

Installation, Storage, and Compute with Windows Server 2016

Course outline 70-740

[Install Windows Servers in host and compute environments \(10–15%\)](#)

- Install, upgrade, and migrate servers and workloads
 - Determine Windows Server 2016 installation requirements; determine appropriate Windows Server 2016 editions per workloads; install Windows Server 2016; install Windows Server 2016 features and roles; install and configure Windows Server Core; manage Windows Server Core installations using Windows PowerShell, command line, and remote management capabilities; implement Windows PowerShell Desired State Configuration (DSC) to install and maintain integrity of installed environments; perform upgrades and migrations of servers and core workloads from Windows Server 2008 and Windows Server 2012 to Windows Server 2016; determine the appropriate activation model for server installation, such as Automatic Virtual Machine Activation (AVMA), Key Management Service (KMS), and Active Directory-based Activation
- Install and configure Nano Server
 - Determine appropriate usage scenarios and requirements for Nano Server, install Nano Server, implement Roles and Features on Nano Server, manage and configure Nano Server, manage Nano Server remotely using Windows PowerShell
- Create, manage, and maintain images for deployment
 - Plan for Windows Server virtualization; plan for Linux and FreeBSD deployments; assess virtualization workloads using the Microsoft Assessment and Planning (MAP) Toolkit; determine considerations for deploying workloads into virtualized environments; update images with patches, hotfixes, and drivers; install roles and features in offline images; manage and maintain Windows Server Core, Nano Server images, and VHDs using Windows PowerShell

[Implement storage solutions \(10–15%\)](#)

- Configure disks and volumes
 - Configure sector sizes appropriate for various workloads, configure GUID partition table (GPT) disks, create VHD and VHDX files using Server Manager or Windows PowerShell, mount virtual hard disks, determine when to use NTFS and ReFS file systems, configure NFS and SMB shares using Server Manager, configure SMB share and session settings using Windows PowerShell, configure SMB server and SMB client configuration settings using Windows PowerShell, configure file and folder permissions
- Implement server storage

- Configure storage pools; implement simple, mirror, and parity storage layout options for disks or enclosures; expand storage pools; configure Tiered Storage; configure iSCSI target and initiator; configure iSNS; configure Datacenter Bridging (DCB); configure Multi-Path IO (MPIO); determine usage scenarios for Storage Replica; implement Storage Replica for server-to-server, cluster-to-cluster, and stretch cluster scenarios
- Implement data deduplication
 - Implement and configure deduplication, determine appropriate usage scenarios for deduplication, monitor deduplication, implement a backup and restore solution with deduplication

Implement Hyper-V (20–25%)

- Install and configure Hyper-V
 - Determine hardware and compatibility requirements for installing Hyper-V, install Hyper-V, install management tools, upgrade from existing versions of Hyper-V, delegate virtual machine management, perform remote management of Hyper-V hosts, configure virtual machines using Windows PowerShell Direct, implement nested virtualization
- Configure virtual machine (VM) settings
 - Add or remove memory in running a VM, configure dynamic memory, configure Non-Uniform Memory Access (NUMA) support, configure smart paging, configure Resource Metering, manage Integration Services, create and configure Generation 1 and 2 VMs and determine appropriate usage scenarios, implement enhanced session mode, create Linux and FreeBSD VMs, install and configure Linux Integration Services (LIS), install and configure FreeBSD Integration Services (BIS), implement Secure Boot for Windows and Linux environments, move and convert VMs from previous versions of Hyper-V to Windows Server 2016 Hyper-V, export and import VMs, implement Discrete Device Assignment (DDA)
- Configure Hyper-V storage
 - Create VHDs and VHDX files using Hyper-V Manager, create shared VHDX files, configure differencing disks, modify virtual hard disks, configure pass-through disks, resize a virtual hard disk, manage checkpoints, implement production checkpoints, implement a virtual Fibre Channel adapter, configure storage Quality of Service (QoS)
- Configure Hyper-V networking
 - Add and remove virtual network interface cards (vNICs), configure Hyper-V virtual switches, optimize network performance, configure MAC addresses, configure network isolation, configure synthetic and legacy virtual network adapters, configure NIC teaming in VMs, configure virtual machine queue (VMQ), enable Remote Direct Memory Access (RDMA) on network adapters bound to a Hyper-V virtual switch using Switch Embedded Teaming (SET), configure Bandwidth Management

Implement Windows containers (5–10%)

- Deploy Windows containers
 - Determine installation requirements and appropriate scenarios for Windows containers, install and configure Windows Server container host in physical or virtualized environments, install and configure Windows Server container host to Windows Server Core or Nano Server in a physical or virtualized environment, install Docker on Windows Server and Nano Server, configure Docker daemon start-up options, configure Windows PowerShell for use with containers, install a base operating system, tag an image, uninstall an operating system image, create Windows Server containers, create Hyper-V containers
- Manage Windows containers
 - Manage Windows containers using the Docker daemon, manage Windows containers using Windows PowerShell, manage container networking, manage container data volumes, manage Resource Control, create new container images using Dockerfile, manage container images using DockerHub repository for public and private scenarios, manage container images using Microsoft Azure

Implement high availability (30–35%)

- Implement high availability and disaster recovery options in Hyper-V
 - Implement Hyper-V Replica, implement Live Migration, implement Shared Nothing Live Migration, configure CredSSP or Kerberos authentication protocol for Live Migration, implement storage migration
- Implement failover clustering
 - Implement Workgroup, Single, and Multi Domain clusters; configure quorum; configure cluster networking; restore single node or cluster configuration; configure cluster storage; implement Cluster-Aware Updating; implement Cluster Operating System Rolling Upgrade; configure and optimize clustered shared volumes (CSVs); configure clusters without network names; implement Scale-Out File Server (SoFS); determine different scenarios for the use of SoFS versus clustered File Server; determine usage scenarios for implementing guest clustering; implement a Clustered Storage Spaces solution using Shared SAS storage enclosures; implement Storage Replica; implement Cloud Witness; implement VM resiliency; implement shared VHDX as a storage solution for guest clusters
- Implement Storage Spaces Direct
 - Determine scenario requirements for implementing Storage Spaces Direct, enable Storage Spaces direct using Windows PowerShell, implement a disaggregated Storage Spaces Direct scenario in a cluster, implement a hyper-converged Storage Spaces Direct scenario in a cluster
- Manage failover clustering

- Configure role-specific settings, including continuously available shares; configure VM monitoring; configure failover and preference settings; implement stretch and site-aware failover clusters; enable and configure node fairness
- Manage VM movement in clustered nodes
 - Perform a live migration; perform a quick migration; perform a storage migration; import, export, and copy VMs; configure VM network health protection; configure drain on shutdown
- Implement Network Load Balancing (NLB)
 - Install NLB nodes, configure NLB prerequisites, configure affinity, configure port rules, configure cluster operation mode, upgrade an NLB cluster

Maintain and monitor server environments (10–15%)

- Maintain server installations
 - Implement Windows Server Update Services (WSUS) solutions; configure WSUS groups; manage patch management in mixed environments; implement an antimalware solution with Windows Defender; integrate Windows Defender with WSUS and Windows Update; perform backup and restore operations using Windows Server Backup; determine backup strategies for different Windows Server roles and workloads, including Hyper-V Host, Hyper-V Guests, Active Directory, File Servers, and Web Servers using Windows Server 2016 native tools and solutions
- Monitor server installations
 - Monitor workloads using Performance Monitor; configure Data Collector Sets; determine appropriate CPU, memory, disk, and networking counters for storage and compute workloads; configure alerts; monitor workloads using Resource Monitor