy, Draft. September 2009

**Glossary of terms**

Amor and Atos BT Bull Capito Dimension Data IBM OCSL	These are all ICT vendors, so these are company names.
EMC IBM HP NETAPP Novell and VMware	These are all ICT manufacturers, so these are company names.

Aberdeen City Council

ICT Technical Strategy

2010 - 2015

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<b>Rev</b>	<b>Date</b>	<b>Description</b>	<b>Author</b>	<b>Reviewed</b>	<b>Approved</b>
V 0 draft		Initial draft for review	PE	AM / SM	
V0.1 (draft)	24/11/09	Draft Issued for consultation	PE	AM / SM	RA
V1.0 (draft)	22/12/09	Issued for committee approval	PE	AM / SM	RA

## 1.0 Executive Summary

The ICT Technical strategy sets out the Information and communications technologies (ICT) technical vision that will enable the Services of the Council to attain improved and fit for purpose use of technology to fulfil their business requirements.

The ICT technical strategy provides the computing foundation for the data and applications architecture required to support the objectives of the various Services.

This ICT technical strategy was developed by:

- speaking with the various Services in the Council and identifying their future ICT requirements (noted as the drivers for change in section 2.2)
- understand the changes fulfilling these requirements will have on the ICT systems used by the Council
- reviewing the current ICT provision and
- then determining what the future ICT provision therefore needs to be and the changes required to achieve that

This provided the basis of the vision which is:

- That all Services in delivering their operational requirements should be supported by technology that is flexible enough to allow them to access and use all necessary data in a 24/7 working environment.

For the technology provision in the Council this means moving from the traditional ICT architecture which in effect resulted in technology constraining the service delivery options of the Service, to having a Service Orientated Infrastructure.

A Service Orientated Infrastructure means the use of technology to meet the needs of the Service. Such an approach enables there to be a greater focus on what the technology has to achieve for the Services and away from the traditional focus of how the technology can be used. The result is improved performance potential for Services because the use of ICT can be synchronised with business needs.

For the technology provision to the Council this means that the principals to be observed are virtualisation, automation and consolidation.

- **Virtualisation**  
For the Services this will mean staff will enjoy access to all of their ICT resources, regardless of location, which accords with the corporate direction of improved customer service and of a more flexible workforce. For the technology provision it means moving to a standardised environment that is easier to support with fewer resources. In turn for the Services this means quicker and less costly support.
- **Automation**  
For the Services this means the move to allowing key ICT systems and resources to become available 24 / 7 to meet their demands regarding improving service standards. For the technology provision working with a standardised environment, means that updates, upgrades and the provision of new services



becomes quicker and easier as they are carried out from a central location. In turn for the Services this means an improvement in the overall standard of ICT provision with less planned down time to keep their systems fully up to date.

- Consolidation  
For the Services this means service improvement through being able to have applications provided more quickly and with ICT becoming more reactive to customer requests.  
For the technology provision this means that consolidation in software packages and hardware platforms will bring a reduction in ICT support costs whilst improving the service delivered to the council.

Beyond the improvements noted above for each Service's specific use of technology this ICT strategy also addresses several corporate business needs:

- Reducing the environmental impact of the council  
The council is committed to cutting its carbon emissions by 15 percent between 2010 and 2015. ICT systems consume power to keep them running and to maintain a steady temperature in the data centre. This strategy includes approaches that will decrease the overall electrical demand during and outside normal working hours through the use of innovative hardware, software, implementation of best practices.
- Smarter working  
The corporate objective of attaining a smaller more flexible workforce coupled with the imminent move to Marischal College will require changes to working practices to make the most efficient use of council premises. The demands for smarter working are set to grow significantly over the next 3 years and this strategy enables key aspects of this to be met.
- Improved Customer access  
The council aspires to be recognised as a role model in customer service provision, with customers who feel that council services are accessible. Customer access to council services will therefore increasingly be driven down three main channels - face to face, telephony and internet / email.
- Cost reduction  
Through the adoption of new technology and smarter ways of working it will be possible to significantly reduce the revenue cost whilst improving service levels to customers and citizens.

In this ICT Strategy sections 3.1 to 3.4 are the technical detailing. They shall be included as an appendix in all future ICT tender documents so that vendors can align any proposals they make with the council's technical ICT strategic direction. Hence the content of these sections is highly specialised.

This strategy will be subject to regular review which is consistent with the philosophy of this being a live document.

## 2.0 ICT Strategy – Vision for the future

Looking forward over the next three to five years, the council faces a number of pressures that will shape how ICT facilities provided both to and by the various services will have to evolve to meet citizen and council needs. In addition to these pressures, the ICT department will also be faced by internal pressures to work smarter, to be more efficient at providing services and to meet the needs of their customers with fewer resources.

The ICT technical strategy contained within this report shall

- provide a commercially and technically viable, enduring approach to ICT technical resources;
- provide a durable solution for flexible working and disaster recovery;
- ensure the availability of ICT technical systems is maximised within agreed constraints;
- ensure the development of environmental (“green”) policies for all aspects of ICT technical systems

The approach taken in developing the strategy has been to engage with key services, review the current situation within the ICT department and to identify best practices within peer organisations and other industries.

Looking to the future, there will be a significant drive to accelerate the progress of centralized and shared services within and out-with the council. This will be accompanied by a move towards a Service Orientated Infrastructure (SOI) where ICT is delivered as a service. This enables business processes to drive the definition, creation and execution of services that can be shared and reused across the organisation. SOI changes ways of thinking about traditional ICT architecture. It brings an end to monolithic, rigid application architectures and the high maintenance costs associated with them.

The strategy highlighted within this document is designed to underpin and support the above vision as well as Corporate Online, ICT security and Customer service strategies as these evolve. This document will not recommend the choice of one particular system, application or infrastructure component over another unless there is a significant reason for doing so. These tactical aspects will be addressed technically, and financially validated, in the respective projects that will result from this document.

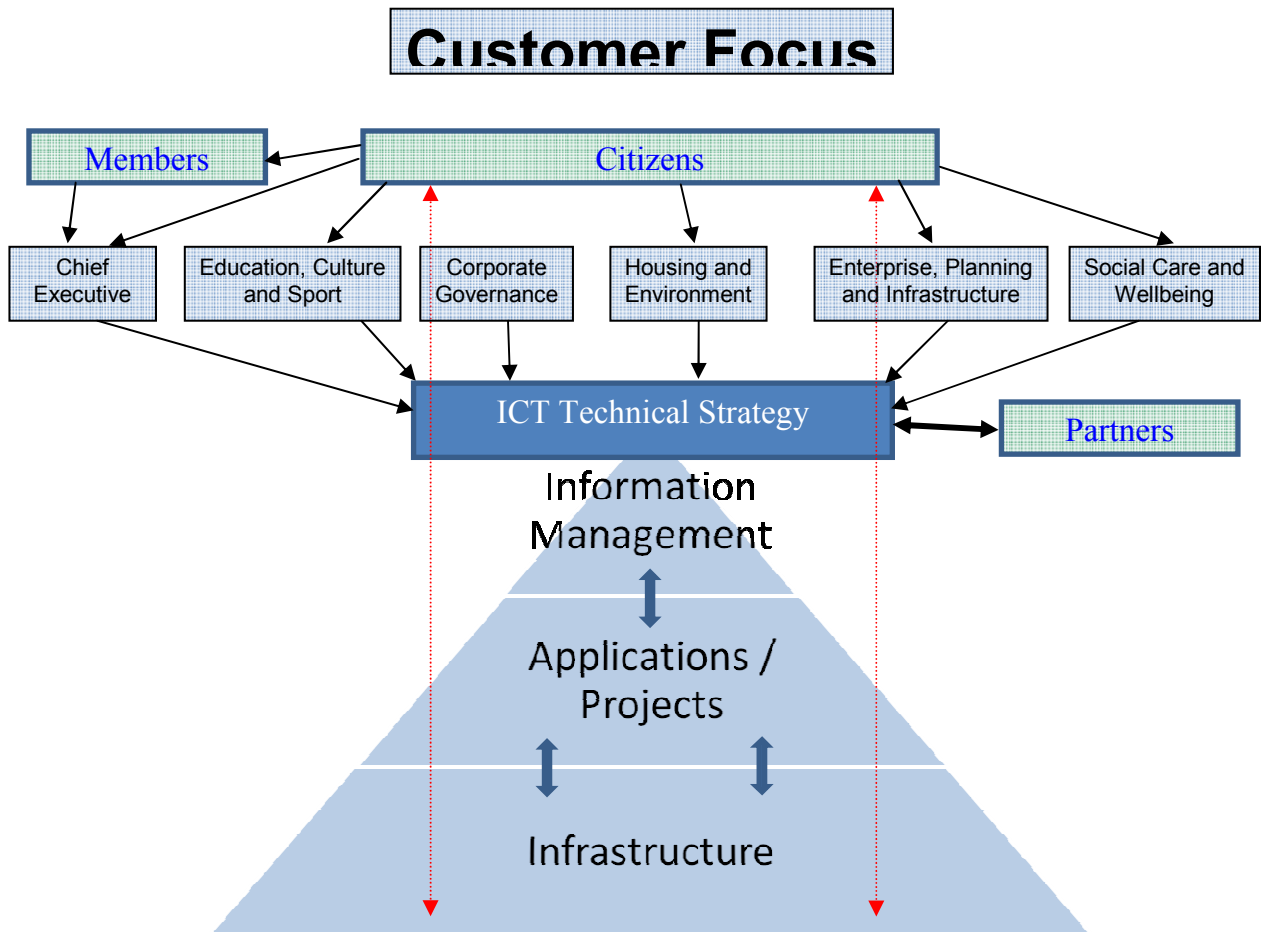
A glossary has been provided at the end of the document.

## 2.1 Strategy development

The ICT technical strategy has been developed by

- identifying the demands being placed on ICT by various service departments through various meetings with stakeholders within the organisation (a summary of which can be provided on request);
- understanding how these demands impact on current and future ICT systems;
- reviewing the current infrastructure;
- clarifying the steps required to move from the present into the future

Whilst this strategy doesn't address the Corporate Online, ICT Security or Customer service strategies, it has been developed with full awareness of these documents.



## 2.2 Drivers for change

As a result of the discussions with various service departments and key ICT personnel, the key drivers for change for the period 2010-2015 have been identified as below.

