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General Practice IT Infrastructure Specification

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Related Documents:

These documents will provide additional information.

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1	NPFIT-SHR-QMS-PRP-0015	Glossary of Terms Consolidated.doc	<enter latest>

Glossary of Terms:

List any new terms created in this document. Mail the NPO Quality Manager to have these included in the master glossary above [1].

Term	Acronym	Definition

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1 About this document

1.1 Purpose

The purpose of this document is to set out the requirements for the IT infrastructure required to support clinical applications in use in GP practices now and in the future including the [GP System of Choice](#) (GPSoC) initiative. The requirements have been specified to ensure that the:-

- performance of systems provided through NHS Connecting for Health (CFH) is not impaired by the IT infrastructure provided to each practice or by the operation of local business applications;
- good or best practice advice is made available to enable practices and trusts to drive toward lowest total cost of ownership of their IT infrastructure; and
- responsibility for funding the purchase and support of IT infrastructure for practices is clearly understood.

1.2 Scope

In order to ensure that PCTs are able to make investment decisions to deliver an infrastructure this document gives advice in four key areas:

- 1) Funding responsibilities
- 2) Expected developments that will occur as a result of GPSoC and the changes to the delivery of GP IT to ensure these applications perform to specification.
- 3) Requirements for new equipment to support both NPfIT applications and local business activity within the practice.
- 4) Measures of system performance.

It is intended that this document will be used by PCTs to:

- Develop an understanding of the direction of travel of GP IT systems within NHS CFH, and how they impact on the developments already in progress to the way that practices are supported within the PCT
- Use this understanding to make strategic decisions about support arrangements for GP practices.
- Estimate the needs of individual practices for an effective supporting infrastructure, based on the overall need to deliver both clinical services and local business applications
- Estimate the investment required to bring practices from their existing provision to the required standard
- Upgrade general practice IT infrastructure in line with the priorities set out in Table 1 of this specification

In many cases PCTs have outsourced arrangements for the support of ICT in practices to Health Informatics Services (HIS) or other organisations. For consistency this document uses the term PCT throughout but recognises that in many cases PCTs, although bearing the overall responsibility, have delegated delivery responsibility to third parties who will need to comply with the requirements of this document. Whether the practice has outsourced arrangements for the support of ICT in the practice, organisations providing that support should still comply with this document.

2 Funding Responsibilities

Under the GMS contractual arrangements, PCTs are responsible for costs associated with the provision of IT infrastructure and clinical applications to support GP practices. The Department of Health and the BMA have agreed that elements of IT infrastructure in GP practice should be regarded as:-

- 'Core' – which GPs are entitled to expect PCTs to support; and
- 'Additional', which may be PCT funded subject to agreement between the PCT and practice, or may be a practice responsibility.

The latter includes practice finance and accounting systems, on-line banking etc. The items agreed to be 'Core' and 'Additional' are set out in the 'Modernising Information Management and Technology in General Practice' guidance

(http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidance/PublicationsPolicyAndGuidanceArticle/fs/en?CONTENT_ID=4133866&chk=jLKxo)

and are listed in Appendix A.

PCTs are required to provide IT infrastructure to practices in accordance with the guidance set out in this document. In so far as the cost of infrastructure purchase and installation can be capitalised, PCTs have received as of the end of July 2007 GPSoC capital funding for the specific items classified as being eligible for GPSoC funding in Table 2 below. All revenue costs arising as a result of these infrastructure improvements will be the responsibility of the PCT.

Priorities for funding will vary in each practice and the PCT will need to assess the need for infrastructure upgrade/replacement in each practice required to support the performance of NPfIT applications including GPSoC compliant systems.

The priorities for the IT infrastructure upgrades is as follows:

1. Networking infrastructure and server upgrades/migration to a hosted system
2. Anti-virus, desktop support and business continuity services
3. Scanners and document management software
4. Workstations, monitors and printers

An overview of the responsibilities for funding each of the items specified in section 4 of this document is given in the table below

Table 1: FUNDING RESPONSIBILITY

Item	DH Classification	Examples	GPSoC Level	Funding Responsibility	GPSoC Capital funding available in 2006/7	
					Funding Priorities (4 least, 1 highest)	Notes/Conditions
Workstations	Core	PCs, Laptops, Thin Client Terminals	All	PCT	4	GPSoC capital funding support available
Monitors	Core		All	PCT	4	GPSoC capital funding support available
Printers	Core		All	PCT	4	GPSoC capital funding support available
Clinical server (In GP Practice)	Core		1-3	PCT	1	Purchase and installation of a replacement clinical server will only be funded by GPSoC if:- a) the clinical server is no longer fit for the practice's GP clinical system; and b) if there is no suitable hosted system available for the practice to migrate to.
Clinical server (Hosted by PCT/HIS/ other)	Core		1-3	PCT	1	Purchase and installation of a replacement clinical server will only be funded by GPSoC if:- a) the clinical server is no longer fit for purpose; and b) if there is no suitable hosted system available for the practice to migrate to.

Item	DH Classification	Examples	GPSoC Level	Funding Responsibility	GPSoC Capital funding available in 2006/7	
					Funding Priorities (4 least, 1 highest)	Notes/Conditions
Other Servers	Core	File and Print, email, server where required	All	PCT	n/a	No GPSoC contribution to costs, provided at PCT's discretion
Scanning and document management (including associated hardware)	Additional		All	PCT by agreement or Practice	3	By agreement with PCT where Practice is committed to becoming paperless in line with the Department of Health Good Practice Guidelines for Electronic Patient Records and the procedures have been locally agreed with the PCT.

