

## Practice That Profits

Simulation-based exercises in HP's Education Services' curriculum helps enterprise customers ensure hands-on proficiency of network administrators in ways that matter

by Tracy Avent and Paul Pappas

Within HP Education Services, IT service management for the enterprise gets a lot of attention, and deservedly so. The costs of inefficient processes or, worse, downtime and system unavailability are widely known to be staggering. With IT organizations so motivated, it is only natural that HP service management courses emphasize service delivery. But it also follows that IT organizations complete their learning practice, develop their management processes, and fully hone their skills.

The value of thorough training is clearly evident when students are back at their console and look at trouble tickets. If they've practiced handling real problems and gain proficiency at responding, then service level management for the enterprise gets a real boost in ways that were not otherwise possible. The difficulty faced by HP Education Services, however, is providing students with real life infrastructures and situations. Imagine the expense and complications of setting up practice networks to any realistic degree in order to test students with a wide variety of element configurations and other conditions that degrade service levels.

For this reason, simulations enabled by MIMIC Simulator technology from Gambit Communications have a key place in some of the curricula of HP's Educational Services. The simulation exercises featured in several courses give students hands-on work that reinforces theoretical knowledge with experience and accelerates their proficiency.

HP Education Services uses MIMIC in a number of lab exercises, either demonstrating HP NNM's extended topology features, or enabling students to practice and actually query emulated devices as though these existed on the network.

### The Case for Classroom Simulations

"In IT management, the key to the change process is efficiency," observes Reid Shay, consultant and author of the book, *Impacting Business, a Simple Model of IT Management*. "Learning from past experience and repeating what works make IT departments more efficient. If experience can be gained through simulation, without actually deploying hardware and software, so much the better. This is particularly valuable in preventing over-provisioning."

Take a close look at the role of simulations in training to enhance the every-day management of enterprise networks. A good case in point is HP Education Service's course for HP OpenView Network Node Manager (NNM), a Level III course, which is designed to build network administrators' mastery over the enterprise topology. It employs network simulations to illustrate the latest and most advanced features of NNM, including its Layer 2 Management and Event Correlation Services, and also discusses emerging technologies such as Active Problem Analyzer.

In this particular course the instructors use MIMIC in a number of lab exercises, either demonstrating the extended topology features, or enabling students to practice and actually query emulated devices as though these existed on the network. HP NNM's extended topology feature set primarily focuses on vendor-specific connective device feature recognition and monitoring.

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**Table 1. Enterprise-level justification for expert network device simulation:**

- Reduces hardware costs by a factor of 10 to 1,000
- Provides total cost savings of 92% over a physical lab, based on 100 devices
- Saves the time and costs of engineering labor
- Creates large-scale, multi-vendor labs that would otherwise not be possible
- Produces realistic disaster scenarios and develop successful responses

- Reproduces scenarios for regression testing, demos, and training
- Diminishes sales and marketing expenses to produce powerful product demos
- Determines an NMS application's optimum performance before deploying
- Trains each new engineer on the appropriate NMS applications in private, virtual labs

Source: Gambit Communications, Inc.

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Whether used to create a replica network environment for classroom training (or to have a realistic environment in the lab for testing product developments), the purchase cost for network devices is so expensive, and subsequent maintenance such a major undertaking, that it is normally not feasible to offer high-end courses without some strategy for emulations, simulations, or group-shared equipment.

