

S-38.192
**ITGuru Exercise (5: Simulating the Non
Dimensioned Network)**

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Task Description

As was stated in the previous part of the exercise, the current link capacities are not able to support the requirements of the traffic offered to the network. In this exercise the idea is to study the performance of the applications in different locations of the network when the links are not properly dimensioned. In the next exercise you will see how the dimensioning improves the application performance.

Changing Destination Preferences

In the previous exercise application traffic was initially configured to be sent randomly to any of the subnets. However, since part of the network is using MPLS/VPN and another part is using IP/VPN, not all sites are able to communicate with each other. In this exercise the network should be configured so that application traffic flows between the following subnets:

- Lissabon → Berlin, Rome
- Berlin → Lissabon, Rome
- Rome → Berlin, Lissabon
- Athens → Berlin
- Paris → Berlin

This means that for example in Berlin you should set the destination addresses of the application servers to the server addresses of Lissabon and Rome. This can be done by configuring **Applications->Destination Preferences** attribute in the LAN object of Berlin. First, create one row for one application server type (e.g. Database Server) as shown in Figure 1 and create a weighted destination server list by opening the Actual Name Table (Figure 2). Assign same weight for both servers so that half of the traffic is sent to Lissabon and other half to Rome.

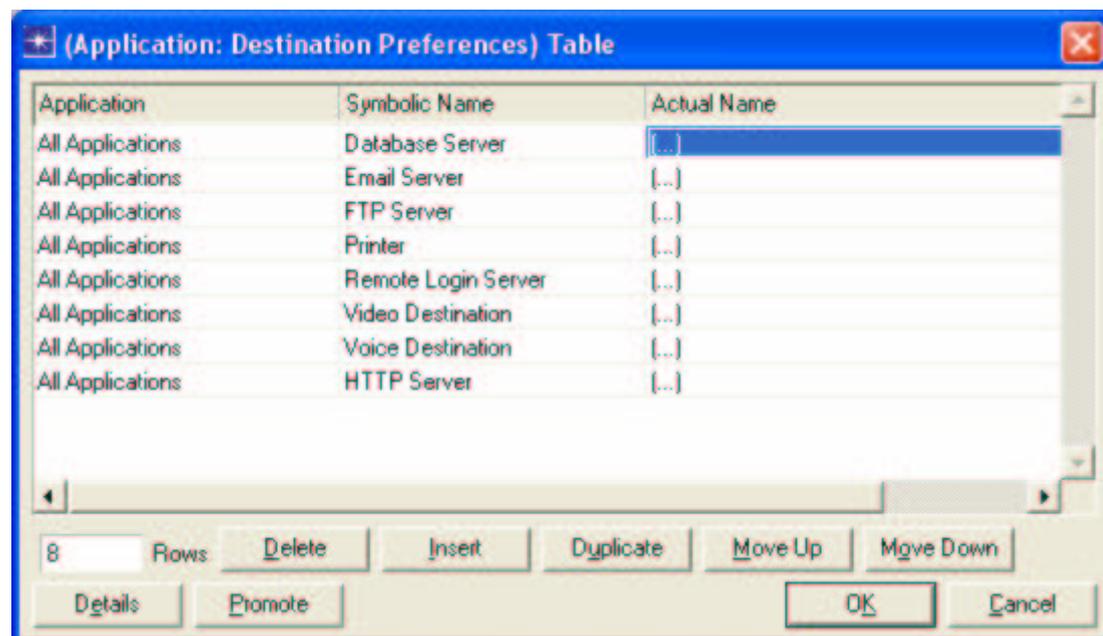


Figure 1 Destination Preferences Table

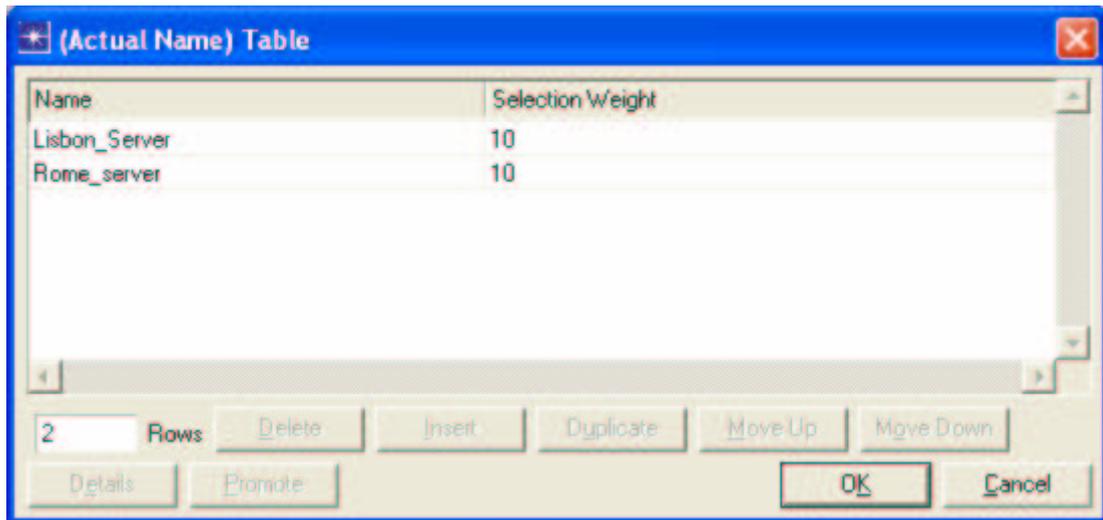


Figure 2 Actual Name Table

Then, go back to the Destination Preferences Table, duplicate the Database Server row seven times and change the server names so that all server types will be represented. If you wish, you can only include those application servers that are actually used by the profiles supported in the LANs. Do the same to all subnets following the desired communication patterns.

Changing Profile Start Times

In the default configuration of Sample Profiles selected in the Object Palette start time of different profiles has to be set between 100 and 110 seconds. However, since BGP processes related to MPLS/VPNs do not converge before 160 seconds application traffic can not be routed before this time instant. Thus, change the starting times for all profiles so that they range from 200 seconds to 300 seconds. Make also sure that all the applications supported in the profiles are set to Heavy mode. Note: Sometimes there is a problem in saving changes to the Profile Config object. In this case it usually helps to restart ITGuru or to remove unnecessary files in order to save memory (a good place for starting is op_admin/bk and op_admin/tmp directories including a lot of unnecessary backups). If your changes in Profile Config are destroyed, copy a new one containing the profiles from the previous exercise scenario.

