

Functional Specification

Institutional Infrastructure

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Executive summary

Over recent years, ICT expenditure by educational institutions has increased significantly. Despite increased spending, ICT infrastructure in institutions varies greatly. While some institutions have an infrastructure that is comparable with some of the best found in the commercial world, other institutions are only just embarking on providing a first class service which enhances learning and teaching, in addition to supporting and improving the way administrative tasks are undertaken.

It is Becta's aim strategically to assist institutions to develop and maintain a coherent, sustainable and dependable ICT infrastructure by offering guidance in specifying the requirements for ICT in both functional and technical terms, and offering procurement advice to support ICT requirements. To facilitate this, it is vital that there is a standards-based implementation for infrastructure, demonstrating an institution-based framework, achievable within the next 3–5 years.

This paper sets out Becta's vision for institutional infrastructure and concerns itself with the Institutional Infrastructure Services component of Becta's conceptual architecture for ICT infrastructure.¹ It sets out the vision primarily from a functional stance, providing a detailed view of what learners, educators and administrators need to expect from the institution's infrastructure, and what functions need to be in place in order for these expectations to be met in the next **3–5 years**.

Four areas of functional requirements for institutional networks, services and applications are identified in this specification:

Using ICT to offer a wide range of choice and access – The ICT infrastructure needs to support individual choice by offering a range of supported applications, services and access devices to enhance the learning and educating experience for all.

Using ICT to support flexible working – To enable an ICT infrastructure to support learners, educators and administrators, there needs to be flexibility designed into the infrastructure so that users have a range of ways and locations in which they can undertake their daily tasks.

Using ICT to manage data and improve efficiency – The institution's ICT infrastructure needs to be an efficient resource which takes care of managing data on behalf of the user, and which is supportive yet unobtrusive for the user. The user needs to have confidence in the ICT infrastructure to deliver a fast and reliable service, regardless of the task in hand.

Using ICT to secure data and protect the user – All institutions need to ensure that any data is held securely and that users are offered a range of protection from inappropriate ICT resources.

It is anticipated that the requirements outlined here should challenge even institutions with an advanced network infrastructure, while being attainable for all other institutions.

¹[\[http://www.becta.org.uk/schools/infrastructure\]](http://www.becta.org.uk/schools/infrastructure)

Introduction

All institutional infrastructure needs to be based on the requirements of the user. Learners and educators need high quality resources to support them in their learning and teaching. Similarly, administrators and institution managers need to be able to use ICT resources that allow them to undertake their work efficiently and effectively. Using the functional requirements outlined in this specification, institutions should be able to concentrate on their priorities for meeting the expectations of the user rather than attempting to prioritise on particular perceived technical requirements. Using a common functional specification complemented by local and regional requirements will help lead to an infrastructure that suits the demands of all users within each individual institution, and is reliable, secure and flexible.

This functional specification identifies four main areas that institutions need to focus upon to support the future of institutional infrastructure:

1. Using ICT to offer a wide range of choice and access.
2. Using ICT to support flexible working.
3. Using ICT to manage data and improve efficiency.
4. Using ICT to secure data and protect the user.

Each of the four sections contains functional-level requirements that need to be met in order to achieve an ICT infrastructure that is designed to meet the high demands of educational ICT.

These functional requirements set a minimum specification that should be attainable by all institutions over the next **3–5 years**. They also allow institutions with a more advanced ICT infrastructure to continue to surpass this level, based on the needs of their users.

It should be noted that this document refers to all learners and educators. Where accessibility issues are not explicitly mentioned, it is for the individual institution to decide what additional requirements may be needed for users in their institution.

In order to concentrate on how the ICT infrastructure can support and enhance learning, teaching and administrative tasks, specific technologies and technical requirements are not explicitly mentioned, but can be found in Becta's Technical Specifications [<http://www.becta.org.uk/schools/techstandards>]. Guidance concerning funding can be found at [<http://www.teachernet.gov.uk/management/schoolfunding>].

Intended audience

This functional specification is written for those who have an interest in and responsibility for institutional ICT infrastructure. It should be of particular interest to head teachers, ICT coordinators, Local Authority(LA) /Regional Broadband Consortium(RBC) advisors, institutional network managers and educational ICT suppliers.