## **HP Training an Exercise in Realism**

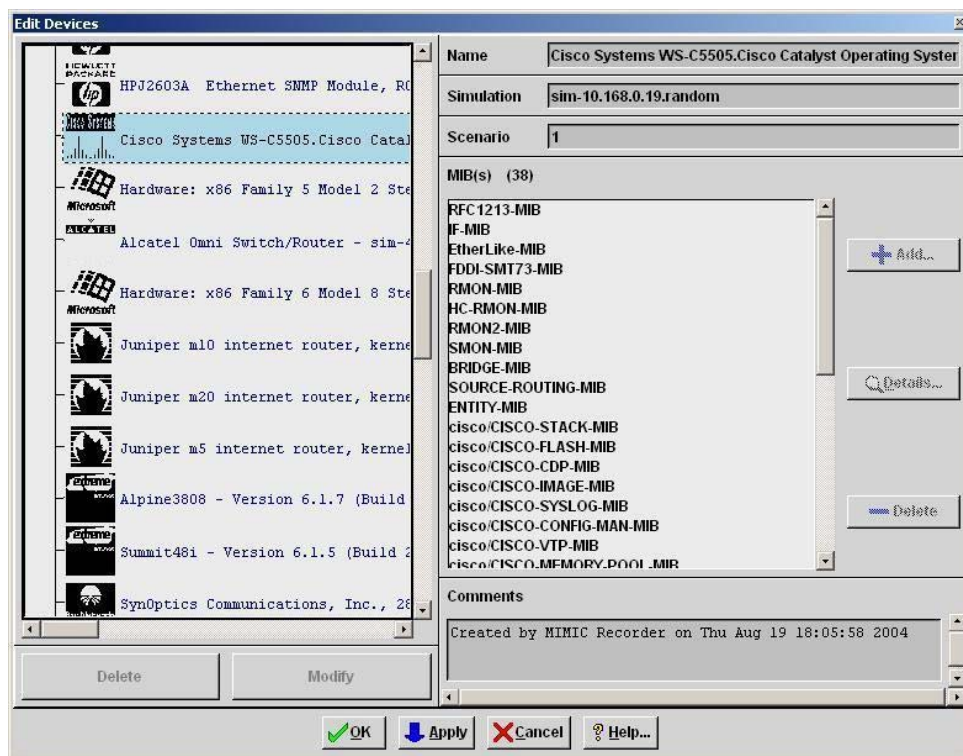
In the NNM III course, HP Educational Services deploys MIMIC on the lab network to simulate vendor devices, allowing interaction with NNM Extended Topology discovery, mapping and event stream features. Students in the classroom labs know the bridges and router devices they are working with are simulated rather than actually present. The "live" MIMIC devices respond to ICMP and SNMP queries and send traps as though running on the network.

Students frequently ask questions about the MIMIC simulator, seeing its potential for their own staff training environments — and even installing it at their companies in order to improve their internal test bed processes. This understanding is important because most companies consider their production environments untouchable, i.e., they cannot afford to risk down time because of the likely financial impact.

Contrast the above "live" use of MIMIC in the Level III class with its use in the Level I class to provide static or offline training. In the Level I class students use a variety of Web-based Extended Topology mapping features and interact with icons derived from an up-loaded MIMIC-derived simulation database. Extended Topology is a major NNM new feature set, and MIMIC indirectly provides a means for HP Education to help students grow familiar with some of the NNM Extended Topology concepts.

The Fort Collins HP OpenView Business Unit's lab used MIMIC to build a very portable and effective interactive demonstration of basic Extended Topology features. This demonstration figures prominently in some of the NNM I course labs, as though ET has already been configured. Instructors cover ET configuration topics in more detail in the level III course, where the live MIMIC server must be present. The different uses of MIMIC amount to a reasonably efficient and economical use of the classroom setup and equipment logistics resources.

For the NNM courses, a mix of beta site live data, test bed and HP lab equipment are used. The MIMIC solution includes ready-to-use simulations for many vendor devices. When developing the class, HP Education Services used MIMIC's "record" capability to create additional device simulations so that customers could see these operate as well. Recording is the simplest way to create simulations, by representing "private enterprise" MIBs for an existing device on the network.



MIMIC Device Library: Instructors preparing classes for HP customers can select ready-simulated devices from different manufacturers.

Once students realize what the simulation technology is accomplishing for their lab work, they are quite enthusiastic and confident about the skills they are developing. When students work through certain steps of the lab exercises, HP instructors can change simulations to represent some common problems with the device configuration by having the devices respond with improper information. It gives them the highly interactive means to do some troubleshooting of Extended Topology features, while also enabling instructors to focus their classes on how the features work when they are configured correctly rather than when they are misconfigured.

One can readily see how students can practice working, using simulations of standard MIB structures and even proprietary MIB structures and generation of traps. Prior to using MIMIC, the instruction on Extended Topology was limited to only demos and theoretical discussion.

