

Lab Exercises

Lab 9

Objective

You will

- install an open source Data Centre Infrastructure Management (DCIM) tool on top of our LAMP stack called RackTables (<http://racktables.org>).
 - create a virtual host of the Apache server
-

1. Install RackTables on the server VM

RackTables uses a web-server with PHP for front-end and a MySQL server for back-end. The most commonly used web-server for RackTables is Apache web server.

You already have MySQL server installed from a previous lab and almost all of the Apache2, MySQL and PHP libraries required. However, some further installation of modules and configuration are required for RackTables to work.

a. Prepare MySQL server

MySQL server is already installed in the earlier lab when the Ubuntu Linux server VM is installed. You need only enable Unicode in the MySQL server as follows.

```
sudo sh -c 'printf "[mysqld]\ncharacter-set-server=utf8\n" >
/etc/mysql/conf.d/charset.cnf'
sudo service mysql restart
```

b. Install additional PHP modules

PHP is already installed in the earlier lab when the Ubuntu Linux server VM is installed. You need install some additional modules for PHP that RackTables requires.

It is a good idea to update the package list and/or upgrade the available updates each time when you need to install packages from the distribution repository.

```
sudo apt update
sudo apt install php7.4-mbstring php7.4-bcmath php7.4-snmp php-gd
```

c. Install RackTables

- Download RackTables

On your Ubuntu server VMs, we will grab the software via `wget` (`man wget` if you are curious):

```
cd /tmp
wget https://github.com/RackTables/racktables/archive/RackTables-0.21.5.tar.gz
tar xvfz RackTables-0.21.5.tar.gz
```

- Relocate the decompressed RackTables files to Apache document folder and set proper ownership

```
sudo mkdir /var/www/racktables
sudo cp -R /tmp/RackTables-0.21.5/wwwroot /var/www/racktables
cd /var/www
sudo chown -Rh www-data:www-data /var/www/racktables
```

2. Create a virtual host of the Apache server

- Create a new file in the Apache2 area on the server VM:

```
sudo pico /etc/apache2/sites-available/racktables.conf
```

and enter the following content

```
<VirtualHost racktables.abc123.test:80>
  ServerAdmin your@email.address
  DocumentRoot /var/www/racktables/wwwroot
  ServerName racktables
  <Directory /var/www/racktables/wwwroot>
    Options FollowSymLinks
    AllowOverride All
  </Directory>
  ErrorLog /var/log/apache2/racks-error_log
  CustomLog /var/log/apache2/racks-access_log common
</VirtualHost>
```

Save and exit.

- Enable the virtual host

```
sudo a2ensite racktables
sudo systemctl reload apache2
```

- Add a domain name to the DNS forward zone file on the server VM

Edit the forward zone file for abc123.test domain to add an alias for racktables. (How?)

Do not forget restarting the DNS server. (How?)

Verify the DNS working for your new host name. (How?)

Note: If your DNS works well, you do not need to the following.

If your DNS server still has problems to work properly, you can add the host name to the local hosts file as:

```
sudo pico /etc/hosts
```

Add the following line to the file:

```
10.0.2.100 racktables.abc123.test
```

Save and exit.

3. Configure and initialise RackTables

If you point your web browser to the following link from your desktop VM:

```
http://racktables.abc123.test
```

You should see a page showing "Configuration error" indicating a missing configuration file (/var/www/racktales/inc/secret.php). Now let's create one on the server VM.

```
sudo touch '/var/www/racktables/wwwroot/inc/secret.php'
sudo chmod a=rw '/var/www/racktables/wwwroot/inc/secret.php'
```

(Don't worry, we will change those permissions to something more sensible in a moment)

Now click to launch the installer from the browser on your desktop VM as instructed on the page.

You will now transition to a web based installer. You should see a page showing steps to "install" the RackTables. Follow the instructions to configure and initialise RackTables.

- RackTables installation: step 1 of 7

Click Proceed.

- RackTables installation: step 2 of 7

NOTE that there may be some yellow warnings present... this is because you are in a 2 hour lab – we can't address it all. A production instance would be further configured, and these warnings addressed. For now, you should see no red items and plenty of green, some yellow.

Click Proceed.

- RackTables installation: step 3 of 7

No database set up yet? No problem. Follow the instruction to create one.

Now create the database on your server VM.

```
sudo mysql

mysql> CREATE DATABASE racktables_db CHARACTER SET utf8 COLLATE utf8_general_ci;
Query OK, 1 row affected (0.02 sec)

mysql> CREATE USER racktables_user@localhost IDENTIFIED BY 'racks';
Query OK, 0 rows affected (0.04 sec)

mysql> GRANT ALL PRIVILEGES ON racktables_db.* TO racktables_user@localhost;
Query OK, 0 rows affected (0.00 sec)

mysql> set global log_bin_trust_function_creators=1;
Query OK, 0 rows affected (0.00 sec)

mysql> quit
Bye
```

That 'racks' part above is your mySQL admin password to Racktables. You can change it later if desired.