Becta's institutional infrastructure specifications

Becta's infrastructure specifications, frameworks and tools offer a coherent and comprehensive approach to institutional infrastructure requirements. This document should therefore be seen as part of a series of documents that support the institutional component of Becta's National Digital Infrastructure.² The relationship of Becta's infrastructure specifications, frameworks and tools to an institution's ICT design and implementation is demonstrated in Figure 1.

Functional Specification: Institutional Infrastructure

- Sets out the functional requirements for institutions to aim to achieve within the next 3–5 years.

² [<http://www.becta.org.uk/schools/infrastructure>]

Technical Specification: Institutional Infrastructure

- Supports the Functional Specification by setting out the technical specifications and requirements for an institution’s infrastructure in four key areas: institutional networks, institutional services and applications, institutional ICT security, and ICT hardware requirements. Available from [\[http://www.becta.org.uk/schools/techstandards\]](http://www.becta.org.uk/schools/techstandards).

Institutional Infrastructure matrix tool

- This is a tool that an institution can use for self-evaluation processes against the requirements set out in the Functional Specification. Available from [\[http://matrix.becta.org.uk\]](http://matrix.becta.org.uk) (from December 2005)

Functional Specification Procurement Guidance

- Supports the Functional Specification by giving institutions supplementary advice on questions to ask before implementation of a requirement takes place (available from December 2005).

Framework for ICT Technical Support

- A best-practice Framework for ICT Technical Support (FITS), available to support the delivery of ICT in schools. Available from [\[http://www.becta.org.uk/schools/fits\]](http://www.becta.org.uk/schools/fits).

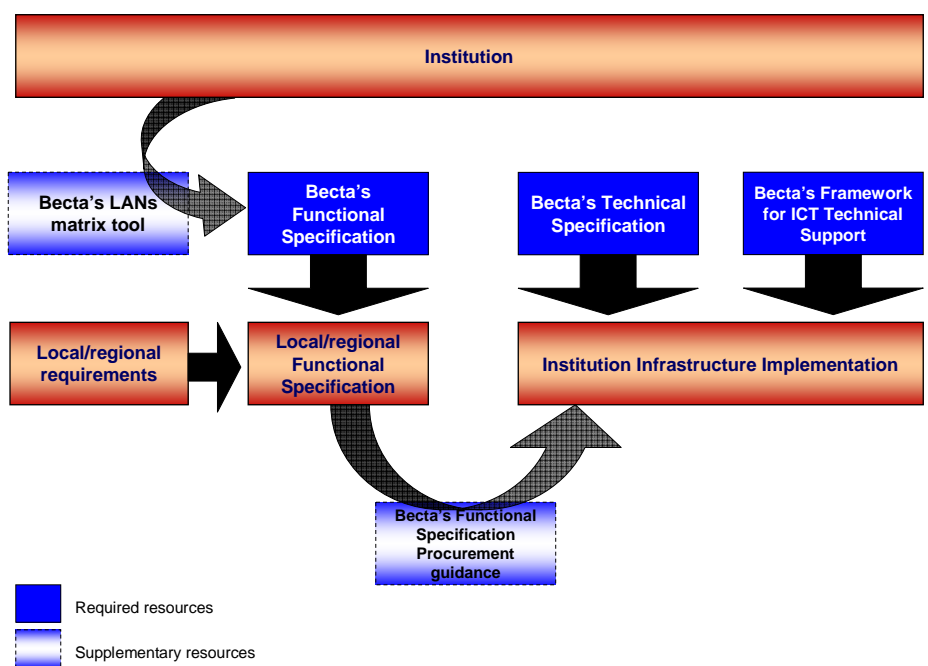


Figure 1 The relationship of Becta’s institutional infrastructure documents to an institution’s ICT design and implementation

How to use this document

It is possible to use this document in several distinct ways:

- For an institution that is being newly built or completely refurbished, the vision described here should provide a comprehensive framework for the institution’s ICT infrastructure requirements.
- For an LA/RBC, this vision could provide the basis for all institutions in the region to achieve the same level of infrastructure provision.
- For individual institutions this vision could provide a checklist of the functions that are already in place and a vision of what needs to be implemented in the next 3–5 years.

