The Mac OS X Server Essentials 10.6 Exam
Skills Assessment Guide

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The Mac OS X Server Essentials 10.6 Exam (Prometric exam no. 9L0-510) is a computer-based test offered at Apple Authorized Training Centers and Prometric Testing Centers.

The exam is one of two required exams in the Apple Certified Technical Coordinator (ACTC) 10.6 certification track. You must pass this exam and the Mac OS X Support Essentials 10.6 Exam to become an ACTC 10.6.

You may take up to two hours to complete the exam, which consists of 91 multiple-choice questions that are based on the objectives listed in this guide.

The score required to pass is 71 percent. Five demographic questions are presented but are not scored.

To prepare for the exam, read through the objectives in this guide to determine which areas you need to review. The primary reference source for this exam is the book: *Apple Training Series: Mac OS X Server Essentials v10.6: A Guide to Using and Supporting Mac OS X Server* (Peachpit 2009).

You will not have access to any resources or references during the exam. Please note that the exam is based on Mac OS X and Mac OS X Server version 10.6. All references to Mac OS X and Mac OS X Server refer to version 10.6.

The number of test questions drawn from each knowledge area is indicated below. Please note that although this guide divides the objectives into nine knowledge areas, questions are presented randomly during the exam. Also note that UNIX commands and processes are shown in `monospace font` in the exam. Finally, when the term "by default" is used in the exam, it means using only the settings or values assigned automatically by the operating system or application, without any custom configuration.

Installation

This topic has 14 items, drawn from the following objectives:

- Identify the minimum hardware requirements for installing Mac OS X Server.
- Describe how to verify that a computer meets the minimum hardware requirements to install Mac OS X Server.
- List the computer-specific details that you will need from a Mac computer in order to perform a remote installation of Mac OS X Server on the computer.
- List the volume formats which can be used for a Mac OS X Server boot volume.

- Describe how installing Mac OS X server on a multiple-partition drive simplifies the task of keeping operating system files separate from server data.
- Given a specified volume format, describe how to format a computer's hard disk into multiple partitions in the specified format.
- List the possible passwords to use to access a remote Mac computer with Server Assistant when configuring a new installation of Mac OS X Server.
- Given a description of a set of organizational needs for a server, and the Mac OS X Server Worksheet included in the Mac OS X Server documentation, design and document the server's proposed configuration.
- Identify the computer-specific details needed to perform a remote installation of Mac OS X Server.
- Describe how to install the Mac OS X Server administration software on a Mac OS X client computer.
- Describe how to install Mac OS X Server on a headless computer.
- Identify the packages that are installed by Server Assistant when Easy Install is selected.
- Describe how to install Mac OS X Server on a Mac computer.
- Describe three procedures for installing Mac OS X Server on a headless Xserve that has no optical drive.
- Describe how to use the Installer log file from a Mac with Mac OS X Server newly installed to verify that the installation was successful.
- Given an Installer log file for a failed Mac OS X Server installation, identify the point of failure.
- Describe how to use Server Assistant on a Mac OS X client computer to configure a newly installed Mac OS X Server computer.
- Compare and contrast the effects of selecting each of the three Users and Groups options in Server Assistant (Manage Users and Groups, Import Users and Groups, Configure Manually), including how they effect the state of Open Directory service.
- Describe how to use Server Assistant to configure a newly installed Mac OS X Server computer with a valid serial number so that the computer can function as a server.
- Describe the security implications of having the root account enabled on a Mac OS X Server computer.
- Describe the relationship between the password for the root account and the password for the initial administrator account on a Mac OS X Server computer.
- Describe how to use Server Assistant to create the initial administrator account on a Mac OS X Server computer.
- Describe how to use Server Assistant to configure a network interface on a newly installed Mac OS X Server computer with a specified IP address.
- Explain the purpose of the computer name assigned using Server Assistant on a Mac OS X Server computer.
- Explain the purpose of the primary DNS name assigned using Server Assistant on a Mac OS X Server computer.
- Explain the purpose of the local hostname on a Mac OS X Server computer.
- Describe how to use Server Assistant to configure the computer name on a Mac OS X Server computer.

- Given Server Assistant, configure the local hostname on a Mac OS X Server computer.
- Describe the importance of configuring server and client computers to use a common network time server so that time-dependent services, such as Kerberos function correctly.
- Describe how to use Server Assistant to configure the date and time on a Mac OS X Server computer.
- List the directory server roles (Create Users and Groups, Import Users and Groups, and Configure Manually) that can be chosen during the initial configuration of Mac OS X Server.
- Compare and contrast how the two directory usage roles, Standalone Server, and Connected to a Directory System, provide directory data.
- Describe how to use Server Assistant on a Mac OS X Server computer to configure the server to use a local data store for directory data.
- Describe how to use Server Assistant to save setup configuration data for a Mac OS X Server computer to a text file so that it can be referenced at a later time.
- Describe how to use Server Assistant to save the setup configuration data for a Mac OS X Server as a record in a directory server so that another Mac OS X Server computer can recognize the record and use the record to configure itself.
- Explain the benefits of encrypting a Mac OS X Server configuration file.
- Describe how to use Server Assistant to configure a stored configuration file or configuration records so that they are encrypted with a passphrase to prevent unauthorized access to the configuration data.
- Explain how to use Server Assistant to create a configuration file so that when it is copied to a Mac OS X Server computer, the server recognizes the file and configures itself based upon the settings stored in the file.
- Describe the two main purposes, service configuration and share point maintenance, of the Server Admin utility.
- Describe how to use Server Admin on a Mac OS X computer, with the network address of a Mac OS X Server computer, and the name and password of an administrator account on the server, connect to the server so that you can monitor and configure it.
- Given a list of services that can be monitored and configured by the Server Admin utility, briefly describe what each service provides when enabled.
- Describe how to configure Server Admin so that specified services offered by a Mac OS X Server are added to the list of those that you can monitor and configure.
- Describe how to use Server Admin to determine the percentage of free disk space on a Mac OS X Server computer.
- Describe how to use Server Admin to display a graph showing the amount of CPU utilization that has occurred on a Mac OS X Server computer over the past hour, day, and week.
- Describe how to use Server Admin to display a graph indicating the amount of network traffic that has occurred on a Mac OS X Server computer over the past hour, day, and week.
- Describe the role of the Server Status widget, including where it runs, and which services it can monitor.
- Describe how to configure the Server Status widget so that it can be used for high-level monitoring of a Mac OS X Server server.