### Practice That Makes Perfect Everyday

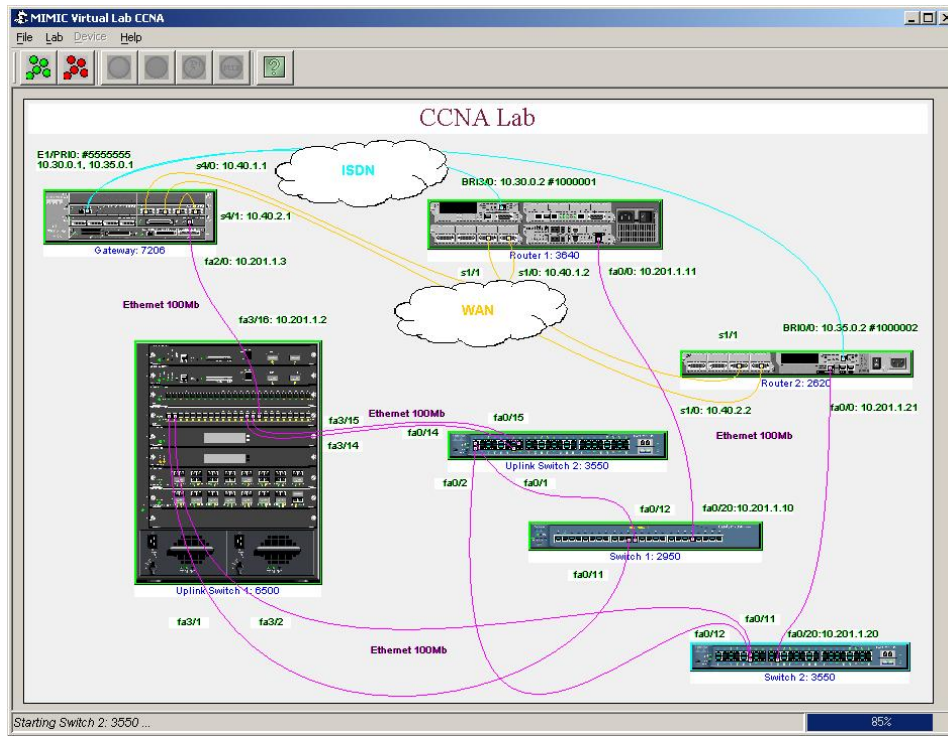
Using MIMIC it is possible to simulate a variety of scenarios that students might shortly face back at their workplace. For example, an instructor can dynamically simulate for students a router, lightly loaded at first, becoming overloaded by changing the input/output packet error rates. In the NNM III course the instructor can misconfigure the device agent so students can experience some basic troubleshooting principles and see the effects of certain trap types. This can be accomplished either interactively or through pre-defined scripts.

HP's NNM developer team uses MIMIC to build test beds and develop product software in order to emulate certain kinds of connective devices and technology because investments in the actual hardware equipping the classroom network would be prohibitive.

The Level III training is equipped to teach and help students practice everything they'll need to do to manage the enterprise network including:

- Activate and verify automatic zone configuration

- Configure protocols for extended topology discovery
- Update SNMP configuration
- Enable/start/manage/stop NNM extended topology discovery processes
- Check discovery status



As students work through their lab exercises they will see the MIMIC Virtual Lab GUI showing a network of routers and switches, similar to this view.

## Long-playing Record of Success

HP Education Services is also experimenting with much more sophisticated emulations that can be used for further enhancement of course lab opportunities. Already underway is a proof-of-concept for making training on NNM III and other HP management tools interactive over the Web, as a virtual classroom, including access to web-enabled lab equipment.

Perhaps it is not surprising that HP's use of MIMIC extends back for several years. Several HP business units have been using MIMIC to test product technologies since shortly after MIMIC was first released. HP's NNM developer team uses MIMIC to build test beds and develop product software (in order to emulate certain kinds of connective devices and technology because investments in the actual hardware for their development/test network would be prohibitive.)

This prior experience led to using MIMIC in the Level I and III NNM training. Typically, HP Education Services works closely with HP product business units because when the product comes rolling out, appropriate educational course materials are needed almost immediately. The group, in fact, worked in parallel with the HP NNM product development team and was using MIMIC early on to develop course materials, as well as to simplify product feature demos in the field. It was clear even then that MIMIC could be used to focus and enhance some of the customers' educational experiences, adding levels of realism for training that was not previously possible.

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