The reader should note that:

- the word ‘institution’ refers to a place of learning where ICT is being used – this includes all schools, but institutions are not necessarily limited to the school sector

- while the requirements here are challenging, it is anticipated that both institutions and LA/RBCs and will need to set additional requirements to meet local and regional needs
- the functional requirements specified in this document are underpinned by Becta's Technical Specifications which can be found at [\[http://www.becta.org.uk/schools/techstandards\]](http://www.becta.org.uk/schools/techstandards).

Main sections:

The sections 1, 2, 3 and 4 each begin with a general requirement, which is expressed as an entitlement for learners and educators. Following this entitlement are a series of requirements that address the implementation of the entitlement in functional terms. Each requirement is shown in **bold**, and the reader is asked to refer to the 'Wording conventions' and 'Glossary of terms' sections for guidance on terminology.

Appendices

Appendix A gives a glossary of terms used in this document.

Appendix B offers a self-evaluation checklist that an institution can use to check quickly which requirements have been implemented and to enable it prioritise those which are still to be implemented. A self-evaluation tool that enables an institution to evaluate its ICT infrastructure against the requirements stated in Sections 1, 2, 3 and 4 and offers advice and guidance as to how move forward with implementing each requirement is available from [\[http://matrix.becta.org.uk\]](http://matrix.becta.org.uk) (from December 2005).

Wording conventions

The following wording conventions apply to the specifications set out in this document:

- The word '***shall***' (italicised and bold) defines a *mandatory* requirement of this specification.
- The word '***should***' (italicised and bold) defines a *highly recommended* but not mandatory requirement of this specification.

The use of standards and specifications

While international, national and technical standards and specifications are not explicitly mentioned in this document, the implication is that recognised and open technical standards and specifications must be used wherever possible. (These are documented in Becta's technical specification for institutional infrastructure [\[http://www.becta.org.uk/schools/techstandards\]](http://www.becta.org.uk/schools/techstandards).) Implementing requirements to known and specified standards is the best, and in many cases, the only way to ensure that an institution's ICT infrastructure can evolve and expand in a sustainable and coherent manner, helping to make certain that there is seamless interoperability between ICT resources. This will be paramount as institutions move forwards towards ever more integrated learning environments.

Basic principles

Within this specification there are basic principles that need to be continually considered and addressed. The following principles are not explicitly mentioned within the functional requirements, but are paramount and need to be considered (and in some cases considered as prerequisites) whenever ICT infrastructure enhancements are being planned:

- **Reliability**
The institution's ICT infrastructure must be reliable. An unreliable infrastructure is likely to detract from the learning experience and obstruct the educator. It will become a frustration to learners, educators and administrators alike if devices, applications and services cannot be relied upon. While using an infrastructure that meets Becta's technical specification [\[http://www.becta.org.uk/schools/techstandards\]](http://www.becta.org.uk/schools/techstandards) will greatly aid reliability, the institution will

still be responsible for checking with suppliers and providers that components of the infrastructure are of proven reliability.

- **Coherence**

With the variety of technologies on offer in the marketplace, it is important that an institution ensures coherence by implementing ICT technologies that work together and fit with the overall ICT strategy. This coherence must be applied equally to devices and services running over the institution's infrastructure and to any connection that enables effective use of the National Education Network [<http://www.becta.org.uk/nen>] or the internet.

- **Affordability and sustainability**

While institutions can often identify the immediate costs of a new ICT resource, the total cost of ownership (TCO) must be considered in order for the institution to be able to sustain a resource. Becta has carried out a considerable amount of work in this field, and readers are encouraged to familiarise themselves with this.³

- **Planning**

It is essential to plan upgrades or enhancements to the institution's current infrastructure. Institutions' infrastructures will need to be enhanced over time, therefore plans need to be drawn up looking at long- as well as short-term goals to allow the infrastructure to continue to evolve, yet at the same time remain a reliable, coherent and sustainable resource. Goals and visions, whether short term or long term, need to be based on the gains to the learner, educator or institution as a whole. In this way, the institution will be able to plan for improvements to its infrastructure led by educational requirements rather than focused on perceived technical requirements.