- Describe how to use the Server Status widget to determine the percentage of free disk space on a Mac OS X Server computer.
- Describe how to use the Server Status widget to determine the amount of network load and the amount of CPU utilization that has occurred on a Mac OS X Server over the past hour, day, and week.
- Describe how to use Server Admin on a Mac OS X client computer to observe a screen shared from a Mac OS X Server computer.
- Describe how to use Server Admin to configure a Mac OS X Server to send a message to one or more email addresses when an Apple-provided software update is available.
- State which notifications can be configured in the main Settings pane of Server Admin to trigger an email notification when the condition has been met.
- Describe how to use Server Admin to update a Mac OS X Server computer with available software updates provided by Apple's Software Update service.
- Describe how to use Server Admin to export configuration settings for specified services from a Mac OS X Server computer, so that they can be imported into a different Mac OS X Server computer.
- Describe how to use Server Admin to import into a Mac OS X Server computer a list of configuration settings exported from another server.

Authenticating and Authorizing Accounts

This topic has 11 items, drawn from the following objectives:

- Define the terms "authentication" and "authorization" as they apply to computers and servers.
- List at least three examples of user authentication on a Mac OS X client computer, such as logging in on a client computer, connecting to a file server, authenticating as an admin user for configuration purposes, and providing a username and password for a secured website.
- Explain the main purpose of Workgroup Manager in Mac OS X Server.
- List the four types of Mac OS X Server accounts that can be created and managed by Workgroup Manager, including user, group, computer, and computer group.
- Explain the purpose of the user ID for a user account on a Mac OS X Server computer.
- Describe how to use Workgroup Manager to create a user account so that the user can authenticate before accessing services provided by a Mac OS X Server computer.
- Describe how to use Workgroup Manager to enable a user account on a Mac OS X Server computer to have administrative capabilities on the server.
- Define the term "groups" as it applies to user accounts on a computer.
- Describe how to use Workgroup Manager to create a group account on a Mac OS X Server computer.
- Describe how to use Workgroup Manager to assign specified users to a group account stored on a Mac OS X Server computer.
- Describe how to use Workgroup Manager to assign specified groups to a user account stored on a Mac OS X Server computer.

- Describe how to use Workgroup Manager to assign groups on a Mac OS X Server computer to one group, so that all of the users can be granted the same permissions, as a group, on the server.
- Describe how to use Workgroup Manager to export user, group, computer, and computer group accounts so that they can be imported into a different Mac OS X Server computer.
- Describe how to use Workgroup Manager to import user accounts from a text file containing user account data from another source onto a Mac OS X Server computer so that the accounts can be used for authentication and authorization purposes on the server.
- Describe how to use Workgroup Manager to import user accounts from an XML file containing accounts exported from another source onto a Mac OS X Server computer so that the accounts can be used for authentication and authorization purposes on the server.
- Describe three examples of authorization on a Mac OS X client computer.
- Explain why it is a best practice to use groups instead of individual user accounts to manage permissions in Mac OS X Server.
- Explain how unique IDs (UIDs) and group IDs (GIDs) are used to relate permissions for files and folders to users and groups on a Mac OS X Server computer.
- Explain how Guest access and Everyone permissions to files on a Mac OS X Server computer can expose shared items to undesirable access.
- Describe how to use Server Admin to modify the POSIX permissions for files and folders on a Mac OS X Server computer to restrict user access to them.
- Explain how POSIX permissions can limit your options when setting up folder and file permission structures that involve multiple users or groups.
- Define the term "access control lists" (ACLs) as it applies to Mac OS X Server v10.6.
- Define "access control entry" (ACE) as it applies to ACLs in Mac OS X Server.
- Define "globally unique ID" (GUID) as it relates to user and group accounts in Mac OS X Server.
- Explain how ACEs are interpreted to determine the permissions of a file or folder.
- Explain the order in which Mac OS X interprets ACEs and POSIX permission settings to determine the effective permissions of a file.
- Explain how GUIDs associate ACLs to users and groups.
- Describe how to use Server Admin to create ACLs that will control access to files and folders shared by the server.
- Describe how file system ACLs in Mac OS X Server map to file system ACLs in Windows server.
- Define "inheritance" as it applies to file system ACLs in Mac OS X Server.
- Describe service access control lists (service ACLs).
- Describe how to use Server Admin to configure service ACLs on a Mac OS X Server so that users and groups cannot access specified services.
- Explain why a user account may be given administrative capabilities for a subset of the services provided by a Mac OS X Server computer.
- Describe how to use Server Admin to configure a Mac OS X Server computer to allow specified users to monitor all of the services provided by the server.

- Describe how to use Server Admin to configure a Mac OS X Server to allow specified users to administer all of the services provided by the server.
- Describe how to use Server Admin to configure a Mac OS X Server to allow specified users to monitor only the listed services.
- Describe how to use Server Admin to configure a Mac OS X Server to allow specified users to administer only the listed services.

