OPS335 - Assignment 1 (Part 2)

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Contents

Purpose

In this assignment, you will use the **335assign** virtual network and the **cloyne** cloning-source that you created in assignment 1 (part 1) to create two name-servers. One of the cloned VMs (hostname: **toronto**) will be a **master** name server, and the other VM (hostname: **ottawa**) will be a **slave** name server. You will install and setup the master and slave servers in order to provide various domain name resolutions for existing servers, and for servers that will be created and used in assignment #2.

General Requirements

Weight: 7% of the overall grade

Due Date: During **Week 9** (in class)

Detailed Requirements

> ⚠️ **It is YOUR responsibility to Backup all of your VMs for this Assignment!**
> You are required to frequently backup your VMs prior to exiting a work session during this assignment. Your instructor will NOT accept the fact that your hard disk crashed and lost all of your work. If you properly backed up your VM images and xml configuration files to a USB, then you can purchase a new hard-disk or wipe and recreate your hard disk and restore your VMs.

Set-up Master Name Server (toronto)

Perform the following steps for this section:

1. Create a clone virtual machine called **toronto** from the **cloyne** cloning-source. Refer to the table below for **address** and **hostname**.
2. Create a **regular user** for this virtual machine using **your Seneca userID**.
3. Setup a DNS server on your **toronto** virtual machine noting the following items below:
   a. This virtual machine will be the **Master DNS server** for **towns.ontario.ops**.
   b. Only **ottawa** will be allowed to obtain zone transfers of this zone.
   c. This machine will provide **forward** and **reverse** lookups of ALL virtual machines in the **towns.ontario.ops.** zone, including resource records for virtual machines that do not currently exist.
   d. You MUST use the following names for both the forward and reverse zone files in **/var/named** directory: **mydb-for-towns.ontario.ops** and **mydb-for-172.17.15**
   e. Include an **MX record** for email sent to the domain to be directed to **kingston.towns.ontario.ops**.
   f. Any machine in the **towns.ontario.ops** network may use this machine to perform queries of machines outside the network, however it will route all such queries through the DNS server you created in lab #3.
   g. For machines outside the **towns.ontario.ops** domain, it will only answer queries about machines inside the network. They may not use it to query other machines.

Set-up Slave Name Server (ottawa)

Perform the following steps for this section:

1. Create a clone virtual machine called **ottawa** from the **cloyne** cloning-source. Refer to the table below for **address** and **hostname**.
2. Create a **regular user** for this virtual machine using **your Seneca userID**.
3. Setup a DNS server on your **ottawa** virtual machine noting the following items below:
   a. This virtual machine will be the **Slave DNS server** (in case the Master Name Server goes down).
   b. This virtual machine will obtain its zone files by copying them from the Master Name Server.
   c. This Slave DNS server will check for updated records from the Master DNS server every two days. If the initial attempt fails, then it will attempt every six hours until it succeeds, or one week has passed.
   d. This machine will provide **forward** and **reverse** lookups of ALL virtual machines in the **towns.ontario.ops** zone, the zone files for which will be obtained from **toronto.towns.ontario.ops**.
   e. Only machines within the **towns.ontario.ops** domain will be allowed to query this machine.
   f. This machine will not provide recursive lookup capabilities for any machines.

Network Configuration

As you will now have functioning primary and secondary DNS servers, modify your network configuration file on these machines and on the cloning source to specify the correct IPADDR.

Table of Virtual Machines / DNS Records

All the machines in the following table require DNS records. The rows not shaded represent future servers that will be created in Assignment #2.

Hostname / Domain	Address	Purpose
york.towns.ontario.ops (your existing host)	External Facing Address: **DHCP assigned** Internal Virtual Bridge (virbr1): **172.17.15.1**	Your **host** machine
cloyne.towns.ontario.ops	**172.17.15.100**	**Cloning-source** used to create other servers for other assignments.
toronto.towns.ontario.ops	**172.17.15.2**	**Master** Name Server
ottawa.towns.ontario.ops	**172.17.15.3**	**Slave** Name Server
kingston.towns.ontario.ops	**172.17.15.5**	**SMTP** mail Server
coburg.towns.ontario.ops	**172.17.15.6**	**IMAP** mail Server
milton.towns.ontario.ops	**172.17.15.8**	**Samba** Server

Set-up Firewall Policies

In addition to the basic firewall established in assignment 1, ensure the following restrictions are met:

1. Any machine may query **toronto**
2. Only the machines in the **towns.ontario.ops** network may query ottawa.

Assignment Submission

The student is required to prove to their professor that their set-up works correctly during the regularly-scheduled lab period.

