MIS 131: Information Systems Administration

Part VI: Networks

Section C: Network Management

Network Management

- **Generally thought of as day-to-day management of network operations**

- **Point-to-point consideration**

  - Point-to-point is simplest design (if cost not an issue)

  - Cost-effective if point-to-point network busy with critical information

    - Difficult to achieve!

- **Objective: Balance between *accurate*, *timely*, and *secure* data vs. cost**

Network Management Concerns

- **Bandwidth**
- **Convergence**
- **Payload security**
- **Redundancy**

Network Management Components

- Fault management
- Configuration management
- Security
- Performance monitoring
- Performance and capacity planning
- Recovery and contingency planning

Network Management Activities

- **Configuration of the network server**
- **Installation and testing of the network operating system**
- **Set-up of user accounts and log-in security**
- **Set-up of network file system and security**
- **Set-up of network resources (e.g. network printer)**
- **Set-up of client and log-in scripts**

Network Server Considerations

- Ensure large main memory and secondary storage capacity
- Separating network from database server is recommended
- Consider hard disk spanning and/or mirroring
- Minimum two volumes recommended
  - System
  - Applications and data
- Configuration best done by a certified network engineer

Network Operating System

- The system software that runs the network, enables resource sharing, and implements network security

- Different from client O/S (e.g. Unix with Windows clients)

- Best installed, configured, and tested by certified network engineer

Client Machine

- **Requires network log-in to connect to the network upon start-up**

- **Login script**
  - **Set of instructions that client machine executes during network log-in**
  - **Automates drive mappings, search mappings, and other shared resources**
  - **Users sometimes grouped into logical units with common log-in scripts**

Managing User Accounts

- **Required before any network services are accessed**

- **Users normally provided with a log-in name and password**

- **Implement network security**
  - **Login security**
  - **File system security**

Login Security

- **User account restrictions**
  - Account balance (limited time use)
  - Number of connections
  - Disk space
  - Expiration date
  - Network address (specific workstation)
  - Password
  - Time of use (say, only during office hours)

Login Security

- **Intruder limits**
  - Identify number of consecutive times a user can unsuccessfully log-in
  - Disable account when exceeded

- **Network resources**
  - Shared hardware
  - Shared files and directories
  - Applications

- **Authentication**
  - Required when accessing different servers

Network File System

- **Volumes**
  - System volume to contain system files
  - Application + data volume to contain users' work
  - One volume for each type of client O/S
  - For fault tolerance, one volume per disk
  - For performance, one volume over spanned disks
- Plan file system based on:
  - Ease of use
  - Ease of administration

Network File Directories

- **System will generate several directories depending on NOS, e.g., system, public, etc.**

- **Recommended directories (administrator-defined when not created by O/S)**
  - **Home directories (to contain user files)**
  - **Application directories**
  - **Configuration file directories**
  - **Shared data directories**

Network File Security

- Regulates who can access directories and files in the network
- Common rights to directories and files (depends on NOS)
  - Read (R)
  - Write (W)
  - Edit (E)
  - Delete (D)
- Every directory and file has a user (or trustee) list to identify who can access and what level of access

Network File Security

- **Rights inheritance - rights normally flow down (inherited from parent directory)**
- **Inherited rights can be blocked**
  - **Assign new rights to lower level**
  - **Use of inherited rights filter**
- **Hence, for every level of directory and file, each user has effective rights, which are combinations of:**
  - **Rights granted through inheritance**
  - **Rights filtered**
  - **New rights assigned**

Shared Network Resources

- Identify resources (e.g. printers) that will be shared and by whom
  - Note: Not all resources need to be shared, some can remain local
- Configure necessary resources (with attendant servers, if required) for sharing
- Grant permission to every user requiring the use of the resource
- Implementation depends on NOS