Initial Testing

Before making the actual exercise you should be sure that the network is working properly and that application traffic is flowing between the selected sites. Run the simulation for at least 500 seconds and check if there are any major errors in DESLog file. Some errors are acceptable but if you get for example messages about duplicate IP-addresses on some interface or about destinations that can not be found this means that there is a flaw in the router configurations. In order to monitor links and applications, select appropriate measures from **DES->Choose Individual Statistics**.

Defining link capacities for non-dimensioned network

In this exercise the idea is to simulate the network with very small capacity links, resulting in heavy congestion in some parts of the network. After you have made sure

that the network and applications are working, change all the links in the core network to PPP-E1 (2.048 Mbps). The easiest way to do this is to select all the core network links, and then edit the data rate attribute of one of these links. Mark the '**Apply changes to selected objects**' check box in the lower left corner before editing, and this change will be applied to all selected links simultaneously.

Results to be collected

You may decide yourself what results to collect, but record at least the traffic received and traffic sent both in the client and the server side of the applications. In the client side, record also the download or object/page response times. Notice that you must select these results from the node statistics in **DES->Choose Individual Statistics** and not from the global statistics in order to examine the performance in different locations of the network. In addition to the application statistics it may be wise to collect also network level statistics such as link utilizations or routing convergence information.

Running the simulations

You should run the final simulation long enough in order to get reliable results (at least for 1000 seconds). However, it is recommended that you use shorter simulation time for testing that everything – including collection of results and creating the WebReport – is working properly.

Reporting the results

You may generate the report of the results with any tool you like but probably the easiest way is to use the WebReporting tool available in ITGuru. If you have not done the WebReporting tutorial available in ITGuru yet, go through it. In order to save space in your working directory, you may change the directory for storing the WebReport to /tmp in the file system. The default directory can be changed from **Edit->Preferences->web_rep_storage_dir**. However, since 200MB have been reserved for each group for saving exercise files, there should be enough room for the WebReport in the working directory also.