<b>Infrastructure</b> <ul style="list-style-type: none"><li>• Provision of high availability, efficient and effective networks, servers and systems on a 24 / 7 basis.</li><li>• Increased use of the internet to access internal systems.</li><li>• Disaster recovery to meet the needs of the business continuity plan.</li><li>• Reducing the carbon impact of delivering the ICT infrastructure.</li></ul>	<b>Information Management</b> <ul style="list-style-type: none"><li>• Overcoming limitations of e-mail and file storage.</li><li>• Increased demands on electronic storage and retrieval as a result of electronic document records management and workflow take up within the services.</li></ul>
<b>Delivery of Services</b> <ul style="list-style-type: none"><li>• Provision of systems out-with normal office opening times.</li><li>• Continued development of web based transactional services for citizens.</li><li>• More flexible working for council employees.</li><li>• Provision of easy to use, resilient technology appropriate for purpose.</li></ul>	<b>Future Plans</b> <ul style="list-style-type: none"><li>• Relocation to Marischal College and associated hot desk requirements.</li><li>• New data centre.</li><li>• Significant budget constraints.</li><li>• Enhanced CRM needs</li><li>• Estate rationalisation</li><li>• Decommissioning of St Nicholas House.</li><li>• Replacement of the Payroll system.</li><li>• The potential sharing of services with other local authorities.</li></ul>

## 2.3 The vision

To be successful, the organisation must become increasingly flexible. That means the underlying ICT infrastructure must keep pace with today's fast changing business dynamics. To achieve that agility, organisations must adopt new ways of looking at and implementing ICT architecture.

ICT architecture comprises various layers of systems. Traditionally, these systems may include custom applications, mainframe systems, client server applications, and ERP systems, as well as more modern web-based systems. These ICT systems tend to form a sprawl in three distinct types:

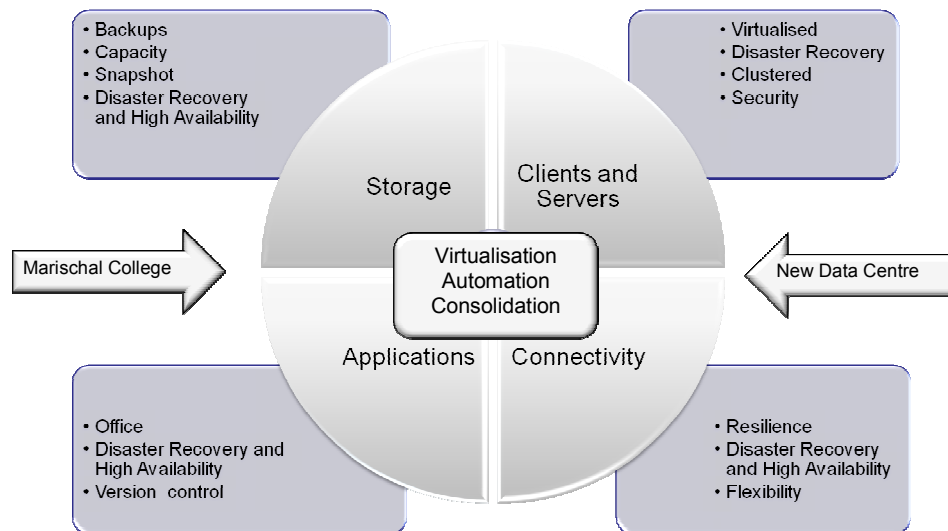
- Slabs: Layers of historical ICT,
- Silos: Redundant and mutually inaccessible systems,
- Spaghetti: Jumbled point-to-point integrations.

A key fundamental principle underlying the ICT Technical Strategy is to move towards a Service Orientated Infrastructure to tackle the problems that are inherent with the system sprawl identified above.

Moving towards a Service Orientated Infrastructure helps the council to

- Enhance business agility;
- Provide a configure-to-order rather than a build-to-order culture;
- Synchronize ICT with the business;
- Break the barriers between service units and business partners;
- Lower the cost of maintaining ICT systems;
- Focus resources on innovation rather than maintenance;
- Efficient delivery of web services to meet business demands;
- Provide support for ICT process automation;
- Protect ICT investments by building on the existing infrastructure.

As a result the vision for the ICT technical strategy for the period 2010-2015 is based on the key values of **Virtualisation** (where possible), **Automation** (where practical) and **Consolidation** (where appropriate), focused in on four core areas with Marischal College and the new data centre having a major influence. This vision is detailed below.



### **Virtualisation**

In moving to a virtualised environment for the desktop PCs, Laptops and Storage, and building on the current server virtualisation, the council will see a standardised environment that is easier to support with fewer resources. In a virtualised environment, the ability to allow council staff to gain access to all of their ICT resources, regardless of location, can be achieved.

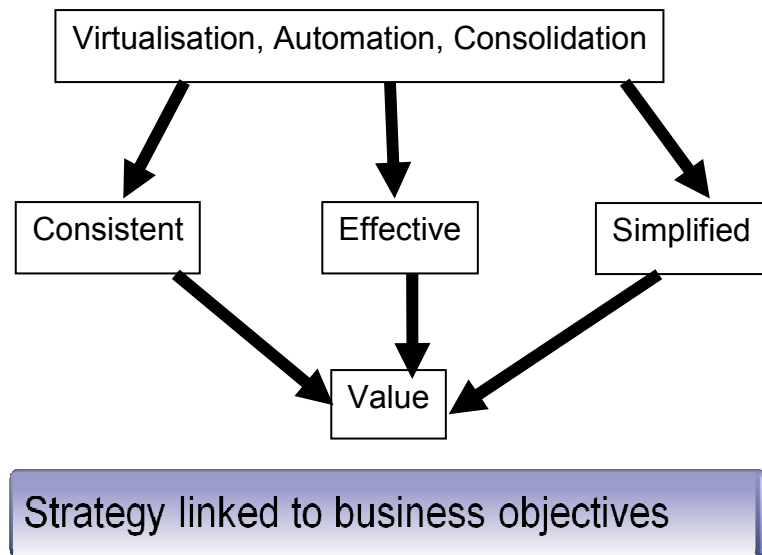
### **Automation**

With a standardised environment, updates, upgrades and provision of new services becomes quicker and easier as they are carried out from a central location. In addition, automation will ensure that system failover can take place without ICT intervention. This allows key ICT systems and resources to become available 24 / 7 to meet the demands of the services.

### **Consolidation**

Supporting a variety of different software packages and hardware platforms is resource hungry and fails to leverage the benefits of consolidated spend. Consolidation will bring a reduction in ICT support costs whilst improving the service delivered to the council. The service improvement will come through being able to provide applications more quickly and with ICT becoming more reactive to customer requests.

The result of this vision is that the ICT technical strategy will provide a consistent, effective and simplified approach that will deliver value for the council as shown below.



## **2.4 Contributing to the council's "Corporate Body"**

### **Reducing the environmental impact of the council**

The council is committed to cutting its carbon emissions by 15 percent between 2010 and 2015. ICT systems consume power to keep them running and to maintain a steady temperature in the data centre.

The strategic approach contained within this document aligns itself to the council's carbon emission target by decreasing the overall electrical demand during and outside normal working hours through the use of innovative hardware, software, implementation of best practices. To achieve this, the strategy focuses on making the existing technology "greener" by using inbuilt software features that are not yet activated, deploying new hardware that consumes less electricity, automatically switching off hardware due period of inactivity as well as extending the life of hardware where practical.

### **Smarter working**

With the imminent move to Marischal College, changes to working practices will be required to make the most efficient use of council premises.

Once Marischal College is fully operational, there will be seven desks for every ten people who are destined to work in this building. This will require "hot desk" working together with the smarter delivery of services and applications to users in the new building. In addition, when combined with Pandemic and Business continuity planning, this will give rise to increased flexibility as to potentially how, where and when people work. This could be at other council premises, at libraries or from home. The demands for smarter working are set to grow significantly over the next 3 years and this strategy enables key aspects of this to be met.

### **Improved Customer access**

The council aspires to be recognised as a role model in customer service provision, with customers who feel that council services are accessible. Customer access to council services will therefore increasingly be driven down three main channels - face to face, telephony and internet / email.

Two of these channels (in particular internet) allow self service to be deployed but must be available on a 24 / 7 basis. These allow customers to access information and carry out routine tasks at a time that suits them, without requiring any interaction with council representatives. Use of the internet should give customers direct access to their own service transactions. Whilst it can never completely take the place of talking to a real person when dealing with complex enquiries, it is by far the most cost effective way of delivering services and has the potential to realise significant financial or time benefits.

### Cost reduction

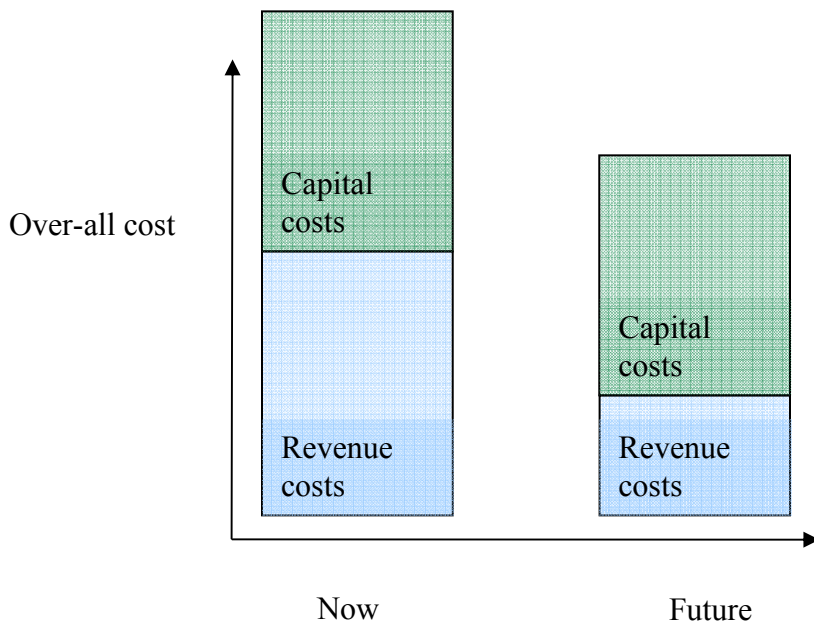
Through the adoption of new technology and smarter ways of working it will be possible to significantly reduce the revenue cost whilst improving service levels to customers and citizens.

The use of virtualised technology to centralise and automate service delivery will reduce costs. Consolidation will result in a reduction in the number of systems and applications to be maintained and supported. A significant proportion of daily ICT effort is spent maintaining the existing systems and infrastructure with little time to look to the future and to engage with the business. This strategy will ultimately address this imbalance.

The use of innovative methods to link offices together removes technical dependencies on telecoms providers, and reduces the exposure to uncontrolled cost escalation for leased lines, where there are no viable alternative supply models.

The centralised / shared data service model will continue to grow due to expected financial constraints. Opportunities exist and will continue to expand for taking services on a cost per user basis, or even to provide services for other organisations. This will lead to cost reductions, improvements in service levels in key areas as well as potentially providing sources of revenue.

The ultimate cost impact of the ICT strategy within this document will be to reduce revenue costs whilst maintaining capital costs as indicated in the diagram below.





## **2.5 Improving the council's processes and service levels**

The introduction of a virtualised environment, and the consequent centralising of ICT service delivery, will highlight the ICT business processes which are missing, are weak or need to be changed to sustain a Service Orientated Infrastructure.

