

Oracle Solaris 11 System Administration for Experienced Administrators

Course Summary

Length: 5 Days

Prerequisite: Solaris fundamentals course

Recommendation Statement:

Student must have a minimum of six months UNIX system administration experience (any UNIX system), completed a UNIX Fundamentals course, and has a strong desire to learn Solaris OS administration in an accelerated, intense environment. This course is also recommended for system administrators migrating from HP's HP-UX or IBM's AIX .

Course Description:

This course teaches basic and advanced topics in Solaris 11 system administration. The operating system will be Oracle Solaris 11.4. Students will have access to both SPARC and x86-based Solaris servers to perform their labs.

This course prepares the student for the Oracle Certified Associate- Oracle Solaris 11 System Administrator Certification Exam (1Z0-821), the Oracle Certified Professional- Oracle Solaris 11 Advanced System Administration exam (1Z0-822) and also the Upgrade to Oracle Solaris 11 System Administrator Exam (1Z0-820).

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

- Understand system boot and shutdown procedures on SPARC and x86-based systems
- Understand SPARC hardware components (devices, ILOM, OpenBoot)
- Administer the Service Management Facility (SMF)
- Manage and update software with the Image Packaging System (IPS)
- Configure and manage software repositories
- Manage CPU, CVE, Firmware updates and Solaris "dot" releases
- Install Solaris 11 and understand all methods of provisioning Solaris systems
- Create and administer user accounts
- Understand security issues and security administration
- Learn utilities to monitor and manage system resources
- Perform OS backups and restorations
- Configure the network interface and network services
- Understand Solaris virtual networking and configure virtual network components
- Configure IP Multipathing and Aggregations
- Configure and Administer ZFS file systems
- Understand Oracle Solaris virtualization technologies: Logical Domains, non-global and kernel Zones
- Create and administer Solaris Zones including immutable non-global and global zones
- Manage system swap and dump space
- Manage crash dumps and core files
- Administer Solaris 11 Boot Environments (BE)
- Install Solaris 11 using the Automated Installer (AI)
- Configure Role Based Access Control (RBAC); understand authorizations and profiles
- Configure non-global Zones and build a Virtual Network between zones
- Configure the NFS Environment
- Configure System Messaging (rsyslog and syslog)
- Monitor and troubleshoot software and hardware failures
- Use DTrace to monitor system applications and resources
- Software and Hardware Troubleshooting techniques will be taught throughout the course

Overview of the Solaris 11 Operating Environment

- Solaris 11 System concepts and features
- Describe the Solaris 11 Directory Hierarchy

System Startup and Shutdown Procedures

- Understand all of the phases of the boot process on a SPARC system
- Booting to a ZFS boot disk
- OpenBoot commands and options for Solaris boot environments
- The Integrated Lights Out Manager (ILOM)
- Understanding OpenBoot and how to control the boot process
- Understand the various shutdown procedures including interrupting an unresponsive system
- Introduction to GRUB and the GRUB boot process (x64 systems)
- Use the eeprom and kernel commands
- Interrupting and unresponsive system

Service Management Facility (SMF)

- Understand the role of the SMF and the phases of the boot process
- Administer services and service instances
- Understand the Fault Management Resource Identifier (FMRI)
- Service dependencies
- SMF command line administration utilities
- Display information about services
- Understand and Modify the SMF repository including recovering a corrupt database
- Starting and stopping services using SMF
- Create SMF Manifests and Profiles
- Modifying services and service properties
- Creating custom services
- Understand Milestones and Run Levels
- SMF message logging
- Using run control scripts to stop / start legacy services
- Understand the Fault Management Architecture
- Configure SMF notifications
- Diagnose SMF and FMA errors

Installing the Solaris 11 Software

- Understand the requirements for installing the Solaris 11 software
- Methods of installing the Solaris 11 software (Interactive installer, Automated Installer, Distribution constructor)

Managing and Updating Software with IPS

- Understand the Image Packaging System (IPS)
- Understand the IPS repository and software publishers
- Understand the IPS repository, create/access/update/manage multiple local repositories
- Understand the OS update process and failback procedures
- Update the OS and individual software packages
- Installing and managing software packages
- Understanding boot environments (BE's)
- Create and administer boot environments (BE's)
- Keep the system secure with Security Updates
- Use the `solaris-11-cpu` package to administer CVE updates
- Obtain and Install Support Repository Updates (SRUs)
- Manage CPU, CVE, SRU, Firmware and Solaris "dot" releases updates
- Troubleshoot software update issues

Administering Storage Devices

- Describe Solaris device naming conventions and location of device drivers and modules
- Understand physical, logical, block, and character devices
- Understand how to trace devices from the OS device to the hardware component
- Troubleshooting access to devices
- Reconfiguring devices
- Administering LUNs and SAN storage devices

