**Session 1 Foundation for System Administration**

**Objectives**

By the end of this session the learner should be able to describe:

* *System Administration*
* *Network Administration*
* *System Administrator and his roles*
* *Network Administrator and his role*
* *System and Network Administration*
* *Education and certification*

**1.1 Introduction to System and Network Administration**

**Definition: Network Administration**

Network administration involves a wide array of operational tasks that help a network to run smoothly and efficiently. Without network administration, it would be difficult to maintain network operations.

The main tasks associated with network administration include:

* Design, installation and evaluation of the network
* Execution and administration of regular backups
* Creation of precise technical documentation, such as network diagrams, network cabling documents, etc.
* Provision for precise authentication to access network resources
* Provision for troubleshooting assistance
* Administration of network security, including intrusion detection

In *large enterprises*, network administration would more often be strictly related to the actual network. Specifically, this would include the management and maintenance of

* switches,
* routers,
* firewalls,
* VPN gateways, etc.

In *small companies*, the network administration is often a jack-of-all trades and involved in the

* configuration of databases,
* installation, maintenance and upgrading of software,
* management of user accounts and security groups,
* desktop support, and sometimes even basic software development.

**Definition: Network Administrator**

A Network Administrator is the individual who, in a company is responsible for the proper functioning and optimization of the network of the structure. In addition, his tasks include managing the physical cabling of the network, its good routing, the smooth flow of intangible information and ensuring the security of the network and managing the different user accounts and access rights.

**Qualities and Skills Needed**

**What are the qualities and skills needed to be hired as a network administrator?**

**•** Of course, excellent computer skills, especially in network computing (cabling, routing protocol, cybersecurity, and management of access rights).

• But also in operating systems, since it is by these that end-users of the network will access its ability to solve complex and new problems.

• Good interpersonal skills, since, again, the end-users of the networks of the structure are human — project management capabilities, both in terms of constraints and good behavior in the long term.

• Know how to keep abreast of all technological developments, but also changes in standards, to provide the company with the best possible solution.

**Education and Training**

**What training and how to become a network administrator?**

* Bachelor’s degree in IT/ICT, Computer Science, and Telecommunication.
* Certification Courses such as Cisco, Huawei and Microsoft certified network engineering

**Evolution and Recruitments**

***What to do and where to go after a network administrator career?***

Once proven, a [network administrator] can evolve to positions of telecommunications manager, network architect, but also leave the framework of a single company to become a consultant or business engineer.

***Which companies can recruit a [Network Administrator]?***

The network administrator can virtually exercise wherever there is a more or less complex network to install or upgrade. And also in practice, network administrator can be hired within a company, a government structure, or an association. Besides, network administrator can even be employed by an external service company that will contract him/her with various client organizations.

**1.2 System Administration**

**Definition: System Administration**

System administration refers to the management of one or more hardware and software systems.

System administrator monitors system health, allocates system resources like disk space, performs backups, provides user access, manages user accounts, monitors system security and performs many other functions.

System administration is a job done by IT experts for an organization. System administration ensures that computer systems and all related services are working well. The duties in system administration are wide ranging and often vary depending on the type of computer systems being maintained.

Common tasks include:

* installation and configure of new hardware or software,
* creating and managing user accounts and workstations,
* maintaining computer systems such as servers and databases, and
* planning and properly responding to system outages and troubleshoot various other problems.
* Ensure security through access controls, backups and firewalls
* Upgrade systems with new releases and models
* Develop expertise to train staff on new technologies
* Build an internal wiki with technical documentation, manuals and IT policies
* Other responsibilities may include light programing or scripting to make the system workflows easier as well as training computer users and assistants

**Definition: System Administrator**

A system administrator installs and upgrades computer systems and networks. The job involves making sure they are running well and at maximum efficiency.

**Duties of a System Administrator**

In a system administration role, you'll help support your employer's computer systems by installing, designing and protecting them. This includes working on local area networks, network segments, Internet systems and wide area networks. When a problem arises with the systems, it is your job to examine the issue and see that it is fixed. You'll regularly perform routine maintenance and monitor the networks to ensure everything is running smoothly.

Additionally, you'll gather statistical information and figure out how your employer wants to use the computer systems. For example, if co-workers need a faster speed or more memory, you'll help meet those needs by installing additional hardware or software.

System security also falls under your responsibilities in many cases. You might work alongside computer security specialists or oversee the security by putting firewalls and other cyber security measures in place.

**Education and Training**

If you're entering this career, then a bachelor's degree is recommended. However, in some cases, a Master’s degree maybe required with the right work experience. Before acquiring a systems administrator position, you can obtain work experience through computer support specialist positions. The most common fields of study for a system administrator are information science and computer science.

Professional Certification from software firms or product vendors in the industry, such as Microsoft (e.g. Microsoft Certified Systems Administrator (MCSA)) and Cisco is recommended

**1.3 Network Administrator versus System Administrator?**

*A degree may open the door to a variety of opportunities and diverse career paths. The degree programmes offered at ICI (BTIT, BSIT and BSCS) will not necessarily lead to the featured careers. This section is intended to help inform and guide you through the process of determining which level of degree and types of certifications align with your desired career path.*

There is reasonable demand for both positions, with the U.S. Bureau of Labor Statistics projecting 6% job growth for network and computer systems administrators through 2026 (about the same rate as the national average).

One might question the differences between a network administrator and a system administrator. At first glance, the role each plays in an organization can be unclear and the two may seem interchangeable.