Item	DH Classification	Examples	GPSoC Level	Funding Responsibility	GPSoC Capital funding available in 2006/7	
					Funding Priorities (4 least, 1 highest)	Notes/Conditions
Additional Clinical applications (including associated hardware)	Additional	Out of Hours, A&E, MIU, and NHSD links Discharge and referrals messaging Chronic disease mgt software Drug monitoring Remote access	All	PCT by agreement or Practice	n/a	No GPSoC contribution to costs, provided at PCT's discretion
Business applications	Additional		All	Practice unless agreed with PCT	n/a	No GPSoC contribution to costs
Microsoft Office applications	Core	Word, Excel, PowerPoint, Outlook & Access	All	NHS CFH	n/a	No GPSoC contribution to costs

Item	DH Classification	Examples	GPSoC Level	Funding Responsibility	GPSoC Capital funding available in 2006/7	
					Funding Priorities (4 least, 1 highest)	Notes/Conditions
Anti-virus software	Core		All	PCT	2	GPSoC capital funding support available
Local Networking	Core	Switches, cabling	All	PCT	1	GPSoC capital funding support available
Standard N3 service	Core		All	NHS CFH	n/a	No GPSoC contribution to costs
Top Up N3 service	Core		All	PCT	1	GPSoC funding support available for capital element of required VPN or a top up service where a branch surgery accesses a clinical system in a main surgery and the N3 links are over-subscribed. This should be provided through N3, may be a contribution to the introduction of a COIN.
Extended IP VPN N3 service (secure remote access to practice systems from the Internet)	Not Specified		All	PCT	n/a	No GPSoC contribution to costs, provided at PCT's discretion

Item	DH Classification	Examples	GPSoC Level	Funding Responsibility	GPSoC Capital funding available in 2006/7	
					Funding Priorities (4 least, 1 highest)	Notes/Conditions
NHS CFH Network Applications Monitoring Report	Not Specified		All	PCT	1	GPSoC capital funding support available to investigate individual practice performance issues where necessary.
Desktop support and Patch/Asset management Applications	Not Specified	ZENworks,	All	PCT	2	GPSoC will fund the capital elements of the installation and training associated with the introduction of the Novel ZENworks product suite available to PCTs under an NHS CfH EWA.
Disaster Recovery & Business Continuity solutions	Not Specified		All	PCT by agreement or Practice	2	GPSoC capital funding support available . GPSoC contractual provisions aim to include priced solutions from each clinical system supplier for PCTs/practices to procure as required locally.

3 GPSoC Functionality

The GPSoC Solution Maturity Model describes a hierarchal model which encourages progressive improvements of the functionality, security and reliability of GP systems. As GP systems attain increased levels of GPSoC Compliance the level of integration with other NPfIT technologies will increase.

There are six Compliance Levels within the GPSoC Solution Maturity Model. The following table describes the high level functional compliance required for GPSoC accreditation:

Table 2: GPSoC Solution Maturity Model

Level	Functionality
GPSoC Compliance Level 0	QOF, RFA99/CAP-GP Core GP Clinical System Requirements and Information Governance
GPSoC Compliance Level 1	GPSoC Level 0 plus PDS and Choose and Book
GPSoC Compliance Level 2	GPSoC Level 1 plus ETP
GPSoC Compliance Level 3	GPSoC Compliance Level 2 plus GP2GP
GPSoC Compliance Level 4	GPSoC Compliance Level 3 plus fully hosted GP Clinical system to NHS CFH specification
GPSoC Compliance Level 5	GPSoC Compliance Level 4 plus PSIS, SNOMED CT, Clinical Spine Applications, the NHS CFH Diagnostic Requests and Reports (Order Comms) and Provision of Care.
GPSoC Compliance Level 6	GPSoC Compliance Level 5 fully integrated to the NHS CRS Level VI integrated system

For the attainment of each GPSoC Level it is a prerequisite that compliance with the requirements of all previous GPSoC Levels have also been attained.

PCTs are expected to develop a strategic plan for the rollout of GPSoC services. This will specify for each practice, what GPSoC Level is expected to be achieved, over what timescale and what support arrangements are expected to be required. The strategic plan will need to take account of:-

- practice aspirations
- clinical system supplier's delivery roadmap
- availability of GPSoC funding support

- local support arrangements and organisations

3.1 Local Server Based Architecture

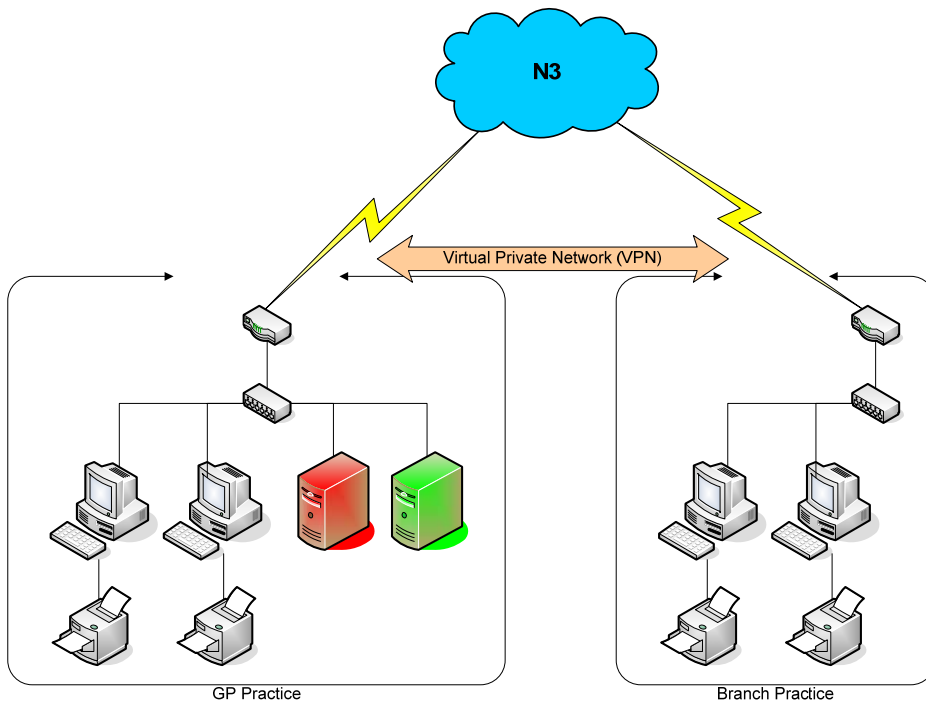


Figure 1 - Local Server Based Architecture

Local server based GP clinical IT systems, may be provided using a clinical server, indicated in green in figure 1, located in the GP practice. The red server above represents non-clinical systems.

There are practices with branch surgeries which are reliant on the main site for clinical and business services, or occasionally vice versa.

