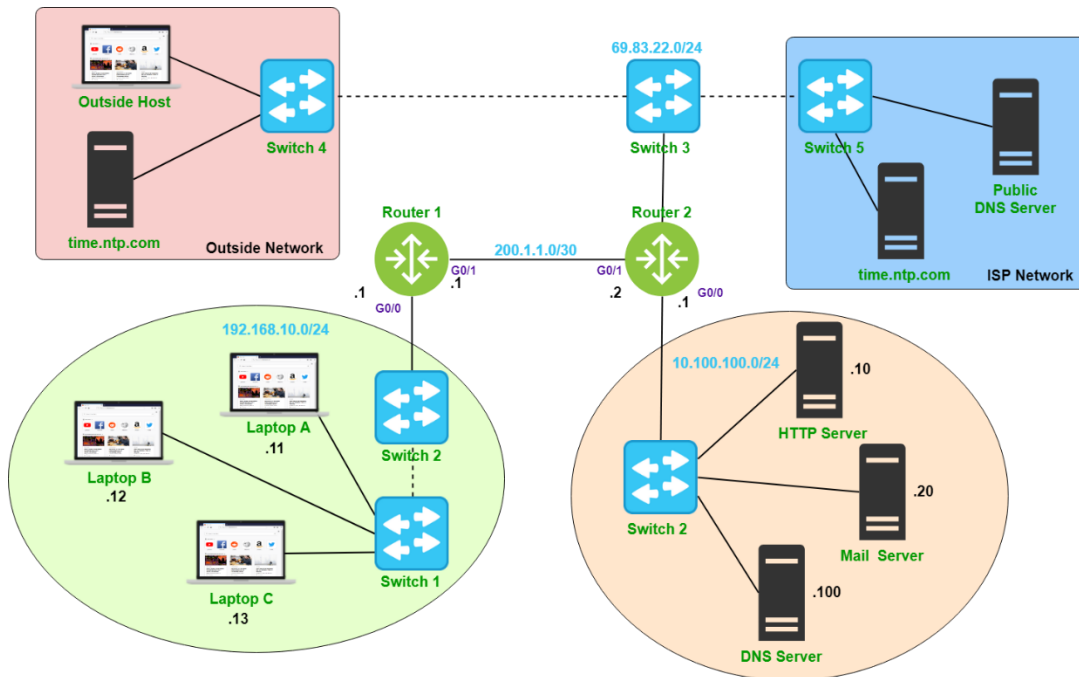# Lab 5 – DNS & NTP

Lab Topology and Learning Goals

Continuing our investigation of network protocols, in this lab we will configure and explore protocols operating in layer 7 of the OSI model.

Lab Instructions and Required Resources

- Complete this lab in the Packer Tracer file: **INFO-6078 – Lab 5 – DNS & NTP.pkz**
- Take Lab Quiz: **Lab 5 - Requires Respondus LockDown Browser**

Domain Name System (DNS) Operation

DNS is an application layer protocol that is used to convert a Fully Qualified Domain Name (FQDN) into other host names and IP address. DNS uses numerous record types tailored for the protocols it supports.

Observe a Failed DNS Request

- On **Laptop A** open the **Web Browser** and navigate to **www.fanshawe.ca;** it will take a moment, but the page will fail to load
- Open the **Command Prompt** and attempt a manual lookup for the record corresponding to **www.fanshawe.ca** with the command: **nslookup www.fanshawe.ca;** again, the lookup will fail
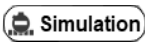
Simulation Observe a Successful DNS Request

- Switch to **Simulation Mode**
- On **Laptop A** return to the **Web Browser** and navigate to **www.outside.com**
- Increase the speed of the simulation and press the play button so that the simulation automatically moves to the next step
- After about a minute, the simulation will successfully load the web page; sometime later, the image will appear on-screen
- Return to Realtime mode
- Open the **Command Prompt** and attempt a manual lookup for the same record
- Observe the response

Observe Existing Records on the DNS Server

- Open the internal **DNS Server** and switch to the **Services** tab, then select **DNS** from the left menu
- Observe the records that exist on the server including the record types (it is not typical for a DNS server to contain records for every accessible domain, this is due to the limited DNS implementation on Packet Tracer)
- The **Public DNS Server** in the ISP Network hosts both the **outside.com** zone and the **ntp.com** zone, the internal DNS server references this server for records in this zone based on the **NS** record configured
- View the records contained on the **Public DNS Server**; we will not be modifying records on this server

Configure a DNS Host Record for www.fanshawe.ca

- On the internal **DNS Server**, create a new host record for **www.fanshawe.ca** that points to the **HTTP Server**
- Test the new record by opening the **Web Browser** on **Laptop B** and navigating to **www.fanshawe.ca;** the page should now load

- Open the **Web Browser** on the **Outside Host** and navigate to **www.fanshawe.ca**; does the web page load?

Configure the Internal DNS Server to access ntp.com

- The internal **DNS Server** has a host record that points toward the **Public DNS Server**, and is configured to reference the public server for records related to the **outside.com** domain
- The **Public DNS Server** also hosts the **ntp.com** domain; however, the internal network is not configured to access this domain
- Open the **DNS Zone** for the internal network and configure a new **A Record** for the **ns.ntp.com** domain that points to the IP address of the **Public DNS Server**.
- Test the new record by opening the **Command Prompt** on **Laptop B** and sending a ping to **time.ntp.com;** if you do not receive a response, troubleshoot this step before continuing

Lab 5 – DNS & NTP

Configure Network Time Protocol (NTP)

Network Time Protocol (NTP) is used to synchronize time across network devices. NTP is synchronized in a hierarchical manner, often from a source located on the internet.

Configure Router 2 to Receive Time Via NTP from time.ntp.com

Configure an authentication key
Router2(config)# ntp authenticate
Router2(config)# ntp authentication-key 1 md5 cisco
Router2(config)# ntp trusted-key 1

Configure NTP to get time from time.ntp.com
Router2(config)# ntp server 69.83.22.20

Wait a minute or two and confirm that Router 2 has an association with the NTP server
Router2# show ntp association
In what stratum does the NTP server reside in?

View additional information with about the NTP configuration
Router2# show ntp status

Correct the Time Zone on Router 2

View the current time on Router 2
Router2# show clock

Router 2 is currently configured to display time in the UTC time zone. To change the current time zone, based on the season, use the **clock timezone** command
Router2(config)# clock timezone EDT 0
Router2(config)# clock timezone EST 0

Configure Router 1 to Receive Time Via NTP from Router 2

Configure an authentication key
Router1(config)# ntp authenticate
Router1(config)# ntp authentication-key 1 md5 cisco
Router1(config)# ntp trusted-key 1
Router1(config)# ntp server 200.1.1.2