1. Deeply MultiVendor Import study with Cisco routers

Abstract

Modeling the behavior of a router has always been a difficult task. Using Opnet for educational purpose can be complex too, because it is a common method to focus the project on the creation of a model instead of analyzing it. It would be also difficult to make a guided study in terms of performance when changing some few configuration parameters, just because there would be two slightly different models needed for this purpose, and the complexity resides on modeling both.

With Multi-Vendor Import (MVI), modeling tasks are simplified: now it is possible to import configuration files from CISCO routers, CISCO Catalyst switches and Juniper Networks routers. Using this feature you can assure the model’s behavior will be almost exactly the same as the real one. It is also possible to edit one or more lines of the configuration file in order to evaluate the behavior of the networking element after completing a simulation. Also, NetDoctor is very useful as a troubleshooting tool using the AppDoctor rules.

Introduction

This paper surveys the Multi-Vendor Import tool (MVI) to be used as a teaching tool to help students in their objectives of having a complete knowledge about the performance of different routing protocols and to aim teachers to model scenarios that closely replicate real ones, to support their explanations.

The study will be based on CISCO routers, and the main goal will be the use of MVI to evaluate its usefulness, analyzing the advantage of simulation as a teaching tool.

Some of these advantages include the unnecessary use of hardware and the ability to run simulations and, once obtained the results, comment the behavior of the modeled scenarios and establish a comparison between them.

Network Scenario

The study will be focused on how to explain the students the behavior of a routing protocol using MVI to create scenarios that, based on the simulation results, will permit us to make a comparison between configuration options, and to evaluate network performance and availability improvement.

The accuracy of the results obtained through simulation will depend on how closely the model replicates the real scenario. The use of MVI facilitates the creation of these models because it obtains network topology, configuration, and utilization data from a variety of sources, leveraging existing information to enable advanced network and application troubleshooting, planning, and network engineering.

First of all, we will test the scenario shown below and save the configuration files of every router to import them to OPNET using MultiVendor Import afterwards.
This scenario different four routing protocols: ISIS, EIGRP, IGRP, RIP version 1 and 2, and OSPF, in four different autonomous systems linked with another one using BGP. The use of various routing protocols creates a more complex scenario, used to analyze the MVI performance in obtaining the network topology in a complex environment.

After modeling the scenario, the simulation results will be useful to know how efficient the scenario was and how to modify the behavior of any of the routers, to facilitate the learning of some of the routing protocols used.

The scenario shown below will be the focus of the study.

*Figure 1: VMI with Cisco routers*