The technological direction that is at the heart of this strategy is firmly focused on delivering higher availability for key systems, together with providing improved access to these systems for a given set of circumstances. One of the consequences of this approach is that recovery from failure becomes quicker (if not transparent). This naturally leads to a more effective disaster recovery plan which is easier to implement in order to meet corporate business continuity plans.

In addition, the combination of standardisation, simplification and increased control of the PC and laptops, makes this environment more stable and easier to support. The provision of new applications and services becomes easier and quicker, which in turn leads to improved services levels for the organisation.

## 3.0 Strategic Direction

### 3.1 Storage

#### Summary

Data storage shall be treated as a commodity. This shall enable ICT to provide storage that meets the needs of the business, delivers improved data restoration functionality and improves data availability. This shall be accompanied by automatic archiving and the implementation of quotas to contain data growth.

The storage needs of the council fall into the following main categories, covering the information management life cycle:-

- Storage media,
- Backup philosophy,
- Archiving,
- Management.

Based on this, the key aspects of the storage strategy are detailed below with further information in Appendix A.

#### Storage media

- 3.1.1 The Council shall implement a Storage Virtual Network (SVN) that will be split between two data rooms. Equal consideration shall be given to Open Source and proprietary technology.
- 3.1.2 The SVN shall consist of tiered storage that meets the business needs of the council. Fibre Channel discs (FC) shall be used for performance (tier-1) and Serial Advanced Technology Attachment (SATA) discs to service file / print needs (tier-2).
- 3.1.3 The development of Fibre Channel over Ethernet (FCoE) will reduce data centre complexity. This technology shall be monitored regularly and then implemented at the appropriate time.
- 3.1.4 The SVN shall support file and directory snapshot technology for data restore purposes. This can be self administered or provided via the helpdesk as required by users. This shall include Oracle and (Microsoft) SQL servers as well as the office environment.
- 3.1.5 If there is a delay in the provision of a second data room, the council shall deploy a virtual tape library to backup data stored in the SVN.

#### Backup philosophy

- 3.1.6 In a dual computer room scenario, the need to carry-out onsite backups shall no longer exist.

### **Archiving**

- 3.1.7 The council shall locally archive personal and shared data that has not been accessed for a predefined time onto tier 3 storage.
- 3.1.8 Business application data that is no longer current shall be archived onto tier 3 storage but shall remain available via the application.
- 3.1.9 All data shall be archived to an offsite location after being de-duplicated and encrypted. Consideration shall be given to offsite cloud storage to reduce costs once security and availability concerns are resolved.

### **Management**

- 3.1.10 SVN management shall enable easy storage provision in a proactive as well as reactive manner.
- 3.1.11 The SVN management shall provide proactive alerting and predictive software to prevent the situation where "disk out of space" messages are sent to users.
- 3.1.12 The SVN management tool shall identify data that has not been accessed for a pre defined time and shall flag this for archiving.
- 3.1.13 Storage management, and the responsibility for this, shall lie within one team.
- 3.1.14 All data that the council is responsible for (including that within the education environment) shall be hosted in the SVN.
- 3.1.15 The long term strategy shall be to contain tier-1 storage by automatic migration to tier-2 storage.
- 3.1.16 Disk quotas shall be used to restrain the growth in tier-1 and tier-2 storage requirements.

## 3.2 Clients and servers

### Summary

A Virtual Desktop Environment shall be implemented on all council workstations to reduce the cost of providing ICT services, improve reliability and aid faster deployment of applications. This is a prerequisite for the deployment of “hot desk” functionality which is to be used at Marischal College. The Virtual Desktop Environment will bring increased flexibility on where and how users work, increase security, and deliver a more environmentally friendly ICT service.

The server environment shall provide increased availability, and support the faster implementation of new systems at a lower cost.

Open Source software shall be considered as a replacement for proprietary software as appropriate.

The client and server hardware and software needs of the council fall into the following main categories:-

- Desktop hardware and operating software,
- Server hardware and operating software,
- Management,
- Printing,
- Training.

Based on this, the key aspects of the client and server hardware strategy are detailed below with further information in Appendix B.

### Desktop hardware and operating system

- 3.2.1 The Council shall implement a virtual desktop environment across all corporate sites. This shall provide the foundation for all staff to securely access data and systems regardless of location. Where applications cannot be virtualised, they shall be deployed in such a way as to make them appear that they are virtualised whilst reducing the support impact for the desktop.
- 3.2.2 The range of hardware used on the desktop shall be reduced.
- 3.2.3 The logon process for the desktop device shall also result in the automatic login for the associated telephone handset.
- 3.2.4 The use of smart card technology shall be deployed for PC login and the electronic protection of confidential data.
- 3.2.5 The use of virtualisation shall be extended to all portable devices with the potential of encrypted “computer on a stick” technology. No data shall be stored on Laptops.
- 3.2.6 The use of Open Source desktop operating software and virtualisation software shall be given equal consideration to proprietary software.

### Server hardware and operating system

- 3.2.7 The virtualisation and clustering of the servers in the main computer room shall continue and shall be extended into a second or backup data centre.
- 3.2.8 The current Sun based Unix and Solaris environment shall be migrated into a clustered Intel based (or similar) Linux environment as and when

appropriate. The decision to migrate should be based on the Total Cost of Ownership and not just the software purchase and maintenance cost.

- 3.2.9 Where practical, databases shall be clustered to reduce the hardware required
- 3.2.10 Any new servers shall be deployed using blade technology.
- 3.2.11 Hardware assisted virtualisation shall be leveraged, rather than relying solely on software virtualisation products.
- 3.2.12 The ability to self provision virtualised server environments shall be cascaded to system owners to build test and training environments.
- 3.2.13 The use of Open Source server virtualisation and operating software shall be given equal consideration to proprietary software.

### **Management**

- 3.2.14 The council shall deploy monitoring tools for the desktop and server environment. Access to these shall be restricted according to job function and responsibilities.
- 3.2.15 Service Level Agreements shall be established for the virtualised environment.

### **Printing**

- 3.2.16 The investment in the Xerox or similar multi function printing devices shall be leveraged through the use of “smart print” technology.

### **Training**

- 3.2.17 “Just in time” training shall be provided to the ICT team and users as part of a migration process. This shall be backed up with Computer Based Training modules for new users or as a refresh for existing users.

### 3.3 Connectivity

#### **Summary**

Connectivity between main council locations shall be improved by providing more bandwidth between sites, reducing the number of single points of failure, and by reducing the cost of ownership associated with the inter-site links.

This shall support a consolidated and simplified infrastructure that presents data and voice services over the same cable. Additional connectivity features and functionality shall also be provided.

The connectivity needs of the council fall into the following main categories:-

- Workstation connectivity within and between offices,
- Voice connectivity within and between offices,
- Mobile device connectivity
- Management

Based on this, the key aspects of the connectivity strategy are detailed below with further information in Appendix C.

#### **Workstation connectivity within and between council offices**

- 3.3.1 The council shall implement diverse routing between and within offices to ensure that connectivity cannot be broken by the failure of a single device.
- 3.3.2 The council shall migrate away from hardwired links between sites to a wireless solution as appropriate and practical. The wireless solution shall be interlinked or “meshed” in such a way as to improve the availability of links between offices as well as providing additional bandwidth.
- 3.3.3 The council shall consolidate to a single manufacturer for the data centre(s) network connectivity and a single manufacturer for work group network connectivity.
- 3.3.4 All networking equipment shall be capable of providing “Power over Ethernet” to facilitate the connection of IP based telephony devices.
- 3.3.5 The council shall deploy bandwidth optimisation and acceleration devices where application performance is impacted by bandwidth constraints or latency between sites.
- 3.3.6 The WiFi network within the council shall be upgraded to provide a high-speed meshed solution for laptop users, other portable device users and telephony users.

### **Voice connectivity within and between council offices**

- 3.3.7 The council shall migrate all voice communications to an IP based solution.
- 3.3.8 The council shall rationalise to a single manufacturer for the telephone exchanges deployed within the organisation, and shall ensure that a failure of a single site has minimal impact on the services provided.
- 3.3.9 The telephone system shall provide the corporate contact centre including the switchboard and RCC (Regional Communications Centre) functionality as part of the available product range.
- 3.3.10 The council shall deploy PC based soft phone technology and reduce the range of handsets provided at the desk.
- 3.3.11 The council shall route telephone calls depending on presence, and skills based routing.
- 3.3.12 The ability to forward voicemail and faxes to workstations and for email to be sent to a telephone number as a voice message shall be provided.
- 3.3.13 Increased Video and Audio conferencing facilities shall be provided.
- 3.3.14 The use of standard based voice connectivity between all sites shall be implemented.

### **Mobile devices**

- 3.3.15 The council shall provide mobile or Personal Digital Assistant (PDA) devices from one manufacturer, with a single middleware solution and a single airtime service provider.
- 3.3.16 Laptops and Notebooks shall be provided from single manufacturer.

### **Management**

- 3.3.17 The council shall deploy network management tool(s) for key services in the most effective manner including network performance and analysis tools.

### 3.4 Applications

#### Summary

The number of systems and applications shall be consolidated where duplicated features and functions exist within the council's supported portfolio. This will reduce support costs, lead to improved availability, reduced complexity and easier integration. This shall be accompanied by standardisation on how data is entered into systems with the goal of removing duplicated effort.

The use of Open Source software to replace proprietary applications such as Office, together with a review of the most appropriate email system (which could be provided as an external service), shall be fully investigated, with the goal of reducing costs whilst providing an improved service.

Web 2.0 technology and collaboration tools shall be deployed to improve the way the council works both internally and with external parties.

The application needs of the council fall into the following main categories:-

- Business orientated applications and systems
- Office productivity applications and systems
- Training

Based on this, the key aspects of the application strategy are detailed below with further information in Appendix D.

#### Business orientated

- 3.4.1 A common data standard shall be adopted as the precursor to introducing a common method of inputting data.
- 3.4.2 The council shall carry out a data cleansing exercise to ensure that unique data is held in each application e.g. Unique Property Reference Number (UPRN), Unique Citizen Reference Number (URCN), personal details, budget and financial information etc.
- 3.4.3 All applications shall support the UK eGovernment Interoperability Framework (E-GIF), OpenScotland Information Age Framework (OSIAF) and other government standards.
- 3.4.4 The council shall standardise on a single middleware platform to ease real time data exchange and interconnectivity between different systems.
- 3.4.5 The council shall reduce the database portfolio.
- 3.4.6 The current number of applications supported shall be consolidated.
- 3.4.7 Oracle and SQL server database management systems shall be the only ones supported within the organisation and shall remain no more than one version behind the current version.
- 3.4.8 The council shall provide improved database availability and the ability to recover from hardware or software related issues for Oracle and SQL server based infrastructure.
- 3.4.9 There shall be no application customisation without a robust case that considers the widest possible impact of all the options being considered.
- 3.4.10 The council shall give full and proper consideration of Open Source and proprietary software solutions.
- 3.4.11 The current portfolio of application development tools and languages shall be streamlined to the market leading products.
- 3.4.12 Application development shall be based on web-based access to back end systems.