(Don't worry about understanding the content of this part of the installation – it is outside of the scope of this course. But you need this to happen to make Racktables work in your VM.)

Now enter the password 'racks' without quotes into the password field on your RackTables installer page on your desktop VM and click Retry.

Click Proceed.

- RackTables installation: step 4 of 7

Follow the instruction to set ownership and/or permissions of secret.php file on your server VM as:

```
sudo chown www-data:nogroup /var/www/racktables/wwwroot/inc/secret.php
sudo chmod 440 /var/www/racktables/wwwroot/inc/secret.php
```

Click Retry then click Proceed.

- RackTables installation: step 5 of 7

It should say that

```
Initializing the database...
done
```

Click Proceed.

- RackTables installation: step 6 of 7

Step 6 asks for an admin password. Use 'racks' again (without quotes).

Click Retry then click Proceed.

- RackTables installation: step 7 of 7

You will see "Congratulations!" for you to complete the RackTables installation.

Click Proceed.

You will eventually be presented with a pop-up dialogue asking for authentication to RackTables.

Login with the username of admin and the password of racks.

You have now successfully configured and initialised RackTables.

4. Configure your data centre

(If there is no response from your operation on the web page, you may need to shut down the server VM and edit VM to increase the Memory, say, to 4GB.)

Let's add some hardware to manage. But first we must configure some space in which to put them.

- Customise RackTables page header

Click the Racktables Administrator link (top right) and the Quick links tab.

Scroll down and check the box for Configuration.

Now click the "save changes" icon at the bottom (a blue arrow rolls onto a grey disk)

- Set Enterprise name

You should now see a Configuration option at the top near the IPv4 space option. Click that, then look for the User Interface link on the left and click it, and select the Change tab.

Scroll down the page until you find the enterprise textbox, and change the value to ABC123-*yourusername* and click the "save changes" icon at the bottom.

- Create Racks at a location

On that top black and blue line, now click the Rackspace option. You don't have any data yet. That is ok.

Select the Manage Locations tab and set up a site called Tycho. Click "add new location" icon at the right.

Select the Manage rows tab and select the location: Tycho

Now add a single row (of racks) called Armstrong. Click "add new location" icon at the right.

- Create some objects

You will need to create some Objects to go in that site before you can say where they will go. So select the Objects option now and the Add more tab. You can add a few at once, so let's add:

1. Cisco Catalyst 3850 switch
2. Cisco 2921 router
3. Ubuntu 18.04 Server

Select proper Object type and use the same for Common name and Visible label. Use ABC123-*serialNumber* format to create an Asset tag for each.

Once add all details for your objects, click Go! button.

- Add a rack at a location

Start by adding a rack at a location.

Go to Rackspace and select your Armstrong row at the Tycho.

Select Add new rack tab and provide the Name as One. Change the Height in units to 5. Click "add new location" icon bellow.

Then view it.

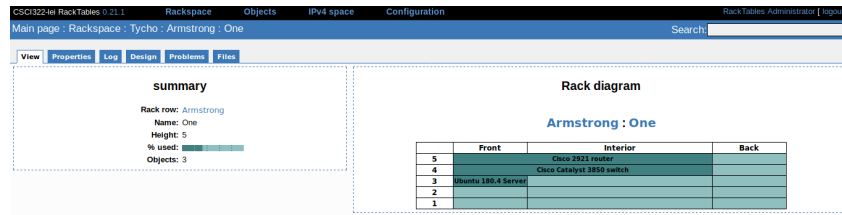
- Put your object on the rack

Return to the Objects option and select your Cisco 2921 router from Browse tab.

And select the Rackspace tab (white on blue), and tick the appropriate boxes to show its location in working copy (Put it at the top of the rack, occupying front and/or interior portions.) Then click Save in the middle.

Repeat the above steps for your switch and server. Save it each time.

Choose the Rackspace option again (blue on black), and select your rack (One) to view it. (The view tab opens by default). You should now see a rack diagram similar to the following.



Submission and mark

Show your work to the teacher.

Of 6 marks, you can get

- 1.5 for installing RackTables by showing the installer page in your browser (Task 1&2);
- 3 for demonstrating that your RackTable instance is running by showing the main page in your browser (Task 3);
- 1.5 for showing some hardware in the Tycho:Armstrong:One rack (Task 4).

You should be ready to answer any questions to demonstrate that all work is done by yourself otherwise you may receive 0 mark.

IMPORTANT NOTE: You will need to document all of your lab work in your wiki.