

Software support for server blade computing

By C. Bret Martin and Peter Palm

There is no question that telecom and network equipment providers (NEPs) are feeling the "squeeze" due to limitations in physical space, electrical power, and air conditioning capacity needed to keep their servers continuously operational. What they're looking for is a way to fit more servers into smaller space, with less power consumption, less weight on the central office floors, and an increase in system uptime at the same time.

Initially, system suppliers responded with stackable, racked, "thin servers," each a self-contained unit with power, disk and processor with limited PCI card expansion, but only one unit of rack height. Today, as NEPs continue to ask for more density, less power consumption, and improved service availability, the need for low-cost standard integrated hardware and software solutions becomes even more urgent.

CompactPCI-based telecom blade servers to the rescue

Fortunately, systems vendors, such as Sun, have stepped up to the challenge, supplying NEP customers with ultra-thin, modular, single-board servers, known as telecom blade servers. Sun has been a leader in the telecom blade server market since the carrier-grade, NEBS-certified Netra ct product family was first introduced in February 2001.

Telecom blade servers, such as the Sun Netra ct 400 and ct 800 (see Figure 1), are based on the CompactPCI standard and are uniquely qualified to meet the increasing demands of telecom and NEP customers – helping to streamline central office infrastructure resources, enabling the fast and easy deployment of services,



Figure 1. NEBS-certified Netra ct400 and ct800 CompactPCI systems

and offering the flexibility and scalability to meet stringent service level agreements. Furthermore, when combined with high-availability middleware, such as Sun's Netra High Availability (HA) Suite 2.0 which provides the lynch pin to continuous uptime, these carrier-grade, ruggedized telecom blade servers, prove they can deftly handle today's increasing environmental demands.

Why CompactPCI for telecom blade servers?

CompactPCI offers numerous features that make it ideally suited for telecom blade servers – from a more robust mechanical design, high compute density, and vertical airflow for simplifying cooling, to higher quality components and I/O cards, a passive backplane for enhanced serviceability (MTTR), a high performance I/O bus standard (132 MBytes/sec), lower systems costs, quicker time-to-market, and increased supplier flexibility. Additionally, technology advances and industry hardware and software standards used in CompactPCI, including developments in low-power processors, laptop disk drives, switched Ethernet, and carrier-grade board standards of CompactPCI, are being applied to blade servers (see Figure 2), making them an excellent choice for telecom and NEP customers.

High-performance processors with large memory support, such as the 500 MHz Sun UltraSPARC-IIe at 10 watts power dissipation, allows 2 Gbyte RAM servers

to be packaged in a single CompactPCI slot, 0.8-inch wide x 6-inch deep x 9-inch high. PICMG standard chassis allows 16-20 CompactPCI telecom blade servers in a 19-inch wide, 15-inch deep chassis, saving critical central office space, and improving the ease of serviceability.

A typical 42-inch high telecom rack can contain up to 48 such CompactPCI telecom blades. With appropriate air conditioning in the chassis, a standard 32-inch deep rack potentially can support up to 96 telecom blades using back-to-back CompactPCI chassis. The PCI Industrial Computers Manufacturers Group's (PICMG) PMC expansion module technology allows laptop disk technologies to fit into the PMC envelopes on CompactPCI boards like Sun's Netra CP2060, utilizing the fast IDE/PCI standard interfaces and software drivers. The RAMIX PMC233, for example, supports 10 Gbyte – 40 Gbyte disk drives in a single CompactPCI slot (shown in Figure 3).

High-availability software for blade servers is essential for telecommunications industry

NEPS are using telecom blade servers for another reason: achieving five nine's availability, a key to delivering high quality of service. Hotswap capabilities greatly reduce the mean time to repair telecom blade servers by eliminating the need to turn off the power before maintenance. The NEBS Level 3-certified Netra ct 400 and 800, shown in Figure 1 is an



Figure 2. Netra CP2060 CompactPCI with PMC I/O expansion



Figure 3. RAMIX PMC disk module for CompactPCI blades

example of such a system. Combined with high availability middleware, redundant IP networks, state checkpointing, and system failover are all now available for building highly available, scalable platforms. For example, Sun's Netra High Availability Suite 2.0 offers software redundancy "out of the box," helping NEPs build telecom server platforms with virtually no single point of failure. With features such as reliable network file system and boot server, carrier-grade transport protocol, cluster events and checkpoints, the Netra HA Suite 2.0 can be used to create a highly available, dynamically scalable platform.

A rock-solid UNIX platform with massive scalability

Perhaps one of the most important elements in telecom blade servers, however, is the software support and management of a large number of blades. Companies such as Sun that offer a bullet-proof operating environment and system management software, are best suited to meet the demands of a high-availability telecom environment.

Industry-standard UNIX operating systems, now available on all CompactPCI boards, greatly simplify delivery of telecom blade servers. A leading OS for network computing today is UNIX, and the leading UNIX platform is Solaris, which is used on telecom blades, IT systems, and ISP Web servers. Service and equipment providers find Solaris to be stable under load, better supported, and more scalable horizontally and vertically in telecom blades. And to minimize risk, NEPs prefer Solaris for its vertical scalability support of up to 106 symmetrical multiprocessors with the same Solaris OS. No other combination of processor architecture and OS available today is able to scale such a range of platforms, from single processor, low-cost boards to 100+-way SMP servers.

For service providers, systems management of large numbers of telecom blade servers is of particular concern. To meet load balancing and telecom blade server management requirements, Sun provides Grid engine software. For blade component system management, PICMG IPMI/I2C standards are available for integration of blades in a shelf, while SNMP and Java agents, and network management Web interfaces are available for inter-shelf and network management. Sun's Management Center, for example, offers graphical display of blade, rack, and system components, and the Netra ct "lights out management" hardware/software enables remote servicing.

The bottom line is that advanced CompactPCI technologies are proving their metal as the standard for telecom blade servers. Combined with high-availability middleware and a solid OS platform and management software, telecommunication companies and NEPs are able to quickly deliver higher density computing solutions, with higher availability, providing overall cost savings and improved service for their users.

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Martin has worked in a variety of product marketing and business development capacities at Sun Microsystems throughout his nearly-10-year career with the network computing leader. Most recently, Martin was the senior product line manager for Sun's Fault Tolerant Systems group, responsible for managing a worldwide team of marketing professionals and product engineers. In this role, Martin and his group lead the successful delivery of Sun's first in-house-manufactured fault-tolerant computer. Martin also previously held the position of senior Internet business development manager for the Western region, where he assisted the regional sales team in revenue development related to the

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Prior to joining Sun Microsystems, Martin worked in a variety of UNIX-focused positions at companies including Netframe Systems, where he was the UNIX product line manager, and Tandem Computer, where he managed a worldwide team of professionals in jumpstarting Tandem's new UNIX platforms. Martin also worked as the worldwide technical UNIX pre-sales manager for Sperry Corporation.

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