- 3.4.13 There shall be no further development using Microsoft Access. Existing applications shall be converted to a front end run time only, with Access being removed from the desktop environment. The backend data shall be stored in a central, council wide SQL data base where reporting functionality will be provided by the primary reporting tool.
- 3.4.14 Business Objects (including Crystal reporting) shall be used for the current reporting together with the appropriate Business intelligence package. However, the council shall monitor developments and deploy the appropriate reporting package. The council shall not support more than two concurrent reporting tools.

**Office Productivity**

- 3.4.15 Open Source based Office productivity software shall be considered as a replacement for Microsoft Office.
- 3.4.16 The council shall consider migrating to having the corporate email system delivered via “Software as a service”.
- 3.4.17 The use of electronic collaboration tools and Web 2.0 technology shall be provided on an as needed basis.
- 3.4.18 The council shall deploy software onto end stations to reduce energy consumption and thus the carbon foot print of ICT.

**Training**

- 3.4.19 The council shall provide ICT training on a “just in time” basis through a variety of interlinked methods.

### **3.5 On the Horizon**

The rate of change within ICT presents a number of opportunities when defining a technical strategy. Some of these result from technologies having been developed in the recent past that have not yet seen mass adoption, or are yet too immature for deployment in anything other than a proof of concept phase. Nevertheless, it is important that the progress of these into main stream ICT technology is monitored on a regular basis to ensure the council is an intelligent follower and that moving forward there is alignment between the various strategic documents such as e-Gov, ICT security and customer relationship etc. The list below identifies a number of these technologies that shall be tracked and reviewed on a regular basis.

#### **Storage**

- As new technology such as Serially Attached SCSI (SAS) disks using Solid State Disc technology becomes fully mature and cost effective, these shall be considered as potential replacements for FC discs.
- As external cloud based storage matures, this shall be considered as a means of reducing revenue costs for the council once the security and Service Level Agreement (SLA) issues have been completely addressed.

#### **Open Source**

- The Open Source market continues to mature with a consequent reduction or elimination of interoperability issues. The main areas of interest include Open Office as a replacement for Microsoft Office, Samba as a replacement for windows file and print, XEN for virtualisation, Open LDAP for Active Directory and Eclipse for application development. Potential benefits include reduced software costs, extended PC and laptop life thus reducing costs and their carbon foot print, improved security, improved start-up time and faster application delivery. Whilst some of these may be adopted early as part of this strategy, others may have to mature or develop further before they could be considered as a replacement for proprietary software.
- As Open source gathers momentum within the public sector, opportunities should emerge a national level to ease the migration of the council through information sharing or a procurement strategy. Some work on this is starting to emerge from Procurement Scotland initiatives.

#### **Desktop and Server**

- The use of a virtual desktop environment within the schools education or curriculum network shall be evaluated and piloted. The potential support and management benefits are the same as those of the corporate environment but without the financial benefits from reduced licence costs.

## **Monitoring**

- The use of external suppliers to monitor key aspects of the corporate infrastructure is a mature service. Given the complexity, and range of skills required, outsourcing monitoring can free up internal resources to provide added value core services. The supplier can provide a range of services from monitoring only, through to full fault management as required. The monitoring is carried out on a network port, software application or hardware device basis and can thus be deployed where required, rather than on an all or nothing basis.

## **Voice**

- The hosted telephone exchange is a mature model based on a cost per user basis. The main telephone system can be hosted by a third party who is responsible for running the voice network. This may be a viable alternative to hosting an internal system from a single manufacturer.

## **Wi-Max**

- Using lower bandwidth than normal WiFi, Wi-max is currently able to interconnect sites which are just out of view or "near line of sight". With a meshed Wi-Max environment it will be possible to provide connectivity for mobile or fixed devices without using mobile service providers. This could include laptops, PDA's and Closed Circuit TV (CCTV) systems for a range of services including Social Care and Infrastructure.

## **Dual vendor**

- In areas of the infrastructure that are mature, considering alternative solutions will improve the council's negotiating position, help reduce capital costs and avoid vendor lock-in. In addition, it will refocus attention back on requirements, to ensure the right feature mix and architectural decisions, and will not constrain solutions to one vendor's view of the world. Organisations can achieve at least a 30% reduction in capital costs just by considering alternative vendors, and savings can be much higher. The decision on how and where to use these vendors will be based on functional, operational and financial objectives
- Operational issues are perceived to be the major hurdle to be overcome by organisations who want to act on their desire for more choice and vendor leverage. There are four specific areas that need to be addressed to deal with these operational challenges:
  - Interoperability
  - Training
  - Management
  - Support escalation

However, by taking a systematic approach to the architecture, and following network management best practices, the objections raised by incumbent vendors can be easily overcome.

- Introducing a second vendor should be done with the network strategy and architecture in mind with the potential of using one vendor for the data centre and one for workgroup connectivity. By establishing a foundation of multi vendor network management tools that work with the current network infrastructure vendor this will allow time for staff training and conversion of skills to the new hardware and associated tools when introducing a second vendor.

## **IP V6**

- IP version 4 (IP v4) is currently deployed and is the standard for connectivity between network devices. IP version 6 (IP v6) is designed to work in an environment that has a greater number of addressable IP devices, requires greater flexibility in the IP addressing schema and brings improved Quality of Service for new applications such as video, IP telephony etc. Despite being available for a number of years, and new hardware being IPv6 enabled, the uptake and deployment of IP v6 is not yet main stream and continues to be relegated to the backwater for most organisations. Deploying IP v6 should take place as the council starts to recognise that IP v4 is starting to reach its limits and where a business case is made to migrate. To ease the migration process, IP v6 should be included as part of any ICT hardware specification (even if it is disabled during installation).

## **Cloud Computing**

- Cloud computing is a general term for anything that involves delivering hosted services over the Internet. These services are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). The name cloud computing was inspired by the cloud symbol that's often used to represent the Internet in flow charts and diagrams.
- A cloud service has three distinct characteristics that differentiate it from traditional hosting. It is sold on demand, typically by the minute or the hour; it is elastic -- a user can have as much or as little of a service as they want at any given time; and the service is fully managed by the provider (the consumer needs nothing but a personal computer and Internet access). Significant innovations in virtualization and distributed computing, as well as improved access to high-speed Internet and a weak economy, have accelerated interest in cloud computing.

- A cloud can be private or public. A public cloud sells services to anyone on the Internet. (Currently, Amazon Web Services is the largest public cloud provider.) A private cloud is a proprietary network or a data centre that supplies hosted services to a limited number of people. When a service provider uses public cloud resources to create their private cloud, the result is called a virtual private cloud. Private or public, the goal of cloud computing is to provide easy, scalable access to computing resources and IT services.
- Cloud computing is evolving, but until robust answers are provided to questions regarding security, licensing, compliance, costs and SLAs, using cloud technology only for testing applications or new services appears a pragmatic way forward for the council.

### **Shared IT Services**

- The concept of shared IT services will play a pivotal role in the re-thinking of how the public sector will deliver services to its customers. The concept of each public authority owning, maintaining and supporting a set of systems to deliver the required services will be increasingly challenged as severe budget cuts are imposed. In the future, public authorities will share systems between each other. This means a payroll system may be hosted in Kent and be used by a number of council authorities. In turn, Aberdeen City Council may host a social care system that is used by other local UK councils or provide a disaster recovery site for the public sector partners in the North East. This will require a robust infrastructure but could lead to revenue generating opportunities.

## 4.0 Benefits and risks

### Organisational benefits

One of the pre-requisites for the above strategy will be a change to the current ICT culture in order to become more heavily service focused. This will require the formal adoption of the Information Technology Infrastructure Library (ITIL) frame work for service management. Providing a structured approach to incident, problem and change management will significantly improve the service provided and needs to be embedded within the council's ICT culture.

The adoption of an ITIL based frame work will minimise any adverse impact on the business by restoring services as quickly as possible, providing effective incident management, improving communication with users and reducing the impact of changes to the ICT environment.

The end result will be an ICT service not only is more inherently stable, but also provides value for money to ACC.

### Financial Benefits

Key Strategic Direction	Indicative cost	Indicative annual cost savings potential	Carbon foot print reduction
Virtualised desktop environment – based on 1800 devices.	Not evaluated.	£110,000 to £130,000 (from hardware replacement costs).	Not evaluated.
Migration to Open Source Office from Office 2003.	£200,000 to implement (based on Bristol City Council figures.)	£100,000 (£500K upgrade cost every 5 years).	N/A.
Carbon Control software on 1800 PCs to reduce electrical needs.	£5,000 to implement.	£50,000 (£28/PC – after software costs).	330 Tonnes per year.
Links between council offices migrated to radio network.	£200,000 to implement (40% of proposed schools connectivity cost).	£160,000 (80% reduction in leased line costs).	N/A.
Storage and backup Maintenance.	Not evaluated.	£50,000 (H/W maintenance)and £60,000 (S/W maintenance).	Not evaluated.
Unix to INTEL migration.	Not evaluated.	£50,000 in hardware maintenance. Reduction in hardware costs.	Not evaluated.
Email as a service.	£50,000 as a revenue cost	£100,000 in licence costs (based on 4500 desktops). £30,000 in infrastructure and support costs.	Not evaluated.

## Risks

A number of the high level risks with this strategy are detailed below:-

<b>Risk</b>	<b>Impact</b>	<b>Mitigation</b>
Lack of internal technical skills.	Technical experts are trained and use the skills once or twice but never develop the in-depth skills that external vendors have. This will impact implementation timescales.	Use external vendors who are doing similar projects on a weekly basis and leverage their skills and expertise.
Cost analysis for any solution is based on purchase cost only.	The purchase cost will typically make up less than 50% of the true cost of owning a solution.	Maintenance costs together with training, internal support, integration and customisation costs over a five year period must be included in the financial analysis.
Business Processes remain unchanged (“always been done this way “syndrome).	New systems have to be customised to meet business needs resulting in higher support costs.	Business processes to be reviewed to see how they could be modified to eliminate the need for customisation.
Financial constraints result in projects being implemented over a period of time.	Difficulty in supporting a heterogeneous environment during transition.  Inability to effectively closeout a project.	Segmentation of the strategy in suitable portions that can be completed within one budget cycle (unless part of an ongoing rolling programme).
Trying to do everything at once.	Projects not completed on time, within budget or with agreed functionality and benefits.	Agree priorities based on business and operational demands with the business.  Use project management methodology with an understanding of the impact of operational tasks on project progress if using internal resources.

