

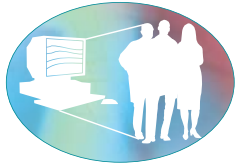
# Systems Administration

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### **Key**

Cross reference: [Cross reference](#)



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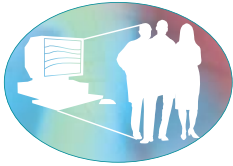
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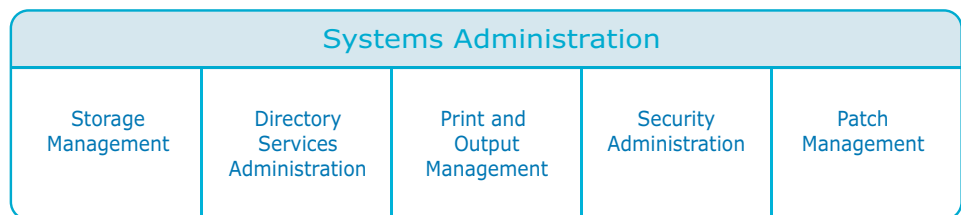


# Systems Administration

## SysA 1 What is Systems Administration?

The goal of Systems Administration is to structure the internal and any external technical support resources in the most effective way to carry out all the FITS OM function activities. Systems Administration provides day-to-day administrative services in support of the technology in the ICT infrastructure.

The Systems Administration function performs the activities of Storage Management, Directory Services Administration, Print and Output Management, Security Administration, and Patch Management.



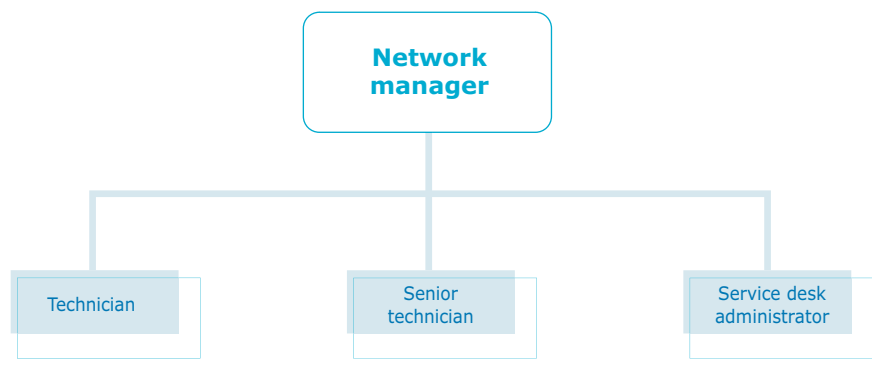
The diagram shows how the Systems Administration function spans all the other FITS OM functions as it provides the management and support resources.

It is likely that all internal and any external technical support staff will be involved with some element of Systems Administration. However, the technical support team needs to be structured with functions in place and activities allocated to appropriately skilled staff.

Systems Administration allows the school to put in place the appropriate structure with the available staff to enable technical support staff to maintain a reliable and secure network to support the ICT services in the school.

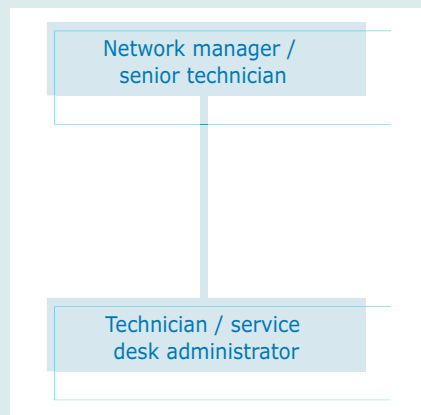
In the guidance for each FITS OM function there is a 'Roles and responsibilities' section that suggests how to allocate each activity to members of the technical support team. Your adoption of each function will depend on the technical support skills your school has and which tasks, if any, you could allocate to an external supplier.

School or college with four or more internal technical support staff



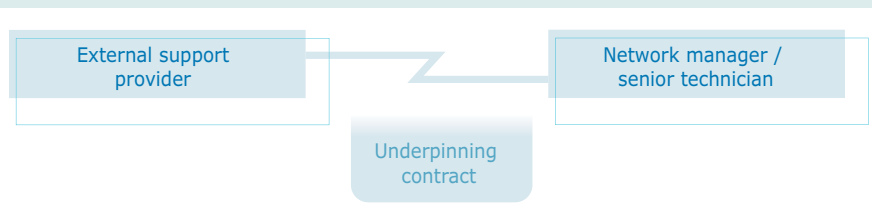
A school with a network manager, senior technician, technician and service desk administrator has the internal resources to carry out the activities of all the FITS OM functions. The network manager would take ownership of all functions and allocate the activities to the technicians and administration staff.

