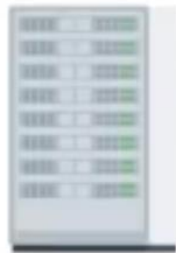


Free Course Link: <https://www.youtube.com/watch?v=1DvTwuByjo0>

Intro

- **System administration:** the field in IT that's responsible for maintaining reliable computer systems in a multi-user environment
- **IT infrastructure** encompasses the software, the hardware, network, and services required for an organization to operate in an enterprise IT environment
- **Server** - software or a machine that provides services to other software or machines



Tower Server



Rack Server

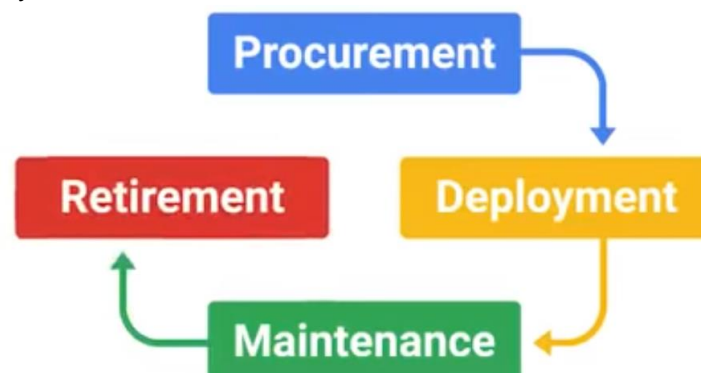


Blade Server

- **Data Center** - facility that stores hundreds, if not thousands, of servers

Sysadmin Tasks

- Organizational policies (usually created by CISO)
 - Should users be allowed to install software?
 - Should users have complex passwords & certain requirements?
 - Should users be allowed to view non-work-related websites, like Facebook?
 - If you hand out a company phone to an employee, should you set a device password?
 - Practice good documentation
- IT Infrastructure Services
- User & Hardware Provisioning
 - Hardware lifecycle

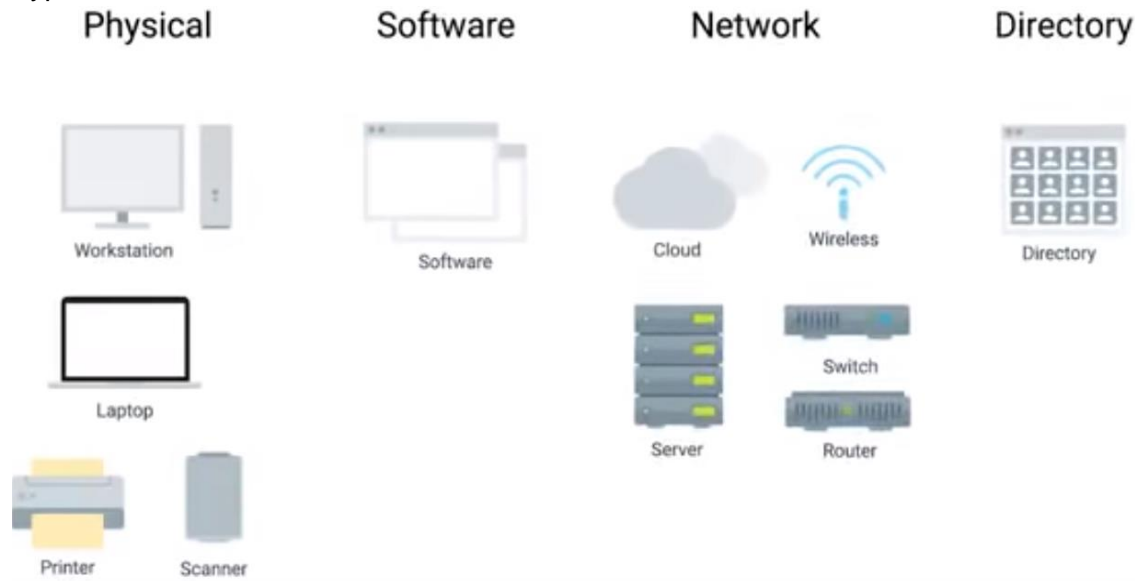


- Routine maintenance
 - Batch update(s)
- Vendors
 - TV, Fax, Printers, etc.
- Troubleshooting & managing issues

