Due Date: Sep 12, 2018 @ 6:00 PM PST

Lab 1: Hubs versus Switches in Small Business LAN

Goal

The goal of this lab is to compare performance of pure hub LAN with switched LAN in a tiny network.

Overview

We will create two scenarios. In one scenario there are five workstations that connect to a web server via a hub. Relevant performance statistics will be collected at both the workstations and the server. The same will be done in a second scenario except that instead of a hub it will be a switch facilitating the connection between server and workstations.

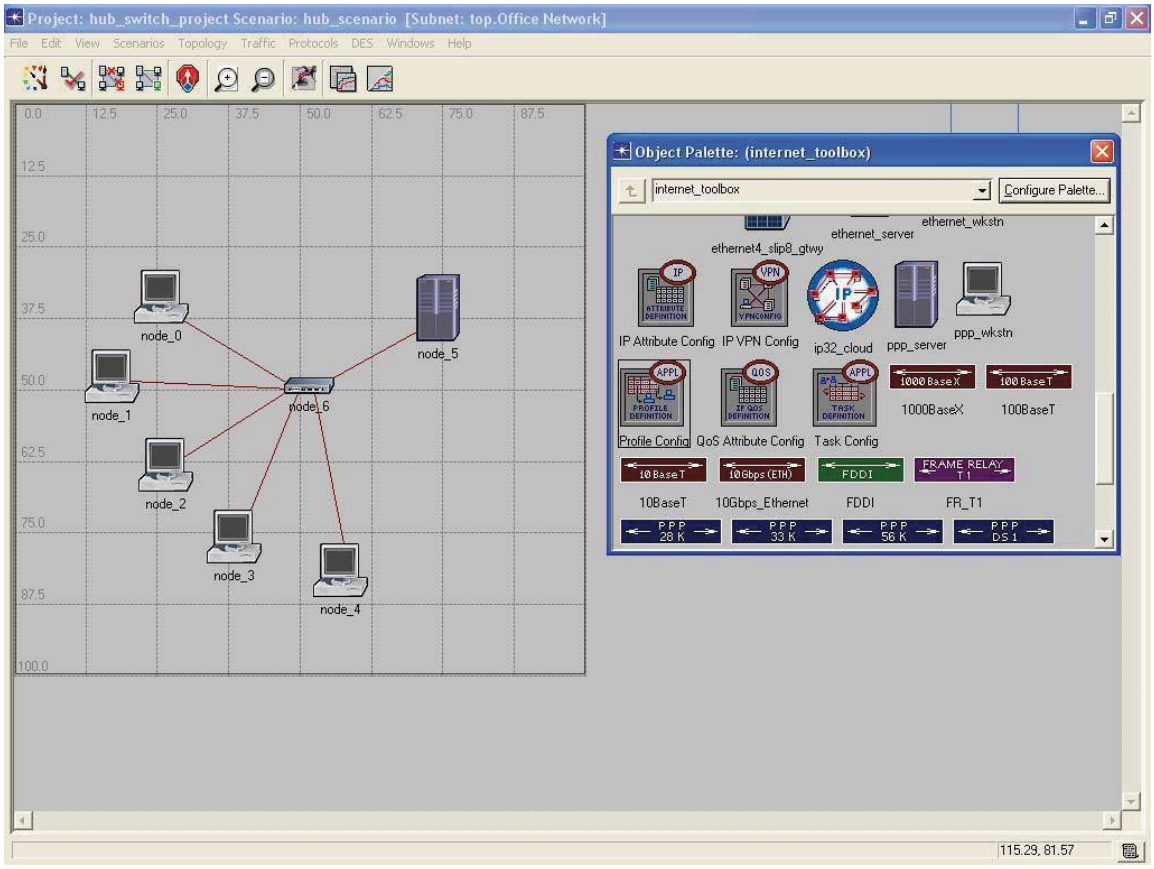
IT Guru Step by Step Procedure

Step 1. Launch IT Guru and create a new project – hub_switch_project.

Step 2. Create a scenario – hub_scenario. Later we will add another scenario into the same project - switch_scenario.

Step 3. Choose the default model library and default scenario dimensions.