<b>Risk</b>	<b>Impact</b>	<b>Mitigation</b>
Lack of change control.	<p>In today's environment a "bad" change has potentially a minimal impact.</p> <p>Moving to a virtualised desktop significantly increases the impact of an unapproved / untested change.</p>	<p>Process and policies for change management (effective testing and change control, risk analysis, roll back plans etc) must be implemented and become part of the ICT culture.</p>
Strategy Divergence	<p>There is a danger that separate, isolated development of this strategy from other related corporate strategies (e-Gov, ICT Security and Customer relationship strategies etc) would cause fundamental problematic differences at best, or could even have completely incompatible elements at worst.</p>	<p>ICT corporate governance needs to be strengthened so that there is clear linkage and reference between the core strategies.</p>
Lack of communication with the business	<p>The business sees ICT as an end unto itself offering little added value to the organisation.</p> <p>Services drive through changes based their own needs with little cognisance of the wider organisational needs.</p>	<p>Provide a regular, non technical, key project updates to all appropriate levels within the organisation.</p> <p>Introduce ICT corporate governance to ensure a cohesive approach is maintained across the organisation and to ensure ICT focused on delivering real value.</p>



## **5.0 The way ahead**

### **5.1 Approval of Strategy**

The ICT technical strategy approval shall follow the steps detailed below:-

- Review and approval by the ICT technical experts;
- Review and approval by ICT team leaders;
- Review and approval by ICT Account managers;
- Review and approval by ICT Management team;
- Review and approval by Director of Corporate Governance;
- Issue for consultation;
- Review and acceptance by CMT;
- Issued as an information paper by Policy and Performance.

The document will then be used to provide the governance and strategic direction for all future ICT technology deployed and used by Aberdeen City Council.

It is the intention of the ICT management that this document will be reviewed and formally updated on an annual basis to reflect changes within the organisation, as well as ICT technology trends and best practices. This document shall form a key part of the annual ICT budget setting exercise.

### **5.2 Implementation roadmap**

With respect to the implementation of the main strategic themes identified within this document, the main steps are detailed below. They can be used as the basis or guide for a detailed project plan. These steps will need to be modified depending on technological and financial considerations. The implementation strategy assumes that a number of parallel activities are taking place as required. For example the implementation of the Storage Virtual Network assumes that new data centre and associated main and alternative or backup connectivity has been completed or is in progress.

As far as the overall strategy is concerned, there should be ICT steering group setup to monitor progress and to ensure alignment, governance and understanding between the business and ICT. This should include key stakeholders within the business as well as senior ICT managers.

It should be noted that decisions being made as part of the Marischal College project will impact the implementation roadmap.

#### **5.2.1 Storage**

- Identify the team, and the position within that team, who shall have responsibility for the council storage needs.
- Identify the storage needed in 12 months time. Use this as the initial design basis for the next three years depending on projected growth analysis (assume archiving is deployed within 12 months to enable the recovery of the storage space required).
- Having identified tier 1 (FC / SSD / SAS) and tier 2 (SATA) storage requirements, issue a request for proposal (RFP)

including data de-duplication. This RFP shall be based around the strategic direction identified within section 3.1 of this document and vendors should include indicative pricing for the solutions.

- It is recommended that the RFP should be issued to no more than five principle original equipment manufacturers. These should include HP, IBM, Netapp and EMC – either directly or via a value added reseller. Any proposal should not generate heat loading in excess of 12kW per rack when fully populated.
- Review the RFP and hold proposal review meetings with vendors.
- Select up to three preferred solutions (based on technology / cost / vision / ability to integrate with other vendors including EMC). Issue formal tender based on preferred solution(s). This shall be for the supply, installation, training and handover of the solution.
- Attention shall be paid to the ROI (return on investment) for the preferred solution(s)
- Note that with the use of a Storage Virtual Network, it shall be possible to mix and match vendor hardware. Whilst this approach should be taken for the future, using a single vendor for phase 1 below will reduce potential risks.
- Issue contract to successful vendor and implement in a number of discrete phases.
- Phase 1 – implement storage into new data centre together with data de-duplication and potentially archiving.
- Phase 2 – implement and test the SVN between existing and new data centre.
- Phase 3 – implement and test snapshot functionality.
- Phase 4 – implement offsite storage for archived data. After a three month period of successful operation, stop and decommission the current backup solution.

- Carry out an interim benefits analysis review.
- Phase 5 – provide storage capacity in second location (permanent DR site) once St Nicholas House has been removed as a single point of failure for the infrastructure.
- Phase 6 – decommission St Nicholas house storage which is currently out of warranty and thus subject to increasing maintenance costs.
- Phase 7 – bring the education storage into the SVN environment.

## 5.2.2 Clients and servers

### **Clients**

- Identify the team, and the position within that team, who shall have responsibility for the desktop environment (hardware, operating software, applications etc).
- Technically and commercially evaluate the leading proprietary and Open Source desktop operating and virtualisation software.
- Complete a proof of concept and then pilot virtualised corporate client devices (desktops, thin clients, laptops and “back end infrastructure”) from various key locations. This shall include the use of smart card technology and the automatic login for the telephone associated with the desktop.
- Complete a proof of concept and then pilot secure remote access from home PCs and corporate mobile computing devices.
- Complete migration from E-Directory to Active Directory (AD)
- Once the pilot has been completed, identify the various phases required for a council wide rollout programme. It should be noted that the rollout will not necessarily result in 100% of users being migrated to a virtual desktop although 100% of people will have secure access for home working.
- Identify and address training and implementation issues and concerns.
- Carry out user awareness, user training, ICT support training and then migrate users.
- The initial plan shall be to complete the roll out of the virtualised desktop and smartcard login shall be completed by 1/May/11, in time for the move into Marischal College.
- Carry out a benefits analysis of the migration to a virtual desktop three months after the project has been completed.

### **Servers**

- Identify the team, and the position within that team, who shall have responsibility for the server environment (hardware, operating software, applications etc).
- Technically and commercially evaluate the leading proprietary and Open Source operating and virtualisation software for the Intel environment.
- If this results in a potential move away from VMware and / or Microsoft, complete a proof of concept and pilot of the new virtualised server environment.
- Move into production within the new data centre using clustered blade technology in preparation for the client virtualisation above.
- Technically and commercially evaluate the options for moving the applications that currently run on a UNIX environment into a clustered Linux Intel based environment.
- Carry out a proof of concept for running the main UNIX based applications on Linux based Intel systems.
- Migrate from UNIX to Linux where feasible (technically and commercially).
- Carry out a benefits analysis post project closure.

### **Management**

- Commercially and technically evaluate the software used to manage the server, desktop hardware and software environments. This shall be carried out in conjunction with the client and server road map above.
- Access rights shall be restricted to meet the needs of the various team responsibilities to ensure effective control of the ICT environment. Granting significant numbers of ICT support staff "administrator" rights shall be actively discouraged.

### **Printing**

- Migrate the existing Xerox multi function printers into a “smart print” mode ideally using the smart card technology that will be deployed with the desktop virtualisation project. This will require a small degree of user education which could be completed as part of the virtual desktop roll out.

### **Training**

- Training shall be provided on a “just in time basis” for the ICT teams who are responsible for supporting the virtual environment.
- User training shall be provided just before they are migrated to the virtual environment and this shall be backed up by using the trainers as “floor walkers” immediately after the migration has been completed.
- For new starts and to refresh skills, Computer Based Training (CBT) shall be provided in small bite sized sessions that target specific issues rather than requiring the user to sit through longer training session. In house services such as “OIL” should be considered providing they can be made available to everyone who uses ICT within the council regardless of their employment status.

## 5.2.3 Connectivity

### **Workstation connectivity**

- Identify the team, and the position within that team, who shall have the responsibility for the network (LAN and WAN) environment.
- Identify the technical requirement to meet the business needs for data centre and workstation connectivity (both wired and wireless).
- Having identified the LAN and WAN requirements, issue a request for proposal (RFP) for each area. These RFPs shall be based around the strategic direction identified within section 3.3 of this document and vendors should include indicative pricing for the solutions.
- It is recommended that the RFP should be issued to a limited number of leading vendors / suppliers / manufacturers. These should include HP, 3COM, Cisco, Extreme and Brocade – either directly or via a system integrator.
- Review the RFPs and hold proposal review meetings with vendors.

- Select up to two preferred solutions (based on technology / cost / vision / ability to deliver the business needs). Issue formal tender based on preferred solution(s). This shall be for the supply, installation, commission, and handover of the solution together with training.
- Attention shall be paid to the ROI for the preferred solution(s)
- Note that with the use of a LAN technology (workstation and data centre connectivity) it is possible to mix and match vendor hardware. Using this approach, care should be exercised to reduce potential risks (see using dual vendor in section 3.5).
- Issue contract to successful supplier(s) and implement in a number of discrete phases.
  - Phase 1 – implement new data centre connectivity.
  - Phase 2 – implement WAN connectivity
  - Phase 3 – implement workstation connectivity solution(s) within Marischal College.
  - Carry out an interim benefits analysis review.
  - Phase 4 – provide data centre connectivity in second location (permanent DR site) once St Nicholas House has been removed as a single point of failure for the infrastructure.
  - Phase 5 – decommission St Nicholas house LAN infrastructure.
  - Phase 6 – bring the education LAN connectivity into the corporate environment.

#### **Voice connectivity**

- Identify the team, and the position within that team, who shall have the responsibility for the voice network (desktop and mobile environment).
- Identify the technical needs to meet business requirements for voice connectivity (both wired and wireless).
- Having identified the voice requirements, issue a request for proposal (RFP). The RFP shall be based around the strategic direction identified within section 3.3 of this document.
- It is recommended that the RFP should be issued to no more than five principle original equipment manufacturers. These should include NEC-Phillips, Avaya, Cisco and Mitel – either directly or via a system integrator.

- Review RFP and hold proposal review meetings with vendors.
- Select up to two preferred solutions (based on technology / cost / vision / ability to meet the business needs of the council).
- Issue formal tender based on preferred solution(s). This shall be for the supply, installation, training and handover of the solution.
- Attention shall be paid to the ROI for the preferred solutions(s)
- Issue contract to successful vendor and implement in a number of discrete phases.
- Phase 1 – Implement new Telephony system for Marischal College and ensure full functionality with the rest of the council telephone systems.
- Phase 2 – Implement new telephone number (and council wide numbering range) for the council as required.
- Phase 3 – implement backup / alternative telephony in key locations which can take over as the main answering point for the council as and when required. This will remove Marischal College as a single point of failure for voice connectivity.
- Phase 4 – Implement at all council premises as and when justified.

#### **Mobile devices**

- Identify the team, and the position within that team, who shall have the responsibility for the mobile devices.
- Identify technical needs to meet the business requirements for mobile connectivity.

#### **Management**

- Commercially and technically evaluate the software to manage the workstation and voice connectivity. This shall be carried out in conjunction with the above road map.
- Access rights shall be restricted to meet the needs of the various team responsibilities to ensure effective control of these environments.