Using Open Directory

This topic has 11 items, drawn from the following objectives:

- Describe the function of directory services in a networked computing environment.
- List three advantages provided to users and system administrators by networked directory services, including providing a common user experience, providing easier access to networked resources such as printers and servers, and allowing users to log in on different computers using a single account.
- Explain two advantages of using a server to provide shared directory data, including providing common authentication information to multiple servers, and providing common configuration data, such as automounts and printers, to multiple client computers.
- Define the term Open Directory as it applies to a Mac OS X client computer.
- Describe the structure and components of Open Directory on a Mac OS X client computer.
- List and describe the four Open Directory service roles as configured by Server Admin on a Mac OS X Server computer: Standalone, Open Directory master, Connected to, and Open Directory replica.
- Compare and contrast the four Open Directory service roles as configured by Server Admin on a Mac OS X Server computer.
- Describe how to use Server Admin and Directory Utility to configure a Mac OS X Server computer to use directory data provided by another directory server so that users can access services on the Mac OS X Server by authenticating with user accounts provided by the other directory server.
- Describe how to use the pop-up menu in Workgroup Manager that lists the directory domains for the server to identify which item should be chosen to allow viewing and editing of records provided by the server to other computers bound to the server.
- Describe how to use Server Admin to configure a Mac OS X Server as an Open Directory master so that multiple computers on the network can access directory data provided by the Mac OS X Server computer.
- Describe how to use Workgroup Manager to create user accounts on a Mac OS X Server that is configured as an Open Directory master, so that the accounts can be accessed by client computers that are bound the Mac OS X Server computer.
- Describe how to use Directory Utility and the address of a Mac OS X Server computer configured as an Open Directory Master to configure a Mac OS X client computer to connect to the Mac OS X Server computer for authentication and directory data.
- State how many replicas can be connected to a single Mac OS X Server computer and how many total replicas can be part of a single Open Directory network.
- Describe how to use Server Admin to configure a Mac OS X Server computer to act as an Open Directory Replica so that the replica server shares with client computers directory data as provided by the Open Directory Master server.

- Describe how to use Server Admin and a Mac OS X Server configured as an Open Directory Master to determine if any replica computers are connected to the Open Directory Master server.
- Describe how to use Server Admin connected to a Mac OS X Server computer to display Open Directory service-related log files.
- Describe how to use Server Admin to archive the Open Directory data on a Mac OS X Server to a disk image file so that the data can be restored later.
- Describe how to use Server Admin and a disk image containing archived Open Directory data to restore the Open Directory on a Mac OS X Server computer.
- State which utilities are used to configure the Open Directory service in Mac OS X Server and the primary purpose of each.
- State what data is archived when the Open Directory Archive function is used with Mac OS X Server.
- Describe five methods a Mac OS X Server can use to provide authentication including hash files, crypt passwords, password server, Kerberos, and LDAP.
- Contrast the following methods for storing authentication information: crypt, shadow, Open Directory.
- Describe how to use Workgroup Manager to configure the password type for a user account stored on a Mac OS X Server computer.
- Describe how to use Workgroup Manager to disable a specified user account so that it can no longer be used for authentication purposes, without deleting it.
- Describe how to use Workgroup Manager to configure the password policies of Mac OS X Server user accounts so that they become disabled on a specified date.
- Describe how to use Workgroup Manager to configure password policies of Mac OS X Server user accounts so that they become disabled after a specified number of failed attempts.
- Describe how to use Workgroup Manager to configure user accounts so that the users cannot change their passwords.
- Describe how to use Workgroup Manager to configure user accounts on Mac OS X Server so that when a user changes his password, the password conforms to a set of password policies.
- Describe how Kerberos provides both identification and authentication services.
- Define the following terms as they apply to Kerberos: ticket, Kerberos Distribution Center, Ticket Granting Ticket, Service Ticket.
- List four possible reasons a client computer might not be able to use Kerberos authentication to access a service including a DNS configuration issue, a mismatch in time settings between the client and server computers, Kerberos authentication disabled for a service, a user account not configured correctly.
- Given the `ktutil` utility on a Mac OS X client computer, display the Kerberos tickets that have been granted to the computer.
- Describe how to troubleshoot a situation where a client computer is unable to use Kerberos to authenticate and access kerberized services provided by a Mac OS X Server.
- Given a user account stored on a Mac OS X Server computer, determine the appropriate password type for the account to use.
- State which utilities are used to set password policies for Mac OS X Server user accounts.
- State which types of password policies can be applied to a user account in Mac OS X Server.

- State one method for displaying the status of Kerberos tickets on a Mac OS X client computer.

Using File Services

This topic has 13 items, drawn from the following objectives:

- List the file sharing protocols that can be used to share files from a share point on a Mac OS X Server computer.
- Describe the four basic steps to set up file services, including planning, configuring accounts, configuring file service, and monitoring the service.
- Explain two issues related to configuring a share point to share files over two different protocols, including volume format case-sensitivity, and file system permissions.
- Describe how to use Server Admin to create a new folder on a Mac OS X Server.
- Describe how to use Server Admin to configure a folder on a Mac OS X Server to act as a share point.
- Describe how to use Server Admin to configure a share point on a Mac OS X Server as a Time Machine repository for Mac OS X client computers.
- Describe how to use Server Admin to enable Spotlight to search a share point on a Mac OS X Server.
- State what tool is used to create and manage share points in Mac OS X Server.
- Describe how to use Server Admin to configure a share point on a Mac OS X Server computer to allow client computers to access the files using the Apple Filing Protocol (AFP).
- Describe how to use Server Admin to configure an AFP share point on a Mac OS X Server computer so that client computers can access the files on the share point without having to provide a user name and password.
- Describe how to use Server Admin and an AFP share point on a Mac OS X Server computer, configure the share point name that AFP client computers see when browsing for the share point.
- Describe how to use Server Admin to stop and start the AFP service on the server.
- Describe how to use Server Admin to configure AFP service on a Mac OS X Server so that client computers can browse for AFP share points via Bonjour.
- Describe how to use Server Admin to edit a Mac OS X Server's AFP service greeting message that is displayed when clients connect.
- Describe how to use Server Admin to configure a Mac OS X Server's AFP service greeting message to display once per user session.
- Describe how to use Server Admin to select the authentication methods used when client computers attempt to connect to a Mac OS X Server via AFP.
- Explain the usefulness of an administrator user's ability to masquerade as any registered user for the AFP service on a Mac OS X Server computer.
- Describe how to use Server Admin to configure a Mac OS X Server computer's AFP service to allow an administrator to masquerade as any registered user.
- Describe how to use Server Admin to configure a Mac OS X Server computer's AFP service to limit the number of simultaneous connections to a specified number of users.