- **Management and support**

Users need to be confident that the ICT infrastructure will work reliably and consistently, allowing them to concentrate on their learning, educating or administration activities. In order to help meet and manage ICT requirements, Becta advocates a managed service approach to institutional infrastructure.⁴ Additionally, Becta has carried out a considerable amount of work in the field of network management and support by developing and helping institutions to implement the Framework for ICT Technical Support (FITS). Familiarisation with and adoption of this scheme of work should be considered as a prerequisite to meet the requirements outlined in this document [<http://www.becta.org.uk/schools/fits>].

³ <http://schools.becta.org.uk/index.php?rid=9650>

⁴ Further information is available from [<http://www.becta.org.uk/schools/infrastructure>]

1 Using ICT to offer a wide range of choice and access

1.1 Introduction

1.1.1 All educators and learners *shall* have extensive access to and a choice of a wide range of services, applications and devices

To get the greatest possible range of benefits from ICT, a wide range of applications, services and access devices will need to be provided by the institution for learners, educators and administrators. The potential for greater personalisation of learning, a reduced administrative burden and improved communications can be encouraged by using ICT resources that can be adapted to the choice of the individual, and used in a variety of situations, and that can access information in a variety of ways.

1.2 Requirements

1.2.1 All educators and learners *shall* have access to a wide range of applications that allow manipulation of text, images (including video), tables and sounds

The range and types of applications required by an individual to access a wide range of media may be numerous, encompassing curriculum and curriculum-planning tools, and administration and communication tools. Appropriate software may include commercial, free or open source software.

1.2.2 Learners and educators *shall* have access to a wide range of online curriculum resources

Online curriculum resources are available from a variety of sources (both commercial and non-commercial). Institutions need to ensure that access to a diverse range of text and image based resources, and audio and video resources are available to enhance learning and teaching independently of the location of the learner/educator.

1.2.3 All educators and learners *shall* have access to learning resources available via the National Education Network (NEN)

The National Education Network (NEN) is being developed to provide every learner and educator with access to a consistent set of resources, services and applications, improving the availability and use of high-quality educational content. Further information is available in 'Becta's view: the National Education Network', which is available from [<http://www.becta.org.uk/publications>] and from [<http://www.becta.org.uk/nen>].

1.2.4 Learners and educators *shall* have access to a wide range of access devices

Computing devices are the devices that allow access to learning content and services. The institution will need to decide which access devices are needed to meet the demands of the learner and educator. Vital considerations will include the location of the devices within the institution, the number of devices required, and whether the devices will need to be portable. Institutions will also have to consider how to manage the use of learners' own access devices that are used for curricular activities.

1.2.5 Learners and educators *should* have access to a secure email service

Email has quickly become a useful and common method of communication, and a secure email service is important to the learner, educator and indeed the administrator. Most institutions will need to provide all users with access to a personal mailbox, accessible at all times in school and elsewhere, that users can manage themselves wherever appropriate.

1.2.6 All educators and learners *should* have access to a learning platform

'Learning platform' is a generic term covering a variety of different products, all of which support online learning in some way. Learning platforms are increasingly becoming an important part of the strategy for delivering online and flexible learning. This includes delivery via the internet and third party hosting.

The Becta publication 'An introduction to learning platforms' provides further information and is available from [<http://www.becta.org.uk/publications>].

1.2.7 Learners and educators *should* have access to a range of collaborative tools

The increasing use of collaborative tools outside the educational environment has led to learners being in a position to embrace these tools within the institution. Collaborative tools enable teams of learners to work together on projects in real time, sharing experiences, comparing lifestyles and participating in lessons, even when learners are not physically located in the institution.

1.2.8 Institutions *should* discuss with their LA/RBC decisions concerning choice and locations of access devices

Choice of access devices and their locations in the institution is ultimately something to be decided by each individual institution. However, many LA/RBCs have useful advice concerning benefits and procurement of particular devices as well as guidance on how a device could be used or where it could be located to best aid the learner.

2 Using ICT to support flexible working

2.1 Introduction

2.1.1 Learners and educators *shall* be entitled to a working environment that allows flexible access to curriculum and administration resources

There is an increasing need for learners and educators to achieve flexible access to an institution's ICT resources from within the institution and from remote locations such as the home. Therefore, institutions need to develop strategies for supporting learners and educators within traditional work areas in the institution itself, beyond the institution's designated work areas and indeed beyond the physical boundaries of the institution. This includes the need for institutions to develop ICT access strategies to cater for learners who are excluded, non-attendees or those with special educational needs.