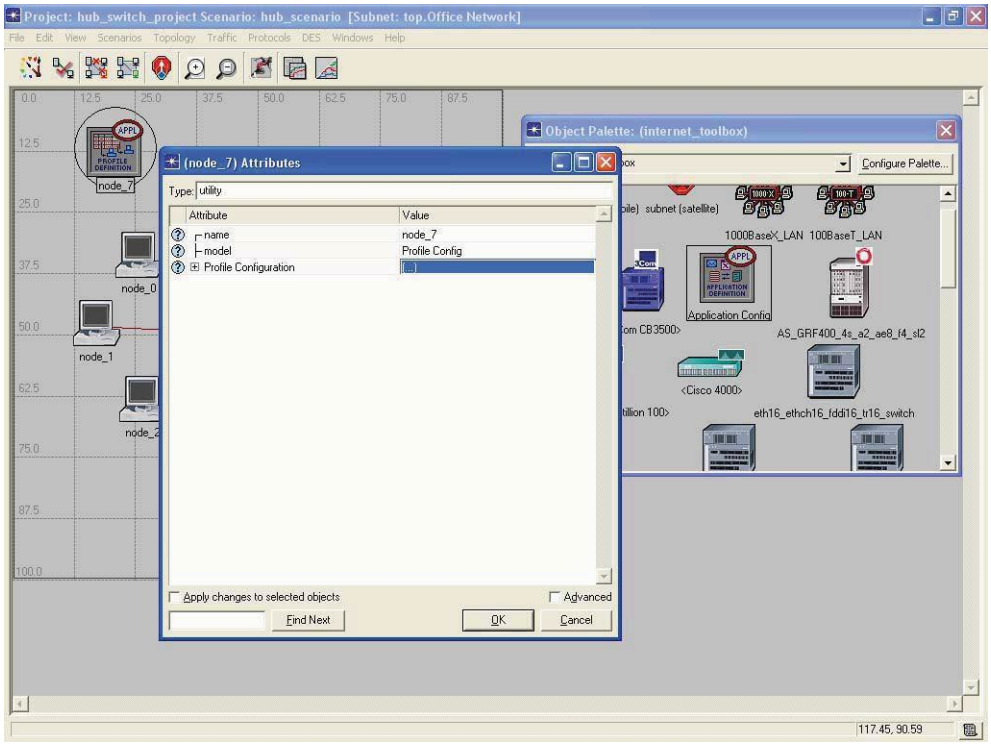
Step 4. Drag five Ethernet workstations and a Server into the construction area and connect them up with the aid of a hub. The topology should look like the screen capture below:



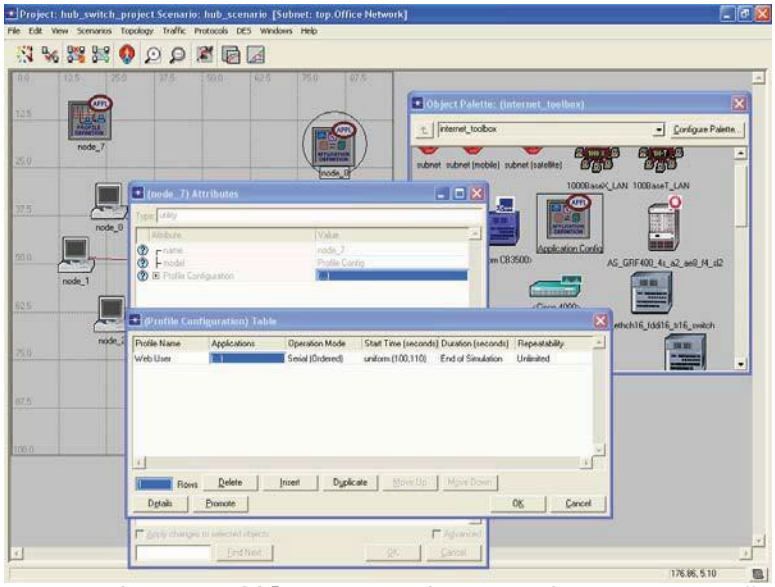
Step 5. Add profile and application nodes.

Step 6. Open the attributes window for application node and select “Default” for the Application Definitions row. This makes all standard network applications available for use in our topology – HTTP, FTP, E-Mail, Database, etc.

Step 7. We will create a custom profile – web application user profile – let us call the profile “web user.” To get there, go under the edit box – attributes window - for the profile. It looks as follows.

