Core Job Descriptions

Definitions

These definitions are guidelines, not rigid categories. As any of the variables at a site increases—number of computers, number of users, types of hardware, variety of software, and operating systems supported—the site becomes more complex. Increased site complexity typically requires increased system administration resources and also requires more experienced system administrators to manage the more complex aspects of the site.

> **Small, uniform site:** Fewer than 100 computers and fewer than 100 users, all running the same base operating system. (Multiple versions of one operating system, e.g., Windows 2000, Vista, and Windows 7, or Red Hat, Solaris, and SuSE, would be considered one base operating system; Windows and Linux would be considered more than one base operating system.)

> **Complex site:** Up to 1000 computers and up to 1000 users, running more than one base operating system.

> **Large, complex site:** More than 1000 computers and more than 1000 users, running more than one base operating system.

The titles proposed here may not be suitable for all sites. Senior System Administrator is a relatively standard title, but the titles in use for the lower levels vary widely from place to place. You should feel free to use whatever title is most appropriate for your situation.

Level I: Novice System Administrator

Required Skills

- Strong interpersonal and communication skills; ability to explain simple procedures in writing or verbally; good phone skills

- Strong ability to learn; ability to follow instructions well; strong analytical skills

- Familiarity with an operating system and its commands/utilities at a user level; ability to edit files, use basic utilities and commands, find users' home directories, navigate through the file system, install software on workstations, and use I/O redirection; some understanding of how user authentication happens in a directory service context

- Ability to identify/locate shared resources and perform simple tasks (e.g., manipulate jobs in a print queue, figure out why a network file system isn't available)
- Works well alone or on a team

Required Background

- Two years of college or equivalent post–high school education or experience

Desirable Background and Skills

- A degree or certificate in computer science or a related field
- Previous experience in customer support, computer operations, system administration, or another related area
- Interest in structured approaches to system configuration management
- Strong intellectual curiosity, motivation to advance in the profession

Appropriate Responsibilities

- Performs routine tasks under the direct supervision of a more experienced administrator
- Acts as a front-line interface to users, accepting trouble reports and dispatching them to appropriate system administrators

Level II: Junior System Administrator

Required Skills

- Strong interpersonal and communication skills; ability to train users in applications and operating system fundamentals and to write basic documentation
- Strong skills with most operating system commands/utilities
- Familiarity with most basic system administration tools and processes; for example, ability to boot/shut down a machine, add and remove user accounts, use backup programs and fsck or chkdsk, manage shared resources (e.g., file systems, printers), add a workstation to a network, mount remote file systems, and maintain system database files (groups, hosts, aliases, usermanager)
- Familiarity with the principles and practice of system configuration management using modern declarative tools
- Understanding distinctions between system processes/services and user processes, the authentication/authorization processes in use at the site, local and network resources and resource sharing, basic networking concepts and practices

- For Windows administrators, familiarity with the basic Windows administrative tools and how to locate them (e.g., Computer Management tool, lowest-level Active Directory tools)
- Works well alone or on a team

Required Background
- One to three years of system administration experience

Desirable Background and Skills
- A degree in computer science or a related field
- Familiarity with networked/distributed computing environment concepts; for example, ability to use the route command, administer routing and remote access service, and modify deployed group policies
- Ability to write scripts in some administrative language (e.g., Perl, Python, VBScript, Windows PowerShell)
- Programming experience in any applicable language

Appropriate Responsibilities
- Administers a small, uniform site alone or assists in the administration of a larger or complex site
- Works under the general supervision of a system administrator or computer systems manager

Level III: Intermediate/Advanced System Administrator

Required Skills
- Strong interpersonal and communication skills; ability to write purchase justifications, train users in complex topics, make presentations to an internal audience, and interact positively with upper management
- Independent problem-solving, self-direction
- Comfort with most aspects of operating system administration; for example, managing processes and services, configuration of mail systems, system installation and configuration, printer systems, and fundamentals of security
- Familiarity with the principles and practice of system configuration management using modern declarative tools; ability to model and reduce complex system requirements as configuration declarations
- A solid understanding of the operating systems in use at the site; understanding of paging and swapping, inter-process communication, devices and what device drivers do, and filesystem concepts
- Familiarity with fundamental networking/distributed computing environment concepts; ability to configure file sharing (NFS/SAMBA or Windows); ability to query DNS records; understanding of basic routing concepts