2.2 Requirements

2.2.1 The institution's network services *shall* be available for use by authorised users at all times within locally/regionally agreed service hours, unless scheduled maintenance is taking place

Institutions and LA/RBCs need to have an infrastructure that offers a reliable service and a wide range of access times. This becomes increasingly important as learners, educators and indeed parents require access to the institution's services from within the institution and from remote locations (eg the home) outside traditional working hours. This requirement implies that an institution needs to strive for a service that can be accessed 24 hours a day, 7 days a week, and that maintenance will be kept to a minimum and not scheduled to take place in the institution's normal working hours.

2.2.2 Learners and educators *shall* be able to access appropriate curriculum resources and administration data from all computers in the institution and from all learning spaces within the institution

In order for staff and students to access their personal data at all appropriate times, all computers need to be part of the institution's network (whether connected via wires or wirelessly). In this way, staff or students can access any appropriate resource or data from any computer.

2.2.3 Institutions *shall* provide secure access to curriculum and administration data from remote locations

To enable flexible working away from the institution, curriculum and administration data needs to be accessible by authorised users from a range of places and via a range of methods. For example, an institution may choose to allow learners or educators access to all appropriate data via secure online methods, while another institution may choose to allow learners and educators to synchronise their portable devices with the institution's networked curriculum and teaching data, allowing offline access to resources from remote locations. Administration data would then be accessed via secure online methods. Institutions need to decide the levels and granularity of access made available for different groups of individuals from remote locations. For example, educators will most likely need access to all teaching materials, pupil work areas and a range of administration data. Learners will need to access their work and to have access to relevant institution notices and information. In most cases, institutions will want to offer parents access to their child's work and relevant administration data relating to their child.

2.2.4 Institutions *shall* ensure that educators and learners have access to a wide range of supportive tools

There are a wide range of specialist learning and educating tools that an institution will want to take advantage of (eg interactive whiteboards, networked audio-visual equipment). It is essential that the

institution's ICT infrastructure allows for efficient and effective use of these tools so that they can be used whenever they are required and, in many cases, in a range of teaching spaces.

2.2.5 Future institutional networks *shall* be based on wired technology

In order to meet the demands of modern educational applications that make extensive use of a variety of media, a network that can deliver multimedia will be needed. Multimedia places heavy demands on the network (eg streaming of video to the desktop). To meet these demands, wired networks will continue to form the majority of an institution's network.

2.2.6 Secure wireless networks *shall* complement rather than replace an institution's wired network

While wireless technologies allow a high degree of flexibility in accessing the institution's network, they are still widely viewed as technologies that support the institution's wired network. It is anticipated that in the medium term, media-rich applications and services that place high demands on the institution's network will be best met via a wired network.

2.2.7 Institutions *should* provide secure wireless access to curriculum and administration resources from a wide range of work spaces in the institution

In order to achieve complete flexibility of working within the institution, a learner or educator needs to be able to gain access to networked resources from all work spaces. To allow flexible access to the institution's ICT services, it is anticipated that a wide area of wireless coverage of the institution will be needed. Wireless networking technologies allow access to networked resources when fixed access to the network is not possible, practical or even desirable. Careful planning of what areas need wireless coverage will be required to ensure that flexible working via wireless technologies is achieved.

3 Using ICT to manage data and improve efficiency

3.1 Introduction

- 3.1.1 **Learners, educators and administrators *shall* be entitled to an ICT infrastructure that facilitates information sharing and electronic data communications, improving administration and data collection, collation and transfer**

Effective information sharing and data management is essential for an efficient and useful ICT infrastructure, and can also lead to time and cost savings. Ensuring data is well managed, accessible and stored in an open format means that information can be shared effectively, in a timely manner and efficiently with authorised institutional users and educational partners. Allowing access to shared information also reduces the risks that arise with storing multiple copies of similar data.

