Solaris™ 10 OS Networking

Extreme Network Performance

Accelerating trends are driving the evolution of networking in the Solaris™ Operating System. Millions of new users connect to the Internet every week through increasingly sophisticated wireless devices, PCs, and even automobiles. Service providers are building out their networks and providing new services such as IPTV. State of the art network capabilities are essential not just in these networks but also the datacenters that process data and deliver content and services to these burgeoning new markets.

Highlights

- Throughput approaching "wire speed" at 10 Gbps with reduced CPU overhead
- An open, programmable network stack, fully compatible with existing applications
- Performance scales linearly with the number of CPUs and connections
- Ready for enterprise and telco IPv6 deployments
- Innovative design features map to technology advancements in network devices
- Provides visibility into and control of network traffic in virtualized environments

New Solaris™ 10 Networking features address performance, scalability, security and protocol support

- Enhanced TCP/IP, UDP/IP, SSL, and packet forwarding performance — highly efficient, optimized stack greatly enhances network throughput while reducing the load on the CPU
- Leverages CoolThreads™ technology for increased throughput and optimal performance with Sun's multithreaded 10-Gigabit Ethernet (GbE) network devices
- Network virtualization through IP instances — enables a discrete network stack for each virtualized OS instance
- IPv6 — next-generation protocol provides increased address space, end-to-end security, and autoconfiguration features
- Berkeley Internet Name Domain (BIND) 9 — the latest Internet domain name server
- Quagga open source routing protocol suite
- IP Filter — IPv6-enabled, integrated open source firewall
- Standards-based link aggregation for increased throughput
- IP Multipathing — high availability of network connectivity and services through end-to-end redundancy
- Support for Stream Control Transmission Protocol (SCTP), Session Initiation Protocol (SIP), Multicast Listener Discovery (MLDv2), Open Shortest Path First (OSPFv2), and Border Gateway Protocol (BGP-4)
- Comprehensive support for gigabit, 10-Gb, and InfiniBand adapters from Sun and other vendors
- Internet SCSI (iSCSI) initiator and target support

Solaris 10 OS Networking benefits

Extreme network performance

The Solaris 10 OS introduces a highly scalable and enhanced networking stack that lowers overhead by reducing the number of instructions required to process packets. This efficiency also increases scalability, allowing more connections and enabling server network throughput to grow linearly with the number of CPUs or threads and network interface cards (NICs). The enhanced stack is tuned for 10-Gbps Ethernet, wireless, and off-loading technologies and provides the foundation to add protocols without impacting the network stack's performance or scalability. This feature facilitates the integration of emerging protocols under development in standards bodies such as the Internet Engineering Task Force (IETF).

Sun has concentrated on improving the performance of key server workloads that have a significant networking component. Customers save time and money from the improvements in network throughput, connection setup and

teardown times, first-byte latency (for transaction performance), connection and CPU scalability, and efficient use of resources. In addition, redesigned Web caching technology provides ease of use and operability with technologies such as Solaris Containers.

Next-generation IP protocol for quality, mobility, and security

The IPv6 protocol is designed to meet the global demand for network connectivity. It leverages the design of IPv4 — the current IP protocol — and extends it by providing a very large number of addresses that enable the vision of a vast global network of many different types of devices. With IPv6, the Internet not only connects people and computers, but virtually any kind of electronic device that can take advantage of Internet connectivity and flexibility.

The Solaris 10 OS supports current IPv6 specifications and application programming interfaces (APIs), and provides full integration with the IPSec implementation, including the Internet Key Exchange (IKE). This enables encrypted and authenticated network access between systems. The Solaris 10 OS, in conjunction with the Sun Java™ Enterprise System, provides the necessary tools to roll out a complete IPv6 based web services infrastructure.

To make it easy to transition to IPv6, Sun also provides a dual network stack with tunneling tools. Additionally, many tools and services such as IP Filter, Simple Network Management Protocol (SNMP) management information base (MIB), and Dynamic Host Configuration Protocol (DHCP) client support IPv6.

Improved network availability and routing protocols support

The Solaris 10 OS adds network-layer 3 redundancy, providing the ability to implement high-availability network solutions for more resilient services and innovative new applications. Layer 3 multipathing enables end-to-end redundancy ensuring greater protection from network failures. This standards-based multipathing (MP) feature is implemented via a combination of virtual IP address selection and OSPF-MP. Virtual IP address selection enables system administrators to specify IP source addresses for packets on a per-network basis. OSPF-MP employs the protocol to route traffic around failed network interfaces. The Solaris 10 OS also includes OSPFv2 and BGP-4 routing protocols, making it easier to administer complex routing policies.

Recent updates have added policy-based routing, which provides a means to set routing policy for individual connections.

Telecommunications

The Solaris 10 OS includes in-kernel support for SCTP and SIP protocols, making it an ideal development and deployment platform for voice over IP (VoIP) and other telephony applications. SCTP provides reliable transport over IP and is excellent for high-availability deployments such as telephony and Signaling System 7 (SS7), which require more reliable network connections.

SIP establishes, modifies, and terminates calls over IP networks and is most often used for VoIP. The Solaris SIP server implementation is supported on a wide range of industry-standard platforms and interoperates with clients on a range of operating systems, such as Microsoft Windows and Linux. This makes the Solaris 10 OS ideal for development projects that seek to exploit these new capabilities.

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Datacenter and beyond

The network capabilities in the Solaris OS are pivotal for extracting the most value from systems and network infrastructure deployed in the datacenter. Lower CPU overhead and reduced network latency provides advantages in grid-based, compute-intensive applications. Resilient high-speed networking is an essential element of productive NFS and iSCSI storage networks. In addition, the inclusion of technology for network virtualization provides new paradigms for deployment of virtual appliances, where, for example, bandwidth can be allocated to a virtualized OS instance.

For more information

To learn more about the Solaris 10 OS and its extreme networking performance, visit sun.com/solaris

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