Oracle Solaris 10 System Administration – Part 1

Course Summary

Length: 5 Days **Prerequisite**: Solaris fundamentals course

Recommendation Statement:
It is assumed that the student has an understanding of UNIX. You must be familiar with basic UNIX commands, and the VI editor. The Solaris fundamentals course or an equivalent UNIX SVR4 fundamentals course is recommended.

Course Description:
This course teaches basic topics in Solaris system administration. The operating system will be Oracle Solaris 10 (SunOS 5.10 Release 8/11 U10). Both SPARC-based and x86-based versions of Solaris are covered in this course. Students will have access to both SPARC and x86-based Solaris servers to perform their labs.

This course prepares the student for the Oracle Solaris 10 System Administrator Certified Professional Examination – Part 1 (1Z0-877)

Upon completion of this course, you should be able to:

- Perform system boot and shutdown procedures on SPARC and x86-based systems
- Administer the Service Management Facility (SMF)
- Manage Solaris file systems
- Install the Solaris 10 Operating environment on SPARC and x86-based systems
- Create and administer user accounts
- Understand security issues and perform security administration
- Manage system processes
- Perform system backups and restorations
- Describe network basics
- Configure the network interface and network services
- Understand and administer ZFS file systems

Oracle Solaris 10 System Administration – Part 1

Detailed Course Outline

Overview of the Solaris 10 Operating Environment

- System concepts
- The main parts of the Solaris OS
- The Client/Server environment
- Describe the Solaris 10 Directory Hierarchy
  - Understand Solaris 10 file types
  - Understand hard links and soft links

System Startup and Shutdown Procedures – SPARC-Based Systems

- Understand phases of the boot process – SPARC
- Booting the system
- The Advanced Lights Out Manager (ALOM)
- Understanding OpenBoot and programmable read-only memory (PROM)
  - OpenBoot Firmware tasks
  - PROM fundamentals
  - PROM commands and syntax
  - Understand how to view and set PROM parameters from (OpenBoot and the shell)
  - Understand how to view and set device aliases
  - OpenBoot security
  - OpenBoot diagnostics
- Boot PROM and program phases
- Stopping the system for recovery purposes (Interrupting an unresponsive system)
- Understand the pros and cons of the various shutdown procedures

System Startup and Shutdown Procedures – x86/x64-Based Systems

- Understand phases of the boot process – x86-based systems
- The BIOS, Boot archive, and GRUB
- Configuring the video display
- Understand the pros and cons of the various shutdown procedures

GRUB – Grand Unified Bootloader (x86/x64 platform)

- Introduction to GRUB
  - How GRUB based booting works
- Modifying boot behavior with GRUB
- Use the eeprom and kernel commands
- GRUB device naming conventions
- Booting the x86-based system with GRUB
- GRUB boot archives
  - Boot the failsafe archive for recovery
- Interrupting and unresponsive system

Service Management Facility (SMF)

- Describe features of the SMF and the phases of the boot process
  - The init process and the /etc/inittab file
  - svc.startd daemon (master starter/restarter)
- Understand services and service instances
- Understand the SMF manifest
  - Creating the manifest
- Understand the SMF repository database
  - Modify the service configuration repository
- Understand the Fault Management Resource Identifier (FMRI)
- Understand service dependencies
- Identify run level fundamentals
  - Describe SMF Milestones
  - Changing milestones
- Compare run levels and SMF milestones

- Understand when to use a SMF service vs. a legacy service
- Identify phases of the boot process
- SMF command line administration utilities
  - Display information about services
- Starting and stopping services using SMF
- Starting services during boot
- Troubleshooting SMF problems
- Control boot processes and services
- SMF message logging
- Creating new service scripts
  - Convert a legacy service to a SMF managed service
- Legacy services
  - Administering the SMF
  - Troubleshooting SMF
- Using run control scripts to stop / start legacy services
  - Adding scripts to the run control directories

Installing the Solaris 10 Software

- Requirements and preparation for installing the Solaris 10 software
  - Supported architectures
  - Minimum system requirements
- Software Terminology: Packages, Groups (Clusters), and Configuration Groups
  - Software package
    - Software groups and configuration groups
- Upgrade vs. Initial installation
- Disk storage systems
  - Considerations for planning partition sizes
  - Partition arrangements on multiple disks
- Methods of installing the Solaris 10 software
  - Interactive (CLI)
  - Custom JumpStart
  - Flash Archive
  - WAN boot
  - Live Upgrade
- Secure by Default
- The Solaris interactive installation process
- Installation and Secure by Default

Managing Local Disk Devices

- Describe disk architecture
- Describe device naming conventions
  - Physical device name
  - Instance name
  - Logical device name
  - Block and character device files
  - Tools to list devices
  - Reconfiguring devices
- Describe the format utility
  - Perform disk partitioning using the format utility
  - Perform disk partitioning using the Solaris Management Console (SMC)

Managing File Systems

- A file system defined
- Defining a disk's geometry
  - Disk controller
  - Defect list
  - Disk label (EFI vs. SMI labels)
  - Partition table
  - Formatting SPARC and x86 drives

- Solaris file system types
  - Disk-based file systems (UFS, ZFS, HSFS, PCFS)
  - Network-based file systems
  - Virtual file systems (SWAPFS, PROCFS, LOFS, CacheFS, DEVfs, TMPFS)
- Disk slices
- Displaying disk configuration information
- Using format
- Logical volumes
- Parts of a UFS file system
  - The bootblock
  - The superblock
  - The inode
  - The storage block
  - Free blocks
- Creating a UFS file system
- Understanding custom file system parameters
- File system operations
  - Synchronizing a file system
  - Repairing file systems
  - Using fsck