3.2 Requirements

- 3.2.1 **The institution *shall* use a dedicated repository (or series of repositories) to hold securely all curriculum and administration data**

Learners, educators and administrators need to be able to electronically store and access their work, teaching materials and administration data wherever they are in the institution. In order to achieve a system where data can be stored and accessed in a secure and reliable manner from all the institution's computers, a dedicated repository (or series of repositories) will be needed where data can be backed up, and security (including physical device security) can also be ensured. This repository *should* be hosted at the institutional, LA or RBC level as appropriate.

- 3.2.2 **Institutions *shall* have a formal user support process in place**

For ICT to effectively support the activities of learners, educators and administrators, there needs to be an efficient user support process in place, which can be accessed via a single point of contact, for reporting and recording incidents or requests and their respective resolutions. (This type of process is described in detail in Becta's Framework for ICT Technical Support (FITS) [<http://www.becta.org.uk/schools/fits>])

- 3.2.3 **All institutions and local authorities *should* use a caching system**

Institutions using a caching system optimise the usage of available bandwidth by allowing users to access a single locally stored copy of the content many times rather than repeatedly requesting the same content from the original source. There may also be some advantages gained by institutions from using content delivery systems, which work on the principle of delivering content to the local network before it is required, allowing content to be pre-positioned before a lesson.

- 3.2.4 **The institution *should* implement a network that gives priority to data associated with particular learning activities**

In every institution's network, there are likely to be certain learning activities taking place using networked resources that need to be given a higher priority than others. For example, video-conferencing applications will need the network to handle their data as a matter of priority; if this data is not prioritised, then a breakdown in audio and visual quality could occur. Conversely, web page access rarely needs to be treated with high priority because web-access technologies are designed to cope with minor delays. Without a system in place to control how priority is given to learning activities or parts of the institution's network, the experience for learners and educators could become a very frustrating and unsatisfactory one.

3.2.5 **Data gathering between the LA and the institution *should* be via secure automated processes**

To reduce administrative burdens for institutions and increase the accuracy of data, frequent and automated exchange of data between institutions and LA Management Information Systems (MISs) has been outlined by Becta as an important MIS interoperability requirement in its publication 'School Management Information Systems and Value for Money'.⁵

3.2.6 **Institutions *should* implement an electronic facilities management system**

Electronic facilities management systems can help to reduce the institution's administrative burden surrounding building and service facility management and management of learners. It can also help to improve institutional security. Many 'smart cards'/ID cards also allow for electronic registration, helping to keep track of learners, deny unauthorised access into the institution and individual rooms of the institution, and allow for cashless transactions.

⁵ [http://www.becta.org.uk/corporate/publications/publications_detail.cfm?currentbrand=all&pubid=279&cart=].

4 Using ICT to secure data and protect the user

4.1 Introduction

4.1.1 Learners, educators and administrators *shall* be entitled to a network that protects the user from inappropriate content and ensures data security and integrity

Institutions now have responsibility for storing various types of data, including curriculum work, administration data, emails and learner profiles. In addition, they have a responsibility to protect their users from access to inappropriate data which could be received via the internet or even from within the institution's network itself. Users must be confident that data is being stored securely and can only be accessed by appropriate authorised users of the network. They will also need to be confident that they are protected from access to or distribution of inappropriate content and from unsolicited contacts.

4.2 Requirements

4.2.1 All institutions and LAs *shall* use a content and email filtering system and this *should* be managed by LAs/RBCs in discussion with relevant institutions. Filtering *should* be able to be refined at an institutional level

There is a responsibility to make sure that students' use of email and the internet is appropriate and safe. Filtering is an extremely important task in this respect, and it is imperative that management is undertaken in an effective and efficient manner to reach the minimum level requirement in accordance with the standards laid out in Becta's ISP accreditation scheme.⁶

4.2.2 All institutions *shall* offer safe and secure internet access for every user of the service, and this access *should* be provided by the institution's LA/RBC

Safe and secure access to the internet, the institution's intranet (if applicable), and RBC and LA networks is essential for efficient communications and access to a wide range of educational content.

4.2.3 Institutions *shall* maintain ongoing documentation regarding their security requirements and *should* readdress this before extending or altering their network

An institution will need to take into account a number of variables when considering its ICT security. The institution will need to document and follow a policy that describes how various issues are addressed, such as acceptable use of ICT resources, user authentication, security of user data, and physical security of the network infrastructure. This policy will need to be amended to take account of any changes and updates to ICT infrastructure requirements, and reviewed regularly.