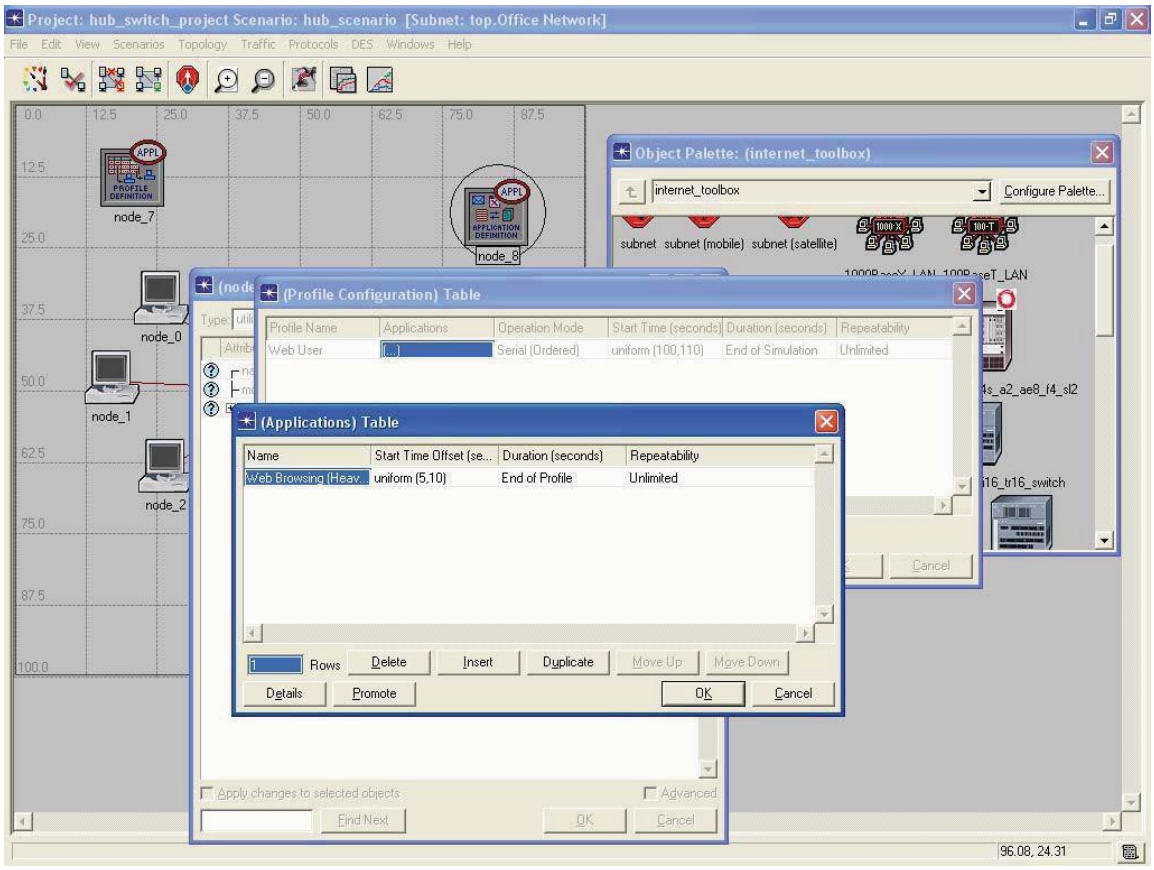


Go to profile configuration – it is highlighted above – and select “edit”. A new mini-window opens up – profile configuration table window – select row #1. It should look as follows:



