Introduction

Chapter 1:

Performance Objectives

You will learn:

- New features of Solaris 10.
- Improvements in communication.
- Changes in data management.
- Updates in security.
- Updates to file integrity.

Network Features

Sun Solaris 10 Operating System:

- **Improves network performance without requiring changes to be made to existing applications.**
- **Supports current IPv6 specifications.**
- **Improves application performance by 50 percent via an enhanced TCP/IP stack.**
- **Supports the latest networking technologies, such as 10 Gigabit Ethernet, wireless networking, and hardware offloading.**
- **Accommodates high-availability, streaming, and Voice over IP (VoIP) networking features through extended routing and protocol support.**

TCP/IP: Improved

- **The Solaris 10 Operating System introduces a new and highly scalable TCP/IP stack that significantly increases network throughput and capacity.**
- **This innovative stack speeds packet processing by reducing overhead when processing packets.**
- **The Solaris 10 TCP/IP stack is tuned for 10 Gigabit Ethernet, wireless networking, and hardware offloading technologies.**

Full IPv6 Deployment

- IPv6 is the next-generation IP protocol, designed to meet the global demand for network connectivity.
- IPv6 offers a number of advantages over IPv4, including increased address space, end-to-end security, and autoconfiguration features.

Data Management

- Solaris ZFS (zettabyte file system), is part of a Solaris 10 update, incorporates advanced data security and protection features, eliminating the need for fsck or other recovery mechanisms.
- By redefining file systems as virtualized storage, Solaris ZFS provides for essentially unlimited scalability.

Data Management

- **UFS: UNIX File System, the primary Solaris file system, is designed to handle small, cacheable files accessed randomly by individual processes.**
- **Solaris Volume Manager software minimizes downtime by providing continuous data access, even in the event of a hardware failure.**
- **Network File System, Version 4 (NFS V4), adds enhanced security features, performance, and cross-platform interoperability.**
- **Solaris ZFS technology will deliver dramatic advancements by automating tasks, protecting data from corruption, and providing high scalability.**

UFS: UNIX File System

- Significant improvements have also been made for:
  - I/O performance for databases.
  - providing fast access to directories with large numbers of files.
  - providing the ability to create multiterabyte file systems.

Solaris Volume Manager

- Solaris Volume Manager is a disk and storage management solution suitable for enterprise-class deployment.
- It can be used to:
  - pool storage elements into volumes and allocate them to applications.
  - provide redundancy and failover capabilities which can help provide continuous data access in the event of a device failure.

Solaris ZFS

- **Near-Zero Administration**
  With Solaris ZFS, complicated storage administration will be automated and consolidated into straightforward language, reducing administrative overhead by up to 80 percent.
- **End-to-End Data Integrity**
  Under Solaris ZFS, all data is protected by 64-bit checksums, resulting in 99.9999999999999999% error detection and correction. Solaris ZFS will continually read and check data to ensure it is correct. When an error is detected in a mirrored pool, the technology will automatically repair the corrupt data.
- **Immense Capacity**
  Solaris ZFS is a 128-bit file system, and it will provide 16 billion, billion times the capacity of 32-bit or 64-bit file systems.

Security

- **Solaris Secure Execution and file verification features will verify the integrity of a system.**
- **Reduce risk by granting only the privileges needed with User and Process Rights Management.**
- **Simplify administration by using the open standards-based Solaris Cryptographic Framework for file encryption.**

File Integrity and Secure Execution

- **Sun has digitally signed binaries in the Solaris 10 Operating System, enabling administrators to track changes easily.**
- **The Solaris 10 OS also introduces a file integrity checking application for data files and customer applications known as the BART - Basic Audit and Reporting Tool.**
- **In addition, Sun continues to publicly provide digital hashes for all files shipped in Solaris as part of the Solaris Fingerprint Database project.**

User and Process Rights Management

- **In traditional UNIX-based operating systems, applications and users often need administrative access to perform their job.**
- **In most implementations, there is one level of higher privilege: the “root” super-user. Any user or application given root access has the ability to make major changes to the operating system and is typically the target of hacking attempts.**
- **Borrowing technology from the battle-proven Trusted Solaris OS, Solaris 10 offers unique User Rights Management (aka Role Based Access Control) and Process Rights Management (aka Privileges). These technologies reduce security risk by granting users and applications only the minimum capabilities needed to perform their duties.**

Cryptographic Services and Secure Remote Access

- **Sun Enterprise Authentication Mechanism, which is Sun Microsystems implementation of Kerberos, LDAP, and interoperability enhancements enable enterprise-wide, secure, standards-based single sign-on to servers and applications.**
- **These enhancements reduce costs by centralizing administration of system access across multiple operating systems while increasing security.**
- **New to the Solaris 10 Operating System are Kerberos-enabled remote applications such as rsh, rcp, telnet, and others that were previously only available via download.**
- **In addition, the new Solaris Cryptographic Framework adds a common API for system-wide cryptographic routines.**

Interoperability

- **Provides source and binary compatibility for Linux applications and interoperability with Microsoft Windows systems.**
- **Includes Perl, PHP, and other widely used scripting languages.**
- **Includes Apache, Samba, sendmail, IP Filter, BIND, and other popular open source software.**
- **Supports Java application development and deployment with J2EE and J2SE.**

Observability

- **The Solaris 10 Operating System improves the way system administrators and developers can identify the reasons for suboptimal system and application performance.**
- **Solaris Dynamic Tracing (DTrace) technology makes it possible to inspect today's complex systems for troubleshooting systemic problems in real time.**
- **New Features:**
  - **Real-time troubleshooting of systemic problems.**
  - **New tools for low-level system debugging.**
  - **System hardware testing and analysis.**
  - **Fine-grained project accounting.**
  - **Existing applications benefit from Solaris 10 enhancements without modification.**

DTrace: Dynamic Tracing

- **DTrace is an advanced tracing tool for troubleshooting systemic problems in real time.**
- **With DTrace, administrators, integrators, and developers can tune applications for performance and troubleshoot production systems - with little or no performance impact.**

System Analysis Tools

- **These tools include:**
  - **Thread analysis and monitoring tools, including lockstat, truss, and pstack.**
  - **Memory management and debugging tools, including libumem, a multithreaded memory allocation library with built-in monitoring functions.**
  - **Support for Intelligent IPMI - Platform Monitoring Interface, an industry standard for “lights out” management of x64/x86-based servers.**
  - **Modular Debugger (mdb) and Kernel Modular Debugger (kmdb), extensible tools for monitoring and analyzing applications and kernel routines.**

Predictive Self Healing

- **Predictive Self Healing is a capability in Solaris 10 that automatically diagnoses, isolates, and recovers from many hardware and application faults.**
- **Solaris Fault Manager**
  - Is a new Predictive Self Healing facility that collects data relating to hardware and software errors.
  - It automatically and silently detects and diagnoses the underlying problem, with an extensible set of agents automatically responding by taking the faulty component offline.
- **Solaris Service Manager**
  - Creates a standardized control mechanism for application services by turning them into first-class objects that administrators can observe and manage in a uniform way.