- Describe how to use Server Admin to configure a Mac OS X Server's AFP service to limit the number of simultaneous guest connections to a specified number of users.
- Describe how to use Server Admin to configure a Mac OS X Server's AFP service to disconnect idle users when a specified time limit is reached.
- Describe how to use Server Admin to configure a Mac OS X Server's AFP service to exempt guests, administrators, registered users, and users with open files from being disconnected automatically after being idle for a period of time.
- Describe how to use Server Admin to configure a Mac OS X Server's AFP service to allow client computers to sleep up to a specified time limit before being disconnected automatically.
- Describe how to use Server Admin to configure a Mac OS X Server's AFP service to log AFP user activity.
- List the types of AFP activities that can be logged including logging in, logging out, opening files, creating files, creating folders, and deleting files or folders.
- Describe how to use Server Admin to configure the AFP service on a Mac OS X Server computer to log specific types of AFP activities including logging in, logging out, opening files, creating files, creating folders, and deleting files or folders.
- Describe how to use Server Admin to configure the AFP service on a Mac OS X Server computer to log errors that occur with the service.
- Describe how to use Server Admin to display AFP Error and Access logs so that they can be referenced for troubleshooting purposes.
- Describe how to use Server Admin to display a graph that shows AFP file service activity, including throughput and connections.
- List the two log files that provide AFP service-specific info in Mac OS X Server
- Describe how the different authentication method choices for the AFP service in Mac OS X Server effect how a user authenticates.
- Explain how an administrator can masquerade as a registered user in Mac OS X Server.
- Describe how a Windows client accesses a shared Server Message Block (SMB) volume that resides on a Mac OS X Server computer.
- Describe how to use Server Admin to configure a share point on a Mac OS X Server to allow client computers to access files using SMB.
- Describe how to use Server Admin to configure the share point on a Mac OS X Server computer so that client computers can access the files on the share point without having to provide a user name and password.
- Describe how to use Server Admin to configure the share point on a Mac OS X Server computer name that SMB client computers see when browsing for the share point.
- Explain the difference between the specified permissions and inherited permissions models, as they relate to assigning permissions to new files and folders on an SMB share point hosted by a Mac OS X Server computer.
- Describe how to use Server Admin to select a default permissions model, specified permissions or inherited permissions, to use when new files and folders are created on an SMB share point on a Mac OS X Server computer.
- Define the terms oplocks and strict locking as they apply the the SMB service in Mac OS X Server.

- Describe how to use Server Admin to enable oplocks or strict locking for an SMB share point on a Mac OS X Server computer.
- Describe how to use Server Admin to stop and start SMB file services on a Mac OS X Server computer.
- List and describe the four roles, Standalone, Domain Member, Primary Domain Controller, and Backup Domain Controller, provided by the Windows service on a Mac OS X Server computer.
- Describe how to use Server Admin to configure the Computer Name and Workgroup for the SMB service on a Mac OS X Server computer.
- Describe how to use Server Admin to configure the SMB service on a Mac OS X Server computer to allow users to connect without providing a user name or password.
- Describe how to use Server Admin to select an authentication method to use when client computers attempt to connect to a Mac OS X Server computer via SMB.
- Describe how to use Server Admin to configure the SMB service on a Mac OS X Server computer to limit the number of simultaneous connections to a specified number of users.
- Define the terms "workgroup master browser" and "domain master browser" as they apply to the SMB service in Mac OS X Server.
- Describe how to use Server Admin to configure a Mac OS X Server computer to act as a Workgroup Master Browser.
- Define WINS registration as it applies to Mac OS X Server.
- Describe how to use Server Admin to configure the WINS registration for the SMB service on a Mac OS X Server computer.
- Describe how to use Server Admin to configure the SMB service on a Mac OS X Server computer to log SMB user activity,
- Describe how to use Server Admin to display a graph that shows the number of SMB connections to a Mac OS X Server computer over time.
- Describe how to use Server Admin to configure a share point on a Mac OS X Server computer to allow client computers to access the files FTP.
- Describe how to use Server Admin to configure the share point name that FTP client computers see when browsing for an FTP share point on a Mac OS X Server computer.
- Describe how to use Server Admin to stop and start the FTP service on a Mac OS X Server computer.
- Describe how to use Server Admin to configure a share point on a Mac OS X Server computer so that a client computer can access the share point via FTP without a user name and password.
- Describe how to use Server Admin to enable and disable anonymous connections to a Mac OS X Server's FTP service.
- Describe how an FTP client requests the Mac OS X Server FTP server to perform file conversions before sending files.
- Describe how to use Server Admin to create access control lists (ACLs) to control access to FTP services on a Mac OS X Server.
- Describe how to use Server Admin to select the authentication methods to use when client computers attempt to connect via FTP to a Mac OS X Server sharing files over FTP.