Mounting and Unmounting File Systems

- Mounting file systems
  - The /etc/vfstab file
  - Using the mount command
  - Displaying mounted file systems
  - Mounting a file system with large files
  - Mounting a file system with UFS logging enabled
  - The /etc/mnttab file
- Displaying a file system's disk space usage
- Displaying directory size information
- Controlling user disk space usage
- Constructing a file system
- Large vs. Small files
- Unmounting a file system
  - The fuser command
- Volume manager (vold)
  - Troubleshooting volume manager
  - Using fdformat
- Information on file systems
- Troubleshooting file systems

Introduction to the ZFS File System

- Introduction to ZFS
  - ZFS Terms
  - Hardware and Software requirements for ZFS
  - What is Self-Healing?
- ZFS RAID configurations
- Create a ZFS file system
  - Rename a ZFS file system
  - Listing a ZFS file system
- Remove a ZFS file system
- Remove a ZFS Storage Pool
- ZFS Components
  - Disks, Files, Virtual Devices
  - Naming convention
- Using disks in a ZFS storage pool
- Using files in a ZFS storage pool
- Mirrored storage pools

- Converting a non-redundant pool to a mirrored pool
- Detach a device from a mirrored pool
- RAID-Z storage pools
- Displaying ZFS storage pool information
- Adding devices to a ZFS storage pool
- Attaching and Detaching devices in a storage pool
- Taking storage pool devices offline and online
- ZFS history
- ZFS properties
  - Native and settable properties
  - Setting ZFs properties
- Mounting ZFS file systems
- Legacy mount points
- Sharing ZFS file systems
- ZFS Web-based management GUI
- ZFS snapshots
  - Creating snapshots
  - Listing snapshot information
  - Saving and Restoring a ZFS snapshot
  - Renaming a ZFS snapshot
  - Rolling back a ZFS snapshot
  - Save/Restore to a remote system
- ZFS Clones
  - Creating and destroying ZFS clones
  - Replacing a ZFS file system with a ZFS clone
- Zpool scrubbing
- Replacing Devices in a Storage Pool
- Using ZFS with Solaris Zones
  - Adding a ZFS dataset to a non-global zone
  - Delegating a ZFS dataset to a non-global zone
- Emulated volumes
  - Using ZFS as a swap or dump device
- Designating hot spares in a storage pool

The Solaris Network Environment

- The Solaris Client/Server model
- Network interfaces Network Hardware
  - Configuring and Monitoring network interfaces
  - Configuring static information
  - Configuring dhcp
- Configuring the Network Interface
  - /etc/hostname.interface
  - /etc/nodename
  - /etc/defaultdomain
  - /etc/inet/hosts
- Configuring Network Services
  - Enable and disable server processes using the Service Management Service (SMF)
  - Understanding inetd and the inetd.conf file in the SMF environment
  - Starting services on well-known ports
  - Using inetadm
- Understand and monitor RPC services
- Network Security Files
- Understand how to configure the secure shell (ssh)
- Network Maintenance and Troubleshooting

System Security

- Physical security
- Controlling system access
- User account information
- Restricted shells
- Controlling file access
  - umask
  - Sticky bit
  - Setting the correct PATH
  - setuid / setgid programs
- Auditing users
  - Monitoring users and system usage
  - Checking who's logged in
  - The whodo command
  - The last command
- Network security
- Securing superuser access
- Automated security enhancement tool (ASET)
- Common sense security techniques
- Securing services

Administering User Accounts

- Describe user administration fundamentals
- Adding, modifying, and deleting a user account from the command line and SMC
  - Adding a group from the command line and SMC
  - Setting up and customizing the user's shell
- Managing initialization files
  - The /home directory
  - Name services

Software Package Administration

- Describe fundamentals of package administration
- Tools for managing software from the command line and from the system GUI tools
  - Adding and removing software packages
  - Listing and verifying installed packages

Managing Software Patches on the Solaris 10 OS

- The fundamentals of patch administration
- Installing / verifying / removing a patch and patch clusters
- Introducing Sun Connection services
  - Using Sun connection services to automate patching
  - Using the update manager from the GUI and from the command line

Controlling System Processes

- Viewing system processes
  - Commands used to monitor system resources and processes
  - PROC tools
- Process types
- Using signals
  - The kill command
- Scheduling processes
  - The fair share scheduler (FSS)
  - Scheduling and changing process priorities
  - The nice and priocntl commands
- Clear frozen and "zombie" processes
- Using the Solaris batch-processing facility to schedule execution of commands
  - Configuring crontab for executing recurring processes
  - Using the at command for automatic one-time execution of a command

Backup and Recovery

- Backup and recovery fundamentals
- Solaris backup and restoration utilities
  - Using the tar, dd, cpio, and pax utilites
  - Using ufsdump and ufsrestore
- Recovering the root (/) and /usr file system
- Backing up a mounted file system
- Creating a UFS snapshot
- Backing up the snapshot file
- Creating a Flash Archive

Overview of the Solaris Certified System Administrator Certification Process

- Why become certified?
- Overview of the certification and testing process.
- How to prepare for the 1Z0-877 exam.
- What to expect on the certification exams.