Yet while there is some overlap in typical job descriptions, there are key differences in areas ranging from daily responsibilities to certification paths. Knowing these differences can help you clarify which option may fit for your experience, interests and career goals.

**Network Administrators Focus on Computers Working Together**

A Network Administrator's main responsibilities include installing, configuring, and supporting an organization's local area network (LAN), wide area network (WAN), internet systems, and/or a segment of a network system.2 Daily job duties may depend on the size of a company's network. For example, at a smaller company, a network administrator may be directly responsible for performing updates and maintenance on network and IT systems, as well as overseeing network switches and setting up and monitoring a virtual private network (VPN). However, at a larger company, responsibilities may be more broad and managerial, such as overseeing a team of IT specialists and working with network architects to make decisions about equipment and hardware purchases and upgrades.3

**System Administrators Work Directly with Computer Hardware and Software**

At the most basic level, the difference between these two roles is that a Network Administrator oversees the network (a group of computers connected together), while a System Administrator is in charge of the computer systems – all the parts that make a computer function. A Computer Systems Administrator's responsibilities may include software and hardware installation and upkeep, data recovery and backup, setup, and training on user accounts and maintenance of basic security best practices.

As with Network Administrator positions, specific daily job duties may depend on the size and scope of a company's computer systems. At smaller businesses, the System Administrator may handle all IT duties, and thus maintain and update all computers as well as ensure data security and backup. Larger corporations may divide system administrators' responsibilities into more specific sub-roles, therefore resulting in specialized positions like database administrators or security administrators.

**Do These Positions Ever Overlap?**

While the fundamental differences described above still apply, the specific job titles of "network administrator" and "systems administrator" can potentially mean somewhat different things depending on the company. The overlap between these two roles may start with the local area network – a network that is company-based or includes surrounding buildings. The smaller the organization, the more likely you'll find a system administrator taking on both system and network responsibilities.

For those entering the field, seeking a position in a smaller organization may offer you exposure to a wide range of experience in both system and network administration. You may find that you'll interface with departments and be part of project teams you might not normally be part of in a larger organization. However, as an organization grows, the roles may become more defined.

**Education and Certifications for Network Administrators**

If you're interested in pursuing a career path in network administration, a bachelor's degree in computer science or information technology, or an online network degree, can help you prepare and work to develop the fundamentals needed to start out in IT and in this field. Companies may require their administrators to obtain certification in the products they use in their daily work. Certification programs may be offered directly from vendors or from vendor-neutral certification providers. Certification helps validate the understanding and the use of best practices required of network and computer systems administrators.

So, what certifications should you consider pursuing? This can depend on your role and the company. To start, the CompTIA A+ certificate provides a vendor-neutral certification in many fundamental skills needed in the field. For those looking for more specific certifications in network administration, the CompTIA Network+ certificate focuses on network-specific skills, while the CompTIA Security+ certificate may be relevant for those looking to work in cybersecurity and data protection. You may also want to research whether the companies and organizations you're interested in working for run on a specific type of system in order to help determine whether a vendor-specific certification (like a Cisco or Microsoft certification) would be useful in pursuing your career goals.

**Education and Certifications for System Administrators**

Similarly, to a Network Administrator, a degree in information technology or computer science may be required to become a system administrator. An organization may run on some kind of Microsoft or Linux system; hence, common certifications split into two paths: Microsoft and Linux (or a variation of Linux, Red Hat) system admin certification. Other certifications, such as a CompTIA certificate, are also an option for those working in system administration.

**1.4 Summary**

System and Network Administration is a branch of *engineering* that concerns the operational management of human–computer systems. It is unusual as an engineering discipline in that it addresses both the technology of computer systems and the users of the technology on an equal basis. It is about putting together a network of computers (workstations, PCs and supercomputers), getting them running and then *keeping* them running in spite of the activities of *users* who tend to cause the systems to fail.

A ***system administrator*** works for users, so that they can use the system to produce work. However, a system administrator should not just cater for one or two selfish needs, but also work for the benefit of a whole community. Today, that community is a global community of machines and organizations, which spans every niche of human society and culture, thanks to the Internet. It is often a difficult balancing act to determine the best policy, which accounts for the different needs of everyone with a stake in a system. Once a computer is attached to the Internet, we have to consider the consequences of being directly connected to all the other computers in the world.

S***ystem administration*** is an extremely demanding engineer’s job. It’s about hardware, software, user support, diagnosis, repair and prevention. System administrators need to know a bit of everything: the skills are technical, administrative and socio-psychological.

The terms *network administration* and *system administration* exist separately and are used both variously and inconsistently by industry and by academics.

*System administration* is the term used traditionally by mainframe and Unix engineers to describe *the management of computers whether they are coupled by a network or not.* To this community, *network administration* means *the management of network infrastructure devices (routers and switches)*.

The world of personal computers (PCs) has no tradition of managing individual computers and their subsystems, and thus does not speak of system administration, *per se*. To this community, *network administration* is the *management of PCs in a network.*

Network and system administration are increasingly challenging. The complexity of computer systems is increasing all the time. Even a single PC today, running Windows NT, Windows 10 Pro, etc and attached to a network, approaches the level of complexity that mainframe computers had years ago. We are now forced to think *systems* not just computers.

Note

*System administration is not just about machines and individuals, it is about communities. There is the local community of users on multi-user machines; then there is the local area network community of machines at a site. Finally, there is the global community of all machines and networks in the world.*

**1.5 Student Activity**

a) Define the following terms

i) System administration

ii) Network administration

b) State any three roles a System administrator

c) State any three roles a Network administrator

d) State professional certifications necessary for System administration and Network administration