Network & Infrastructure Services

Intro to IT Infrastructure Services

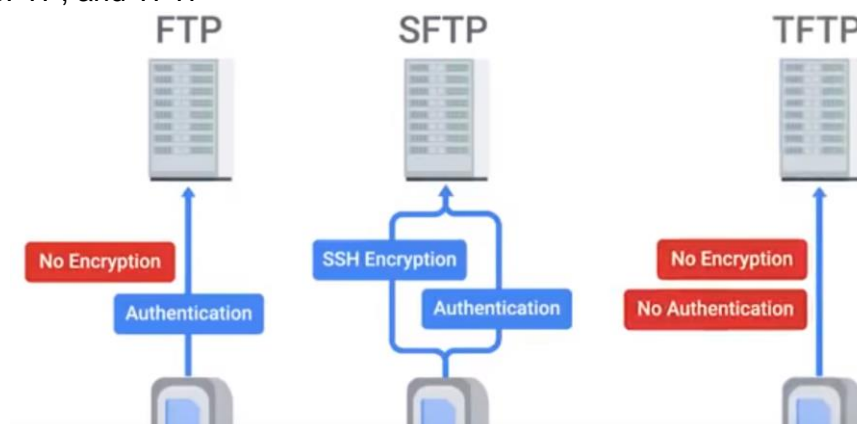
- Types of IT infrastructure services



- o **IaaS** - infrastructure as a service | AWS, GCP, Azure
- o **NaaS** - network as a service
- o **SaaS** - software as a service | Google Office, O365
- o **PaaS** - platform as a service | Heroku, Windows Azure
- o Directory services | AD, OpenLDAP
 - **DaaS** - directory as a service

Physical Infrastructure Services

- Server operating systems
 - o **Server operating systems** - regular operating systems that are optimized for server functionality
- Virtualization
- Remote access revisited
 - o Setting up OpenSSH in Linux
 - **sudo apt-get install openssh-client**
 - Install openssh server on client you want to access
 - **sudo apt-get install openssh-server**
- Network services
 - o FTP, SFTP, and TFTP



- NTP
- Network support services revisited
 - **Intranet** - an internal network inside a company; accessible if you're on a company's network
 - **Proxy server** - acts as an intermediary between a company's network and the internet
- DNS
 - **DNS** - Maps human-understandable names to IP addresses
 - DNS for web servers
 - DNS for internal networks
- DHCP

Troubleshooting Network Services

- Unable to resolve a hostname or domain name
 - Ping host / domain (confirm IP)
 - Use nslookup > copy non-authoritative IP and search in browser to determine if DNS is resolving
 - Check host file
 - Keep isolating until getting to root cause

Software & Platform Services

Software services

- Configuring communication services
- Configuring email services
 - Remember that the **A record** is used for hostnames, but for email servers, we use **MX** for the **mail exchange record**.
- Configuring user productivity services
 - When considering software licenses, it's important to review the terms and agreements
- Configuring security services
 - **HTTPS** - the secure version of HTTP, which makes sure the communication your web browser has with the website is secured through encryption

File services

- Network file storage
 - Network file system (**NFS**) - a protocol that enables files to be shared over a network
 - Samba
 - SMB is a protocol that Samba implements

Print services

- Configuring print services
 - **CUPS** (common UNIX printing system)

Platform services

- Web servers revisited
 - **Web server** - stores and serves content to clients through the internet
- What is a database server
 - **Databases** - allow us to store, query, filter, and manage large amounts of data