- Describe how to use Server Admin to isolate and resolve FTP service issues.
- Describe how to use Server Admin to configure a Mac OS X Server's FTP service logs.
- Explain what passive FTP is and when it would be used.
- Describe how to use Server Admin to configure an NFS share point on a Mac OS X Server to be accessible only to client computers within a specified subnet.
- Describe how to use Server Admin to configure an NFS share point on a Mac OS X Server to be accessible only to client computers at specified IP addresses.
- Explain how Mac OS X Server uses user IDs for access control on NFS volumes.
- Describe how to use Server Admin to configure an NFS share point on a Mac OS X Server so that all clients access its files as Nobody (Guest).
- Describe how to use Server Admin to configure an NFS share point on a Mac OS X Server so that any client who accesses the files as root, accesses them as Nobody (Guest).
- Describe how to use Server Admin to configure an NFS share point on a Mac OS X Server so that its files and folders are Read Only to NFS client computers.
- Describe how to use Server Admin to configure the security level for an NFS share point on a Mac OS X Server.
- Describe how to determine the URL used by a client computer to access an NFS share point on a Mac OS X Server.
- Describe how to use Server Admin to configure a share point on a Mac OS X Server so that its contents are accessible over NFS.
- Describe how to use Server Admin to configure an NFS share point on a Mac OS X Server to be accessible to any NFS client computer regardless of the client's IP address.
- Explain two benefits of providing automounts, including providing networked home folders and sharing OS resources such as system files and applications.
- Describe how to use Server Admin to configure a share point on a Mac OS X Server computer to act as a shared Applications folder for Mac OS X client computers.
- Describe how to use Server Admin to select the file sharing protocol to use when a share point on a Mac OS X Server is automounted.
- Describe how to use Server Admin to configure a share point on a Mac OS X Server computer to act as a shared Library folder for Mac OS X client computers.
- Describe how to use Server Admin to configure a share point on a Mac OS X Server computer to host networked home folders.
- List the file sharing protocols that can be used to serve home folders hosted by Mac OS X Server.
- Describe how to use Server Admin to configure the protocol that Mac OS X Server uses to serve home folders.
- Describe how to use Server Admin and Workgroup Manager to configure a disk quota for a home folder hosted on a Mac OS X Server.
- Given a need for an automount share point and Server Admin, select the appropriate type of automount.
- Explain how to configure a disk quota for a user account.

Hosting Mail Services

This topic has 6 items, drawn from the following objectives:

- Explain three reasons for hosting a mail server, including limited network bandwidth, increased security, and enhanced control.
- Define the terms POP, IMAP, and SMTP as they apply to mail service.
- Explain how an email message travels from a source client computer through multiple mail servers and is received by a destination client computer.
- Explain how when handling outgoing email a mail server identifies the network address of the destination mail server.
- Describe how to use Workgroup Manager to enable a user account on Mac OS X Server to send and receive email.
- Describe how to use Workgroup Manager to configure a user account on a Mac OS X Server computer to use a given mail server to send and receive email.
- Describe how to use Workgroup Manager to select the protocols, POP or IMAP, that are used by a user account on a Mac OS X Server computer to receive email.
- Describe how to use Server Admin to stop and start the mail service hosted by a Mac OS X Server computer.
- Describe how to use Server Admin to configure the domain name for the mail service on a Mac OS X Server computer.
- Describe how to use Server Admin to configure the host name for the mail service on a Mac OS X Server computer.
- Describe how to use Server Admin to enable the mail service on a Mac OS X Server computer to allow client computers to use the POP protocol to receive email.
- Describe how to use Server Admin to enable the mail service on a Mac OS X Server computer to allow client computers to use the IMAP protocol to receive email.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to limit the number of IMAP connections to a specified number.
- Describe how to use Server Admin to enable the mail service on a Mac OS X Server computer to use the SMTP protocol to receive email from other servers.
- Describe how to use Server Admin to enable the mail service on a Mac OS X Server computer to use the SMTP protocol to receive email from client computers.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to relay all outgoing email through a specified mail server.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer so that users can access their mail accounts via a web browser.
- Define the term “cluster” as it applies to mail servers.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to participate in a mail cluster.
- Define the terms “open relay” and “spam” as they apply to mail servers.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to enable the authentication methods for POP, IMAP, and SMTP to increase the server’s security.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server to only relay email from trusted mail servers.

- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to refuse email from the rogue mail servers.
- Describe how to use Server Admin to verify that the mail service on a Mac OS X Server computer is not acting as an open relay.
- Define the term "blacklist service" as it applies to mail servers.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to reduce the amount of incoming spam sent to local users.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to scan incoming email for junk mail.
- Describe how to use Server Admin to configure how aggressive the mail service is in rejecting junk mail.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to send or to not send to its destination any incoming mail that has been identified as junk.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to scan incoming email for viruses.
- Describe how to use Server Admin to configure how the mail service on a Mac OS X Server computer handles infected messages.
- Describe how to use Server Admin to configure the frequency of the mail service on a Mac OS X Server computer's virus database updates.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to reject any incoming messages that are greater than a specified message size.
- Describe how to use Workgroup Manager to configure the mail quota for a user account so that it does not use more than a specified amount of disk space to store email.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer so that incoming email for a user is disabled when the user's mail quota has been exceeded.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer so that a user is sent a warning message when the amount of incoming email for the user account on the server exceeds a specified warning percentage.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to send a copy of all mail to a specified email address.
- Describe how to use Server Admin to configure the mail service on a Mac OS X Server computer to send a copy of all undeliverable mail to a specified email address.
- Describe how to use Server Admin, a Mac OS X Server computer, and a list of email addresses to create a mail list so that an email message sent to a single email address is distributed to multiple users.
- Describe how to use Server Admin to set the appropriate log levels for the SMTP, IMAP/POP, and Junk Mail logs according to specified operating conditions, such as normal, under a spam attack, users unable to send or receive email.
- Describe how to use the SMTP and POP/IMAP log files, Server Admin, and a Mac OS X Server computer to identify messages that can help diagnose why a user is unable to send or receive email using the server.