School with two or three internal technical support staff



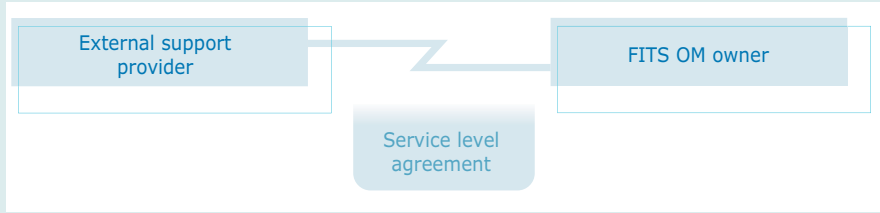
A school with a technically knowledgeable network manager and a technician may also be able to carry out the activities of all the functions. The network manager would take ownership of all the functions and carry out the more technical activities. The technician would undertake the less technical and administrative activities.

School with one internal technical support staff, or less



It is unlikely that the school will have the technical support resources to take ownership of all functions and carry out all activities in each. Therefore the school should look at allocating whole functions or activities within them to a supplier such as a local authority or commercial provider. If whole functions or activities are allocated to a supplier, levels of service should be agreed between the school and supplier in an underpinning contract to match any service levels agreed within the school. See Service Level Management for more details on underpinning contracts.

### School with no internal technical support staff



In this case the school needs a FITS OM owner who does not have to be too technical, but who must be aware of the functions and associated activities. This will enable the school to manage its supplier effectively and to ensure that the supplier adequately manages the school’s technology in order to support the services used in the school reliably and securely. With all technical support provided by a supplier, the school should have a service level agreement in place outlining the services to be provided, including the FITS OM functions and activities. See Service Level Management for more detail on service level agreements.

## SysA 2 Why use Systems Administration?

With the increase in size and complexity of networks and the demand for reliable ICT services in schools, it is now more important than ever to use technical support resources effectively.

The best-practice functions in FITS OM are specialist areas of operations management activities. Systems Administration helps schools to define the structure of their technical support team, allocate ownership and assign the activities of each function to staff with the appropriate skills. Without this structure, you will probably neglect some areas and activities, which risks compromising your ICT services.

Most schools have limited technical support resources. In industry, the larger companies employ staff with specialist skills to manage each operations management function, such as security, backups or directory services. Schools have to be more creative with their allocation of activities, but on the plus side this gives technical support staff the opportunity to acquire skills and experience in all areas of operations management.

FITS OM has been specifically written for schools to enable them to implement best practice with limited technical support resources.

## SysA 3 Who is involved in Systems Administration?

Network manager	<ul style="list-style-type: none"> <li>• Defines the structure for the technical support team</li> <li>• Allocates the ownership of all functions</li> <li>• Allocates the activities in each of the FITS OM functions</li> </ul>
Senior technician	<ul style="list-style-type: none"> <li>• Accepts and understands all activities allocated</li> <li>• Reports function issues to the network manager</li> </ul>
Technician	<ul style="list-style-type: none"> <li>• Accepts and understands all activities allocated</li> <li>• Reports function issues to the network manager</li> </ul>
Service desk administrator	<ul style="list-style-type: none"> <li>• Accepts and understands the administration activities allocated</li> <li>• Carries out the single point of contact activities and communicates with users</li> </ul>

Senior management	<ul style="list-style-type: none"> <li>Provides input and supports the network manager when defining the policies</li> </ul>
Suppliers	<ul style="list-style-type: none"> <li>May carry out all activities of network manager and technicians if internal resources are not available</li> </ul>
ICT users	<ul style="list-style-type: none"> <li>Adhere to defined policies</li> <li>Report incidents using the defined procedure</li> </ul>

## SysA 4 How Systems Administration works

To help you put in place the technical support structure to implement and operate the FITS OM functions, follow this flowchart.



The flowchart is intended to help schools put in place the ideal technical support structure to implement the FITS OM functions. If you need to make any changes to existing roles, job titles or job descriptions, you should do so using your school's HR processes.

## SysA 5 What does Systems Administration cost?

The cost of Systems Administration has three aspects: expenditure, people and time. Before considering the cost of implementing Systems Administration, we illustrate some of the consequences of not doing so.

