Simulation: Disaster Preparedness and Training

Gambit's MIMIC Simulator Helps Keep SITA Flying High: Simulation-based exercises prepare network staff for smooth handling of outages and disasters to assure business delivery.

by Bill Cicci and Pankaj Shah

When you're the largest provider of products and services that help air transport companies with everything from reservations to baggage tracking to in-flight communications, high availability of your production network is critical to support your operations. Having an available network impacts your business' ability to generate revenue. SITA realizes that disasters strike when you least expect them. This poses a particular challenge in the IT world. The inability of a company's network to recover from a disaster quickly can have a significant impact on the bottom line.

Few companies properly plan for this, because it is difficult to envision and reproduce all the possible scenarios that can cause outages. When companies create a network availability and recovery plan, several objectives must be considered. They need to ensure that the IT staff:

1) is familiar with the network topology and configurations;
2) can use the network management applications effectively;
3) knows all the outage scenarios that could occur;
4) is trained with the appropriate responses; and,
5) tests and verifies all recovery procedures for effectiveness.

> "Network availability is vital for Enterprise business. This implies a need for thorough evaluation and testing of network applications and training of the staff. MIMIC Simulator represents a paradigm shift from using the traditional lab by providing a practical and cost-effective way to prepare for disasters."
>
> - *David Seifert, Manager, Net Solutions Group, SITA*

Having incorporated these objectives, how is it possible to evaluate the plan's effectiveness? Traditionally two options have existed: practicing on the production network or in a physical test lab. Both options have downsides that cannot be ignored.

Practicing on the production network exposes the company to a potentially enormous risk. A training mishap could damage the network and create a real disaster. Therefore, this is not a viable option.

In comparison, a physical lab seems to be a better option, since the production network cannot be harmed. However, the physical lab is typically a scaled-down version of the production network and cannot produce the true scope of a disaster's effects on the entire network. In a physical lab it is also difficult to create conditions similar to those that occur during a disaster.

Does an adequate means of evaluating the viability of a company's disaster preparedness exist? Yes, SITA decided to use MIMIC SNMP and IOS Simulator for that purpose. They have found that creating a "Virtual Lab" using MIMIC Simulator for simulating the network's managed devices provides the ideal solution. SNMP based applications and utilities are parts of SITA's offering. These include IT infrastructure, common use terminal equipment, common use self-service kiosks, integrated baggage solutions, wireless, and VoIP. SITA maintains its own SNMP MIB, which is used for the management of SITA's service offerings. Before those applications are used in production, SITA assures with MIMIC that they do exactly what they are supposed to. At the same time they keep the operations staff trained to make sure that the network is available all the time. Overall, MIMIC saves time and money in application evaluation, testing and training.

SITA's engineering lab utilizes MIMIC Simulator to build virtual environments utilizing SITA's private MIB along with other vendor specific agents to develop and test the integration and interaction between SITA's SNMP applications and HPOV NNM as would be expected in a "real world" environment.

SITA's lab environment is comprised of many different labs (Development, Networks, Integration, and Quality Control) where each maintains their own infrastructure and equipment. Much of the time they are isolated from one another and are very dynamic in nature, in that their configuration changes often. This creates an issue when trying to

develop and test SNMP applications and is expensive to maintain another environment just for this. MIMIC greatly helps in that it can record any device and simulate any environment that is required. In addition MIMIC provides a mechanism to simulate numbers of devices for stress and scalability testing.

SITA also plans to utilize MIMIC to simulate SNMP traps to aid in the definition of correlation and trap rules to be fed into the HPOV correlation engine and other SNMP based management utilities.

MIMIC's simulated "Virtual lab" serves as a practice area for disaster scenarios and recovery procedures without affecting the production network. The IT staff can remove part of the network, simulate cut cables, increase/decrease traffic or generate trap storms. In this way, they experience how the management applications react to these conditions and practice their responses, thus gaining real-world experience. All scenarios can also be saved in a library to be reused or changed in the future. Other employees and all new hires can be trained using these scenarios.
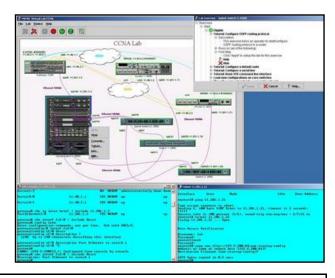
Do what Airline Pilots do

Figure 1 Flight Simulator (NASA)   **Network Simulator (Gambit Communications)**

Much like airline pilots use flight simulators to train for routine and disaster situations, MIMIC Simulator provides the same benefit to IT personnel. The well-being of a company's entire infrastructure relies entirely on the IT staff. Like pilots, there is no room for panic when a disaster occurs. Having been trained using a "virtual lab", they have the knowledge to handle any situation with confidence.

