



# DNS and Directory Servers

Module 6

# Module 6 Agenda

- DNS
- Packages 
- bind9
- Directory Servers

# Domain Name System (DNS)

# Domain Name System (DNS)

## Warm-up Video time:

- Hey! Welcome to module six, where we will be covering the topic of DNS. We'll learn about its role within the larger internet and how to set up our own DNS server during the activity.
- Before you proceed in this slideshow, watch the following video talking about DNS up to the 2:30 minute mark. [Video](https://www.youtube.com/watch?v=mpQZVYPuDGU) (<https://www.youtube.com/watch?v=mpQZVYPuDGU>)
- The “PowerCert” YouTube channel always has great IT-related content.

# Domain Name Systems (DNS)

- As you've seen, computers operated through numbers.
  - The most important numbers on the Internet are IP addresses.
- Web addresses like `www.google.com`. are just translated version of IP address, so human can easily remember them.
- When you type a domain name (`www.google.com`) into your search bar, your computer goes to work in translating it into its IP address.

# Domain Name Systems (DNS)

- **The Domain Name System (DNS)** converts domain names (i.e. `www.google.com.`) into IP addresses.
  - Think of the DNS as a telephone directory for the internet. It is used to map a name to its IP address.
- DNS is composed of what are called name servers.
  - Resolving name servers (internet providers)
  - Root name servers
  - Authoritative name servers

# Domain Name Systems (DNS)

- Resolving Name Servers
  - The first step of DNS.
  - After searching the domain name, it is sent to the resolving name server. This is normally your internet provider
  - Your internet provided has a list of frequently searched domains and their IP addresses in storage. This list is called a cache.
  - If the resolving name server does not have the domain name and its IP address stored in its cashe, it calls the root name server.

# Domain Name Systems (DNS)

- Root Name Servers
  - DNS then works backwards in translating the domain name to its IP address.
  - The domain name ([www.google.com](http://www.google.com)) is sent to the root servers.
  - Root servers stores the top level domains (TLD).
    - TLD's are website suffixes (.com, .edu, .gov, .org, etc.)
  - The root server guides the DNS to where the TLD name server is located.



# Domain Name Systems (DNS)

- Authoritative Name Servers
  - The TDL name server stores all the informations for the domain names of a certain web suffix (.com, .edu, .gov, .org, etc.)
  - This information leads the DNS in finding the authoritative name servers.
  - The authoritative name servers are usually the domain providers.
  - It stores the complete IP address for the specific domain name.
  - The IP address is then sent back to the OS to start downloading.

# Packages

# Packages

## What are Packages?

- In essence, packages in Linux are small programs that help us manage other programs.
- **Packages** help us install, remove and update software within our Linux machine.
- Dealing with packages may seem a bit tedious, but they actually save us a lot of time and headaches. Rather than resorting to doing this manually, packages do it for us.
- The syntax of a lot of these commands will look familiar to you, especially the keyword “apt”. This is because Kali Linux uses the “apt” package manager.

# Packages

- Package Manager:
  - accesses, installs, updates, and removes software.
  - some certain package manager comes already installed in each and every Linu
- Package Commands:
  - **apt install <package>**
    - installs a specific package
  - **apt remove <package>**
    - removes binaries from specific packages while keeping the configuration files

# Packages

- Package Commands:
  - **apt purge <package>**
    - removes everything in a specific package
  - **apt autoremove**
    - removes automatically installed packages that do not support the dependencies of the current package
  - **apt update**
    - updates the package database
  - **apt upgrade**
    - upgrades packages to the latest version in the package database

# Packages

- Package Commands:
  - **apt full-upgrade**
    - upgrades installed packages and removes any that interfere with the whole system upgrade
  - **apt search <package>**
    - searches package names and their package database descriptions
  - **apt show <package>**
    - shows information about a specific package

# Packages

## Why do Packages matter?

- Two important package-related commands are **sudo apt update** and **sudo apt full-upgrade**
- They are important because sometimes you might not see the results of a system configuration until you execute these commands and restart your computer.
- These two commands also help the user keep programs and as a result your computer as a whole, up-to-date.
  - Keeping your system updated is critical for patching up old bugs or flaws that you or the package author may have introduced.