3.2 Hosted Architecture

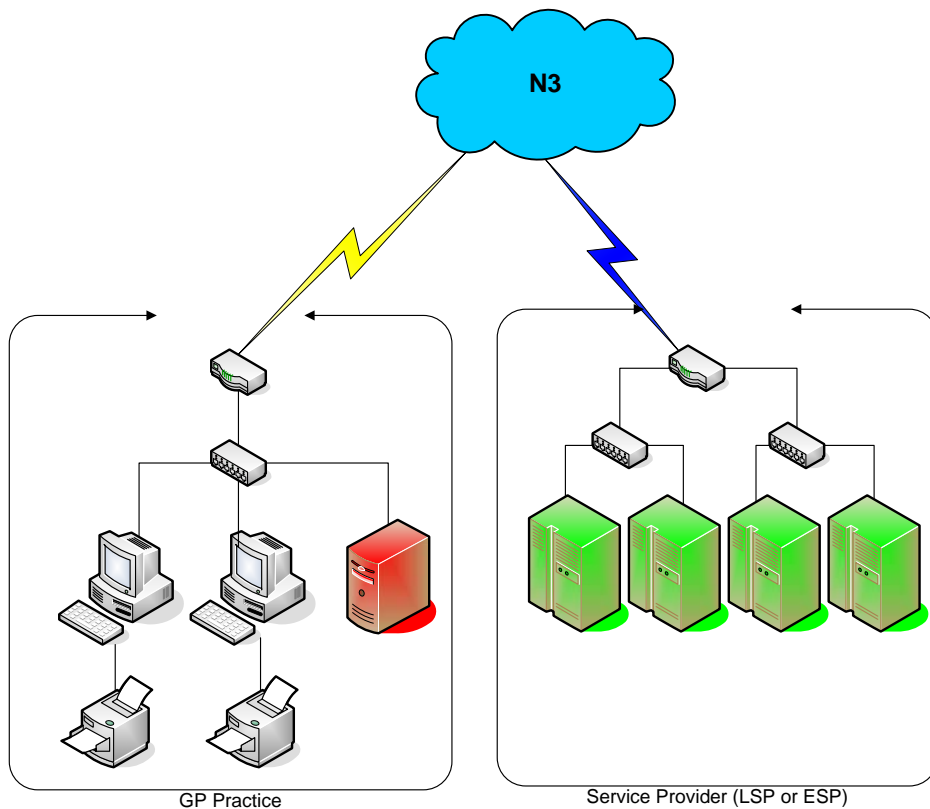


Figure 2 - Hosted Architecture

In some areas the PCT or a third party organisation may host the Clinical Server, indicated in green in figure 2. They may also host business services such as:-

- email
- file and print;
- document management; and
- finance systems.

This has advantages in terms of the ability to provide robust systems with redundant backup and disaster recovery, but does have implications for networking requirements.

Where PCTs host GP clinical IT systems and for all practices with systems that are hosted by suppliers, the clinical server will no longer be required in the practice¹. In these cases, clinical

¹ however suppliers may include onsite backup clinical servers as part of their business continuity products and services

systems will be hosted by a Local Service Provider (LSP) or Existing Systems Provider (ESP) in a resilient data centre. Branch surgeries will :-

- access clinical applications in the same way as main surgeries; and
- continue to access business functions such as file and print services from the main site or PCT depending on the local arrangements for how these services are to be delivered

4 Infrastructure Requirements

4.1 Clinical Application/Database Servers

4.1.1 Server Specification

4.1.2 Requirement

For local server based clinical IT systems, local clinical servers will be required whether located in GP practices or hosted by PCTs or other organisations on their behalf.

Clinical servers are required to be adequate to the task, secure, robust and well supported.

The performance of the clinical server must be such that clinical applications are accessible without undue delay to the user. Refer to section 6 of this document for more on performance monitoring.

The server specification will depend on the size of practice, number of registered users, estimated number of concurrent users and the particular requirements of the clinical software. GPSoC will seek, as far as possible, to develop the benchmarks for clinical servers across all GP system suppliers. However, the relevant GP system supplier should always be consulted about the specification the clinical server.

Servers must, as a minimum, be:-

- resilient;
- protected from malicious applications (viruses etc); and
- backed up.

Back up media should be stored in an appropriate environment and tested periodically to ensure that data is recoverable. An appropriate environment for backup media will comprise a fire proof safe, preferably at another location, but certainly somewhere other than the server room if it must be stored in the same building. Backup media from the previous evening should be removed and stored the following morning.

All business critical clinical servers must be supported by software/hardware that protects them from data loss in the event of disaster. This must include:-

- Backup devices and backup, restore and verification software/service (local or remote), which should be adequately tested;
- Redundant database with real time replication;
- Virus (and other mal-ware) protection software for servers if appropriate;
- Uninterruptible power supply, with battery backup, that incorporates safe automatic power-down in the event of power loss;
- Network support software for remote access and support (if required); and

For hosted GP clinical IT systems clinical application and database servers are no longer expected to be needed in GP practices².

Servers must be physically secure, accessible only to authorised personnel and preferably in an appropriate climate controlled environment with adequate power capacity and fire protection.

² however suppliers may include onsite backup clinical servers as part of their business continuity products and services

4.1.3 Considerations

Where providing an appropriate environment for local servers will require significant local expense, the practice and PCT should consider migration to a data centre hosted system.

It is strongly recommended that non-clinical applications such as email servers or finance systems are not hosted on a clinical server.

Where large numbers of scanned images are stored on the Clinical Server this may impact the overall performance.

In a Microsoft server environment using an Active Directory Domain, the Domain Controllers should be dedicated machines with more restricted access (i.e. only to support personnel). The same restriction should apply to the directory server where Novell products are used for the same purpose.

4.2 Other Servers

4.2.1 Requirement

Local non-clinical and business application servers must be adequately sized to ensure applications are available to staff that require them. Servers must be adequately backed up and protected to ensure that there can be no loss of business critical data. This applies whether to server is located in the GP Practice, PCT or other support organisation.

Where required these must be of an adequate specification for the task. The generic requirements set out for a clinical server will generally serve as a minimum for other servers, although a similar level of full redundancy and back up may not be as necessary in this instance. However, it is essential to understand the requirements placed on the server before making purchasing decisions.

4.2.2 Considerations

PCTs and/or Practices may want to consider using different servers³ for specific applications, so as to avoid impacting the performance of the clinical application, such as:-

- file and print operations; and
- where practices make extensive use of scanned images as part of the patient's medical record.

PCTs may instead wish to consolidate servers for shared file and print operations to an offsite hosted solution.

Where practical PCTs should seek to leverage cost benefits from re-deploying IT equipment and software that is no longer required for the original purpose for which it was acquired.

An example of this is where a local practice has migrated to a hosted service. As a result the local clinical server is no longer required but there may be a requirement for a local file and print or other server. In this case PCTs could re-deploy the redundant local clinical server as the new local server rather than making a new purchase.

As the NHS Connecting for Health strategic direction for the provision of email services is with NHSmail which is now available, PCTs are advised that continuing their investment in local practice email servers represents poorer value-for-money than NHSmail. NHSmail is the only approved route for e-mailing patient identifiable information, and future NPfIT service implementations will make it increasingly important for GPs to have this facility.