- Describe two methods (setting quotas and setting maximum incoming message sizes) to limit the amount of disk space used by the Mail service in Mac OS X Server.
- State how to set a quota for a user account.

Managing Web Services

This topic has 5 items, drawn from the following objectives:

- State the standard web server on which the web service in Mac OS X Server is based.
- Describe how to use Server Admin and a Mac OS X Server computer to create a new website.
- Describe how to use Server Admin to enable a website on a Mac OS X Server computer hosting web service, so that the site is accessible by web browsers on computers.
- Describe how to use Server Admin to disable a website on a Mac OS X Server computer hosting web service so that the site is not accessible by other computers.
- State the default location where a Mac OS X Server computer's main website files are stored.
- Describe how to use Server Admin to configure the location of the data files for a website hosted on a Mac OS X Server computer.
- State which group on a Mac OS X Server computer must have Read access to files that are to be served by the web service.
- Describe how to configure the permissions of a set of files on a Mac OS X Server computer hosting web service so that the files can be served by the web service.
- Describe how to use Server Admin to start and stop the web service on a Mac OS X Server computer.
- List the three different methods for distinguishing between multiple websites hosted by Mac OS X Server computer, including domain name, IP address, and port number, so that multiple sites can be hosted on a single server.
- Describe how to use Server Admin to configure two or more websites on a Mac OS X Server so that each is uniquely accessible.
- Describe how to use Server Admin to add an alias to a website hosted by a Mac OS X Server computer, so that the server responds to the new name.
- Define the term "realm" as it relates to a web server.
- Describe how to use Server Admin to create a realm so that access to a website running on a Mac OS X Server computer or to a portion of the site is restricted to specified users.
- Define the term "modules" as they apply to the web service in Mac OS X Server.
- Describe how to use Server Admin to enable or disable a module for the web service on a Mac OS X Server.
- State a reason to enable the Folder Listing option, for example, to provide a simple interface to a collection of files to be made available to users via the web service.
- Explain how enabling the Folder Listing option for a website can decrease the security of a website.
- Describe how to use Server Admin to configure the Folder Listing option for a website hosted on a Mac OS X Server computer.

- Describe how to use Server Admin to enable the log files for a website hosted by a Mac OS X Server computer.
- Describe how to use Server Admin to display a graph that charts the throughput or number of requests made for the web service on a Mac OS X Server.
- List the types of logs generated by the web service in Mac OS X Server.
- State the protocol used by WebDAV to share files.
- Describe how to use Server Admin to enable WebDAV access on a website hosted by a Mac OS X Server computer.
- Describe how to use Server Admin to configure the permissions for a folder of files on a Mac OS X Server computer to allow for Read/Write access over WebDAV.
- Given the address of a Mac OS X Server computer sharing files via WebDAV, state the URL to access the files.
- Compare and contrast WebDAV with other common file sharing protocols such as AFP, SMB, and FTP, discussing security issues, format of the URLs used to access, and benefits of using each.

Using Collaborative Services

This topic has 12 items, drawn from the following objectives:

- Define the term "wiki" as it applies to Mac OS X Server.
- State three benefits of setting up a wiki server.
- Define the term "weblog" as it applies to Mac OS X Server.
- Describe how to use Server Admin to enable the wiki and blog services for a website hosted on a Mac OS X Server computer.
- Describe how to use Server Admin to add specified groups to a list of those that can create a wiki on a website hosted on a Mac OS X Server computer.
- Describe how to use Server Admin to enable the web calendar capabilities for a website hosted on a Mac OS X Server computer.
- Describe how to use a Mac OS X Server computer hosting a wiki-enabled website and a client computer with a web browser to create a wiki hosted on the server.
- Describe how to use a Mac OS X Server computer hosting a wiki-enabled website and a client computer with a web browser to modify a wiki hosted on the server.
- List three reasons according to the Mac OS X Server documentation why you would want to provide shared calendar services using the iCal service on a Mac OS X computer.
- Describe how to use Server Admin to enable the iCal service on a Mac OS X Server so that two or more Mac OS X client computers can access and share calendar data.
- Identify a reason why you would need to establish quotas for users of the iCal service hosted on a Mac OS X Server computer.
- Describe how to use Server Admin to configure the user quota for storing data in the iCal service on a Mac OS X Server computer.
- Describe how to use a Mac OS X Server computer that is hosting shared calendars, and iCal on a Mac OS X client computer to configure iCal on the client computer so that it displays the shared scheduling data provided by the iCal service.