Introduction to the ZFS File System

- Introduction to ZFS
 - ZFS Terms
 - Hardware and Software requirements for ZFS
 - What is Self-Healing?
- ZFS RAID configurations
- ZFS Components
 - Disks, Files, Virtual Devices
 - Naming conventions
- Create a ZFS file system
 - Rename a ZFS file system
 - Listing the ZFS file systems
- Using ZFS on the boot disk
 - Creating a mirrored root pool
 - Booting a ZFS root file system
 - ZFS related OpenBoot commands
 - Multiple ZFS boot environments
 - Booting and recovering a ZFS file system
 - Replacing a disk in a ZFS root pool
 - Boot from an Alternate Disk in a Mirrored ZFS Root Pool
 - Creating root pool snapshots
 - Recreate a ZFS Root Pool and Restore Root Pool Snapshots
 - Roll Back Root Pool Snapshots
- Remove a ZFS file system
- Remove a ZFS Storage Pool
- 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
- ZFS quotas
- Mounting ZFS file systems
- Legacy mount points
- Encrypted ZFS file systems
- Sharing ZFS file systems (NFS and SMB)
- 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
- Understand ZFS shadow migration and how to migrate a UFS filesystem to ZFS

Administering an Oracle Solaris Zone

- Describe the advantages of Zones
- Understand non-global Zones, Kernel Zones and Containers
- Solaris Zones
 - Types of Zones
 - solaris10 brand zones
 - Configuring/Installing solaris10 zones on a Solaris 11 host
- Display and interpret Zone States
- Zone Resource Allocation
- Configure the network in a Zone
- Configure a Virtual Network between Solaris zones
- Understand Zone Daemons
- Configure a Zone and Zone Resources
- Use a configuration profile when configuring a zone
- View and interpret the Zone Configuration File
- Install a Zone
- Boot a Zone
- Halt a Zone
- Reboot a Zone
- Uninstall a Zone
- Delete a Zone
- Modify a Zone
- Move a Zone
- Clone a zone
- Back up a zone
- Restore a zone
- Zone Login
- Using resource controls to contain zones
- Upgrade software and the OS on the global and non-global Zones
- Monitor a Zone and the processes associated with each Zone
- Implement Zone Security using immutable zones
- Implement global zone security using an immutable global zone
- Understand trusted path

The Solaris Network Environment

- Configuring and Monitoring network interfaces
- Configuring Network Services
- Understand how to configure the secure shell (ssh)
- Network Maintenance and Troubleshooting
- Understand Solaris virtual networking
- Configure virtual network components and virtual networks
- Configure virtual networks between zones
- Configure IP multi-pathing (IPMP) and aggregations for load balancing and redundancy
- Monitor network performance
- Understand flows and how network traffic can be controlled and balanced

System Security

- Control system and root access from the ILOM level, OpenBoot level and OS level
- Understand where how to protect user account information
- Control file access
- Audit users and activity
- Understand how to secure network services
- Secure root access with RBAC roles and authorizations
- Setup root as a role
- Setup user roles using RBAC
- Understand RBAC profiles and roles to assign elevated system access to user accounts
- Secure OS services in the Service Management Facility
- The secure shell (SSH)
- Secure file system data
- Manage Common Vulnerabilities and Exposures (CVE) updates

Administering User Accounts

- Describe user administration fundamentals
- Add, modify, and delete user and group accounts from the command line
- Set up and customize the user's shell
- Manage initialization files
- Set user and group storage space quotas
- Understand the root role
- Set and manage userquotas and groupquotas
- User the `useradm` utility to manage accounts

Controlling System Processes

- Viewing system processes
 - Commands used to monitor system resources and processes
 - PROC tools
- Process types
- Understand process signals and traps
- Scheduling processes and understanding the default and fair share scheduler (FSS)
- Using the Solaris batch-processing facility to schedule execution of commands
- Use Dtrace to view details about a process
- Manage swap and dump space

Backup and Recovery

- Understand ZFS backup and recovery procedures in Solaris 11
- Backup the boot disk (/)
- How to boot a system to repair a damaged root pool
- Recovering root (/)
- Creating and backing up ZFS snapshots
- Rolling back and restoring data from a ZFS snapshot
- Backup and Recovery techniques used on production systems
- Utilize Unified Archives to backup, restore and clone systems

Monitoring System Logs and Crash Recovery Files

- Understand Solaris 11 system logs and where they are located
- Understand crash dump files
- Understand core dump files

Perform Basic Troubleshooting

- Troubleshoot system installation issues
- Troubleshoot boot issues
- Troubleshoot Network connectivity
- Troubleshoot login issues
- Troubleshoot file systems