A peek into today’s classrooms, labs, and libraries will likely reveal computers set up for collaborative learning and online research. As IT executives look for ways to maximize efficiency and lower total cost of ownership, shared resource computing also offers an attractive alternative to the one-computer, one-user model in many business and organizational scenarios.

Shared resource computing environments help reduce hardware acquisition costs and energy consumption, often without affecting performance. They are excellent candidates for use cases in which workers tap a small fraction of the computer’s processing power. At the same time, shared resource computing helps simplify IT maintenance by enabling administrators to install security updates and patches on a single, shared host system instead of on multiple individual systems.

For example, the Microsoft Windows MultiPoint Server 2011 OS is designed to host multiple, simultaneous, and independent user stations on a single computer system. Essentially, it shares the power of a single computer system across multiple end users. Moreover, Windows MultiPoint Server 2011 is easy to deploy, manage, and use. Windows MultiPoint Server is designed to deliver a Windows 7–based experience to its stations, so end users do not require additional training.

**Advanced classroom management**

Windows MultiPoint Server 2011 has introduced features that empower teachers to orchestrate computer activities in the classroom. For example, teachers can use the included MultiPoint Manager application to effectively monitor and direct classroom activities. MultiPoint Manager allows teachers to view thumbnails of each user station to see what students are working on and to zoom in on individual stations to make sure each student is on track (see Figure 1). Teachers can also block or unblock stations; control access.

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**Deploying a shared resource computing environment**

By Gong Wang

Shared resource computing advances IT cost-efficiencies in classroom, library, call center, and other business use cases. The Microsoft® Windows® MultiPoint™ Server OS 2011 helps simplify simultaneous, independent multiuser access to a single host system.
to specified Web sites; launch or close applications; and project one station to other stations.

In addition, Windows MultiPoint Server 2011 supports network-connected clients. As a result, Remote Desktop Protocol (RDP)—compatible network clients, including legacy personal computers, thin clients, laptops, and netbooks can be used as MultiPoint stations.

**Topologies for Windows MultiPoint Server**

In a Windows MultiPoint Server configuration, a local user station consists of a station hub, monitor, keyboard, and mouse. There are two typical ways to set up a local station: connecting to a video port on the host system and a standard USB hub or connecting to the host system through a multifunction hub. Windows MultiPoint Server 2011 provides a third option of connecting a user station remotely through RDP.

**Connecting stations using video cables and standard USB hubs**

Each station’s keyboard and mouse are connected to a dedicated standard USB hub that is connected to the host. The station’s monitor is directly plugged into the host system’s video port. This topology requires the host system to have one or more multi-port graphics cards to provide video functionality directly to the stations.

**Connecting stations using multifunction USB hubs**

A topology using multifunction USB hubs allows multiple stations to be connected without being dependent on the number of video ports available on the host. This approach allows the host to have a single video port and integrated graphics controller instead of requiring a multi-port graphics card. Multifunction hubs provide video, keyboard, and mouse connectivity to user stations, with some hubs supporting peripherals such as audio and USB storage devices.

The number of stations that can be connected to the host using multifunction hubs depends on the host system’s configuration and station workloads. For example, a single Dell™ PowerEdge™ T110 server can host 10 stations with Magic Control Technology MWS 8820 USB MultiPoint WorkStation hubs (see Figure 2).

When deploying a multifunction hub topology, at least one station needs to connect directly to the video port of the host system; its keyboard and mouse plug into a standard USB hub instead of directly into the host’s USB ports. This station serves as a primary station that can be used by an administrator or teacher.

**Connecting remote clients over a LAN**

In Windows MultiPoint Server 2011, stations can be deployed remotely on thin clients, traditional desktop computers, and laptop computers through the network (see Figure 3). A remote station is designed to deliver a user experience through the network that is comparable to the one offered by a local station through a USB connection. Unlike local stations, remote stations make use of the remote client’s system resources.

