

**ICT17038**

**Supply of an Early Years and Education Management Information System and Associated Services**

**Appendix B**

**Technical Infrastructure**

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## Introduction

ICT is delivered through the ICT Services team as a central ICT function. ICT Services provides a service to all the Council’s departments to enable the best use of technology and to enable them to deliver their own service plans. The ICT estate includes 7,400 personal computers, the data and voice network covering over 300 locations in Derbyshire, and over 400 servers, many of which are virtualized in a Microsoft Hyper-V environment. The Council operates many software applications for the business, the key ones being:

* Enterprise Resource Planning (ERP) system: ECC v6 from SAP for the Council’s core human resources (HR), payroll and finance system; Electronic Orderpoint system SAP SRM v7.3;
* Office 365 from Microsoft for email and associated services
* Electronic Social Care Record (ESCR) system: Frameworki from Corelogic; and
* Electronic Document Records Management (EDRM): Livelink Server 10 from OpenText.

## Communications Network

The Council currently has a mixed wired and wireless network infrastructure, using Ethernet topologies; with 1Gbps Ethernet backbone and 100Mbps switched Ethernet to the desktop throughout.

Cisco networking equipment is used across the Council at all corporate sites. A Virtual Switching System (VSS) is implemented using Cisco Catalyst 6500 series switches diversely routed across the County Hall campus and to the second data centre at Shand House, Darley Dale.

The current core network consists of two pairs of Cisco 6509-E chassis running the VSS. These are located on separate sites, the primary pair located at County Hall, with the 2nd pair of core switches located at the Council’s Disaster Recovery (DR) site at Shand House, which is 3 miles away. Each pair currently has 20Gbps VSL EtherChannel link between supervisors, and both pairs are connected by a 20Gbps EtherChannel.

Within the two data centres the converged network infrastructure is based on dual 10Gbps connections to the VSS network cores from the data centre fabric operating at 40Gbps utilising Cisco Nexus 5696Q series switch pairs. Connectivity between the primary and secondary data centres is by two diversely routed 10Gbps circuits.

The Derbyshire Wide Area Network (WAN) is a BT VPLS cloud solution. There are 10Gbps connections into each data centre providing a resilient solution for all administrative sites connected to the centre. All sites now have in excess of 10Mbps connections, depending on their size and function.

The Council has a Voice over Internet Protocol (VoIP) telephone system operating on this upgraded infrastructure, so far over 7,000 handsets have been installed in over 200 establishments. The VoIP system is run on a Mitel 3300 Platform.

The Council’s wi-fi network is based on over 440 Cisco wireless access points and provides filtered access to the internet for staff and guest users. The scope of the network is currently limited to 2,500 concurrent users, but this is about to be increased to up to 10,000 users.

The Council has a F5 BIG-IP solution which provides load balancing (LTM) of internal applications and web traffic.

## Server and Storage Management

The Council operates over 450 Windows servers across two data centres based at County Hall, Matlock and Shand House, Darley Dale. The Windows based servers are hosted on HP C-class Blade and HP Proliant series hardware, the majority of the Windows servers are hosted within a virtualised environment using Microsoft Hyper-V as the hypervisor. A Microsoft Server Cloud Enrolment enterprise agreement provides licensing across the server estate until March 2018 and is supported annually by a Microsoft Premier Support agreement.

The primary storage platform is NetApp FAS8040 utilising Clustered Data OnTap at both data centre sites. Total tier 1 disk storage is 280TB at the primary site (County Hall), and 280TB at the secondary site (Shand House). Storage presentation is over the converged data centre fabric (Cisco Nexus switch pairs) utilising SAN and NAS protocols. Data is replicated asynchronously between the two data centre sites. Secondary storage platforms in use are; NetApp FAS2240, at the primary site 48TB total disk storage used for user home drive file data presented in CIFS shares, NetApp FAS2240 at the secondary site used for SnapVault 120TB total disk storage, and a staging/development storage tier using NetApp FAS2552 with 1600GB SSD and 18TB total disk storage. All the above storage tiers are configured as RAID 6 DP.

All storage tiers utilise, versioning, Snapshot technologies, thin provisioning, compression and deduplication at block level. There is 4TB direct attached storage on traditional Windows servers, but it should be noted that the traditional estate is being further rationalised in favour of hosting OSE within virtual environments. The traditional Windows servers use a mixture of VRAID1 and VRAID5 storage array configurations.

Backups for Windows servers are taken using HP Data Protector via the enterprise tape libraries. There are three enterprise MSL 8096 and one 4048 tape libraries with a total of 14 LTO4 tape drives. The backup solution utilises hardware encryption at the tape head. A daily incremental, weekly full, monthly full and annual full backup are taken with offsite security copies rotated weekly. Snapshots (NetApp SnapManager®)committed to the vault located at the second data centre are written to tape media on a weekly basis and stored off site.