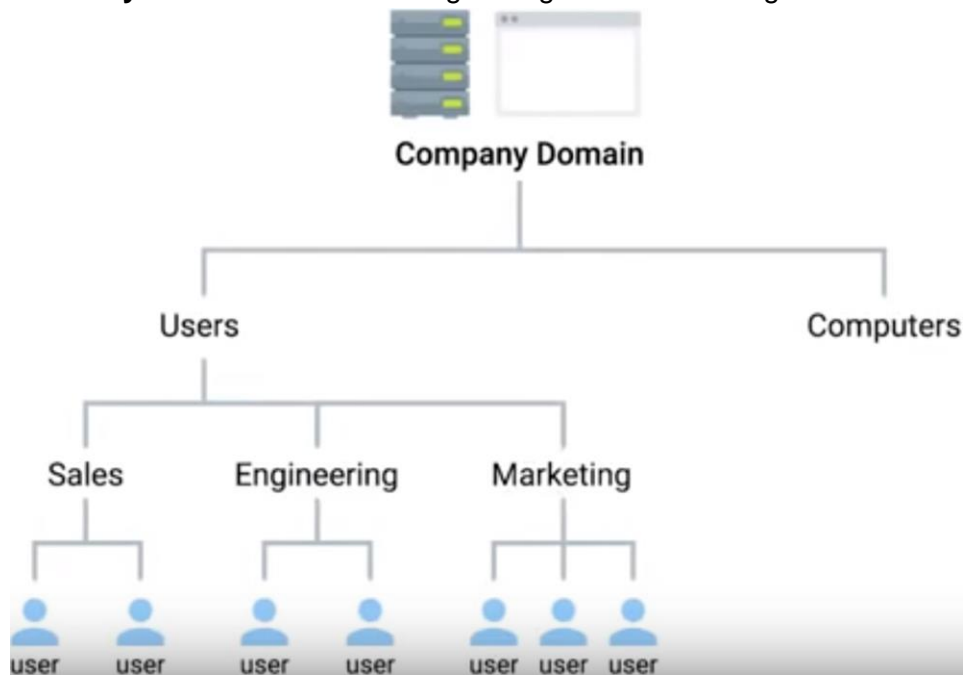
Troubleshooting platform services

- Is the website down
 - **HTTP status codes** are codes or numbers that indicate some sort of error or info messages that occurred when trying to access a web resource

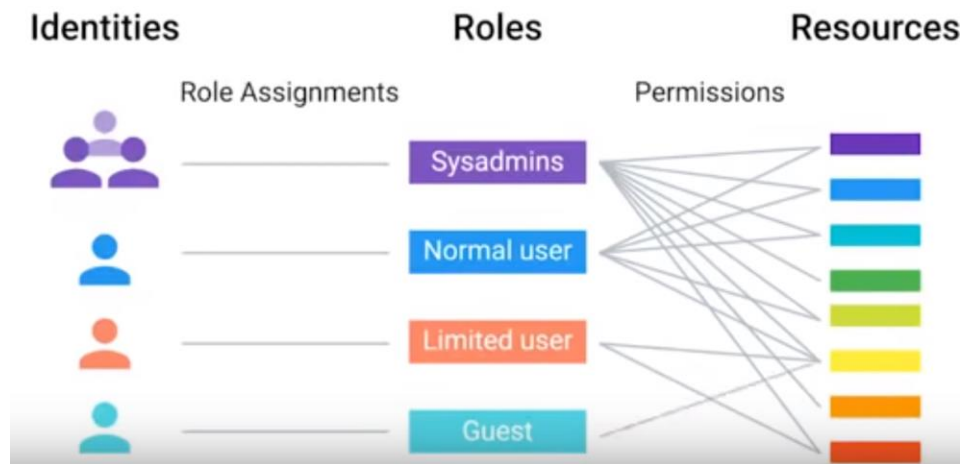
- **404** not found - indicates that the URL you entered doesn't point to anything
- HTTP status codes that start with **4xx** indicate an issue on the **client-side**
- The other common status code is **5xx**. These errors indicate an issue on the **server-side**
- Http status codes tell us more than just errors. They can also tell us when our request is **successful**, which is denoted by the codes that begin with **2xx**.

Directory Services

- Intro
 - **Directory server** - contains a lookup service that provides mapping between network resources and their network addresses
 - **Replication** - the stored directory data can be copied and distributed across a number of physically distributed servers, but still appear as one, unified datastore for querying and administering
 - **Directory services** - useful for organizing data and making it searchable for an organization



-
- Centralized management
 - A central service that provides instructions to all of the different parts of my IT infrastructure
 - Directory services provide centralized **authentication**, **authorization**, and **accounting**, aka **AAA**.

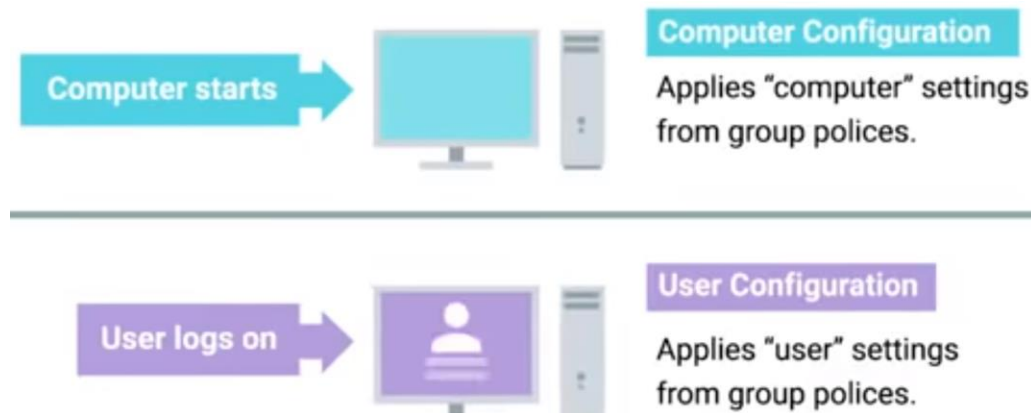


- LDAP

- LDAP is used to access information in directory services like over a network
 - Two of the most popular are AD & OpenLDAP
 - Kerberos - a network authentication protocol that's used to authenticate user identity, secure the transfer of user credentials, and more
 - LDIF - lightweight directory interchange format