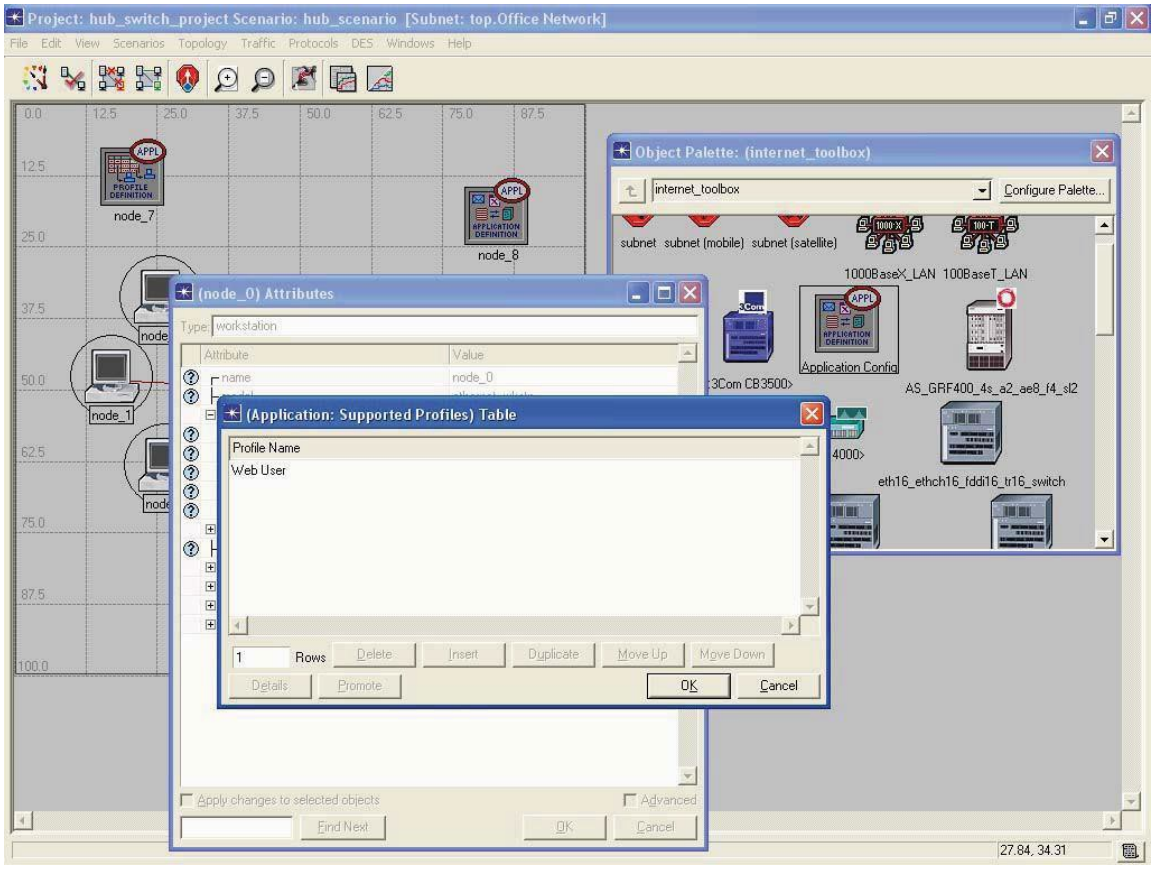
Now under Profile Name change the name to “Web User”. Change the entry under Repeatability column to “unlimited”. Under Applications select edit and a new window pops out – this is the Applications Table window. Here we will select an application

that will be associated with the Web User profile. Select row 1 and pick “web browsing heavy.” It should look as follows:

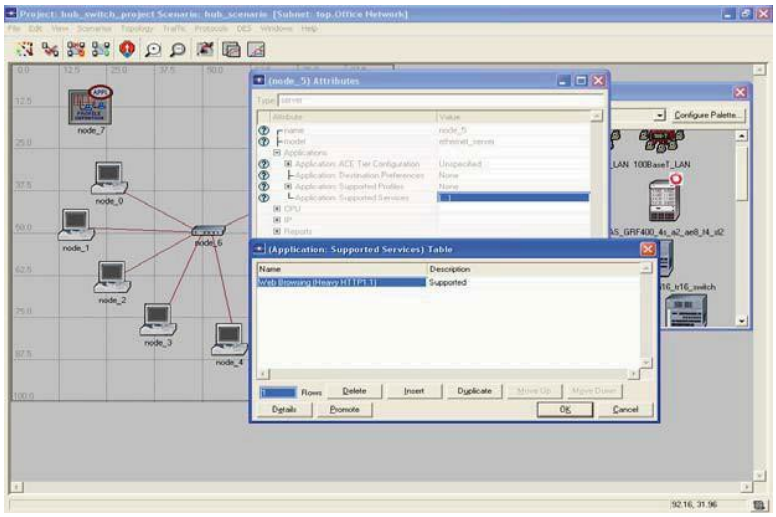


Close all open windows. At this stage we have created a new profile called “Web User” and this profile can be applied in our topology.