Assignment Evaluation Details

- **Demonstrate working assignment to your instructor in class:**
  a. Students need to demonstrate their assignment functionality to their professor during a lab period (like you would for any lab for "sign-off").
  b. Students are required to prepare everything ahead of time so that you can quickly demonstrate to your instructor that all required parts of your assignment are working.
  c. **Do not proceed to the next step** until you have demonstrated your assignment to your instructor to check for errors that may cause problems when running the checking script.

- Download and run a shell script to check your work (Depending on your OPS335 Instructor):

      Peter Callaghan's Classes (Section **D**):
- Refer to instruction on blackboard for instructions on how to submit this assignment.

      Murray Saul, Ryan Lockhart-Thompson and Colin Yip:
1. Login as **root** on your **host** machine.

2. Change to the **/root/bin** directory.
3. Make certain that your **cloning-source (**cloyne**), DNS servers (**toronto **and** ottawa**) VMs are running**.
4. Make certain that the mailx command has been installed. If not, issue the following command to install e-mail on your **host** machine:

```
yum install mailx
```

5. Issue the command to download a checking script for your assignment to your **host** machine:

Murray Saul's classes (section A): wget
https://matrix.senecacollege.ca
/~murray.saul/ops335/check-assn1-p2-
murray-saul.bash

Ryan Lockhart-Thompons's classes (Section B)::
wget https://matrix.senecacollege.ca
/~murray.saul/ops335/check-assn1-p2-
ryan.bash

Colin Yip's classes (Section C, E, and F):: wget
https://scs.senecac.on.ca/~colin.yip
/2187/check-assn1-p2-colin.bash

Set execute permissions and run the shell script.
(Your shell script contents will be mailed to your Seneca email and to your OPS335 instructor's Seneca email.

If you do **NOT** receive an e-mail message in your Seneca email account, then there is a problem, and you **MUST** rerun or contact your OPS335 instructor immediately.

Evaluation Rubric

Here is an evaluation rubric (in table form) showing you how you will be evaluated for this assignment. Part of the rubric is marked from professor observation from student demonstration of assignment in class, and the other part is based on output from the results of an assignment checking script that the student will download and run.

Student Demonstration (in class)	
Evaluation Item	**Mark**
toronto and **ottawa** VMs created	/1
toronto and **ottawa** VMs can perform **DNS queries of vm1, vm2, vm3**	/1
toronto and **ottawa** VMs can perform **forward DNS lookups** for ALL machines within network (listed in the table above)	/3
toronto and **ottawa** VMs can perform **reverse DNS lookups** for ALL machines within network (listed in the table above)	/3
Zone transfer occurs	/3
Configuration (Checking Script Output)	
Evaluation Item	**Mark**
Master Name Server (toronto) - Network Configuration	
correct static network configuration (one mark for each network config item)	/5
Master Name Server (toronto) - Named Configuration Options / Zone Declarations	
Zone transfer (i.e. to slave DNS server) limited to **ottawa** only	/1
Allows forward and reverse lookups to **towns.ontario.ops**	/1
Recursion limited to **towns.ontario.ops** only	/1
toronto server is the **master** name-server for towns.ontario.ops	/1
Master Name Server (toronto) - Zone Record	
SOA - two common options (determined by instructor at time of marking)	/2

Correct **NS** records in forward zone	/2
Correct **NS** records in reverse zone	/2
MX record	/1
Slave Name Server (ottawa) - Network Configuration	
correct static network configuration (one mark for each network config item)	/5
Slave Name Server (ottawa) - Named Configuration Options	
Queries are limited to **towns.ontario.ops**	/1
Slave server is **Non-recursive**	/1
Allows forward and reverse lookup for **towns.ontario.ops**	/1
ottawa server is **slave** name-server for **towns.ontario.ops**	/1
Firewall policies	
toronto allows queries from any machine (i.e. will work with **vm1**, **vm2**, **vm3**)	/2
ottawa limits queries to **towns.ontario.ops** (i.e. won't work with **vm1**, **vm2**, **vm3**)	/2
Less Deductions (1 mark per issue for EACH VM):	
- Not using zone filenames: **mydb-for-towns.ontario.ops** and **mydb-for-172.17.15** **VM hostname** NOT set - firewalld **enabled** / **running** - iptables **disabled** / **not running** - No **Yum update** **Named** NOT active - Local hostname resolution appears in **/etc/hosts** (1 mark per entry, per vm) - Neglecting major safeguards (e.g. no firewall present, firewall allowing all traffic, no active SELinux) (**4 marks per issue, per VM**) - Failing to backup VMs (**1 mark deduction for each**	

VM not backed up)	
TOTAL	**/40**

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