- Describe how to use a Mac OS X Server computer that is hosting shared calendars, and Directory on a Mac OS X client computer to create new resources on the iCal server that can be scheduled using iCal on the client computer.
- Describe how to use Server Admin and a Mac OS X Server computer with iCal service enabled to configure the iCal service to use SSL for secure connections.
- Describe how to use Server Admin and a Mac OS X Server computer with iCal service enabled to configure where the calendar data repository for iCal services will reside.
- Describe how to use Server Admin and a Mac OS X Server computer with iCal service enabled to troubleshoot issues with the iCal Server.
- State which protocols are used by the iCal service in Mac OS X Server.
- State which protocol is used by the chat service in Mac OS X Server, both the familiar name, Jabber, and the official name, Extensible Messaging and Presence Protocol (XMPP).
- Explain the benefits of setting up a chat server, including automatically generating chat transcripts and increases security.
- Describe how to use Server Admin to modify the list of host domains that the chat service in Mac OS X Server will connect to.
- Describe how to use Server Admin to choose the SSL certificate that the iChat service will use to secure text, audio, and video chats.
- List the methods that can be used by the iChat service in Mac OS X Server to authenticate iChat clients.
- Describe how to use Server Admin to configure the authentication method used for the iChat service on a Mac OS X Server computer.
- Describe how to use Server Admin to start and stop the iChat service on a Mac OS X Server computer.
- Describe how to determine the iChat server screen name for a specified user account on a Mac OS X Server computer.
- Describe how to add a service account to iChat on the client computer so that it can be used to chat with other iChat users via the iChat service on a Mac OS X Server computer.
- Describe how to use Server Admin and a Mac OS X Server computer that is hosting iChat service to configure the iChat service so that all chat messages are logged to a file on the server.
- Describe how to use Server Admin and a Mac OS X Server computer that is hosting iChat service to specify the location on the server where logged chat messages will be stored.
- Describe how to use Server Admin and a Mac OS X Server computer that is hosting iChat service to display chat messages, if any, that have been stored on the server.
- Explain the purpose of the federation feature for the iChat service in Mac OS X Server.
- Describe how to use Server Admin to enable the server-to-server federation feature for the iChat service.
- Describe how to use Server Admin and a Mac OS X Server computer hosting iChat service to configure the iChat service to allow federation any other XMPP chat server.

- Describe how to use Server Admin, a Mac OS X Server computer hosting iChat service, and the address of another XMPP chat server to configure the iChat service to allow federation with just the specific XMPP server.
- Describe how to use Server Admin and a Mac OS X Server computer that is providing iChat service to identify how many users are currently connected to the iChat service.
- Describe how to use Server Admin to display the iChat service log on a Mac OS X computer.
- Describe how to use the system log file for a Mac OS X Server computer to identify the users that are currently connected to the iChat service.
- Describe how to use Server Admin and a Mac OS X Server computer with iChat services enabled to troubleshoot issues with the iChat Server.
- Describe how to use a Server Admin, a user or group account, and a Mac OS X Server computer hosting the iChat service to enable or disable access to the iChat service for the given account.
- Explain how contact data is shared between Mac OS X client computers and the Address Book service on Mac OS X Server.
- Describe how to configure the Address Book service so that users can store contact information on the server.
- Describe how to use Server Admin and a Mac OS X Server computer hosting the Address Book service to configure the location on the server where the Address Book data is stored.
- Explain how to configure a Mac OS X client computer to access shared contact information provided by the Address Book services on a Mac OS X Server computer.
- Describe how to use Server Admin and a Mac OS X Server computer hosting the Address Book service to configure the authentication method used to restrict access to the Address Book service.
- Describe how to use a Mac OS X computer and a Mac OS X Server computer hosting the Address Book service to configure the client computer to access contact information stored on the server.

Implementing Deployment Solutions

This topic has 7 items, drawn from the following objectives:

- Explain five problems that are solved by using a NetBoot server, including having to rapidly update a large number of computers with newer system software, quickly repurposing a number of computers with a different software including operating systems and applications, needing an emergency boot disk when a hard drive on a client computer has failed, needing to quickly revert systems such as kiosks to a known "clean" state, and needing a quick and easy method for imaging computers with a variety of configurations.
- Define the term NetBoot as it applies to Mac OS X Server.
- List the initial steps a client computer goes through when it is configured to boot using a NetBoot server.
- Explain how network home folders complement a NetBoot system by providing users a location to store personal data and preferences.
- Describe how to use a Mac OS X computer that has the Mac OS X Server administrator tools installed to locate the System Image Utility application.

- Explain the differences between the three types of System Image Utility images: NetBoot, Network Install, and NetRestore
- List the two types of sources, install media and disk volumes, that can be used to create a NetBoot or NetInstall image.
- Compare and contrast the benefits of using each of the types of images sources that can be used to create a NetBoot or NetInstall image, including the ability to create clean systems.
- State the minimum Mac OS version for a NetBoot or NetInstall image source.
- Describe how to use the System Image Utility running on a Mac OS X computer and an appropriate image source to create a NetBoot image that can be used by the NetBoot service on a Mac OS X Server computer.
- State the minimum network requirements to support client computers booting using the NetBoot service in Mac OS X Server.
- Describe how to use Server Admin to set which volumes on a Mac OS X Server computer will be used to store NetBoot data.
- Describe how to use System Image Utility running on a Mac OS X computer and an appropriate image source to create a NetInstall image that can be used by the NetBoot service on a Mac OS X Server computer.
- Describe how to use Server Admin to configure the NetBoot service to share NetBoot images over a specified network port.
- State the location on a Mac OS X Server computer where a NetBoot image should be stored so that it can be used by the NetBoot service.
- Describe how to copy a NetBoot image to the correct location so that it can be used by the NetBoot service on a Mac OS X Server computer.
- Describe how to use Server Admin to start and stop the NetBoot service.
- Describe how to use Server Admin and a Mac OS X Server computer with a NetBoot image installed to enable the image in the NetBoot service so that client computers can boot using it.
- State three methods that can be used to configure a client computer to boot using an image provided by a NetBoot server.
- State what keys should be pressed during startup to configure a Mac computer to boot from a NetBoot server.
- Describe how to configure a client computer to boot using the NetBoot service by pressing a key sequence during startup.
- Describe how to use System Preferences on a Mac OS X client computer to configure the client computer to boot using an image provided by the NetBoot server.
- Describe how to use Server Admin to configure the NetBoot service to allow or deny specified client computers access to the NetBoot service.
- Describe how to use Server Admin to configure which image among multiple images hosted by a Mac OS X Server will be the default image used by the NetBoot service.
- Describe how to use Server Admin to set what protocol will be used to serve a NetBoot image.
- Define the term "shadow files" as it applies to the NetBoot service in Mac OS X Server.