Step 8. Apply the profile “Web User” to all the workstations. This can be conveniently done by holding the control key down and selecting all five workstations and then making the appropriate change in the attribute window of any ONE workstation. One must make sure that the “Apply changes to selected objects” is checked on however in the attribute window of the workstation. The profile is applied by first opening the Applications tree. In the row entry for Application Supported Profiles select edit.A new window opens – Supported Profiles window – here go to row 1 and select Web User. It should look something like the following:



Step 9. Proceed to configuring the server. Select edit attributes, open the Applications tree and go to the Application Supported Services row. Select edit. A new window – the Applications Services Table window – opens up. Select row 1 and choose web browsing heavy.Essentially a generic HTTP server is set up on this machine at this stage. It may look as follows:



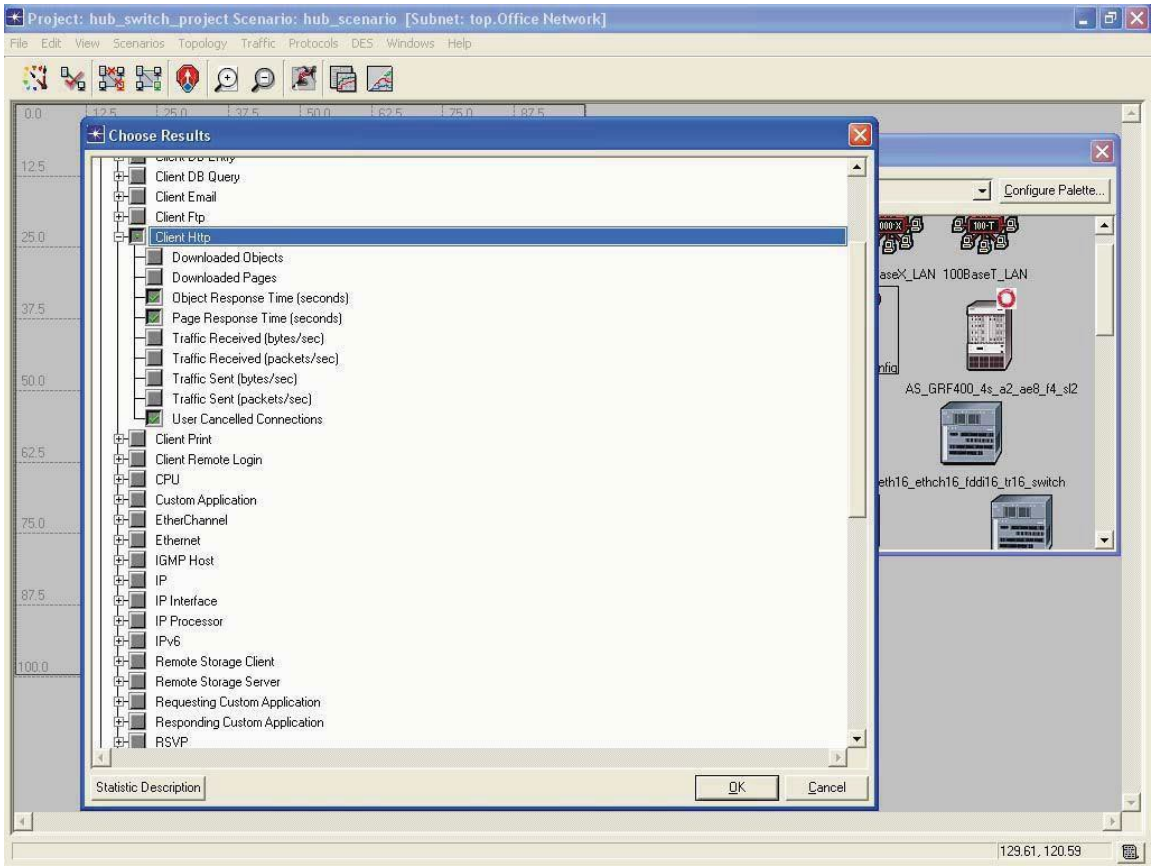
Step 10. Choose the statistics that ought to be collected during a simulation run. Under the DES menu bar select “choose individual statistics.” In the resulting window select the tree for “node statistics”. There are a number of options. Of particular interest for the purpose of this lab may be:

Under Client HTTP: Object Response Time, Page Response Time, Traffic Sent and Traffic Received, User Cancelled Connections.

Under Server HTTP: Load, Traffic Received, and Traffic Sent.