³ servers that contain either clinical or other Patient Identifiable Data (PID) must comply to the relevant Information Governance policies

4.3 Workstation Hardware (PCs and other devices)

4.3.1 Requirement

This document does not provide a new minimum specification for PCs due to the fluidity of the PC market and the risk of becoming an obstacle to achieving the best value-for-money for NHS organisations.

Instead it is recommended that PCTs purchase to the needs of the user and retain a sufficiently flexible purchasing policy that recognises the needs of different user types. NHS Connecting for Health maintain and update a document recommending current Personal Computer specifications. This document should be considered in conjunction to any LSP guidance on Warranted Environment Specification and/or guidelines from GP system provider, though generally it will recommend a system specification that is adequate for most general healthcare computing purposes. Specialist applications and needs (e.g. viewing high-definition diagnostic images) may need a higher specification of hardware.

NHS CFH's guidelines are called 'NHS CFH Infrastructure Principles Standards Procedures & Guidelines (iPSPG)'. This document is available at the following URL:

<http://nww.connectingforhealth.nhs.uk/implementation/search/searchpageresult.asp?owner=Technical+Infrastructure&phase=All+Phase&Submit=Go>

or a copy via email can be obtained from implementation@nhs.net.

This document recommends specifications **only** for users who will access NHS CFH applications. It should **not** be taken as the only indication of purchase recommendation for users not yet migrated to NHS CFH applications. PCTs should check with their systems supplier and consider the user's need to access other applications when making purchase decisions.

All new workstation devices should include an NHS CFH compatible 'Smartcard' reader.

4.3.2 Considerations

The user may require use of other clinical applications such as:

- BNF
- Mentor
- Oxford textbook of medicine

Where required these may need to run concurrently with the GP Clinical system. The PC specification must include additional capacity to support these applications if required.

PCTs need to consider what local business applications will be required by the user. These might include applications such as:

- Microsoft Office applications such as Word, Excel and Outlook (available to all users in the NHS under the Microsoft Enterprise Agreement managed by NHS CFH)
- Finance/Accounting Packages, including those provided by NHS Shared Business Services (NHS [SBS](#))
- Picture Archiving and Communications System ([PACS](#)) where in scope within clusters
- ECG recording or other clinical applications or devices
- On line banking

Where these are necessary, additional PC resources may be required. Although NHS CFH guidance in the iPSPG will remain current and represent a "mainstream" value-for-money choice

from the market, PCTs should not regard the iPSPG specification as a guarantee that a PC is fit-for-purpose for any given user. It is necessary to have a sufficiently flexible purchasing policy that allows for the capacity of the PC to be matched of the requirement of the user. PCTs are encouraged to engage with a local Collaborative Procurement Hub to help consolidate purchase intentions in order to secure lower pricing of standardised Personal Computer offerings.

4.4 Monitors

In general a minimum of 1024 pixels by 768 pixels of screen resolution is sufficient (often written simply as 1024x768 or referred to as "XGA"). Some Clinical System Suppliers require a minimum screen size/resolution. PCTs should confirm with suppliers the minimum specification required to support their applications. For tablet PCs and laptops it may be necessary to purchase an external screen.

The size of a monitor is usually indicated by its diagonal dimension (often still advertised in imperial units). Common monitor dimensions are 15" and 17". New monitors would normally use TFT (Thin Film Transistor) or LCD (Liquid Crystal Display) technology (which has lower power consumption), rather than the CRT variety (Cathode Ray Tube, like older televisions).

Some newer monitors feature "widescreen" formats. These still feature a diagonal measurement (usually indicated in inches, e.g. 15.4" widescreen), but the ratio of the width to the height of the screen is usually 16:9, rather than 4:3 seen in the more traditional monitors.

Consider carefully the size of the screen when considering the use of higher resolutions. Screen images at resolutions in excess of 1600x1200 will normally need screen sizes in excess of 15.4". Please note also that not all monitors can display such high resolutions. Make sure your monitor and graphics card are both compatible with your application needs before any new purchase.

4.5 Printers

4.5.1 Requirement

Printers must be available in consulting rooms and appropriate administrative areas. A minimum specification is provided below:-

- **Print quality:** This must meet the minimum standard for the printing of prescriptions with the ETP barcode. In order to print a clear barcode onto the FP10 form, GPs will require a laser printer with a minimum resolution of 600 dpi. A 1200dpi specification may be preferable for users needing to produce professional quality correspondence;
- Monochrome (Black & White) or Colour devices are both acceptable;
- **Compatible** with Microsoft Windows;
 - **Connectivity** USB 2.0 ports, with or without parallel port and 10/100 base T ethernet ;
 - **Support** for scaleable, bitmapped fonts and Barcode fonts; and

For consulting rooms these must be, as a minimum, dual bin pre-cut sheet feeder to enable printing of prescriptions and other documents.

For larger printers used for administrative and bulk printing purposes the specification must be adequate to the task and will need to be specified to suit the practice's requirements.

4.6 Business Applications

Business applications do not form part of the GPSoC Infrastructure Specification.

There are applications that practices may wish to use for the purposes of running the practice as a business. This would include financial packages, on-line banking applications as required by practices. These may also have an impact on the necessary specification of the workstation or server on which these applications would be running.

A limited number of business critical applications which reside on the Internet may be able to be prioritised within the N3 Internet gateway. PCTs should contact their relevant N3 contact (see www.n3.nhs.uk) to nominate such applications.

4.7 Microsoft Office Applications

The Microsoft Office applications Word™, Excel™, PowerPoint™, Outlook™ and Access™ are available under an Enterprise Wide Agreement (EWA) managed by NHS CFH. Other Microsoft Office applications (e.g. Visio, Project) are classed as additional and responsibility for purchase and support rests with the Practice or PCT by agreement and can be purchased at preferential public sector rates from authorised suppliers through the Office of Government Commerce (OGC) Catalyst service.

For information about inclusions and exclusions to this agreement see

http://download.microsoft.com/documents/uk/government/NHS_Licensing_FAQs.pdf

4.8 Anti-Virus Applications

4.8.1 Requirement

Any system connected to the NHS IT infrastructure must have appropriate anti-virus and where possible anti spy-ware software installed.

The PCT shall consult with the clinical system supplier to ensure that the selected anti-virus application is compatible with the clinical system installed in the practice.

As a minimum requirement any anti-virus software must be maintained in accordance with NHS security policies, as described at: <http://nww.connectingforhealth.nhs.uk/igsecurity/gpg/>

CFH will consider requirements and drive additional benefit through consolidated purchasing in collaboration with the collaborative procurement hubs.