After the simulation has finished, open the **View Results** window. Here you can see all the relevant results that can be saved as figures and incorporated in the WebReport for further analysis. When viewing and saving the figures it is probably wise to use the **Overlaid Statistics** mode in order to show several results in the same graph. In this way you may for example show the traffic sent by HTTP clients in several subnets at the same time, as depicted in Figure 3. Open the figure with **Show** button. Modify the title, time axis etc. appropriately. Leave all figures that you want to be included in the WebReport open in the screen. When all the necessary figures have been opened, create the final web report from **DES->Results->Generate Web Report** and check the ready report from **DES->Results->Launch Last Web Report**.

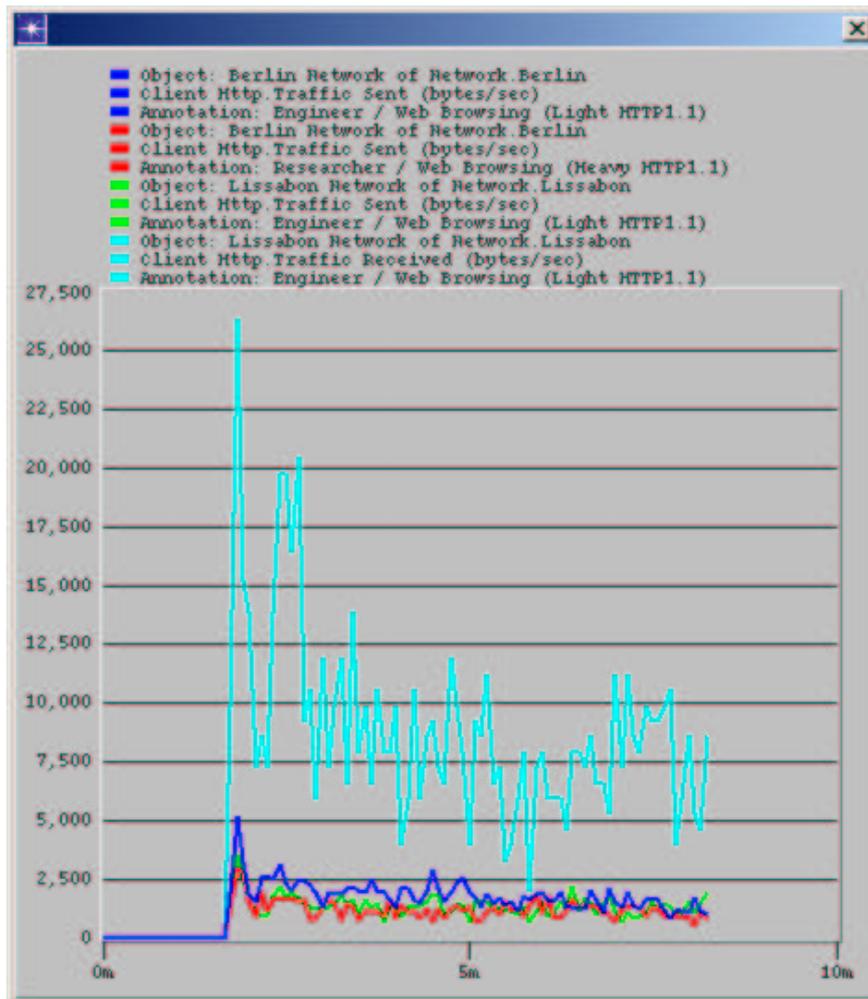


Figure 3 Example graph

In this exercise you do not yet have to make full analysis of the results because the figures of this exercise will be used in the next part of the exercise to compare the performance of the non dimensioned and the dimensioned network. However, you should carefully consider what results you collect and how you group and present them. You do not necessarily have to include every picture if the results seem to be too similar between some subnets. In general, creating a clear and effective report will have a major effect on your grade.

It should be noticed that the WebReport contains results in many different forms (tables, graphs etc.). Only the figures are required in the final report, so it is recommended that when you are ready to start writing the final project report, you just save the graphs as pictures from the WebReport and paste them in a separate document.

Exercise Sessions

The exercise session for this task will be arranged on 2nd March at 14 o'clock in computer class Maari-A.

Handout Requirements

This exercise does not have to be returned since the results will be included in the report produced after the next exercise. However, in case you have some problems in running the simulations or you suspect that traffic is not flowing in the network as it should, contact the assistants as soon as possible. **Next exercise will be held on 15th March at 14 o'clock.**