- Active Directory

- AD - the native directory service for Microsoft Windows
 - ADAC - AD Administrative Center
 - Group Policy Object - a set of policies and preferences that can be applied to a group of objects in the directory
 - When you **link** a GPO, all of the computers or users under that domain, site, or OU will have that policy applied
 - A GPO can contain **computer configuration**, **user configuration**, or both

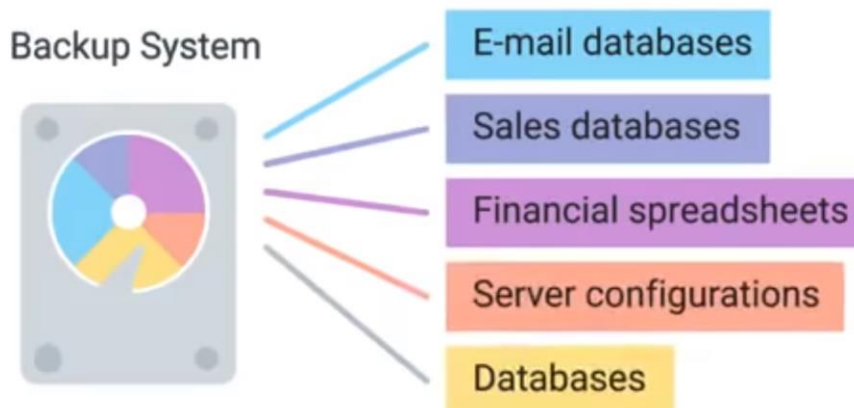


- Policies - settings that are reapplied every few minutes, and aren't meant to be changed even by the local admins
 - Group policy preferences - settings that, in many cases, are meant to be a template for settings
 - Windows Registry - a hierarchical database of settings that Windows, and many Windows applications, use for storing configuration data
 - GPMMC (group policy management console)
 - Default domain policy
 - Before making changes in GPO, always back up and test in non-production environment
 - AGPM - advanced group policy management

- When a computer is processing the GPOs that apply to it, all of these policies will be applied in **precedence** rules
- Troubleshooting
 - One of the most common issues you might encounter is when a user is not able to login to their computer, or isn't able to authenticate to the AD domain
 - A common issue that you might have to troubleshoot is when a GPO-defined policy or preference fails to apply to a computer
- OpenLDAP
 - Usually used in non-Windows OS environment (Unix, Linux)
 - Should / Can utilize **phpMyAdmin** for a GUI management interface
 - **Idapadd** - takes the input of an LDIF file and adds the context of the files
 - **Idapmodify** - modify an existing object
 - **Idapdelete** - will remove the object that the LDIF file refers to
 - **Idapsearch** - will search for entries in your directory database

Data Recovery & Backups

- Planning for data recovery
 - **Data recovery** - the process of trying to restore data after an unexpected event that results in data loss or corruption
 - The best way to be prepared for a data-loss event is to have a well-thought-out **disaster plan and procedure** in place
 - Disaster plans should involve **making regular backups** of any and all critical data that's necessary for your ongoing business processes
 - A **post-mortem** is a way for you to document any problems you discovered along the way, and most importantly, the ways you fixed them so you can make sure they don't happen again



- - Local storage
 - Pros: data is physically nearby, low bandwidth needs
 - Cons: data loss due to damage at location
 - Off-site storage
 - Pros: data is safe in multiple locations
 - Cons: needs security & encryption, needs large amounts of bandwidth
- Backup tools:
 - **Rsync** - a file transfer utility that's designed to efficiently transfer and synchronize files between locations or computers
- Testing backups:

- **Restoration procedures** should be documented and accessible so that anyone with the right access can restore operations when needed
- **Disaster recovery testing** should be done once a year
- It's a good practice to perform infrequent full backups, while also doing more frequent differential backups
- Redundant array of independent disks (**RAID**)
 - A method of taking multiple physical disks and combining them into one large virtual disk
 - RAID is **not** a replacement for backups