Case Study:

Ascend Communications Interoperability

(Ascend is now a Lucent company)

Ascend Communications, Inc., a leading provider of technology and equipment for tele-communications carriers and Internet service providers, uses approximately 800 Cubix single-board computers for its interoperability testing laboratory located in Alameda, CA. Through the use of Cubix's consolidated system architecture (one system contains as many as eight single-board computers) and management software, Ascend has built a state-of-the-art interoperability lab, leveraging a significant competitive advantage over competing vendors.

Ascend Lab uses Cubix processors to test network capacity

Building a better lab

Whether a company conducts interoperability testing in-house or outsources it to a laboratory like Ascend, this case study shows how the choice of a Cubix hardware platform, combined with unique, state-of-the-art automation software, allows companies to save on interoperability and capacity performance testing in the following areas:

- 87% reduction in space/real estate requirements
- 80% reduction in personnel
- Significant increase in accuracy, availability and reliability of test beds

Ascend needed an interoperability lab to test the capacity and evaluate the performance of its Internet dial-in routers. The primary function of the lab is to demonstrate and perform real-world stress testing of network traffic, router bandwidth and the consequences of application configuration changes. Configuration changes had to be seamless and immediate.

It has become imperative to Internet service providers and corporations like AOL, Sprint, WorldCom, Microsoft and NASDAQ to accurately measure the real-world performance impacts and consequences of increased use and application changes to their network prior to implementation. Ascend's interoperability lab allows major corporations and ISPs to complete such testing accurately, efficiently and cost effectively It enables them to base infrastructure and purchasing decisions on proven performance evaluations, eliminating guesswork.

Cubix Management and Consolidation

The Ascend interoperability lab uses approximately 800 Cubix computers, performing as clients, with five modems attached to each. They are configured primarily as Windows NT and Windows 95 clients, but they can be reconfigured within seconds to reflect environmental changes. In a typical laboratory setting, it would take approximately 10-20 people several weeks to set up the boot image for 800 clients in a single interoperability test. Assuming that all the PCs booted up correctly and executed the test without problems, 10-20 people would still be required to monitor the tests, trobleshoot problems and gather data. This could take over a month to accomplish, and human error would become a factor.

One of the biggest factors in choosing Cubix hardware was the reliability of the systems

"Prior to the Cubix solution, we were using individual PCs and a team of l 0 engineers to get only 94 calls per computer, per day. Now we have reduced our team of engineers and can get up to 288 calls

per computer in 5 minutes," said Joey Gerodias, Customer Service Manager for CPE/TAC Laboratory Operations, Ascend Communications, Inc.

Lab automation

Ascend's entire process of test configuration and monitoring has been automated. Management software, codenamed "Maestro" uses Cubix's management bus and software to completely automate the laboratory imaging, configuration, operation and testing processes. From one console, a single laboratory technician can configure, boot image, monitor, trouble-shoot, and gather data, while running multiple tests utilizing all 800 Cubix clients.

When deciding on a client platform for the lab, Ascend chose Cubix for high reliability, flexibility, performance and consolidation.

Maestro completely automates the process of setting up clients, configuring PCs, running tests and gathering data. Maestro is integrated with Ganymede and other testing tools on the market. Maestro kicks off Ganymede scripts on all 800 clients, and verifies the measurements taken by Ganymede to serve as an audit. In addition, Maestro can furnish additional information that other testing tools cannot, such as number of retransmissions.

The management software is tightly integrated with Cubix's management software, GlobalVision, which operates over an out-of-band data highway using Cubix's specialized circuitry. Any changes in the operating system, application, network condition, or I/O condition on the Cubix processors can be effected in seconds and propagated to hundreds of Cubix clients in less than a minute.

Saving time, money and resources

"GlobalVision alone will ultimately save Ascend millions of dollars in operational expenses and additional staffing for the laboratory," said Joey Gerodias.

In other words, by using Cubix's centralized computing resources, GlobalVision management software and Maestro software, Ascend realizes a tremendous savings on manpower, as the laboratory operates using a single lab technician per shift. This further allows Ascend to deliver a very efficient, cost-effective service to its customers. For example, an ISP or any Ascend customer, can call the lab with a problem, and within 15 minutes Ascend can replicate their environment and identify the problem.

"Our testing can now emulate the same traffic that goes into a corporation or ISP. We have moved away from simulation and are setting the standard of how RAS should be tested," said Joey Gerodias.

Saving time, money and resources

When deciding on a client platform for the lab, Ascend chose Cubix for high reliability, availability, flexibility, performance and consolidation.

"One of the biggest factors in choosing Cubix hardware was the reliability of the systems. We simply cannot have Remote Access Servers going down during testing," said Joey Gerodias.

Ascend plans to scale the lab to over a thousand clients, and needs as much density as possible. Cubix's consolidated system architecture, referred to as Managed Server Farms™, can house up to eight single-board computers in each 19", 5U-high, fault-tolerant chassis.

When compared to the space formerly occupied by stand-alone PCs, Cubix's consolidated hardware solution reduced the amount of physical space required for the laboratory by 87%.

Cubix provides our customers with specialized abilities, namely the reliability, manageability and space-saving consolidation of their single-board computers.

Cubix Corporation, headquartered in Carson City, NV, designs, manufactures, markets and supports high-density server systems for mission-critical network services. Cubix offers customers the unique ability to conserve space while ensuring high availability of their network platform. Privately owned, Cubix has been in business since 1975.

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