4.2.4 An institution *shall* take appropriate steps to prevent damage to the network from both internal and external attacks

Securing a network using appropriate hardware and software techniques is not a trivial task. An institution needs to ensure that all the appropriate steps are taken to identify and prevent attacks to the network from both inside and outside the institution, and limit damage from any successful attack. Working in conjunction with the institution's connectivity provider (frequently the LA/RBC) will help to ensure that the potential for external attacks is also reduced.

4.2.5 An institution *shall* take appropriate steps to ensure that curriculum and administration data is recoverable in the event of equipment failure or disaster

An institution will need to ensure that regular back-ups of curriculum and administration data are carried out, and that these back-ups are stored in secure locations. In the event of data loss, it will then be possible to recover vital data with minimal loss. An institution will need a disaster recovery plan which ensures that the institution's network and data can be recovered as quickly and as

⁶ Further information can be found at [<http://ispsafety.ngfl.gov.uk>].

efficiently as possible in the event of failure/disaster (eg major equipment failure, fire damage, etc). Further advice can be found at [<http://www.becta.org.uk/schools/fits>].

4.2.6 **An institution *shall* make secure all data held on the network and *shall* control access to that data**

The securing of data is a vital part of an institution's network security. Data could be administrative, concerning the institution itself, curriculum based, or data concerning an individual. While loss or corruption of some data could be regarded as merely frustrating, loss of other data could have far more serious consequences.

4.2.7 **All institutions *should* ensure that they physically secure their network devices**

An institution will need to ensure that its network devices are protected from theft or damage. While loss of certain network devices, such as a desktop computer, may be merely costly and frustrating, damage to or theft of central repositories, for example, could lead to permanent loss of learners' or educators' work, or indeed compromise the safety of individuals in the case of theft of devices holding personal data.

4.2.8 **All learners and educators *should* be able to use single sign-on authentication for external resources, and this *shall* be carried out in conjunction with the institution's LA**

Normally, a user wishing to access content from multiple sources would have to log on to each source using a username and password. (The username and password could also be different for each source.) Using single sign-on authentication, a user enters their username and password once to enable them to access content from multiple sources. Single sign-on can help to reduce administrative and security issues present when managing multiple usernames and passwords. Further information on single sign-on authentication can be found at [<http://industry.becta.org.uk/display.cfm?resID=14598>].

Appendix A – Glossary of terms

Administration resources	Any digital resources that are used to maintain the administrative activities of an institution. This includes, but is not limited to, the institution's management information system (MIS).
Applications	Computer programs designed for a specific task or use.
Automated process	Any digital process that require little or no human input.
Collaborative tools	Applications that enable one or more users to work together in a common environment, allowing communication and integration of their work to achieve a shared goal.
Curriculum resources	Any digital resources, eg learning platforms and applications, that are used to deliver curricular activities.
Infrastructure	The institution's network, applications, services and data.
Institution	A place of learning where ICT is being used. In this document this includes all schools, but is not necessarily limited to the school sector, eg could include adult learning institutions.
NEN	The conceptual National Education Network, which aims to provide a framework for linking interconnecting regional networks to provide high performance broadband networking and a consistent set of services. [http://www.becta.org.uk/nen]
RBC	Regional broadband consortium – originally established to procure cost-effective broadband connectivity for schools and to promote the development of content for broadband networks. Consortia link to form the NEN.
Remote locations	Any location that is outside the institution's network, eg the student's home.
Repository	A computer resource which is dedicated to storage of curriculum and/or administration data.
Services	ICT functionality delivered via the institution's network, eg video conferencing.
Users	Every authorised user of the institution's ICT resources. While this usually refers to learners and educators, it could also refer to other appropriate authorised users such as administrative staff and parents.

Appendix B – Self-evaluation

The following tables show the list of requirements from the main document. They are provided as a useful tool for institutions to evaluate how many of the functional requirements are in place, and to prioritise those that are not yet implemented.