- Ability to write scripts in some administrative language (e.g., Perl, Python, VBScript, Windows PowerShell)
- Works well alone or on a team

Required Background
- Three to five years of system administration experience

Desirable Background and Skills
- A degree in computer science or a related field
- Significant programming background in any applicable language
- Ability to do minimal debugging and modification of C or Java programs

Appropriate Responsibilities
- Receives general instructions for new responsibilities from supervisor
- Administers a complex site alone or assists in the administration of a larger site
- Initiates some new responsibilities and helps to plan for the future of the site/network
- Manages novice system administrators or operators
- Evaluates and/or recommends purchases; has strong influence on purchasing process

Level IV: Senior System Administrator

Required Skills
- Strong interpersonal and communication skills; ability to write proposals or papers, act as a vendor liaison, make presentations to customers or client audiences or professional peers, and work closely with upper management
- Ability to solve problems quickly and automate processes
- Familiarity with the principles and practice of system configuration management; experience using a declarative configuration management system and a broad understanding of the role of desired configuration as part of strategic organizational knowledge
- A solid understanding of an operating system; understanding of paging and swapping, inter-process communications, devices and what device drivers do, filesystem concepts (inode, clustering, logical partitions), ability to use performance analysis to tune systems
- A solid understanding of networking/distributed computing environment concepts, including principles of routing, bridging and switching, client/server programming, and the design of consistent network-wide filesystem layouts

- Ability to program in an administrative language (e.g., Perl, Python, VBScript, Windows PowerShell)
- Works well alone or on a team

Required Background

- More than five years of previous system administration experience

Desirable Background and Skills

- A degree in computer science or a related field
- Extensive programming background in any applicable language
- Publications in the field of system administration
- Ability to port C programs from one platform to another and to write small C or C# programs

Appropriate Responsibilities

- Designs/implements complex local and wide-area networks of machines
- Manages a large, complex site or network
- Works under general direction from senior management
- Establishes/recommends policies on system use and services
- Provides technical lead and/or supervises system administrators, system programmers, or others of equivalent seniority
- Has purchasing authority and responsibility for purchase justification

NEW: MANAGEMENT-LEVEL JOB DESCRIPTIONS

Computers continue to dominate new technologies, automate business processes, and store information in ways that have eclipsed even the most visionary predictions. The proliferation of computer use has outpaced the increase in efficiency, with the net result being more computers in more places than ever before. And they don't run themselves! Professional system administrators are in high demand, and their numbers have increased along with the systems they oversee.

When the number of machines to manage begins to require a group of system administrators to manage them, naturally a management hierarchy evolves. In larger organizations, it's common for an entire department to be dedicated to running the computers, networks, and applications necessary to facilitate the organization's computing and computing infrastructure. In fact, information technology has become such an integral part of organizations that the highest-level IT manager often reports as a C-level executive position.

These new management-level job descriptions capture the management hierarchy common for those who manage system administrators and their efforts.

Management Level I: Technical Lead

Required Skills

- All Senior System Administrator skills, including:
  - Strong interpersonal and communication skills
  - Ability to solve problems quickly and automate processes
  - A solid understanding of an operating system
  - A solid understanding of networking/distributed computing environment concepts
  - Ability to program in an administrative language and to understand, modify, and use higher-level languages such as C/C++ programs
- Ability and desire to lead and the flexibility to also share the duties of the technical team
- Willingness to mentor, train, and share knowledge with peers

Required Background

- More than five years of previous system administration experience

Desirable Background and Skills

- A degree in computer science or a related technical field
- Experience mentoring employees
- Experience in project, product, or team management

Appropriate Responsibilities

- Serves as a member of the team
- Aggressively automates repeated tasks to allow the team to scale with the organization's growth
- Directs and participates in system administration efforts
- Assists the system administration manager in setting staff goals and training, defining technology priorities, and developing long-term strategies to manage and scale system administration
- Supervises one or more staff and provides them with technical guidance and mentoring
- Communicates and acts as liaison with end users and colleagues
- Acts as liaison between team members and the system administration manager
- Communicates progress on priorities and budget to management and team