#### 5.2.4 Applications

##### **Business orientated**

- When a new application is identified by the council, it shall be assigned to a key application analyst, or team position, for its life cycle within the council.
- Communicate with the business and ICT account managers the strategic direction to use only Oracle and SQL server for all new applications.
- Communicate with the business and ICT account managers the strategic direction that there shall be no customisation of applications. This may require a re-alignment of the existing business processes to meet the standard functionality within the application.
- Communicate with the business and ICT account managers how future real time, data transfer between both internal and external applications will take place in a secure and robust manner.
- Implement a standard reporting tool and environment.
- Phase 1 - Clarify the business needs for higher availability and increased resilience for the Oracle and SQL server environment. Technically and commercially evaluate the options for a high availability and resilient Oracle and SQL server infrastructure (i.e. RAC, Dataguard, OEM etc) and then implement the appropriate options above to meet the business needs.
- Phase 2 - Commence data cleansing including the use of UPRN and/or URCN and then evaluate and implement a middleware solution to facilitate real time data transfer between various applications.
- Phase 3 - Review the existing application suite to identify the applications that are duplicating, or partially duplicating, functionality across the organisation and commence an active programme to consolidate and reduce them.
- Phase 4 – Analyse and convert existing Access applications to a run time version or a web enabled front end which removes the Access licence requirement from the desktop environment.
- Phase 5 - Analyse and migrate existing reports to a standard report tool or move to a web enabled front end using a centralised SQL database.



### **Office productivity**

- Identify the team, and the position within that team, who shall have the responsibility for the office productivity software.
- Build a business case for a migration to Open Source office productivity. Include communications, project, management, training – technical and user, deployment and system testing, document conversion and system integration – including databases and macros, implementation support, productivity gains or losses, functionality gains or losses and new user impact.
- Project plan the migration, training and communication processes after project sanction.
- Build a business case for a migration away from GroupWise to Email being taken via the “Software as a Service” model. Include communications, project, management, training – technical and user, deployment and system testing, document conversion and system integration – including databases and macros, implementation support, productivity gains or losses, functionality gains or losses and new user impact.
- Project plan the migration, training and communication processes after project sanction.

### **Training**

- Identify the key training needs of the council through user engagement and reviewing of helpdesk statistics.
- Develop a library of “smart start” type screenshot, moving mouse and voice over training modules that cover a specific topic. In house services such as “OIL” should be considered, providing they can be made available to everyone who uses ICT by the council regardless of their employment status.
- Consider the use of a floor walker to provide training at user desks and master class type group training sessions to meet user needs.

### 5.2.5 Key recommendations and priorities.

The key recommendations from the strategy are summarised below in order of timescale.

No	Detail	Priority	Completed by Timescale	Resources
1	Design, build and commissioning of the new data centre (up to and including offsite archiving storage - phase four).	High	1/12/09 – design 1/8/10 - built 1/10/10 – live	Internal / External
2	Desktop virtualisation from analysis through to the end of the pilot phase. Include smartcard sign-on and telephony interface.	High	1/12/09 - Analysis 1/2/10 – POC 1/8/10 – Pilot	External / Internal
3	Complete DHCP rollout across all corporate council locations.	High	1/2/10	Internal
4	Select PABX and workgroup connectivity solutions for Marischal College.	Medium	1/3/10	Internal
5	Oracle and SQL High availability / failover.	High	1/3/10	Internal / External
7	UNIX to Linux options and feasibility study.	Medium	1/6/10	Internal / External
8	Smart printing enabled.	Low	1/7/10	External / Internal
9	Completed WAN connectivity through to pilot phase.	Medium	1/7/10	External / Internal
10	UNIX to Linux migration.	Medium	1/12/10	External / Internal
11	Build business case for migration from Group Wise to Email as a service.	Medium	1/2/11	Internal
12	Build business case for migration from Office 2003 to Open source product suite.	Medium	1/2/11	Internal
13	Provision second data centre.	Medium	1/2/11	Internal / External
14	Complete WAN connectivity refresh.	Medium	1/3/11	External / Internal
15	PABX and work group solution implemented at Marischal College.	Medium	1/3/11	External / Internal
16	Complete phase 5 of storage road map – DR up and working at second site.	Medium	1/4/11	External / Internal
17	Start migration to Marischal College (60 people a night.)	High	1/5/11	External / Internal
18	Complete migration to Marischal College.	High	1/7/11	External / Internal
19	Decommission ICT facilities at St Nicholas House.	Medium	1/8/11	Internal
20	Migrate to new office and email applications.	Low	1/4/12	External / Internal
21	Migrate Education environment into the corporate Environment.	Medium	1/6/13	External / Internal

## 6.0 Strategic Plan Review and Reporting

### 6.1 Review

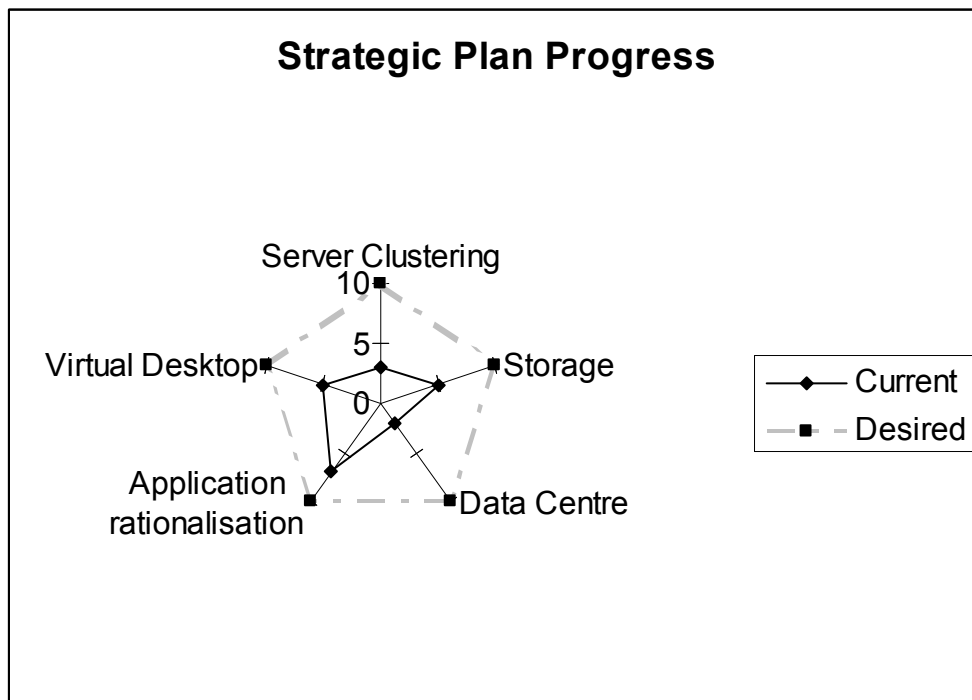
The strategic plan shall be owned by the ICT Technology and Information Systems service manager.

In order to keep the strategic plan alive and current, the follow actions shall be carried out.

- 1) The Strategic plan shall be formally reviewed on an annual basis in alignment with the budget process. This means that the CAPEX budget shall be driven by the Strategic plan which in turn driven by the business.
- 2) The Strategic plan shall be informally reviewed every four months to ensure that it is keeping abreast of current business demands, opportunities and technological developments.

### 6.2 Reporting

Once the key priorities for the next reporting period (quarterly) have been identified, they shall be reported on a monthly basis using a graph similar to the one below indicating the current position and desired target.



## Appendix A - Strategy for Storage

Ref	Strategic Direction	Business Benefits	ICT Benefits	Inter-Dependencies
3.1.1	Implement a Storage Virtual Network (SVN).	Adequate storage provided as required to meet the business needs. Reduction in storage costs.	More effective use of available storage resources across all ICT systems. Able to deploy storage on an “as and when required” basis in a proactive mode (thin provisioning). Storage can be treated as a commodity item providing it is compatible with the SVN. Simplified storage management.	Data Centre. Disaster recovery requirement. Service Level agreements within the organisation.
3.1.1	Split storage across two data centres.	Enabler to increase system availability to 24 / 7.	Enables a data centre to be taken down for maintenance without impact on users. Enabler for seamless High Availability and Disaster Recovery. Removes the need to have a backup system with the associated costs, management over-heads and concerns with media integrity.	Backup requirements and use of Virtual Tape Library. Size of storage and infrastructure requirements. Regulatory requirements
3.1.2	Storage to comprise FC and SATA media with option to deploy SAS and / or Solid State Drives.	Appropriate technology being used depending on cost / performance criteria. Reduced power consumption.	Enables cost effective and flexible storage hardware to be deployed as, when and where required. Reduced cooling needs.	Application requirements Archiving

<b>Ref</b>	<b>Strategic Direction</b>	<b>Business Benefits</b>	<b>ICT Benefits</b>	<b>Inter-Dependencies</b>
3.1.3	Review Fibre Channel over Ethernet	Faster system provisioning time. Reduced costs and improved performance. Consolidation within the data centres.	Reduced complexity within the data centre. SAN and LAN traffic running over single 10Gb connection per server. Cost reduction through not having to provide and support separate SAN and LAN infrastructures. Improved performance for servers. Heat reduction and power needs within virtualised server racks. Reduced cabling requirements.	Storage Local Area Network connectivity.
3.1.4	Snapshot Technology	Able to recover files that have not yet been backed up / archived. Rapid recovery of files that have been backed up.	Users able to carry out restores of own files. Recovery point objective (RPO) shrunk down to minutes depending on snapshot interval. Recovery time objective (RTO) shrunk to minutes. Quicker and easier file recovery.	Backup and RTO / RTP requirements.
3.1.5	Virtual Tape Library	Quicker restore time. Improved backup reliability.	Less support overheads. Reduced revenue costs.	Data centre Storage Backup
3.1.6	Stop doing backups to tape	Increased system availability. Remove tape costs and management from revenue costs.	No need to replace existing tape backup system which is at end of life with regards to supportability. Remove the need for a backup window. Remove the dependency on tapes and remove the risk of not being able to restore data. Reduced power consumption.	Storage requirements Archiving Regulatory constraints
3.1.7	Archiving of data with de-duplication and encryption.	Contain revenue costs by not having to increase onsite storage needs at current demand.	More effective use of onsite storage. Able to recover data that has been deleted outside the current backup windows.	Backup and Storage

