S-38.3192
ITGuru Excercise 4: Network Failures

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Task Description

Overview

The exercise consists of three parts:

Part I: IS-IS Network Failures
- Simulate node and link failures in the IS-IS network from the Exercise 1 with ITGuru.
- Write a report of the results.

Part II: MPLS/BGP VPN Network Failures
- Answer the questions with short essays and include them in your report.
- ITGuru is not used.

Part III: Check your network configuration
- In addition to the written report, you are required to return the network you have built.
- Check the network configuration to make sure that it is your final version.

The language of the report is Finnish. Only if your native language is not Finnish or Swedish, you are allowed to use English in the report.

Preparing for the Exercise

Once again, **read this document carefully** before starting to do anything. Ask if you do not understand what you are supposed to do in the exercise. Make yourself also clear what you have to return in the exercise.

The material for the exercise (especially for the Part II) includes the lecture slides and the recommended additional readings. In addition, you may need to take a look at some relevant books or surf the web. When using the information found on the web, remember the criticism of sources (e.g. Juniper and Cisco documents vs. an essay written by a student).

Before starting to break up the network in the Part I, **duplicate the scenario** and use this new scenario in the exercise.

Part I

Check which way the traffic flows from PE to PE by using the ping demand's *Record Route* option. Use a *Failure Recovery* –object to fail a router (either Sauvignon or Pinot_Noir depending on which way the traffic flows in your network) at 600 seconds. Find out how long it takes for the ping traffic to be rerouted.

Next, remove the node failure and set a link (either Chardonnay - Pinot_Noir or Chardonnay - Sauvignon depending on which way the traffic flows in your network) to fail at 600 seconds. How long does it take for the traffic to be rerouted?

Use the parameters given in table 1.

Parameter	Value
Link / Node failure time	600 s
Ping starting time	300 s
Simulation running time	3600 s

Table 1. *Required parameter values.*

By changing the *Values per statistics* (can be found from the *Configure / Run Discrete Event Simulation...* -menu) and ping interval values you can affect the resolution of the results (e.g. one ping packet every 0.1 seconds and 36000 values per statistics gives you a figure with 10 data points per one simulation second if running a one hour simulation).

In the report:
- Present the relevant results with figures and explanations.
- Explain and discuss the possible difference between the two cases (node/link failure).
- If your results, in your opinion, are somehow weird, explain why you think so, and what kind of results you expected and why. Discuss also the possible reasons for the odd results.

Part II

You do not need ITGuru in this part of the exercise. Answer the questions and include the answers in the report.

1) Consider an MPLS/BGP VPN network (like in the exercise 3). The only LSP (explicitly routed) in the network fails (underlying IP routing still works). What happens to the VPN-routes and why? You can try to simulate this in ITGuru, but it's not required.
2) Consider RSVP-TE and LDP based MPLS networks. Compare the network resiliency after a network failure in both cases. What is the role of the underlying IP routing protocol?
3) What kind of ways there are to speed up failure recovery in an MPLS network?

Write well readable answers. You may also use pictures in the answers, if you like. ***Do not forget to list the (possible) references!***

Part III

Take a critical look on your network configuration. The configuration is graded so before starting to create a returnable package, make sure that there is nothing you want to change anymore.

Exercise Sessions

The exercise session for this task will be arranged on February 22nd at 14 o'clock in the computer class Maari-A.

Feedback Questions

Return your feedback before March 2nd 14 o'clock. Each student writes and returns the feedback separately (this part of the exercise is not a group work). Return your feedback to **Juha.Jarvinen@netlab.tkk.fi**. Attach the feedback to your mail as a PDF file. Name the file as follows:

FB_T4_G*groupnumber_studentID*.pdf

for example *FB_T4_G2_56256T.pdf*.

The feedback questions are:

1. What did you learn during the exercise?
2. If you compare this exercise with the previous ones, did the writing of the report help you to understand the exercise topic better?
3. How much time did you spend in completing the exercise? Was it more or less than you expected in the beginning?

How to return the report

The exercise report should be returned before March 2nd, 14 o'clock. Return your exercise report to **Juha.Jarvinen@netlab.tkk.fi**. Attach your report to your mail as a PDF file. Name your file as follows:

T4_G*groupnumber*.pdf

for example *T4_G2.pdf*.

How to return the network

The network files are returned as a zipped tar archive. See *gzip* and *tar* manual pages for information on how to use them.

The amount and size of the ITGuru files grow easily very large. Therefore, it is important that you follow the instructions below when building the package.

- Remove all unnecessary scenarios. Leave only the final scenarios of each exercise and name them clearly. So **you have to have <u>four</u> scenarios** included in the package, no more, no less.
- Remove all .ah files or use the exclude option when creating the tar archive (see the example command below).
- The size of the package should not exceed a couple of megabytes.
- Name the package P_G*groupnumber*.tar.gz, for example *P_G2.tar.gz*.

> **Do not include unnecessary files in the package! When you have created the package, check what is inside and make sure that it opens correctly!**

For example:

```
moa ~ 123 % tar -cvf P_G98.tar --exclude='*.ah' op_models/
moa ~ 124 % gzip P_G98.tar
```

The above command excludes all .ah-files from the resulting tar-archive so there's no need to e.g. delete them beforehand.