- ICT users have little confidence in the school's ICT owing to unreliable ICT services and equipment.
- The school is not getting value for its ICT investment, as it is not using the ICT to its full potential.
- Lack of accountability and ownership of important areas of operations management means that key areas are ignored.
- Failure to carry out key activities compromises the reliability and security of the network.
- Technical support staff do not know what they should be doing.
- Technical support staff focus on reactive activities only.
- Technical support staff have little time for planning and project work owing to constant fire fighting.
- Additional technical support resources may be required to cope with the reactive workload, which will increase costs.

## SysA 5.1

### Expenditure

Implementing Systems Administration may not involve a direct cost. Schools which have adequate technical support resources – whether internal or external – already in place, may just need to define an appropriate structure for the team and allocate ownership of the FITS OM functions and activities. In fact, improving the structure of the team and allocating activities according to skill levels may actually reduce costs, as the efficiency of technical support will increase and your reliance on external suppliers may reduce.

One of the biggest benefits of implementing Systems Administration is in terms of the return on the investment of the ICT equipment. With functions and activities providing a reliable and secure network to support the ICT services, everyone in the school will feel confident in using ICT for learning, teaching and school administration.

## SysA 5.2

### People

Schools will need technical support staff to implement, own and operate the FITS OM functions. These may be staff employed in school or resources contracted out to an external supplier.

Employing in-school technical support staff will have associated costs such as salaries, taxes, expenses and so on. The cost of a technical support contract with an external supplier will depend on the amount of on-site support allocated, the activities carried out and so on. Some schools may choose to have a mixture of both internal and external resources, undertaking the less technical activities internally.

The most important thing for the school is to put in place adequate resources to carry out the FITS OM functions. You can check this by using the allocation table (see [SysA 6](#)) to match the activities to resources. If you end up with unallocated activities, then your school may need more resources.

## SysA 5.3

### Time

It takes time to define the structure of the technical support team, allocate ownership and activities, implement and operate each of the FITS functions. However, this time is a good investment because you will spend less time dealing with the constant reactive fire fighting of resolving network incidents and problems. Implementing FITS OM and having a proactive approach to operations management will also save time for users, as they will no longer have to report frequent incidents to the service desk or try to cope with unavailable or failing equipment.

## SysA 6 Using Systems Administration to allocate the FITS OM functions and activities

We have provided an allocation table to help schools allocate the activities in each of the FITS OM functions to staff in their technical support team. This will help you to structure your resources efficiently. It is based on a team of four with a skill set ranging from a non-technical service desk administrator through technician and senior technician to the network manager – with correspondingly increasing levels of technical knowledge.

We realise that not all schools will have this many internal technical support staff, in which case you may have to combine some of the roles. For example in a school with two or three technical support staff you can consider the following options.

Combining roles	But beware...
Service desk administrator and technician	This will increase the administrative burden on the technician and mean that they will have less time for technical work.
Network manager and service desk administrator	This will increase the administrative burden on the network manager and will mean that they can devote less time to strategic and planning work.
Network manager and senior technician	A network manager with good technical knowledge should be able to carry out the senior technician work, but it will leave the manager less time for strategic and planning work.

A school with only one full-time technical support staff or less is unlikely to have the capacity to carry out the activities in all of the FITS OM functions. In this case the school may want to ask an external supplier to take ownership of some or all of these. The table below gives some example approaches.

Contracting out FITS OM activities to a supplier	Allocation of functions and activities
In a school with a highly technical network manager only	<p>The network manager could retain ownership of all the FITS OM functions, but ask a supplier to provide assistance with some of the activities.</p> <p>For example the network manager could define the policies and monitor them, but allocate the activities to an on-site technician provided by a supplier for a number of hours per week.</p>
In a school with a less technically skilled network manager or technician only	<p>The school could ask a supplier to take ownership of all of the FITS OM functions, define the policies for each and carry out the more technical activities.</p> <p>The network manager could carry out the less technical activities such as incident management and maintenance tasks.</p>
In a school with no technical support staff	<p>The school would contract out to a supplier the ownership of all FITS OM functions and most of the activities.</p> <p>It would be best for someone at the school to have enough understanding of FITS OM to know that the supplier is carrying out the right activities to the agreed levels of service. Also, it would be beneficial for the supplier to have an understanding of FITS OM so that both supplier and school talk the same language.</p> <p>The school should carry out the service desk administrator activities, as it is important to keep a single point of contact in the school to manage the incidents and problems.</p>

