Software corner:

Networld+Interop 2000: Communications on display

By Curtis A. Schwaderer

Over 70,000 people attended Networld+Interop 2000 on May 9-11 at the Las Vegas Convention Center in Las Vegas, NV. Thousands of exhibitors showed the latest in communications, management, and security equipment. I took the opportunity to peruse as many booths as possible, and the effort was well worth it.

A couple of key technologies discussed at N+I 2000 were:

- High Availability & Security, which seems to be a big issue for service providers and communications equipment manufacturers. Later, we'll look at one increasingly popular solution for this, GoAhead Software.
- Network processors and their emerging impact on the communications industry
- "Service Availability (SA)"— add it to your vocabulary

High-Availability systems are a big concern in the industry today. According to the US Department of Commerce (IDC), Internet traffic doubles every 100 days. These ever-increasing demands on the network infrastructure can result in service outages and unbearably slow response. Over the next five years, IDC estimates that the market for service availability software will exceed $11 billion. Companies will spend approximately 60% of that amount on incorporating SA software into network infrastructure equipment. (See Figure 1.) This represents a significant opportunity for those companies providing high-availability software solutions for the communications industry.

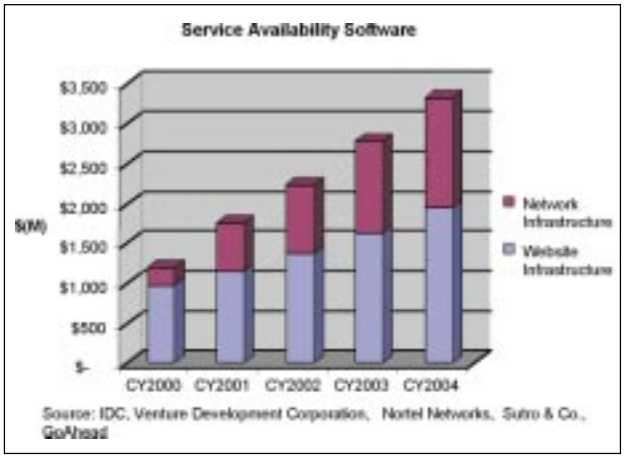

Figure 1

Thanks to an unsolicited tip from a new friend at Lucent, at the conference I talked with representatives of GoAhead Software who claim the company is smack-dab in the middle of the service-availability solutions market. Key markets for GoAhead are routers, switches, and CompactPCI platforms. GoAhead has a number of software product solutions for service availability. FieldUpgrader™ and HighAvailability™ are two of those products. HighAvailability monitors and manages platform hardware, operating system, applications, cards, and other network peripherals. This software solution has switchover and recovery capabilities. The system administrator uses the High-Availability application program interface (HAPI) to set policies and procedures for various scenarios. Dynamic configuration management uses XML to publish component capabilities that can tie into Web-based user interfaces for easy configuration.

Another interesting product is the FieldUpgrader. There are three components to the software system. The DeviceStudio™ is the development environment that configures the UpgradeAgent™. The UpgradeAgent is the software that resides on the target machine and facilitates the upgrade process (downloads, authentication, etc.). The UpgradeServer™ resides at the manufacturer facility and communicates with the UpgradeAgent to send updates to the system as needed.

If you look at the software positioning for this kind of product, it sits on top of an operating system (Linux, OS-9™, etc.). Therefore, the inherent capabilities of the operating system itself have some determination on how effective the SA software can be. In terms of security, LynxOS, Linux, and OS-9 all have a UNIX history, are multi-user, and process models that provide a high degree of protection. VxWorks (another real-time operating system supported by GoAhead) is a threads model real-time operating system that does not have a multi-user environment (i.e., group/user IDS, etc.) and has no system protection. It stands to reason that in these kinds of High-Availability environments, OS-9 and LynxOS are a much better fit for real-time performance. Linux is another good option for non-real time systems (assuming there are engineering resources available to support Linux). Threads-based operating systems tend to be fundamentally flawed for these kinds of applications.

In terms of the field-upgrade-ability of the system, the GoAhead software has a great deal of synergy with the OS-9 real-time operating system from Microware (at least theoretically). While FieldUpgrader provides the complete configuration/download/upgrade environment, OS-9 is a component-based real-time operating system that allows addition, removal, or replacement of any component making up the real-time operating system. In this scenario, FieldUpgrader would have the ability to download individual device drivers or system components while the communications system is online and in use. Without requiring downtime, companies can replace modules currently used on the OS-9 system. Other real-time operating systems require the entire system software (or operating system) to be upgraded together, requiring reboot of the communications device. In any case, High Availability is a concern, and GoAhead is one company that is aggressively producing solutions to address these industry needs.

Network processors — will this be the year?

At N+I, I also spent a lot of time asking communications equipment manufacturers what they think of network processor technology and how it will affect future design. There is a keen amount of interest about network processors; the network processor tutorials were completely sold out at the conference, and the

general industry seems to understand the concepts. The main consensus was yes, network processors are absolutely relevant and applicable to future designs. However, communications engineers seemed concerned about two things: its new technology, and that the product differentiation that used to come from innovative application-specific integrated circuits (ASICs) is now sucked into the network processors.

Many of the silicon manufacturers that were at the conference are developing network processors. If you are not familiar with the technology, network processors are some kind of standard 32-bit core processors with special integrated components that make the processor optimized for communications designs.