Management Level II: System Administration Manager

Required Skills

- Management skills, including:
  - Strong interpersonal and communication skills
  - Strong writing, meeting, and organizational skills
  - A solid understanding of an operating system
  - A solid understanding of networking/distributed computing environment concepts
  - A solid understanding of programming languages and scripts
- Ability and desire to manage a technical team
- Willingness to mentor, train, and share knowledge with team members

Required Background

- More than two years of previous project, product, engineering, or team management

Desirable Background and Skills

- A degree in computer science or a related technical field
- Senior system administrator skills
- Experience mentoring employees
- Experience in hiring and team-building
- Budget management experience
- Course work or training in business or management
- Knowledge of IT-related regulatory and legal requirements

Appropriate Responsibilities

- Sets staff goals, defines technology priorities, and develops long-term strategies to manage and scale the organization's system administration
- Supervises one or more staff and provides them with technical guidance and mentoring
- Provides career guidance and performance feedback to team members
- Communicates and acts as liaison with end users and colleagues
- Acts as liaison between team members and the IT director
- Communicates progress on priorities and budget to management and team

Management Level III: IT Director

Required Skills

- Senior management skills, including:
  - Strong interpersonal and communication skills
  - Writing, presentation, negotiation, facilitation, meeting, and organizational skills
  - Experience in hiring, team-building, and mentoring
  - Experience in budget management

Required Background

- A degree in computer science or a related technical field
- Ability to manage a technical team
- More than five years of previous project, product, engineering, or team management
- Solid understanding of computers and computing environments, including operating systems, networking, distributed computing environments, databases, and programming languages
- Knowledge of IT-related regulatory and legal requirements

Desirable Background and Skills

- A degree, course work, or training in business or management
- Background in system administration or IT
- At least five years at Management Level II
- Experience with medium to large IT environments, multiple-platform OSes, and high availability data centers
- Solid grounding in technical problem resolution and analysis

Appropriate Responsibilities

- Plans and provides tactical direction, sets management goals, defines priorities, and develops long-term strategies to manage and scale the organization's system administration
- Develops, implements, and manages a 24x365 IT environment, ensuring site scalability, integrity, performance, economy, and reliability
- Leads vendor selection process, negotiates contracts, and manages ongoing relationships and deliverables
- Supervises one or more direct managers and provides them with tactical guidance and mentoring
- Provides career guidance and performance feedback to direct reports

- Communicates with partners across the organization and with management to ensure that infrastructure-related priorities are tied to overall organizational objectives and needs
- Acts as liaison between IT managers and CIO or senior management
- Communicates progress on priorities and budget to senior management and direct reports

Management Level IV: Chief Information Officer

Required Skills

- Senior management skills, including:
  - Strong interpersonal and communication skills
  - Writing, presentation, negotiation, facilitation, meeting, and organizational skills
- Experience in hiring and team-building
- Experience in financial management and accounting

Required Background

- A degree in computer science, information systems, business, or a related technical field or the equivalent in experience
- Ability to lead the IT effort of an organization
- More than ten years of previous project, product, engineering, or team management
- Solid understanding of computers and computing environments, including operating systems, networking, information security, distributed computing environments, databases, and programming languages
- Solid grounding in technical problem resolution and analysis
- Executive-level understanding of finances and accounting
- Knowledge of IT-related regulatory and legal requirements

Desirable Background and Skills

- Both a degree, course work, or training in business or management and a degree, course work, or training in computer science or information systems
- At least five years at Management Level III
- Experience managing medium to large IT environments, multiple-platform OSes, and high availability data centers
- Knowledge of business-related regulatory and legal requirements

Appropriate Responsibilities

- Plans and provides direction, sets management goals, defines priorities, and develops long-term strategies to manage and scale secure, reliable IT efforts for the organization

- Supervises one or more direct managers and provides them with strategic guidance and vision

- Provides career guidance and performance feedback to direct reports

- Communicates with partners across the organization and with the Board of Directors and senior management to ensure that IT-related agendas are tied to overall organizational objectives and create competitive advantage for the organization

- Acts as liaison for IT needs between the Board of Directors and senior management and organizational units

- Communicates progress on priorities and budget to the Board of Directors and senior management and to direct reports