To help achieve high performance and reliability in a remote connection topology, Dell recommends running Windows MultiPoint Server on a server platform such as the Dell PowerEdge T110 server. In particular, servers generally have greater processor power and larger memory capacity than desktop computers, as well as RAID capability for storage and hardware-based remote management.
Assessing topologies for appropriate deployment

Best practices recommendations for the appropriate deployment topology are based on typical usage scenarios—considering software applications running on the stations, number of stations or seats, and space layout of the room (see Figure 4).

Deployment of local and remote stations

Before connecting stations to the host, administrators must install the Windows MultiPoint Server 2011 OS on the host computer by completing the following steps:

1. Set up the primary station by connecting the monitor directly to the video port on the host and then connecting the keyboard and mouse through a standard USB hub. The primary station will be used as the interface to the host during installation. (Note: Do not connect the multifunction hubs at this point.)
2. Install Windows MultiPoint Server 2011 using the installation media.
3. Set the administrator password at the prompt.
4. Select Next to enter the Windows MultiPoint Server Configuration Wizard.
5. Follow the prompts to set up the host system name, configure the update settings, enable Windows Error Reporting, and so on. The wizard will automatically reboot the host at the end.
6. Install the driver for the graphics card and other devices such as the network adapter and the multifunction hub. Note that without the proper display driver, a Windows MultiPoint Server Configuration error appears.
7. Reboot the host.
8. Press the associated key as instructed on the screen to map the station.

To deploy Windows MultiPoint Server using multifunction hubs on a Dell PowerEdge T110 server, the administrator must install an add-on PCI Express (PCIe) graphics card, such as the Nvidia Quadro NVS 290 x1 card. After plugging it into slot 4, the administrator should disable the embedded video controller using the appropriate BIOS setting.

Drivers designed for the Microsoft Windows Server® 2008 R2 OS or the 64-bit version of Windows 7 can be used by Windows MultiPoint Server 2011. The latest driver releases for PowerEdge servers can be downloaded from support.dell.com.

Setting up stations using multifunction hubs

In the example 10-seat topology shown in Figure 2, eight stations are connected to a Dell PowerEdge T110 host using eight MWS 8820 multifunction USB hubs. Two stations are connected directly to the host’s video ports.
Connecting remote stations over a LAN

Administrators remotely connect an RDP client system to the Windows MultiPoint Server host by performing the following steps:

1. Connect the Windows MultiPoint Server host to the LAN using a switch or hub.
2. Connect the client system to the same LAN with a routable IP address configured.
3. On the client station, select Start > Accessories > Remote Desktop Connection.
4. Enter the computer name for the Windows MultiPoint Server host system.
5. If necessary, make the following changes at the Remote Desktop Connection menu:
   a. Select Options.
   b. On the Experience panel, select the speed for optimal performance, such as LAN (10 Mbps or higher), from the drop-down list. By default, low-speed broadband (256 Kbps–2 Mbps) is selected.
   c. On the Local Resources panel, uncheck Printers, select More, uncheck Smart cards, and select Drives.
6. Select Connect.

Alternatively, MultiPoint Manager can generate a remote station connection file. Executing this connection file on the client system will connect it to the Windows MultiPoint Server host and join it to the classroom configuration as a remote station.

Expanded cost-effective access to computing resources

Microsoft Windows MultiPoint Server 2011 cost-effectively and efficiently leverages underutilized computer processing power to support multiple end users in classroom, library, lab, call center, and other suitable business and organizational usage scenarios. For optimal performance, administrators should identify the requisite hardware configurations and deploy the supporting infrastructure—enabling simultaneous, independent, multisuser access to a single host system while helping to reduce equipment, power, and maintenance costs.

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Learn more

Microsoft Windows MultiPoint Server 2011: microsoft.com/multipoint

Dell Reference Architecture for Windows MultiPoint Server: dell.com/mpsarchitecture