FITS OM function	Service desk administrator (A)	Technician (B)	Senior technician (C)	Network manager (D)
<p><b>Storage Management</b></p>	<p><b>Service desk</b></p> <ul style="list-style-type: none"> <li>• Acts as single point of contact for any user- or technician-reported backup-and-restore incidents and problems</li> <li>• Records all incidents and problems, and monitors them through to resolution</li> <li>• Records incident and problem resolutions</li> </ul> <p><b>Media librarian</b></p> <ul style="list-style-type: none"> <li>• Ensures supply and control of limited-use media (eg magnetic tapes, diskettes, CD-ROMs)</li> <li>• Audits the physical media library, and ensures consistency of logical and physical media library</li> <li>• Ensures the transport of media to the off-site storage location in accordance with media retention and rotation policies</li> <li>• Ensures that all media are logged and tracked in the logical media library</li> <li>• Supplies and controls media for Storage Management strategy testing</li> </ul>	<p><b>Technician</b></p> <ul style="list-style-type: none"> <li>• Performs daily, weekly and monthly backup routines; checks and updates logs</li> <li>• Detects, diagnoses and resolves all backup-and-restore incidents</li> <li>• Reports all incidents and problems discovered to the service desk for recording</li> <li>• Reports any backup-and-restore capacity problems to the storage administrator</li> </ul>	<p><b>Storage administrator</b></p> <ul style="list-style-type: none"> <li>• Detects, diagnoses and resolves all backup-and-restore problems</li> <li>• Reports all incidents and problems discovered to the service desk for recording</li> <li>• Plans changes to backup-and-restore technology using the request for change template</li> <li>• Ensures that media associated with new service release are available and that procedures are in place prior to service introduction</li> </ul>	<p><b>Network manager</b></p> <ul style="list-style-type: none"> <li>• Has ownership of the storage management function</li> <li>• Chooses the appropriate storage management system and technology</li> <li>• Determines the backup, restore and data-recovery strategies, and documents the policy</li> <li>• Ensures that technical support staff document and understand adequate backup, restore and recovery procedures</li> <li>• Updates backup documentation when changes occur</li> <li>• Forecasts future storage capacity requirements</li> </ul>

FITS OM function	Service desk administrator (A)	Technician (B)	Senior technician (C)	Network manager (D)
<b>Directory Services Administration</b>	<b>Service desk</b> <ul style="list-style-type: none"> <li>• Acts as single point of contact for any user- or technician-reported directory services incidents and problems</li> <li>• Records all incidents and problems and monitors them through to resolution</li> <li>• Records incident and problem resolutions</li> </ul>	<b>Technician</b> <ul style="list-style-type: none"> <li>• Detects, diagnoses and resolves all directory services incidents</li> <li>• Reports all incidents and problems discovered to the service desk for recording</li> </ul>	<b>Directory administrator</b> <ul style="list-style-type: none"> <li>• Has ownership of the Directory Services Administration function</li> <li>• Determines all directory administration, integration and operation strategies</li> <li>• Ensures that all application integration and dependencies are met</li> <li>• Ensures that school directory documentation is accurate and current</li> <li>• Ensures accurate representation of directory resources in the CMDB</li> <li>• Creates new directory objects</li> <li>• Manages directory database schemas</li> <li>• Monitors data replication to ensure that it occurs on time</li> <li>• Monitors directory for capacity, availability, and performance</li> <li>• Manages the security of the directory</li> <li>• Detects, diagnoses and resolves all directory services problems</li> <li>• Reports all problems discovered to the service desk for recording</li> </ul>	<b>Directory designer</b> <ul style="list-style-type: none"> <li>• Designs the directory infrastructure to meet the school's needs</li> <li>• Defines the Directory Services Administration policies</li> <li>• Creates the directory database schema</li> <li>• Creates a list of changes required to an existing database schema in order to meet the school's new requirements</li> <li>• Creates requirements for network infrastructure in order to ensure data replication</li> <li>• Checks that replication has happened often enough and at an acceptable cost (for example replicating a database across a wide area network link)</li> </ul>