Intel had an Intel eXchange Architecture (IXA) booth at N+I where they were showing off the architecture, and specifically the IXP1200 network processor. In an effort to squelch the early technology issue, Intel had a number of partners demonstrate hardware and software solutions for the IX Architecture.

The IXP1200 consists of a StrongARM core processor, RAM and PCI bus interface, an IX Bus interface and six micro-engines, little "DSPs" (for lack of a better term) that have a special instruction set tuned for packet processing. (See Figure 2.)

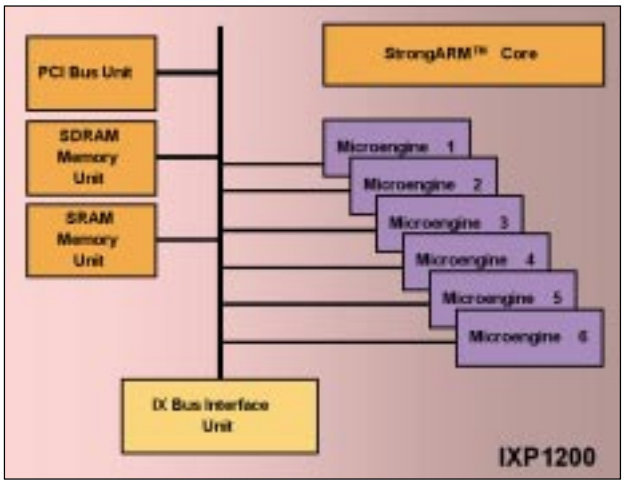

Figure 2

The IX Bus is a high performance bus that allows connection with network interface chips. Typically, 10/100/1000 BaseT Ethernet MACs, or ATM SAR/PHY would connect with the IXP1200 through the IX Bus.

Once the packets get on board the IXP1200, the micro-engine software takes over. In old designs, packet processing used an ASIC. Obviously, ASICs are in silicon, and therefore have a design and manufacturing lead-time issue. Micro-engines take the place of ASICs and allow designers to program the packet processing algorithms dynamically. This provides previously unheard of flexibility to communications developers to update their equipment without costly redesigns.

Partner presentations included Nortel Networks with OpenIP (routing packages); Radisys with IXP1200-based boards; Phobos with hardware and software solutions; and Microware Systems Corporation talking about OS-9 and communications middleware solutions for IXP1200.

One big question surrounding network processors is the microcode solutions issue. Are there examples? Good starting points? Finished solutions? Consulting services? Since microcode writing is like learning assembly language programming, this area represents some of the biggest obstacles to overcome. During Microware's presentation, they unveiled a roadmap. This roadmap not only provides the current OS-9 and Hawk development environment for IXP1200, but also provides microcode solutions that can be used as a starting point or as finished solutions in a variety of applications. (See Figure 3.) Microware's OS-9 operating system provides a component-based architecture and a driver-based, integrated communications framework called SoftStax™. The SoftStax framework provides a great amount of synergy for network processor applications. One thing from all the presentations was clear, you can't use today's generic real-time operating system/tools combination and expect to reach the lofty heights that network processor based equipment can achieve. Companies like Microware, Nortel Networks, Radisys, and Phobos have all recognized this. They represent companies with current product, but with unique inherent technologies, that accentuate the abilities of the IXP1200 network processor. It is clear that uniquely tailored software capabilities like the kind provided by these companies are a big key to the success of the IXP1200 and network processor technologies in general.

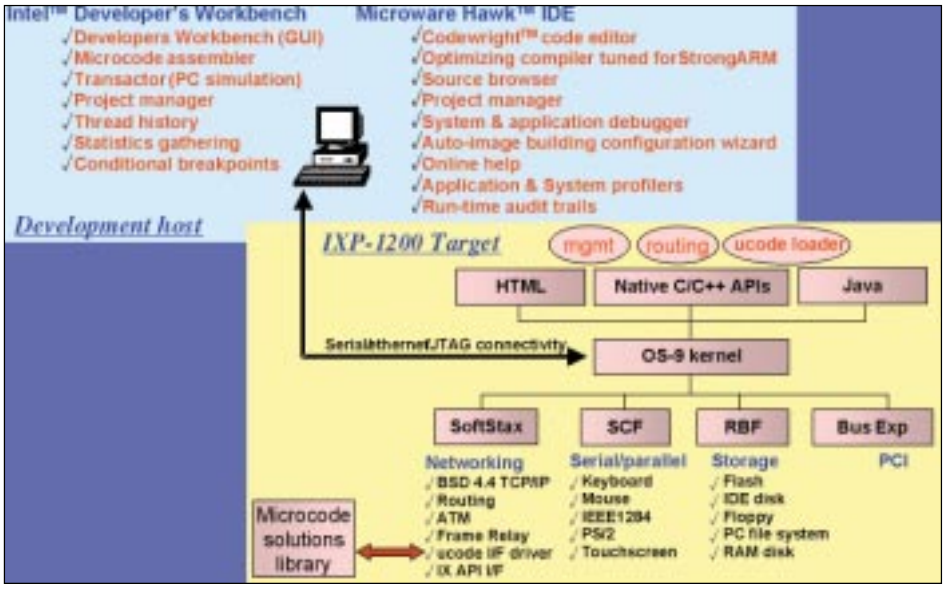

Figure 3

What will be the hot topics at Networld+Interop 2001? Who knows? Judging by the experience I had this year, I'll be sure to be there next year to find out.

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