The Institutional Infrastructure matrix is an online self-evaluation tool that offers advice and guidance on how to move forwards with respect to the requirements set out in the main sections of this document. This is available from [<http://matrix.becta.org.uk>] (from December 2005).

1 Using ICT to offer a wide range of choice and access	
1.1.1 All educators and learners <i>shall</i> have extensive access to and a choice of a wide range of services, applications and devices	
1.2 Requirement	Level of Priority
1.2.1 All educators and learners <i>shall</i> have access to a wide range of applications that allow manipulation of text, images (including video), tables and sounds	
1.2.2 Learners and educators <i>shall</i> have access to a wide range of online curriculum resources	
1.2.3 All educators and learners <i>shall</i> have access to learning resources available via the National Education Network (NEN)	
1.2.4 Learners and educators <i>shall</i> have access to a wide range of access devices	
1.2.5 Learners and educators <i>should</i> have access to a secure email service	
1.2.6 Learners and educators <i>should</i> have access to a learning platform	
1.2.7 Learners and educators <i>should</i> have access to a range of collaborative tools	
1.2.8 Institutions <i>should</i> discuss with their LA/RBC decisions concerning choice and locations of access devices	

2 Using ICT to support flexible working	
2.1.1	Learners and educators <i>shall</i> be entitled to a working environment that allows flexible access to curriculum and administration resources
2.2 Requirement	
2.2.1	The institution's network services <i>shall</i> be available for use by authorised users at all times within locally/regionally agreed service hours, unless scheduled maintenance is taking place
2.2.2	Learners and educators <i>shall</i> be able to access appropriate curriculum resources and administration data from all computers in the institution and from all learning spaces within the institution
2.2.3	Institutions <i>shall</i> provide secure access to curriculum and administration data from remote locations
2.2.4	Institutions <i>shall</i> ensure that educators and learners have access to a wide range of supportive tools
2.2.5	Future institutional networks <i>shall</i> be based on wired technology
2.2.6	Secure wireless networks <i>shall</i> complement rather than replace an institution's wired network
2.2.7	Institutions <i>should</i> provide secure wireless access to curriculum and administration resources from a wide range of work spaces in the institution

3 Using ICT to manage data and improve efficiency	
3.1.1 Learners, educators and administrators <i>shall</i> be entitled to an ICT infrastructure that facilitates information sharing and electronic data communications, improving administration and data collection, collation and transfer	
3.2 Requirement	Level of Priority
3.2.1 The institution <i>shall</i> use a dedicated repository (or series of repositories) to hold securely all curriculum and administration data	
3.2.2 Institutions <i>shall</i> have a formal user support process in place	
3.2.3 All institutions and local authorities <i>should</i> use a caching system	
3.2.4 The institution <i>should</i> implement a network that gives priority to data associated with particular learning activities	
3.2.5 Data gathering between the LA and the institution <i>should</i> be via secure automated processes	
3.2.6 Institutions <i>should</i> implement an electronic facilities management system	

4 Using ICT to secure data and protect the user	
4.1.1 Learners, educators and administrators <i>shall</i> be entitled to a network that protects the user from inappropriate content and ensures data security and integrity	
4.2 Requirement	Level of Priority
4.2.1 All institutions and LAs <i>shall</i> use a content and email filtering system and this <i>should</i> be managed by LAs/RBCs in discussion with relevant institutions. Filtering <i>should</i> be able to be refined at an institutional level	
4.2.2 All institutions <i>shall</i> offer safe and secure internet access for every user of the service, and this access <i>should</i> be provided by the institution's LA/RBC	
4.2.3 Institutions <i>shall</i> maintain ongoing documentation regarding their security requirements and <i>should</i> readdress this before extending or altering their network.	
4.2.4 An institution <i>shall</i> take appropriate steps to prevent damage to the network from both internal and external attacks	
4.2.5 An institution <i>shall</i> take appropriate steps to ensure that curriculum and administration data is recoverable in the event of equipment failure or disaster	
4.2.6 An institution shall make secure all data held on the network and shall control access to that data	
4.2.7 All Institutions <i>should</i> ensure that they physical secure their network devices	
4.2.8 All learners and educators <i>should</i> be able to use single sign-on authentication for external resources, and this <i>shall</i> be carried out in conjunction with the institution's LA	