

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\n/conf.d/charset.cnf'\nsudo 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\nsudo apt install php7.2-mbstring php7.2-bcmath php7.2-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://nchc.dl.sourceforge.net/project/racktables/RackTables-0.21.3.tar.gz
tar xvfz RackTables-0.21.3.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-0.21.3/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> 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.

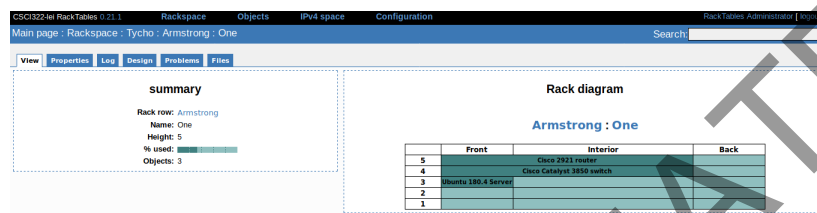
- Put your object on the rack

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.