The Council maintains asynchronous replication of data between the two data centre sites over dual diversely routed10Gbps WAN links. The data centre at the Shand House site is maintained for failover in the event of a disaster. Failover is configured for the virtualised estate between both data centre sites with point in time recovery from snapshot versions maintained on disk storage. Traditional server systems are reliant on data recovery from traditional securities taken to tape media. Offsite copies of data are maintained for recovery purposes in the event of a disaster affecting both data centre sites.

Core Financial, Payroll, HR and Electronic Orderpoint systems have been implemented using a SAP platform and are virtualised on the NetApp 8040 tier 1 storage and associated HP C-class Blade systems. These core systems are hosted within a HyperV platform and utilise high availability (HA) and site recovery functionality.

The roles of the Windows servers located at County Hall are print, application, database (SQL Server and Oracle), web (internet, intranet and extranet), EDRM, terminal services (Microsoft Remote Desktop Services), TMG (Reverse Proxy and firewall) and RADIUS services, 2 Factor Authentication (2FA), domain controllers, network monitoring/management and virus definition services. The Microsoft System Centre (MSC) 2012 Suite is used to manage the desktop and server estates, an upgrade to MSC 2016 is planned for the majority of the components by the end of 2017. Supported versions of the Microsoft Windows Server 32bit and Windows Server 64bit operating systems are in use within the infrastructure. Critical updates and patches to server systems are applied every month to ensure that compliance of 100% is maintained within 30 days of the release of an update. Business critical applications are provided by Windows Server 2008/2012 clustered (N+1 configuration) SQL servers, Hyper-V and IP-load balanced web servers.

## Desktop Management

ICT Services currently utilises Microsoft’s System Centre Configuration Manager (MSCCM) 2012 to help manage the Council’s IT assets. An upgrade to MSCCM 2016 is planned during 2018.

### Current Desktop Specifications

#### Desktop

*Standard Spec*

* Intel® Core™ i5 Processor i5-6600, 3.30GHz, Quad Core;
* 8GB of RAM on 64bit OS;
* Hard disk drive 240GB SSD minimum; and
* Microsoft BitLocker drive encryption using TPM.

*High Spec*

* Intel® Core™ i7 Processor i7-6700, 3.40GHz, Quad Core;
* 16GB of RAM on 64bit OS;
* Hard disk drive 540GB SSD;
* Microsoft BitLocker drive encryption using TPM.

#### Laptop

*Standard Spec*

* Intel Core i5 processor 5350U, 1.8 > 2.9GHz Dual Core;
* 8GB of RAM on 64 bit OS; Hard disk drive 240GB SSD; and
* Microsoft BitLocker drive encryption using TPM.

*High Spec*

* Intel Core i7 processor i7 5950HQ, 2.9 > 3.8 GHz Quad Core;
* 16GB of RAM on 64 bit OS; Hard disk drive 240GB SSD; and
* Microsoft BitLocker drive encryption using TPM.

#### Standard Software

* Operating System:
* Microsoft Windows 7 SP1 32bit,
* Microsoft Windows 7 SP1 64bit,
* Microsoft Windows 8.1 32bit,
* Microsoft Windows 8.1 64bit,
* Microsoft Windows 10 (Current Branch for Business) 64bit,

####  Standard Applications

* Microsoft Office 2013 minimum;
* OpenText Enterprise Connect Framework 10.3.1; and
* Internet Explorer 11 and above.

#### Most Commonly Used Browsers

* Internet Explorer – to keep pace with security and version releases;
* Edge – to keep pace with security and version releases
* Chrome – to keep pace with security and version releases; and
* Firefox – to keep pace with security and version releases.

Any required 3rd party software components should be kept up to date and keep pace with the current security releases.

The Council has rolled out Windows 7 to the desktop and laptop estate, but has an increasing number of Windows 8.1 and Windows 10 machines. A plan to upgrade to Windows 10 is being developed and rollout is expected in 2018.  The Windows 10 estate will be keeping pace with the Semi Annual Chanel releases of the operating system

The hardware specification is the minimum currently purchased. However, the majority of the current estate will be of a lower specification.

System Centre Service Manager 2012 Service Pack 2 is used to track service calls and associated Microsoft Configuration Management software updates and patches PCs and laptops across the Council’s WAN.  This element of the System Centre suite is not planned to be upgraded.

## Mobile Infrastructure

The Council has a contract with EE for its mobile voice and data; including the provision of call charges, connectivity and devices. However, there is no ubiquitous mobile or broadband coverage for 2G, 3G or 4G networks within the county.

### Smartphone Specification

The standard specification for the Council’s smartphones is determined through regular evaluation of available handset models and is currently under review, ideally mobile applications should be OS agnostic. The current environment consists mainly of Windows 10 mobile devices.

* Bundled data tariffs of 500MB or 1GB; and
* Push email to compatible mobile devices.