FITS OM function	Service desk administrator (A)	Technician (B)	Senior technician (C)	Network manager (D)
<b>Print and Output Management</b>	<b>Service desk</b> <ul style="list-style-type: none"> <li>• Acts as single point of contact for any user- or technician-reported Print and Output Management incidents and problems</li> <li>• Records all incidents and problems and monitors them through to resolution</li> <li>• Records incident and problem resolutions</li> <li>• Ensures that printing assets are entered in the CMDB</li> </ul>	<b>Print support technician</b> <ul style="list-style-type: none"> <li>• Keeps enough hardware spare parts on hand to meet service level requirements</li> <li>• Creates printer standards to minimise spare parts requirements</li> <li>• Performs printer maintenance tasks</li> <li>• Detects, diagnoses and resolves all print and output incidents</li> <li>• Reports all incidents and problems discovered to the service desk for recording</li> </ul>	<b>Print administrator</b> <ul style="list-style-type: none"> <li>• Manages the acquisition, retiring and repair of printing assets in order to meet school needs</li> <li>• Keeps enough hardware on hand to meet service level requirements</li> <li>• Creates printer standards to minimise spare parts requirements</li> <li>• Manages the acquisition, configuration and location of new printers</li> <li>• Manages the creation and distribution of reports, both printed and electronic</li> <li>• Manages hard-copy output and physical paper assets and records</li> <li>• Manages the storage, retention and destruction of paper and software archives</li> <li>• Detects, diagnoses and resolves all print and output problems</li> <li>• Reports all problems discovered to the service desk for recording</li> </ul>	<b>Network manager</b> <ul style="list-style-type: none"> <li>• Has ownership of the Print and Output Management function</li> <li>• Develops the Print and Output Management policies</li> <li>• Develops and maintains controls and procedures to ensure efficient service operations</li> <li>• Drives the efficiency and effectiveness of the Print and Output Management function.</li> <li>• Produces management information</li> <li>• Monitors school-critical outputs to ensure compliance with agreed service levels</li> <li>• Understands the needs of the users and the school in general</li> </ul>

FITS OM function	Service desk administrator (A)	Technician (B)	Senior technician (C)	Network manager (D)
<b>Security Administration</b>	<p><b>Service desk</b></p> <ul style="list-style-type: none"> <li>• Acts as single point of contact for any user- or technician-reported security incidents and problems</li> <li>• Records all incidents and problems and monitors them through to resolution</li> <li>• Records incident and problem resolutions</li> <li>• Adds, deletes or changes user accounts</li> <li>• Ensures that passwords adhere to school policy</li> <li>• Ensures that encrypted file systems follow the correct school encryption standards</li> <li>• Ensures that only authorised personnel gain physical access to the building and/or computing assets</li> <li>• Manages external and physical security requirements (eg CCTV and hardware security)</li> </ul>	<p><b>Security support technician</b></p> <ul style="list-style-type: none"> <li>• Performs periodic audits of the school network environment (hardware)</li> <li>• Ensures that antivirus/spyware software is in place on all relevant assets (see Patch Management)</li> <li>• Performs security audits</li> <li>• Detects, diagnoses and resolves all security incidents</li> <li>• Reports all incidents and problems discovered to the service desk for recording</li> </ul>	<p><b>Security administrator</b></p> <ul style="list-style-type: none"> <li>• Detects intrusions and protects against viruses</li> <li>• Performs audit tracking and reporting</li> <li>• Provides effective network domain security design and management</li> <li>• Manages authentication and access methods requirements</li> <li>• Manages user policy usage and requirements (such as password policy)</li> <li>• Manages secure messaging requirements</li> <li>• Detects, diagnoses and resolves all security problems</li> <li>• Reports all problems discovered to the service desk for recording</li> </ul>	<p><b>Network manager</b></p> <ul style="list-style-type: none"> <li>• Has ownership of the Security Administration function</li> <li>• Defines Security Administration policies</li> <li>• Tests and implements strategic security technology</li> <li>• Monitors and assesses network vulnerability</li> <li>• Monitors and assesses third-party vulnerabilities</li> </ul>

FITS OM function	Service desk administrator (A)	Technician (B)	Senior technician (C)	Network manager (D)
<b>Patch Management</b>	<p><b>Service desk</b></p> <ul style="list-style-type: none"> <li>• Communicates all planned changes involving patch updates to users as part of the request for change procedure</li> <li>• Provides a full up-to-date CMDB or inventory of ICT equipment</li> <li>• Communicates attachment and download policies and updates to users</li> </ul>	<p><b>Technician</b></p> <ul style="list-style-type: none"> <li>• Installs new patches and updates according to the build procedures</li> <li>• Checks that installations are successful</li> </ul>	<p><b>Patch administrator</b></p> <ul style="list-style-type: none"> <li>• Keeps abreast of all patches and updates available</li> <li>• Ensures that all operating systems and software have up-to-date service packs and patches</li> <li>• Keeps drivers and firmware up to date</li> <li>• Keeps antivirus and antispyware definitions up to date</li> <li>• Plans changes for major patch updates using the request for change procedure</li> <li>• Produces Release Management build procedures for major updates to allow other technicians to carry out the updates</li> </ul>	<p><b>Network manager</b></p> <ul style="list-style-type: none"> <li>• Has ownership of the Patch Management function</li> <li>• Defines Patch Management policies</li> <li>• Chooses the appropriate Patch Management systems and automating tools</li> <li>• Defines Patch Management schedules</li> </ul>