- Describe how to use Server Admin to list the client computers that are booted using a NetBoot image hosted by a Mac OS X Server.
- Describe how to use Server Admin to determine a client computer's connection information, including what NetBoot image it used to boot, and when the client computer last booted.
- Describe how to use System Image Utility to configure a NetBoot image to change ByHost preferences after it has been installed.
- Describe how to use a Mac OS X Server computer hosting NetBoot images to display the log files for the NetBoot service so that they can be used for troubleshooting.
- Describe how to use a set of NetBoot log files for a NetBoot service that is not serving images to clients properly to identify the issue.
- State the minimum network requirements to support client computers booting using the NetBoot service in Mac OS X Server.
- State the minimum system requirements for client computers booting using the NetBoot service in Mac OS X Server.
- Describe the purpose of the filters in the NetBoot service on a Mac OS X Server computer.

Managing Accounts

This topic has 12 items, drawn from the following objectives:

- List six reasons one would use Mac OS X Server to manage user account preferences including providing consistent user experience between multiple computers, managing permissions on portable computers, restricting resources to select users or groups, increasing security, and providing a managed user experience.
- Compare and contrast the characteristics of network user accounts and local user accounts in Mac OS X Server.
- Identify which Mac OS X Server utility is used to manage user account permissions.
- Describe how to use Workgroup Manager to enable the Inspector so that directory data on a Mac OS X Server can be examined.
- Identify which utility is used to manage account preferences in Mac OS X Server.
- Compare and contrast the four types of Mac OS X Server accounts: user, group, computer, and computer group.
- Describe how to use Server Admin to create a group folder on a Mac OS X Server that will be automatically accessible from the desktop of a Mac OS X client computer.
- State the hierarchy of the four account types as that hierarchy applies to managed preferences on a Mac OS X Server computer.
- Describe how to use Workgroup Manager to create a new computer account on a Mac OS X Server so that a Mac OS X client computer's preferences can be managed.
- Describe how to use Workgroup Manager to create a new computer group account that contains specified computers.
- Describe how the four time-based options (Never, Once, Always, and Often) for enforcing managed account preferences effect when a manage preference is enforced.

- Explain when a managed preference setting for one type of account is overridden by a different setting for the same preference on another type of account.
- Explain when the settings for a common managed preference from different account types are combined.
- Describe how account-level precedence applies to managed preferences that follow the inherit rule in Mac OS X Server.
- Describe how to use Workgroup Manager to state what the behavior will be on the client computer when a user logs in who belongs to a specified user account, group account, computer account and computer group account with a common managed preference set.
- State the locations on a client computer where managed preferences are stored.
- Explain the purpose of the Guest Computer account in Workgroup Manager.
- Describe how to use Workgroup Manager to configure the managed preferences for a user account on a Mac OS X Server computer so that any user that connects using the given account can open only specified applications.
- Describe how to use Workgroup Manager to configure the managed preferences for an account so that any user that connects using the given account can open only specified widgets.
- Describe how to use Workgroup Manager to configure the managed preferences for user accounts on a Mac OS X Server so that users on Mac OS X client computers encounter a managed user experience.
- List all managed preference settings that can be applied to a user account.
- List all managed preference settings that can be applied to a group account.
- List all managed preference settings that can be applied to a computer account.
- List all managed preference settings that can be applied to a computer group account.
- Describe preference manifests as implemented in Mac OS X Server
- Describe how to use Workgroup Manager to import a preference manifest so that an application not listed in Workgroup Manager by default can be managed.
- Describe the top preference management problems in accordance to the Mac OS X Server User Management document, and the techniques used to resolve them.
- State two methods to have a group folder hosted by a Mac OS X Server computer to be automatically accessible from the desktop of a Mac OS X client computer.
- Explain two reasons an organization would want to set up an internal software update server, including maintaining control over what updates users install and reducing the amount of network bandwidth used.
- Describe how to use Server Admin to configure a Mac OS X Server to download all software updates provided by Apple.
- Describe how to use Server Admin to configure a Mac OS X Server to download all new software updates provided by Apple.
- Describe how to use Server Admin to configure a Mac OS X Server to automatically enable any updates that have been downloaded from Apple.
- Describe how to use Server Admin to configure a Mac OS X Server to automatically delete unused or legacy updates.
- Describe how to use Server Admin to configure a Mac OS X Server to limit the amount of network bandwidth that can be used for distributing software updates.

- Describe how to use Server Admin to enable a set of updates that have been downloaded to a Mac OS X Server computer so that they are accessible by other computers on the network.
- Describe how to use Server Admin to identify what Apple-provided updates are available to be downloaded.
- Describe how to use Workgroup Manager to configure an account on a Mac OS X Server computer to use the URL of a Mac OS X Server computer providing software updates for software updates provided over the network.
- Describe the basic features of the Software Update Service in Mac OS X Server, including how it can automatically download updates provided by Apple and share only select updates to clients.
- Explain the characteristics of a mobile user account in Mac OS X Server.
- Describe how synchronized folders are implemented in Mac OS X Server.
- Describe how to use Workgroup Manager to configure a Mac OS X Server user account to use a mobile home directory.
- Describe how to use Workgroup Manager to configure a user account on a Mac OS X Server computer to use an external account.
- Describe how to use Workgroup Manager to configure a mobile user account on a Mac OS X Server computer to be deleted automatically from a Mac OS X client computer when a specified time period has elapsed.
- Describe how to use Workgroup Manager to enable synchronized folders for a mobile user account on a Mac OS X Server computer.
- Describe how to use Workgroup Manager, a mobile user account on a Mac OS X Server computer, and a Mac OS X client computer where the mobile user account's home folder is stored to configure when (at login, logout, in the background) the home folder on the client computer is synchronized with the home folder stored on the server.

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