<b>Ref</b>	<b>Strategic Direction</b>	<b>Business Benefits</b>	<b>ICT Benefits</b>	<b>Inter-Dependencies</b>
3.1.8	Business application data archived but remains available.	Increased application performance.		Archiving. Storage
3.1.9	Offsite data archiving.	Improved security of data.	Reduce expensive onsite storage requirements. Provide onsite storage only for data that is "active". Able to use external cloud storage once security and retrieval issues have been addressed.	Backup and Storage.
3.1.10 / 3.1.11/ 3.1.12	SVN management software.	Storage delivered on a "just in time" basis. Reduced revenue cost incurred in managing physical data.	Remove complexity of managing various diverse storage systems or avoid being "locked" into a single hardware vendor. Provision storage automatically to meet the needs of the business. Improved storage management with no more "disk out of space" messages. Automated decision making and implementation against a defined set of criteria on how and when data should be archived. Able to implement service level agreements.	Storage Archiving Data De-Duplication Backups
3.1.13	Storage management to become the responsibility of one team.	Provides direction and clarity of roles & responsibilities that is currently lacking.	Formalising responsibility for storage to one team (Unix or Windows) will improve the service being provided to the business.	ICT Working practices.
3.1.14	All data owned by the council to be hosted in the SVN.	Data storage consolidated into a single environment. Backup and tape management costs eliminated. Able to restore files quickly.	Reduced RTO and RPO time frames. Use replication clients to stream data across WAN links.	ICT and User working practices. Archiving Data De-duplication

<b>Ref</b>	<b>Strategic Direction</b>	<b>Business Benefits</b>	<b>ICT Benefits</b>	<b>Inter-Dependencies</b>
3.1.15	Grow tier-2 storage	More cost effective than tier-1 storage	Restrict growth in cooling and power needs as tier-2 storage needs less cooling (and thus less power).	Storage Archiving
3.1.16	Implement quotas for user storage	Cost containment through not having uncontrolled data growth. Running out of disk space impacts a single user, not the whole council.	Users manage their own storage.	ICT and User working practices. Storage Backups Archiving

## Appendix B - Strategy for Client and Server hardware

Ref	Strategic Direction	Business Benefits	ICT Benefits	Inter-Dependencies
3.2.1	Migrate to a virtualised desktop environment.	<p>Able to move seamlessly between any desktop client hardware within the council.</p> <p>Required if hot desks are to succeed in Marischal College.</p> <p>A major enabler to allowing flexible working due to weather, care issues, DR or Pandemic scenarios.</p> <p>Rapid deployment of existing applications to the user.</p> <p>Faster login</p> <p>Improved response for sites with limited bandwidth.</p> <p>Portable users able to access applications via GPRS based GSM technology.</p> <p>Improve the green credentials of the council by reducing waste.</p>	<p>Reduced desktop support costs. Typically vendors quote the ratio for desktop support technician to user rises from 1:100 to 1:1000 in a virtual desktop environment.</p> <p>Improved user satisfaction due to the increased desktop stability that will result from having the PC locked down.</p> <p>Client hardware refresh cycle extended thus able to considerably reduce PC replacement costs.</p> <p>As PC hardware fails, deploy Thin client hardware where possible thus reducing cost of replacing PCs in virtually all desktop situations.</p> <p>Able to manage and retain control of the whole desktop environment.</p> <p>Reduce image management and improve security.</p>	<p>Storage</p> <p>ICT and user working practices.</p> <p>Marischal College</p> <p>Smart working</p> <p>Application performance</p> <p>Training</p>
3.2.2	Reduce the number of different types of hardware supported.	Reduced costs when looking at TCO.	Reduced support costs. Easier to maintain and support the client infrastructure if a restricted hardware portfolio is deployed.	ICT procurement
3.2.3	Concurrent PC and telephone handset login	<p>Quicker setup of hot desk area.</p> <p>Telephone automatically associated with PC being used.</p>	Reduced support need for users moving within the organisation.	Marischal College



<b>Ref</b>	<b>Strategic Direction</b>	<b>Business Benefits</b>	<b>ICT Benefits</b>	<b>Inter-Dependencies</b>
3.2.4	Deploy smartcard technology for login and data encryption	Single login functionality. Ability to print at any printer.	Able to better protect sensitive files. Improved security using two factor authentication.	User working practices. Marischal College ICT Security Policy. Training
3.2.5	Review deployment of thin client laptops.	Reduced support costs and improved performance for WiFi and GPRS connectivity. Using "computer on a stick" shall enable users to run Office type products on a thin client when they don't have access to the internet.	Reduced support needs. All data stored centrally which means reduced security or backup concerns.	ICT procurement User working practices.
3.2.6	Consideration of Open Source operating and virtual desktop software alongside proprietary solutions	No licence costs. Falls in line with central government guide lines.	Alternative to migration from XP to Windows 7.	Application compatibility and performance.
3.2.7	Continue the virtualisation of the servers and extend across two locations.	A key enabler for increased availability. Potential to reduced power costs through the implementation of more efficient hardware and innovative software features.	Able to perform patching and upgrades without taking systems off line. Able to load share and deactivate servers with low utilisation during the night and at weekends. DR can be rapidly activated (if not seamlessly).	Disaster recovery requirement. Infrastructure requirements.
3.2.8	Migrate from Unix / Solaris environment to a clustered Intel / Linux environment.	A key enabler for increased availability. Reduced costs for licences, maintenance and support. Improved database response. Faster delivery of new systems.	Reduced support costs.	Application compatibility and performance.
3.2.9	Cluster databases	Reduced maintenance costs. Higher availability and increased reliability	Reduced support costs.	Disaster Recovery Requirement.
3.2.10	Expand deployment of blade technology in the virtual environment.	Faster provisioning of new systems	Reduced TCO. Less demand on space requirements.	Computer room (s) floor space and power needs.

<b>Ref</b>	<b>Strategic Direction</b>	<b>Business Benefits</b>	<b>ICT Benefits</b>	<b>Inter-Dependencies</b>
3.2.11	Leverage Hardware assisted virtualisation	Reduce costs as fewer servers required to provide virtualised environment	Eliminate bottlenecks that exist with virtual machine performance.	Application compatibility and performance.
3.2.12	Allow self service provisioning for virtualised server environments	Able to start up test and training environments without waiting for ICT.	Reduce TCO Streamline virtual server deployments.	ICT working practices.
3.2.13	Consideration of Open Source server operating software alongside proprietary solutions.	No licence costs. Falls in line with central government guide lines.	Reduction in licence costs (impacts revenue bottom line)	Application compatibility and performance.
3.2.14	Deploy virtualisation monitoring tools		Provides system monitoring. Set policies for virtual machine deployment, security, configuration and resource optimization. Policies can be enforced for identifying and decommissioning virtual machines that may no longer be needed and to make sure Virtual Machines are still running at optimal levels from a resource standpoint.	ICT working practices.
3.2.15	Establish Service Level Agreements for the virtual environment	Business knows what to expect and what they are paying for.	Differentiates “wants” from “needs” as users pay for the support they need.	ICT working practices and user expectations.
3.2.16	Use the “smart print” technology	Able to print at any printer when required. Less user frustration when a printer goes faulty. Reduced carbon foot print due to less wastage etc. Improved security as prints are not left at a printer awaiting collection.	Remove the support need to setup users with specific printer(s).	User working practices.

Ref	Strategic Direction	Business Benefits	ICT Benefits	Inter-Dependencies
3.2.17	"Just in time" training	<p>Training targeted where it is required, when it is required.</p> <p>Use of floor walkers immediately after migration will address post migration issues and improve the training programme.</p>	Reduced helpdesk and support calls.	User expectations Council ICT training open to all.

### Appendix C - Strategy for Connectivity

Ref	Strategic Direction	Business Benefits	ICT Benefits	Inter-Dependencies
3.3.1	Diverse routing	Key enabler for higher availability of ICT services.	No single point of failure in the LAN. No single point of failure in the WAN.	RTO Data Centre(s) Disaster Recovery and availability.
3.3.2	WiFi WAN connectivity	Reduced revenue costs due to moving away from leased lines between council offices.	Reduced line rental and installation costs. Able to re use Wifi hardware for other locations.	Data Centre(s) Virtual Desktop Infrastructure. Application Response
3.3.3	Consolidate to a single manufacturer for the core and a single edge for workgroup switching.	Reduced capital spending.	Improve negotiation strength. Avoid vendor lock-in. Improved operational processes.	ICT procurement
3.3.4	All LAN edge hardware to be Power over Ethernet enabled.	Increased ease and flexibility to move people within and between council buildings.	Reduced support costs. Improved service to users.	Marischal College
3.3.5	Acceleration and optimization.	Better performance on remote office links without increasing revenue costs.	Defers the time when an increase in the bandwidth to remote sites has to be invoked. Improved performance for applications where latency is a problem on WAN links.	Data Centre Wireless rather than wired connectivity between offices.
3.3.6	High speed meshed WiFi within council buildings	Providing more bandwidth for those using WiFi within council offices. Reduced costs through using the internal network to route calls.	802.11n technology provides increased bandwidth. Use WiFi for voice as well as council and guest laptop use.	
3.3.7	Migrate to IP voice	Ability to move people easily and quickly. Improved voice connectivity for remote and home working with users able to work from any location.	Reduced support costs and faster moves and changes.	Marischal College
3.3.8	Consolidate to a single Telephone exchange manufacturer with a high availability system.	Failure of main site doesn't impact core telephony service. Other sites can be used for fall-back.	Reduced support costs. Reduced complexity by only interconnecting between one manufacturer's hardware.	Marischal College ICT Procurement

<b>Ref</b>	<b>Strategic Direction</b>	<b>Business Benefits</b>	<b>ICT Benefits</b>	<b>Inter-Dependencies</b>
3.3.9	Corporate contact centre (including switchboard and RCC) to be embedded within the telephony system.	Reduced maintenance costs.	Support costs reduced using a single system.	Customer Service Strategy.
3.3.10	Soft phone technology and streamlined handset	Reduced costs through using simpler (i.e. cheaper) phones. Increased productivity for those who are working from home or away from their desk.	Easier to support and provision. Potential cost reduction if using Open Source vs traditional licensing model. Reduced "Toy envy" syndrome.	Marischal College User working practices.
3.3.11	Skills based routing and presence management	Able to identify if a subject expert is available and if not, identify those who have the relevant skills set.		Customer Service Strategy.
3.3.12	Unified Messaging	Voicemails and fax-mails can be forwarded to an email server so that messages can be received on a workstation. Enable email to be sent as voice message to a telephone or mobile handset.		Smart working
3.3.13	Improved Video and Audio conferencing facilities	Reduce unproductive travel time between council offices and key suppliers. Reduce costs by providing an internal audio conferencing facility for more than three participants.		Marischal College User working practices.
3.3.14	Standards based voice interconnectivity between all sites.	Improved interoperability and telephony functionality between sites.	Session Initiated protocol and session management enable a much richer set of telephony features to be provided for users.	