# Packages

- Package Integrity:
  - To insure a package has not been tampered with we can install the command **debsums**.
    - **sudo apt install debsums**
  - When you run the command **debsum\_init**, it will create hash files for packages.
  - As a class, use the **man** command to determine how to output changed files.
    - This command should not output any files if they have not been tampered with.



**bind9**

# bind9

## What is it?

- bind9 is a tool used to set up and manage a domain name server.
- bind9 is the latest version of the software program.
- In Activity 1, this program will contain files to help configure your DNS forward and reverse lookup zones

# Directory Servers

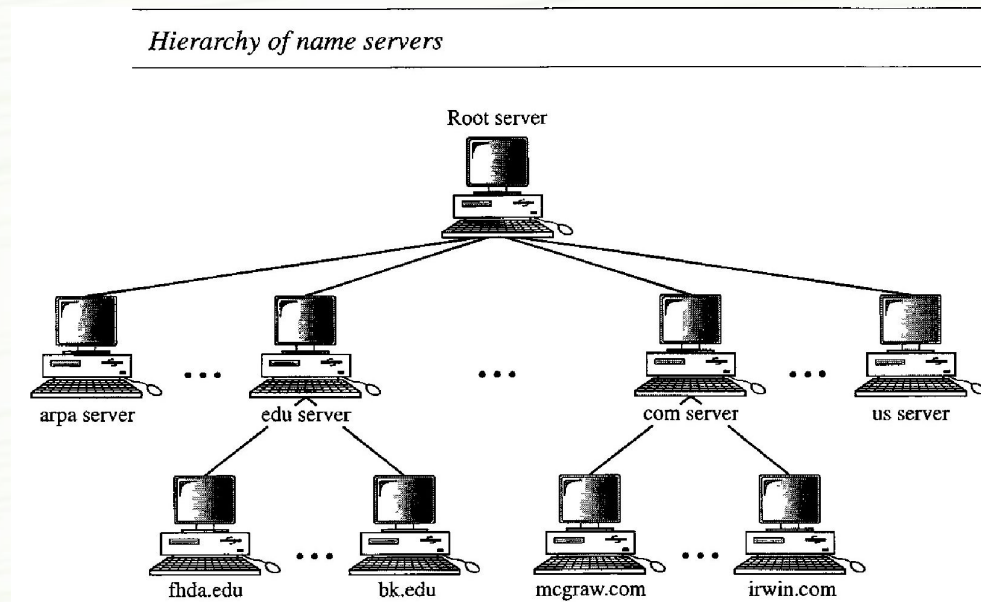
# Directory Servers

- A **directory service** is a collection of softwares that store information about clients.
  - Examples:
    - Domain Name Systems (DNS)
    - Lightweight Directory Access Protocol (LDAP)
  - Directory services are provided by directory servers.
- **Directory servers** are the maps of information.
  - Directory servers can store anything from IP addresses, to names, emails, dates, and numbers.

# Directory Servers

## Important terms:

- **Hierarchical naming model:** used to store the directory information. (mapping)



# Directory Servers

## Important terms:

- **Replication:** directories are copied on more than one server.
  - Makes information for accessible, and it is a backup for server failure
- **Schema:** the type of information that can be store in a directory
  - Most of the time it is extendable (new types of data can be added in)

# Directory Servers

Quick video for understanding...



[https://youtu.be/M1eE\\_hGEKNY](https://youtu.be/M1eE_hGEKNY)

# To Do

- ❑ Complete Activity One
- ❑ Catch up on past assignments
- ❑ Have some fun with the provided cyber security games! (on the outline)



# End of Module 6!

What questions do you have?

Next Module Topic:

**Active Directory and Email!**

# Questions?

Contact IT-Adventures support staff!

email:

[ita@iastate.edu](mailto:ita@iastate.edu)

Your school's IP-Range can be found at:

<http://www.it-adventures.org/ip-ranges/>