6.1.10 Hyper-V Facts

The Hyper-V role in Windows Server enables you to create and manage virtual machines (VMs). Be aware of the following Hyper-V details:

- Hyper-V can be installed on a Desktop Experience installation of Windows Server or a Server Core installation.
- When you add the Hyper-V role using Server manager, the hypervisor software and the hypervisor management tools are installed.
- Running virtual machines (VMs) significantly increases hardware resource utilization on the server. Accordingly, consider implementing the following best practices to maximize the system resources available for virtualization:
  - Consider implementing a dedicated hypervisor host by installing only the Hyper-V role on the server. No other roles should be installed.
  - Consider implementing Hyper-V on a Server Core installation.
- The Hyper-V Manager console allows you to create a VM, import a VM, configure switches, and perform other management tasks. Hyper-V Manager can be run on the local server desktop (for Desktop Experience installations) or remotely (for Server Core installations).

Hyper-V has the following hardware requirements:

- A 64-bit processor that includes hardware-assisted virtualization
- System hardware (UEFI or BIOS) that supports the virtualization hardware, including:
  - Hardware-assisted virtualization (Intel Virtualization Technology (Intel-VT) or AMD Virtualization (AMD-V) technology)
  - Second Level Address Translation Technology (SLATT)
  - VM Monitor Mode extensions
  - Hardware-enforced Data Execution Prevention (DEP)
    - Intel: Execute Disable Bit (XD)
    - AMD: No-Execute age-protection (NX) Bit
- Enough physical RAM to support multiple virtual machines

You may need to enable some of these features in the BIOS or UEFI configuration before installing Hyper-V.

You should know the following about installing Hyper-V:

- Hyper-V can be installed on 64-bit versions of Microsoft Windows Server running Standard or Datacenter editions (including their respective Server Core installations).
- Hyper-V is installed as a role through Server Manager (or using PowerShell on a Server Core deployment).

As you implement Hyper-V, keep in mind the following considerations for the host system:

Component	Description
CPU	Newer processors include virtualization support in the processor hardware. When purchasing CPUs for the host machine, look for processors that include hardware assisted virtualization support, labeled as follows: ▪ Intel VT (Virtualization Technology) ▪ AMD-V (AMD Virtualization)
RAM	When you create a virtual machine, you allocate memory from the physical machine for use by the virtual machine. ▪ Memory allocated to a virtual machine is not available to the host machine or other virtual machines. ▪ In Hyper-V, *dynamic memory* allows you to use physical memory more efficiently, adjusting the amount of memory available to a virtual machine in response to changes in workloads. ▪ When allocating memory to virtual machines, be sure to reserve enough for use by the host operating system. ▪ To identify how much RAM is required by a virtual machine, you can monitor memory usage over time. Using this information, you can increase or decrease the RAM reserved for that virtual machine.
Disk	Virtual machines can use either physical or virtual hard disks. ▪ A virtual hard disk is a file on a physical disk. ▪ If you have multiple virtual machines with virtual disks on the same physical hard disk, disk I/O can become a bottleneck. ▪ For best performance, keep virtual disks on a different physical drive from the host operating system. For even better performance, place each virtual disk on a separate physical disk, or configure physical disks for use by the virtual machine.
Network	Virtual machines share the physical network adapter of the host machine. If each virtual machine generates a lot of network traffic, the network card can become a bottleneck. ▪ Microsoft recommends one NIC for the physical system and an additional NIC for every four virtual machines. ▪ If a virtual machine generates a lot of network traffic, you can install additional network cards for the exclusive use of the virtual machine. Configure adapter teaming to allow a virtual machine to use multiple physical NICs.

Integration Services	Hyper-V products includes special software called *Integration Services* that is installed within the guest operating system to provide features that improve the manageability and performance of the virtual machine. ▪ This software is installed within the guest operating system, not the host. ▪ The software improves guest operating system performance, and provides better mouse integration, optimized video drivers, and time synchronization with the host operating system. ▪ Depending on the guest operating system version, the additional software might be installed automatically.
Security	Security considerations for a virtual machine should be the same as for physical machines. For both the host and all guest machines, be sure to: ▪ Reduce the number of services running. ▪ Apply patches and updates regularly. ▪ Install antivirus and other security software. ▪ Implement backups or other solutions for data protection.