4.9 Desktop, Asset and Patch Management

4.9.1 Requirement

GPSoC recommends that remote workstation and asset management products are used to support practices. These tools can help streamline management of workstations and significantly reduce the cost of supporting remotely located workstations by reducing the instances of engineering visits

They should be used to set policies on local PCs which specify what the end user can and cannot do. This can help protect the organisation from risk of mal-ware and access to inappropriate websites.

Effective use of these products can markedly reduce the cost of ownership of assets, and will also help improve effective use of N3 by scheduling Microsoft Windows and anti-virus updates at appropriate times and establishing proxy servers.

For instance, a Windows update service should be set up locally where possible, and any N3 transfer of Microsoft updates or antivirus updates should be scheduled out of hours. These are relatively easy configuration changes which can have a major impact on performance.

4.9.2 Considerations

PCTs and GP Practices planning to use remote workstation and asset management tools (i.e. those who do not presently have any such tools) are strongly recommended to use Novell [ZENworks](#) for Desktops. Licences for the Novell ZENworks for Desktops application have been purchased by NHS CFH under an EWA.

Where PCTs and GP Practices currently use remote workstation and asset management tools other than Novell ZENworks (e.g. Microsoft Systems Management Server (SMS) or LANdesk) they need to ensure that these products are optimally configured and are maintained to the latest specification.

GPSoC funding is not available to support the use of applications and tools where a valid alternative is available under an NHS EWA.

4.10 Disaster Recovery and Business Continuity

4.10.1 Requirement

Each practice must have plans that, in the event of a failure of a key element of IT provision return the practice to a full service as quickly as possible. (Disaster Recovery)

Each practice must have plans that, in the event of a failure of a key element of the IT provision, enable the practice to continue to provide a service to patients, potentially at reduced service levels for a limited period, while remedial action is taken. (Business Continuity).

Practices will need to assess the full range of risks that may require Disaster Recovery and Business Continuity planning.

4.10.2 Disaster Recovery

4.10.2.1 Requirement

Practices should have disaster recovery plans in place to ensure that practices are able to recover from loss of service whether caused by failure of remotely hosted or GP practice based services. This includes:-

- Validation services for backups;
- ensuring that clinical and other Patient Identifiable Data (PID) is recoverable in the event of disaster in line with relevant Information Governance policies⁴;
- Stand-by servers and SLA or DR contract with external supplier; and
- Regular, (at least 6 monthly), test invoking the Disaster Recovery plan, which should be monitored and audited by a third party
- Identifying which party is responsible for each component in the overall solution

For GP clinical IT systems that are hosted to NHS CFH standards, disaster recovery of the clinical system and full recovery of clinical and other PID is the responsibility of the system supplier who will have agreed SLAs for BC/DR within the GPSoC framework.

⁴ In most cases this is understood to mean a fully redundant back up of data, replicated in real time

4.10.3 Business Continuity

4.10.3.1 Requirement

PCTs must ensure that practices have plans for business continuity in the event of catastrophic failure of essential equipment or services such as:-

- Servers
- Networking and Routers
- N3 connection (i.e. practice router failure, or failure of primary and secondary connections)
- Power outages with the capacity of the battery back up where this exists

Practices need to develop comprehensive business continuity plans, including how DR or BC is evoked, to cover the following non-exhaustive list of conditions:-

- failures of business critical applications;
- flooding;
- Category 1 or 2 civil emergency under the auspices of the 'Civil Contingencies Act 2004⁵;
- civil access restrictions invoked by the authorities including, but not limited to, evacuation of buildings, areas etc; and
- acts of war.

This may include facilities to revert to paper methods, as risk mitigations that require a fully electronic continuity plan are likely to prove too expensive. Practices must ensure that the end to end process remains effective and appropriate where part or all of the process has reverted to paper especially, but not limited to:-

- unscheduled referral of patients to other service providers e.g. GPSI, CAS, CMHT, 1st Outpatient, day case etc;
- new or repeat prescriptions; and
- discharge notes.

Practices should note that the secondary (backup) link provided by N3 is scaled for use of essential national applications only. If the primary link fails, national application traffic will be prioritised over other traffic, and the practice may therefore have to make contingency arrangements for other business applications using N3.

4.10.4 Considerations

PCTs and Practices should consult clinical system suppliers about business continuity products and services available.

For practices with GP clinical IT systems that are hosted by a supplier or a PCT the provision of redundant devices in the event of complete loss of, or access to, remotely hosted services and information.

For practices with local server based GP clinical IT systems, it is likely to be quicker and more cost effective to recover the server than provide Business Continuity services. For these

⁵ the '[Civil Contingencies Act 2004](#)' requires coordinated responses from all applicable public authorities to a range of civil emergencies

Deleted: -

practices Business Continuity plans should involve a reversion to paper working pending the invocation of the Disaster Recovery procedure.

4.11 Local Networking

4.11.1 Cabling

Requirement

For new cabling, Category 5e is the minimum requirement for cabling in “end user” areas.

Existing cabling should be capable of running 100BASE-TX (100Mbps) Ethernet services as a minimum. All Category 5 cable should be capable of this.

For server room installations, consider installing Category 6 cabling capable of supporting 1000BASE-TX (1000Mbps or 1Gbps) Ethernet services for server-to-server and server-to-switch interconnection.

4.11.2 Wireless Networking

Requirement

Wireless LANs should be set up in line with the good practice guidance available at <http://nww.connectingforhealth.nhs.uk/igsecurity/gpg/>

Wireless networking is acceptable subject to the considerations given to security issues.

Practices and PCTs are advised that there is a great deal of change in the standards associated with wireless (also known as WiFi) networking products. Common standards are related variants of the IEEE 802.11 “family” of standards.

In the UK and Europe the 802.11b and 802.11g variants are most popular. 802.11a is more common in the USA.

Out of preference devices conforming to the 802.11g standard provide adequate performance at a reasonable price at this time. Note that some vendors offer proprietary extensions to this standard in an attempt to double throughput (bandwidth). Generally, in order to maintain widespread compatibility with workstation devices (which may be integrated into the workstation), such proprietary products should be avoided.

A new standard referred to as 802.11n has not yet been ratified by the IEEE, although networking device manufacturers are marketing products based on the draft standard specification. It should be noted that incompatibilities with the final standard may occur and prospective purchases should wait until the 802.11n standard has been ratified.