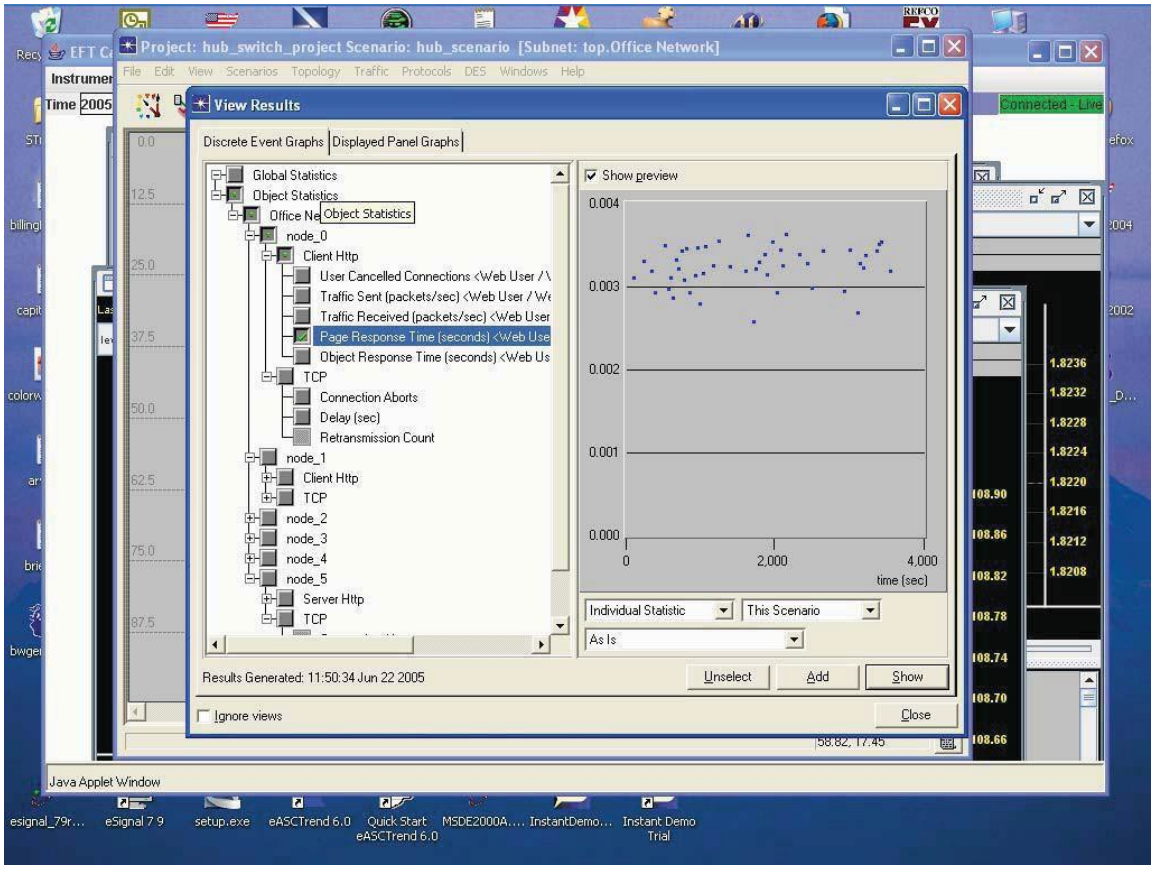
Under TCP: Connection Aborts, Delay and Retransmission count.

A screen capture of the DES statistics window looks like this:



Step 11. Run the simulation by choosing “Configure/Run DES simulation” under the DES menu.

Step 12. Examine the results by selecting DES menu -> results -> view statistics. The statistics window might look as follows:



Step 13. To find a useful contrast let us now create another scenario within the same project. It is convenient to duplicate the entire topology for the hub scenario into the work area of the new scenario and subsequently make changes to the copy. Go under the scenario menu and select duplicate scenario. Name it “switch scenario.” A new work area opens up with a duplicate of the hub scenario. Select an Ethernet switch from the objects window (click on the open object palette button if it is not visible) and place it in lieu of the hub.

Step 14. Run the switch scenario with the same statistics that were selected for the hub scenario. It is possible to compare the two statistics simultaneously – view it on the same graph – by selecting the All Scenarios option in the drop down list. Different colors are used for the different data. Examine all the performance data and answer the following questions.

Lab Observations and Questions

(1) In which scenario is there greater page loading delay? Explain why.

(2) Are there any worthwhile differences in any of the other statistics that were collected? Explain why one would expect differences or identical results.