## Application Systems Development and Support

Major in-house development is only undertaken if a package solution cannot be found or is judged too costly. Business cases and option appraisals are completed for each new major project before deciding which approach should be adopted. ICT systems conform to the Council’s strategy for its IT infrastructure and to central government’s e-GIF standards.

Most system development work often involves the integration of bought-in packages, particularly to the Council’s ERP system. Currently, systems development is preferably web-based and is undertaken using Visual Studio 2010 (.NET framework), normally in conjunction with SQL 2008/2012. However, many legacy systems still operate which use Access and Visual Basic; but the intention is that these should be phased out over time.

**Please note** – Application, web and database updates, upgrades and troubleshooting of incidents are carried out with the support of the Council’s data centre and application support teams.  Suppliers are not granted administrative permission on the internal infrastructure, so these activities are conducted under a supported and supervised remote session with approvals through a change control process.

## E-mail and Internet

There is an externally hosted contract for providing an e-mail and internet service, which consists of over 10,000 email accounts using Microsoft Exchange 2010 and Microsoft Outlook. Dual diversely routed telecommunications links are provided to ensure high levels of service availability.

The service includes filtering of internet and email content and utilises Juniper remote access gateway in conjunction with Vasco based strong 2FA to enable access to systems from non-Council locations. Juniper access is also enabled and provides controlled access from non-Council equipment and external users, whilst restricting access to specific applications and locations. Virtual Private Network (VPN) access is used to facilitate 3rd party support. Email to SMS txt conversion is used to support 2FA access and facilitate public consultations and views.

The internet filtering, via a Websense solution, provides over 90 filtering categories and has different filtering policies for different user groups. The service includes:

* + Monitoring and reporting;
	+ Intrusion detection and prevention (IDP) with reporting; and
	+ In-line anti-virus scanning and spyware/malware filtering.

The Council provides VPN/Access portal via Juniper, which includes:

* + A single secure clientless portal (1000 user licence/6000 ICE)
	+ Secure Meeting (250 meetings);
	+ Network access to files and folders;
	+ 2FA;
	+ Secure portal access;
	+ Host checker ability to perform defined security checks on clients before allowing access;
	+ User and role based access;
	+ Federal Information Processing Standards; and
	+ Virtual workplace functionality so can use home machines without leaving any data.

The Council utilises Instant Messenger with Presence for all email users and Office Communication Server 2007 is provided with full facilities for 50 users.

A project is underway to replace the current contract and the email service will move to Microsoft Office 365 in September 2017. Included in this project is a move to Skype for Business to replace Instant Messenger. The full facilities in Office 365 will be gradually introduced following the completion of the email migration. The remainder of the contract will be transitioned to a new provider in early 2018.

## Website Hosting and Content Management

The Council has an in-house web hosting and content management infrastructure which hosts a number of internet, intranet and extranet based websites, both for the Council and for partner organisations.

Websites are developed in-house to WCAG and WAI accessibility standards, and are managed and maintained using SDL Tridion as the content management system, although this under review. Editors from across the Council and from partner organisations are responsible for using SDL Tridion to manage and update areas of the websites.

The majority of websites are developed using Active Server Pages (ASP) and VBScript. A number of web-based applications have also been developed in-house and integrated into the websites. These mainly use ASP and VBScript, in conjunction with Microsoft SQL databases. A number of Microsoft .NET applications are also integrated with the websites.

## Disaster Recovery

Disaster recovery is based upon the loss of the main data centre at the County Hall, Matlock site with failover of business critical services to the second data centre at the Shand House, Darley Dale site. Failover of services between data centres using HyperV is managed through System Centre Orchestration and PowerShell scripts. ICT Services manages the DR testing procedures, with departmental staff participation in DR tests.

## Security

The Council has acquired ISO27001 accreditation and all new solution providers are expected to demonstrate equivalent compliance within their organisation and their solutions.

The Council does not currently support Bring Your Own Device (BYOD), however, the need to manage portable devices with Windows, and non-Windows operating systems such as Android and IOS is becoming a priority.

## Software Licences

The Council has a mixture of corporate and academic device based licences within the estate. The current split is approximately 5,200 corporate and 2,200 academic.

### Corporate Licensing

The Council has entered into a new Secure Productive Enterprise (SPE) E3 Agreement during 2017, which is effective from the 17th March 2017. The SPE includes Windows 10 Enterprise E3, Office 365 Enterprise E3 and Enterprise Mobility and Security (EMS) E3. The licensing agreement is based on a user model, subscription based and covers the corporate environment.

### Academic Licensing

The Council has a separate subscription EA for the desktop academic estate (none Schools). This covers those devices that are used primarily for delivering services to libraries and schools; there are around 2,200 of these. The same versions of software are deployed as within the corporate environment.

At present no SPE Agreement is available to cover the academic estate so this will remain unchanged. Additional add-ons have been attached to this agreement so that the academic estate is licensed the same as the corporate estate. The additional add-ons include, Enterprise Mobility Suite (EMS), Office 365 EDU and Windows Enterprise Software Assurance.