4.11.3 Switches

Requirement

The local area network (LAN) should meet the minimum elements required to run NPfIT services in all areas. This will usually mean a minimum, 100 megabits per second (Mbps) switched⁶ network.

⁶ “Switched” or “switching” refers to the manner in which the network makes interconnections between devices and, in this context, is usually preferable to the alternative “hub” type of network equipment. Although the latter equipment type is lower cost, it offers dramatically lower performance (throughput) and should, in general, be avoided.

Switches may be “managed” or “unmanaged”. This refers to the capability of the network switch (network interconnection devices) to be configured remotely (managed) or not (unmanaged). PCTs should consult the relevant clinical system supplier as some express a preference.

For GP clinical IT systems hosted by the PCT, switches capable of 1000Mbps or 1Gbps are advisable for local interconnection between clinical servers within the data centre.

These are not necessary for GPSoC non-hosted systems. PCTs must consider whether switches capable of 1Gbps are necessary to run business applications on local servers.

Note that equipment capable of 1Gbps is also commonly referred to simply as “gigabit” and that 100Mbps is also commonly referred to as “100 meg” in common (network) parlance,

4.11.4 Routers/Firewalls

Requirement

Routers and firewalls are supplied and managed by BT N3SP as part of the installation of the N3 service. These are designed to protect data crossing the N3 boundary only. However, larger NHS-only Catalogue Services rely on the hosting organisation to protect N3 and the PCT and vice versa. The PCT also can request this feature to be removed if provided by the hosting organisation to the necessary specification.

Where a GP practice is part of a shared network, managed routers and firewalls will need to be installed that ensure an adequate level of protection for the practice. Adequate protection shall refer to the appropriate GPG - Secure use of N3, ref. NPFIT-FNT-TO-IG-SECUR-GEN-0018, with EAL4 device compliance being required.

4.11.5 N3 connections

Requirement

The NHS CFH National Allocation Algorithm (NAA) provides centrally funded N3 catalogue services sized to support the use of NPfIT applications. Local business requirements might necessitate the use of higher capacity N3 catalogue services. Organisations can purchase a top up to the NAA provided service. A top up is in effect replacing an N3 service provided solely by the NAA with a larger capacity N3 service. In these cases the organisation requiring the upgrade is responsible for funding the additional costs i.e. they top up the centrally funded NAA allowance.

PCTs should assess the additional requirement in each practice to assess if additional bandwidth is required. The N3 catalogue services provided by the NAA include sufficient bandwidth for:-

- NCRS ([National Care Record Service](#)) to and from the BT NASP data centre, including, but not limited to:
 - SSB ([Spine Security Broker](#))
 - IA (Identity Agent)
 - PSIS (Personal Spine Information Service)
 - PDS ([Personal Demographic Service](#))
 - SDS ([Spine Directory Service](#)), including [LDAP](#) queries to SDS
 - TMS (Transaction Messaging Service)
 - SUS ([Secondary Use Services](#))
 - NSTS ([National Strategic Tracing Service](#))
 - NN4B ([NHS Numbers for Babies](#))
- ETP (Electronic Transfer of Prescriptions) a.k.a. EPS ([Electronic Prescription Service](#))
- EBS (Electronic Booking Service) a.k.a. [Choose and Book](#)
- LSP CRS (Care Record Service applications offered by each LSP) including:
 - PAS (Patient Administration System)
 - GP EPR (General Practice Electronic Patient Record)

- Clinical Systems
- Emergency bundles
- PACS ([Picture Archiving and Communications System](#)) , which, in the context of general practice means viewing jpeg diagnostic images on PCs rather than the high definition images viewed on specialist diagnostic workstations in hospitals or diagnostic centres.
- ESR (Electronic Staff Record)
- LSP hosted GP systems a.k.a. Reference PCS, Primary Care Systems or community PAS
- [NHSmail](#) services offered by Cable & Wireless, including, but not limited to:
 - HTML/SHTML browser traffic (Hyper-Text Markup Language / Secure Hyper-Text Markup Language)
 - IMAP4 (Internet Message Access Protocol v4) & POP3 (Post Office Protocol v3) traffic
 - LDAP (Lightweight Directory Access Protocol) traffic to NHSmail Directory Service
 - DNS (Domain Naming System)
- [GP2GP](#) (GP2GP is a service to transfer GP EPR between different GP systems)
- QMAS ([Quality Management and Analysis System](#))
- DTS ([Data Transfer Service](#)), preferably scheduled out of hours to minimise impact
- NHAIS ([National Health Application and Infrastructure Services](#))

PCTs should not need to assess bandwidth requirements nor consider purchasing a top up for GP practices that only require N3 access to these technologies. If there are consistent performance problems, they are often the result of local configuration issues.

Quality of Service

N3 routers, the core of the N3 network and all LSP/NASP data centres use "Quality of Service" (QoS) rules to prioritise network traffic. BT N3SP rolled out QoS over GP Practice N3 Services during November 2006. During January 2007 QoS modifications were rolled out to provide enhanced support for GP Branch-Main practices using the EMIS LV application. Other such modifications may be rolled out periodically to ensure optimum use of the N3 service.

With QoS, the use of, say, an LSP hosted GP clinical system will take priority over another user in the practice downloading a large file from the Internet – both will continue, but the performance of the download will drop to accommodate clinical system requirements. If the practice uses voice services over N3 in the future, these will be assigned an even higher priority level. The national applications listed above, like NCRS, use either priority or bulk transfer classes of service.

4.11.5.1 Branch to Main Practices

The NAA calculation has been developed to ensure that NHS organisations have a centrally funded N3 catalogue service of sufficient bandwidth to use centrally hosted NPfIT technologies. It is recognised that in some cases NHS organisations, with a N3 catalogue service provided under the NAA, may have local business requirements that require a secure network connection. In order to ensure best value for the NHS, where appropriate, organisations can choose to replace their NNA N3 catalogue service with an N3 catalogue item of higher bandwidth. In these cases the:-

- replacement N3 catalogue item must be of sufficient bandwidth to support both the centrally hosted NPfIT technologies and the local business requirements;
- the organisation is required to secure funding any additional costs above those associated with providing the N3 catalogue service allocated under the NAA, this is referred to as 'topping up' the NAA;

- the QoS (Quality of Service) schema applied to the N3 catalogue service will conform to the NHS CFH N3 QoS policy⁷;
- the Organisation can request that the extra bandwidth is used to increase the guaranteed minimum throughput for the six QoS traffic classes as fits their local business need; and
- BT N3SP will ensure that the minimum bandwidth applied to each of the six QoS traffic classes is at least equal to that required under the NAA.

