System Administration (SA)

- Installing an OS and tuning its performance
- Add/removing s/w
- Adding/removing users
- System backup and recovery
- Patch management
- Encryption
- Partitioning and file system management
- System Administrator

OS Installation

- Installation
  - From scratch or an update
  - Which OS?
  - H/W and other requirements
  - Configuring options
- Performance
  - Understand OS
  - Tune to organisation requirements

Add/removing s/w

- Installation
  - Sufficient h/w?
  - Correct related s/w available?
  - Can s/w be installed without shutting system down?
    - What to do if not
- Removal
  - Check that s/w is really no longer required
  - Remove it completely (or disable it)?
- Note: s/w removal is relatively easy on PCs, more complicated on bigger systems

Adding/removing users

- Ensure that only authorised users can enter the system (username, password)
  - Also special cards, other mechanisms
  - What group (if any) to assign a new user
  - What rights should the user have
- Removing users
  - Remove just the login or the user's directories and other info as well?

System backup and recovery

- Backup
  - making copies of data so that the additional copies may be used to restore the original after a data loss event
    - Disaster recovery
    - Accidentally deleted or corrupted
  - Considerable data storage requirements
  - Data repository models
    - Unstructured
    - Full + incremental
    - Continuous data protection
  - Managing the data repository
    - Online, near-line, off-line, off-site vault. Backup site

System backup and recovery

- Objectives
  - Recovery Point Objective (RPO): the point in time that the restarted infrastructure will reflect (~roll-back)
  - Recovery Time Objective (RTO): the amount of time elapsed between disaster and restoration of business function
  - Data security: data must be protected from unauthorised access
- Limitations
  - Backup window: the period of time when the backups can run on a system
  - Performance impact
  - Costs of h/w, s/w, labour
  - Network bandwidth

Patch Management

- An area of SA that involves acquiring, testing and installing multiple patches (code changes) to an administered computer system
- Includes:
  - Maintaining current knowledge of available patches
  - Deciding what patches are appropriate
  - Ensuring that patches are installed properly
  - Testing systems after installation
  - Documenting all associated procedures
- Patches are “make-do” fix, not an elegant solution
- Some automated s/w available

Encryption

- Is the process of transforming information using an algorithm (cipher) to make it unreadable to anyone except those processing special knowledge (usually referred to as a key)
- Encryption s/w is s/w whose main task is encryption and decryption of data, usually in the form of files, hard drives, email messages, network packets etc
- Most OS provide a default algorithm for (password) encryption
  - Can be changed (depending on system)

Security

- Need to protect resources from malicious (or other) intrusions
- Awareness of security loopholes (and related updates)
- Report security incidents and take corrective measures
- Physical security
  - Machines physically secured
  - Access limited
  - Automatic logout after x time period
- Keep systems lean

Partitioning and file system management

- Disk partitioning – the act of dividing the storage space of a hard disk drive into separate data areas knows as partitions
  - More partitions = more control (but more cumbersome)
- File system management
  - Space management
  - Access permissions
  - Directory searching
- Partition size
  - Can it be changed – depends on OS

Partitioning and file system management

- Partitioning schemes
  - Windows (MS family)
  - Unix (and Unix-like)
  - Multi-boot and mixed-boot systems
    - Where more than 1 OS can be booted
    - User given a choice at start-up
    - E.g. Windows as default, option to boot Linux
- Partition recovery
- s/w available to help

System Administrator

- Analysing system logs and identifying potential issues with computer systems.
- Introducing and integrating new technologies into existing data centre environments.
- Performing routine audits of systems and software.
- Performing backups
- Applying OS updates, patches, and configuration changes.
- Installing and configuring new h/w and s/w
- Adding, removing, or updating user account information, resetting passwords, etc.

System Administrator

- Answering technical queries.
- Responsibility for security
- Responsibility for documenting the configuration of the system.
- Troubleshooting any reported problems.
- System performance tuning
- Ensuring that the network infrastructure is up and running.

System Administrator

- Large organisations
  - Tasks may be subdivided among different SAs
  - Example 1: system upgrades, Quality Assurance (QA) team, technical writers
  - Example 2: by OS type
- Small organisations
  - Technical support
  - Database administrator (DBA)
  - Network administrator
  - Application analyst
  - Security administrator
  - programmer

System Administrator

- Skill set
  - Technical skills
    - Scripting
    - understanding of s/w process, but not programmers
  - Project management skills
    - For systems-related projects
  - Supervising and training computer operators
  - Consultant for technical support staff
- Problem solving
  - Constraints and stress
- A blend of technical skills and responsibility
- Certification available