<b>Ref</b>	<b>Strategic Direction</b>	<b>Business Benefits</b>	<b>ICT Benefits</b>	<b>Inter-Dependencies</b>
3.3.1 5	Standardise on Mobile devices from RIM (Blackberry) or other PDA manufacturer and single middleware solution.	Reduced support needs. Ability to focus on providing “thin services” via one device type. One device can be used for I-world, Confirm and Consilium etc. Ensures same look / feel for mobile applications which reduces staff training needs.	Support costs reduced with only one type of device and middle software to be maintained and developed.	ICT procurement User working practices.
3.3.1 6	Laptops and Notebooks supplied from a single manufacturer.	Reduced support costs. Quicker deployment of applications. Increased laptop stability. Reviewed on an eighteen month / two year basis to leverage competitive advantages.	Reducing the hardware type reduces the overall support cost for laptops and notebooks. Able to make “thin” to further reduce support costs. Increased security.	ICT procurement
3.3.1 7	Deploy connectivity monitoring tools.	Reduce instances of congestion between sites by identifying them in the early stages before service is impacted.	Improved ability to track and resolve connectivity related issues before they impact service. Improved service to customers	ICT working practices

### Appendix D - Strategy for Applications

Ref	Strategic Direction	Business Benefits	ICT Benefits	Inter-Dependencies
3.4.1	Implement a common data standard and then a common input approach.	Improved data consistency.	Quicker and easier report development.	User awareness and working practices.
3.4.2	Data cleansing to ensure unique data is held.	Removes confusion when dealing with data.		Storage
3.4.3	Applications to support E-GIF, OSIAF and other government standards.	Ease of integration with government organisations, local authorities etc.	Reduced effort to integrate applications.	ICT and user awareness.
3.4.4	Common middleware to interlink systems.	Quicker and easier system inter-connection.	Reduced costs No more development of point-to-point links on a system by system basis.	
3.4.5	Reduce the database portfolio.	Reduces duplicated input into separate databases.	Reduced effort in linking between various databases. Reduced support costs by consolidating the number of database management systems supported.	User awareness and working practices.
3.4.6	Consolidate the applications that are used within the council.	Deliver projects faster by reusing applications. Reduce the number of databases used. Reduced maintenance and licence costs.	Reduced support costs.	User working practices and awareness. Training
3.4.7	Only Oracle and SQL Server database management systems shall be supported and to remain no more than one behind the current version.	Faster deployment of new applications that use industry standard databases.	Reduced support costs that occur as a result of maintaining a diverse range of databases and of software versions.	ICT procurement ICT and user awareness and working practices.
3.4.8	Improved availability and ability to recover from database or related hardware issues.	Increased availability of Oracle and SQL based systems. Minimal impact for system outages (log off, log on required).	Auto transfer for users between databases. Servers hosting Oracle and SQL server can be removed without impact for users.	

<b>Ref</b>	<b>Strategic Direction</b>	<b>Business Benefits</b>	<b>ICT Benefits</b>	<b>Inter-Dependencies</b>
3.4.9	No customisation of applications.	Increased stability of applications. Existing business processes are challenged to make them more effective.	Reduced support costs.	ICT and user awareness and working practices.
3.4.10	Consideration of Open Source business software alongside proprietary solutions.	No licence costs. Falls in line with central government guide lines.	Significant reduction in licence costs.	User working practices.
3.4.11	Application development tools to be streamlined to the market leading products.	Quicker development of applications.	Reduced support costs	
3.4.12	Web based application development	Faster deployment of applications to the desktop.	Removed need to deploy and maintain thus reduced support costs.	
3.4.13	Existing Access applications to be converted to run time.	Reduction in niche Access systems.	Reduced support costs.	User awareness and working practices. Training
3.4.14	Business Objects shall be the reporting tool.	Quicker development of reports.	Reduced support costs.	
3.4.15	Open Source office productivity suite to replace Microsoft office	Open Source has no, or greatly reduced, licence costs. In line with central government strategic push to use Open Source technology where appropriate.	Significantly reduced revenue costs.	User working practices. Training Storage
3.4.16	Migration to email being provided via Software as a Service (SaaS)	Reduced costs through easier integration. Pay for what is used (per mail box per month) Instant Disaster Recovery (under SaaS option).	Reduced capital and revenue costs. Quicker and more robust application integration.	User awareness and working practices. Training Storage Backups and Archiving.



<b>Ref</b>	<b>Strategic Direction</b>	<b>Business Benefits</b>	<b>ICT Benefits</b>	<b>Inter-Dependencies</b>
3.4.17	Deploy Collaboration tools and web 2.0 technology (webex, IM, Wiki's, video casts, sharepoint, blogging, RSS feeds )	Reduce travel costs and make meetings more effective with larger participation. Able to communicate easier and more easily and effectively with internal and external users.		User awareness Training
3.4.18	Carbon control software on end devices.	Able to reduce energy consumption and measure the reduction in the carbon foot print generated by workstations within the council.		User awareness
3.4.19	Just in time training using CBT, floor walker and reviewing of helpdesk calls.	Training tailored to meet the user needs as they occur. Increased productivity.	Reduced helpdesk calls. Targeted training delivered where it makes an impact.	User awareness Training

## Glossary

<b>Acronym</b>	<b>Definition</b>
<b>802.11n</b>	Ratified in 2009, this is the standard for wireless radio systems that provide 600Mbps throughput, compared with 54Mbps throughput from older standards such as 802.11g.
<b>CCTV</b>	Closed-circuit television is the use of video cameras to transmit a signal to a specific place, on a limited set of monitors.
<b>DR</b>	Disaster recovery is the process, policies and procedures related to preparing for recovery or continuation of technology infrastructure critical to an organisation after a natural or human-induced disaster.
<b>E-GIF</b>	The UK eGovernment Interoperability Framework to enable the seamless flow of information across government / Public Service Organisations.
<b>ERP</b>	Enterprise resource planning (ERP) is a company-wide computer software system used to manage and coordinate all the resources, information and functions of a business from shared data stores.
<b>FC</b>	Fibre Channel, or FC, is a gigabit-speed network technology primarily used for storage networking. It has become the standard connection type for storage area networks (SAN) in enterprise storage. Despite its name, Fibre Channel signalling can run on both twisted pair copper wire and fibre-optic cables.
<b>Floor Walkers</b>	Deliver training just in time for users. Predominately used as part of a migration process and usually consists of the trainers who have just delivered the training. Reduces the impact on the helpdesk and allows training programme to be modified to reflect actual problems and user experiences.
<b>GPRS</b>	Global Packet Radio System. Service provided by GSM phones to allow internet type access.
<b>GSM</b>	Group Special Mobile (standard for European cell phone communication).
<b>HA</b>	High availability is a system design protocol and associated implementation that ensures a certain degree of operational continuity during a given measurement period.
<b>Intel</b>	Trade name for a hardware processor.
<b>IP</b>	Internet Protocol
<b>LAN</b>	Local Area Network. Any network connection, in the council's case, that is considered to be supplied internally.
<b>Linux</b>	An operating system that is Open Source (Redhat and SUSE are common variants).
<b>OIL</b>	Online Interactive Training – ACC computer based training system
<b>Open Source</b>	Community based software packages written by the community for the community.
<b>OSIAF</b>	The standards and specifications to be used by the Scottish public sector which provides a Scottish framework for developing and approving interoperability specifications that support the delivery of electronic public services.
<b>PABX</b>	A PABX is a Private Automatic telephone exchange that serves a particular business or office, as opposed to one that a common carrier or telephone company operates for many businesses or for the general public.
<b>PC</b>	Personal Computer

<b>Acronym</b>	<b>Definition</b>
<b>PDA</b>	A personal digital assistant (PDA) is a handheld computer, also known as a palmtop computer. PDAs commonly have colour screens and audio capabilities, enabling them to be used as mobile phones (smart phones), web browsers, or portable media players. Many PDAs can access the Internet, intranets or extranets via Wi-Fi, or Wireless Wide Area Networks (WWANs). Many PDAs employ touch screen technology.
<b>PSTN</b>	Public Switched Telephone Network. These are traditional voice connections from private enterprises to Telcos.
<b>RAC</b>	Oracle Real Application Clusters (Oracle RAC) enables a single database to run across a cluster of servers, providing fault tolerance, performance and scalability.
<b>RFP</b>	Request for Proposal
<b>RPO</b>	The Recovery Point Objective (RPO) is the point in time to which you must recover data as defined by your organisation. This is generally a definition of what an organisation determines is an "acceptable loss" in a disaster situation. If the RPO of a company is 2 hours and the time it takes to get the data back into production is 5 hours, the RPO is still 2 hours. Based on this RPO the data must be restored to within 2 hours of the disaster.
<b>RTO</b>	The Recovery Time Objective (RTO) is the duration of time and a service level within which a business process must be restored after a disaster (or disruption) in order to avoid unacceptable consequences associated with a break in business continuity
<b>SAS</b>	Serial Attached SCSI (SAS) moves data to and from computer storage devices such as hard drives and tape drives. SAS depends on a point-to-point serial protocol that replaces the parallel SCSI bus technology that first appeared in the mid 1980s
<b>SATA</b>	The <b>serial ATA</b> , or <b>SATA</b> computer bus, is a storage-interface for connecting host bus adapters to mass storage devices such as hard disk drives and optical drives.
<b>SCSI</b>	Small Computer System Interface, or SCSI (pronounced <i>scuzzy</i> ), is a set of standards for physically connecting and transferring data between computers and peripheral devices
<b>Snapshot</b>	Ability to recover data or files that have not yet been backed up or archived.
<b>Soft phone</b>	A piece of software that runs on a workstation that enables the user to make and receive calls.
<b>SOI</b>	Service Orientation Infrastructure main benefits include increased utilisation of individual resources (meaning lower total cost of ownership) and increased service-levels as applications do not depend on the availability of any individual resource, but may use any one resource available in the pool.
<b>Solaris</b>	Software used on top of the UNIX operating system.
<b>SQL</b>	SQL (Structured Query Language) is a database computer language designed for managing data in relational database management systems (RDBMS). Its scope includes data query and update, schema creation and modification, and data access control. It has become the most widely used language for relational databases.
<b>SSD</b>	A solid-state drive (SSD) is a data storage device that uses solid-state memory to store persistent data.

Acronym	Definition
<b>SVN</b>	A Storage Virtual Network (SVN) is the result of completely abstracting logical storage from physical storage. The physical storage resources are aggregated into storage pools, from which the logical storage is created. It presents to the user a logical space for data storage and transparently handles the process of mapping it to the actual physical location. This is currently implemented inside each modern disk array, using a vendor's proprietary solution. However, the goal is to virtualise multiple disk arrays, made by different vendors, scattered over the network, into a single monolithic storage device, which can be managed uniformly
<b>TCO</b>	Total Cost of Ownership for a defined period of time. Includes purchase, maintenance and support costs and shows the true cost of hardware or software systems.
<b>UNIX</b>	An operating system
<b>VC</b>	Video Conferencing
<b>VoIP</b>	Voice over Internet Protocol
<b>VPN</b>	Virtual Private Network. The ability for remote locations to appear as if they were actually part of the council's data network.
<b>WAN</b>	Wide Area Network. Any network connection, in the council's case, that is not considered to be internally supplied.
<b>WiFi</b>	Trademark of the Wi-Fi Alliance for certified products based on the IEEE 802.11 standards. This certification warrants interoperability between different wireless devices.

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