An example of where a local organisation may wish to consider purchasing a top up is GP practices with branch and main sites using local server based architecture..

Most N3 catalogue services allocated to GP practices use Asymmetric Digital Subscriber Line (ADSL) technology. ADSL provides different rates of transmission to (Rx) and from (Tx) a site, in the case of N3 catalogue items the usable Tx is set to 256Kbps and the usable Rx is either 512Kbps or 1024Kbps depending on the size of the practice. Some very large practices may receive 2Mbps private circuits.

BT N3SP catalogue services delivered using 1Mbps ADSL will currently support a single branch practice VPN link. Therefore GP Practices that need to support multiple branches, will currently require a locally funded, upgraded N3 catalogue service delivered using a private circuit. BT N3SP is working with CFH to trial the use of ADSL as a lower cost alternative for multiple branches which do not make heavy use of the network, and will publish details of alternatives in 2007.

Branch to main traffic is allocated to QoS traffic class AF2 which is intended for local community applications, prioritising local community applications over Internet browsing or bulk transfer such as GP2GP but below access to most national applications as listed above.

It is recommended that PCTs purchase top up services, where required, to ensure that the amount of bandwidth guaranteed to AF2 is sufficient to support the locally hosted GP system architecture.

4.12 Scanning and Document Management.

4.12.1 Requirement

Scanners are classed as 'Additional' in the Department of Health Modernising Information Management and Technology in General Practice guidance. However, where a practice has committed to undertake a migration to paperless practice in line with the Department of Health Good Practice Guidelines for Electronic Patient Records and the procedure(s) locally agreed with the PCT, there will be a requirement for scanning equipment and document management software. The PCT should fund scanning and document management for such a practice subject to the availability of funds to meet priorities 1 & 2 as set out in Table 1.. In some instances, the necessary functionality will be available from the LSP, and it is recommended that PCTs investigate this avenue.

Scanning and distributing large numbers of images has a major impact on network performance and data storage requirement. In particular, there will be requirements to:-

- store and retrieve images held on a server;
- back up stored images;

⁷ The NHS CFH N3 QoS policy contains schemas that define which applications are allocated to each of the six traffic classes on N3

- deliver these images over the LAN, and potentially N3 in the case of Branch practices; and
- display Images on the PC screen.

PCTs are strongly advised to look at scanning as an end-to-end solution and not as an individual purchase of a scanner and/or document management service. A recognised document management software package will also be required. PCTs are advised to contact the relevant clinical system supplier for advice on which products are compatible with the clinical system in use in the practice.

Any document management service should not only be compatible with the clinical system but also with GP2GP specifications, see the document "Compliance Requirements for GP2GP Record Transfer" NPFIT-PC-BLD-0148. PCTs should only implement a document management system that can supply the attachments to the Electronic Health Record Extract as part of GP2GP.

Scanners should be adequate to the task in terms of:-

- scanning speed, this should be sufficient for the expected throughput of paper material, which will in turn depend on the size of practice and the types of correspondence to be scanned;
- resolution should be sufficient to produce a usable image;
- single and double sided scanning
- scan area, i.e., the size of paper the practice will need to input to the device, A4 would normally be sufficient;
- paper input, the number of sheets that can be put in a document feeder and automatically processed;
- reliability, usually expressed in terms of daily scan volume; and
- physical dimensions.

4.12.2 Considerations

Where scanners and document management systems are to be procured, practice and PCTs should consider:-

- the impact on other elements of the IT infrastructure, including N3, and therefore possible negative impact on performance of core clinical applications;
- Optical Character Recognition (OCR) capability if required;
- workflow management within the practice;
- support requirements for viewing of scanned images within the GP practice; and
- compatibility with clinical systems.

4.13 Additional Clinical Applications

As well as scanning, the following items are classed as 'additional' in the Department of Health Modernising Information Management and Technology in General Practice guidance:-

- Out of Hours, Accident & Emergency, Major Injury Unit, NHS Direct links;
- discharge and referrals messaging;

-
- pathology / radiology requesting;
 - chronic disease management software;
 - drug monitoring software;
 - remote access software, e.g. VPN; and
 - out of surgery records and transfer, taking individual record(s) on visits and synchronisation on return, mobile computing and handheld devices.

The PCT or the practice should, depending on who agrees to procure any of the above services on behalf of the practice, ensure that the services are adequately supported and the implications for the performance of other applications is assessed and addressed as necessary.

4.14 NHS CFH Applications Monitoring Report

A new 'Applications Monitoring Report' service is being worked on by NHS CFH at the moment. This service provides monitors and reports on the performance of applications across the network and will form a part of the CAP-GP accreditation process for GP clinical systems. The report will include details of PC performance, local network timing, WAN/N3 timing and the performance of remote applications.

Once this has been completed then more specific details will be included in this document.

5 Asset Management Policy and Asset Replacement

5.1 Asset Management Policy

The primary consideration for replacement of IT infrastructure should be the fitness for purpose of the current provision. End to end response times are a measure of fitness for purpose. If overall system performance is inadequate, then replacement should be considered.

PCTs should have an asset management policy which includes plans for the refresh of IT infrastructure with specified review points for different elements of the service provided to practices. For planning purposes, the age of individual assets will be an indication that replacement may be necessary. It is strongly recommended that PCTs maintain an asset register of the infrastructure in each practice.

Investment in replacement IT infrastructure should be focused to deliver the maximum benefit. The following NHS CfH website provides guidance on IT infrastructure purchase

<http://www.connectingforhealth.nhs.uk/implementation/search/searchpageresult.asp?owner=Technical+Infrastructure&phase=All+Phase&Submit=Go>

5.2 Asset Replacement

5.2.1 Managed Assets Guidance

PCTs and GP Practices that either do not own or have transferred ownership of their IT assets to a third party are recommended to ensure that:-

- assets have a reasonable planned lifetime and are renewed as required;
- specification of assets continuously increases inline with technology advances and evolving business needs.

5.2.2 Non-Managed Assets Guidance

Decisions about asset replacement should be based on the overall performance of the applications and systems used by the practice. The following information is provided as guidance for PCTs and GP practices use in assessing the requirement for asset replacement.

5.2.3 Servers

PCTs and GP practices should consider planning replacement of servers after 4 years and with the expectation that servers will probably need to be replaced after 6 years subject to plans to migrate to remotely hosted systems.

Servers should be actively managed, noting the consumption of disk space and the performance of the server in running or offering applications. Server capacity management should monitor the user load on the server to ensure that the server continues to operate effectively. It should be expected that a server may need upgrading during an extended lifetime (longer than 4 years).