MIMIC's recording of the network also serves as a record of all the installed managed devices. The IT staff simply makes scheduled recordings of the network, so that changes are easily tracked. This allows a company to recreate the network if physical damage occurs. Using a simulator with a topology tool, companies can also create a topology of their network and reproduce the network's physical connections as they existed before the disaster.

SITA's Simulation Lab is made up of actual physical infrastructure and other devices within budgetary limits. MIMIC is used to "fill in the gaps" to better emulate a fully populated environment without incurring substantial additional costs. With MIMIC providing the virtual devices simulation and testing results are less apt to be skewed.

MIMIC Virtual Lab is a powerful and effective tool for practicing disaster preparedness. It also produces a significant return on investment in the following ways. First, companies can simulate many more devices compare to a physical lab. Secondly, and most importantly, a well trained and well prepared IT staff can recover from any disaster in a timely manner. This limits network downtime and in turn limits revenue loss. Thirdly, it avoids the headaches of setting up, maintaining and sharing a physical lab.

Everyone hopes that a disaster never occurs in his or her company, but if it does, better policies will be in place to cope with it.

Other Applications of a Virtual Lab

By implementing a virtual lab using MIMIC, IT professionals can easily create environments and conditions that would otherwise be impossible. MIMIC significantly decreases the total cost of ownership of a lab, since it eliminates the need to buy costly devices. The virtual lab's applications within an enterprise are virtually unlimited. Therefore, enterprises will enjoy a more productive IT staff and a more effective and reliable implementation of NMS applications and policy scripts.

Evaluation before deployment: Evaluating network management applications – from layered applications to value-added applications – poses a challenge for most enterprises. MIMIC's recording and simulation capability changes all that. It can record the enterprise's network, then use that recording as input for a simulation of the

> *"For enterprise users seeking economies in the evaluation, introduction and enhancement of new SNMP management products - MIMIC should be particularly worthwhile. "*
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> *- Dennis Drogseth, Enterprise Management Associates*

network. Management applications can then be run against this "virtual network" – a network that is identical to the enterprise's production network. The IT staff is then free to evaluate all NMS applications in the same environment. They can run tests such as disabling devices and/or interfaces, generating a trap storm to see how the management application reacts. They are also free to experiment with additions and changes to the network to test future scenarios without worrying about the impact to the production network.

Using the applications in their duplicated network environment can give enterprises an accurate appraisal of the management software. The IT staff then has the assurance that the software will perform to specifications. There is no longer any guess work involved trying to determine whether or not an application will scale to meet their current and future needs.

SITA will also use MIMIC to help in the evaluation of new SNMP applications and "plug-ins" to HPOV.

Operator training: Providing operator training for new management applications poses a challenge for all companies. Everyone understands the benefits of operator training in allowing employees to perform their jobs with greater success. When new management software or networking devices are introduced, the operator-training problem is compounded. Company personnel need to get up to speed quickly in order to perform their jobs with the new product.

The virtual lab networks can become as extensive and complex, as the trainer would like, which allows them to teach fully the capabilities of the element manager or network management application. Students get the opportunity to practice "real world" scenarios – both positive and negative – which would be impossible with a physical network. By using a virtual lab the operators can receive higher quality training. The training lab is not limited to a network made up of only a few devices. It can be as complex as the production network. In addition to classroom training, a virtual lab lends itself to automated training so students can learn independently of structured classes. The students then have flexibility in their schedules.

Overall, with its ability to hold down hardware expenses, to enable training to be scheduled before devices are even on the shelves, and to reduce training lab administration, a virtual lab provides the solution for today's operator training program.

SITA would like to see MIMIC used in their Training Department for training Site Administrators and NOC personnel when it comes to the use of HPOV and the SITA specific "enhancements".

Infrastructure planning: For IT professionals, infrastructure planning represents a very difficult task. It is practically impossible to determine, in a reliable manner, management software's capacity for future growth. Many IT professionals must rely on the claims of management application about their products. Alternatively, administrators can add a series of devices to their network in order to ensure that their NMS application can adequately manage a larger number of heterogeneous devices. In many cases doing so is not practical due to financial and resource constraints. However, the implementation of a virtual lab provides IT professionals with an environment where they can truly evaluate their management applications' ability to manage the network infrastructure as it expands.

In addition, tests can be performed in order to see if this configuration would cause stress in other areas of the network or on certain other devices or applications. Once testing has been performed within the virtual lab environment, IT professionals can confidently report to management whether or not the current network will be viable well into the future. If not, he or she will be able to suggest the specific measures that should be taken in order to address the issue.

About the Authors

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