Care should be taken to assess that any considered upgrade is economic by including all costs (specification, planning, procurement, installation and down-time).

5.2.4 Personal Computers (Workstations)

PC replacement policy on should be based on:-

- **Age of PC:** Workstations generally have a lifetime of 3-6 years, although if the PC is performing adequately there is no requirement to replace⁸. The PCT asset management policy should include regular review of PCs to ensure they are sufficient to the task. The NHS CFH iSPG recommends a lifetime of approximately 4 years for desktop personal computers and 3 years for mobile personal computers (laptop and tablet PC). These are not fixed timescales and should be treated as flexible with respect to required performance and the cost effective provision of support. Workstations should be replaced within 6 months of their forecast asset lifetime. This lifetime should be forecast by the PCT at the start of the asset's useful life. Workstations should be bought with sufficient specification to see them used productively throughout their lifetime without upgrade.
- **Warranty Status:** PCs are not usually worth fixing in the event of break down after the warranty period. The warranty status should be considered when making an assessment for replacement. A warranty as long as the planned asset lifetime should be taken out at the time of purchase of the asset.
- **User need:** specific user or practice needs should also be considered. However it is recommended that PCTs and GP practices leverage the investment by re-deploying PCs that are not considered decrepitude in terms of the PC replacement policy. This is most effective if it is done within the last 2 years of the asset's planned lifetime and it involves no other change than relocation to another user's desk. It is normally not economic to open the workstation up to install hardware upgrades. The cost of parts added to the procurement and installation cost can often be equivalent or more than the replacement cost.

5.2.5 Software

PCTs should consider the support status of the product when they come to decide on replacement routes.

For example, Microsoft products have a three phase support lifecycle:-

1. Mainstream Support, security updates, hot fixes and complimentary support included in licence cost;
2. Extended Support, security updates included in licence cost, but non-security related hot fixes require purchase of an extended support agreement. No complimentary support available; and
3. Out of Support (self help on-line support only, no support, including no security-related updates will be available).

The cost of supporting products increases as the product matures. Integrating products with other applications as well as support for new standards becomes increasingly difficult and costly as product mature. Therefore consideration should be given to replacing products that are Out of Support and product replacement policies, taking account of lifecycle planning, should be developed as part of the overall asset management policy.

5.2.6 Other

For all other items listed in section 4 the performance of the product should be the primary consideration when investment decisions are made, with age and support status of the product as secondary considerations

⁸ unless there are other drivers such as reduction in maintenance support costs by reduction in number of variant PCs deployed in the real estate

6 Measurement of Service

6.1 Transaction Types

In order to assess the performance of clinical applications, response times will be measured according to 4 transaction types. These transaction types are:-

1. a request for information which results in a single message being generated before returning control to the End User or requesting service.
2. A request for information which results in either:
 - more than one message being generated before returning control to the End User or requesting service; or
 - the sending of an order request including acknowledgement to the user of Message delivery.
3. Either:
 - a request with the primary intention of changing business data stored within one or more Component Systems; or
 - complex scheduling Messages.
4. The transfer of Messages as a background activity including reporting, i.e. asynchronous messaging

6.2 Transaction Timings

For each of the above transaction types, the end to end response time is dependent on the performance of the clinical system, N3 and the local IT infrastructure. The areas of responsibility are outlined below:

- The clinical system supplier is responsible for the response time for the clinical application from the point at which a request message is received by the clinical system message handler to the point at which a response leaves the supplier's domain, essentially the message handler. This will include an element for the time taken to generate the request on the client application running on the local PC, where applicable.
- N3 catalogue services have contractual performance levels including latency and jitter. These are defined in the published N3 catalogues and will depend on which catalogue item is used. Typically, the performance is expected to be better than 120ms (latency) and 20ms (jitter). Note that N3 service levels only apply within the network, so Internet resources or performance within data centres are outside N3 control. In particular, users of Internet performance assessment tools should not confuse the results of Internet tests with performance within N3.
- The PCT is responsible for the performance of the local network and PC, including ensuring adequate capacity for use of the clinical system application alongside local business applications. Experience indicates that network response times should be no more 8-10ms in normal circumstances. A figure of 0.5 seconds is allowed for this response.

6.3 Response Times

In future versions of this document, this section will contain response times provided by NHS CFH which will be used to measure how effectively a PCT has upgraded the practice infrastructure to deliver the desired outcomes.

Appendix A: Core and Additional Infrastructure

6.3.1.1 Core Items

The items agreed to be 'Core' in the 'Modernising Information Management and Technology in General Practice' guidance

(<http://www.dh.gov.uk/assetRoot/04/13/38/67/04133867.pdf>) are:

Item	Note
Clinical system server (and administrative/network servers where appropriate)	This equipment should be fit for purpose to support appropriate, efficient and effective access to clinical information and supporting applications. Memory and storage capacity should be sufficient to meet the immediate and foreseeable requirements of the practice.
Workstations	Normally to be available in consulting rooms and appropriate administrative areas. Memory and storage capacity should be sufficient to meet the immediate and foreseeable requirements of the practice.
Printers	Normally to be available in consulting rooms and appropriate administrative areas. Dual bin cut sheet feeder to enable printing of prescriptions and other documents.
System Management	Backup devices and backup, restore and verification software. Virus protection software for servers and workstations. Auto power down software. Network support software Network backup facility
Clinical applications	Core clinical software and associated applications and licences e.g. Read codes, drug database. Dispensing system and stock control system (dispensing practices only). Messaging including patient registration and pathology. Knowledge bases such as eBNF, Mentor and Oxford Textbook of Medicine. Appointment system.
N3 and the Internet	Connection and usage including firewall and email services
Network infrastructure	Including agreed branch surgery connections (with appropriate security protocols, e.g. VPN) and UPS devices, routers, network equipment, cabling and storage
Core office applications	Office tools under NHS-wide licence arrangements.

6.3.1.2 Additional Items

The items classified as additional include:-

- out of Hours, Accident & Emergency, Major Injury Unit, NHS Direct links;
- discharge and referrals messaging;
- chronic disease management software;
- drug monitoring software;
- Scanning and document managing systems;
- remote access software, e.g. VPN; and

out of surgery records and transfer, taking individual record(s) on visits and synchronisation on return, mobile computing and handheld devices.

Whilst the DH Modernising Information Management & Technology in General Practice indicates these as "additional", many are within the wider contract with LSPs, namely Out of Hours, A&E, and discharge and referral messaging,