



Advantage:

Rack Workstation

Where remote access to a
rackable workstation makes sense

in association with



The workstation's changing image

The classic image of a workstation, whether for engineering, data visualization, media production, financial analysis or any other technical, graphical or design task, is one of an individual single-user system. In this it resembles the office PC - the workstation may be considerably more powerful and have a bigger, higher-resolution screen, but it still sits on, under or alongside a desk, and it is used by the person sitting at that desk.

Those ideas are changing, however. Just as PCs can now be accessed remotely or as virtual desktops hosted on a server, the realization is growing that workstations can be remotely accessed too. After all, there is very little difference between a PC and a workstation in terms of what the user actually needs to connect, see and use - a screen or screens, a keyboard, a mouse, and perhaps some peripherals, such as a graphics tablet or similar.

The one big difference is that the workloads that typically run on workstations are highly demanding and are not well suited to running on traditional virtualized systems. In addition, their software pricing structure may not be designed with virtual servers in mind. That means the remote option tends to be overlooked, even though 'remote' doesn't have to mean a virtual system - it can also be remote access to a rack-mounted physical workstation. In this paper, we explore the concept of the rack workstation and look at the opportunities such systems can offer.

Why move systems out of the office?

Remote-access technology has improved dramatically since the emergence during the 1990s of desktop and application-sharing systems, such as VNC and Microsoft Terminal Services (now Remote Desktop Services). For example, those early systems typically lacked key features such as bidirectional audio, multi-monitor support, the option to use local devices such as printers and graphics tablets, or the ability to play video content.

Today's remote access brings few limitations

Today though, almost anything you can do locally can also be done remotely, even connecting multiple 32-megapixel displays with support for high dynamic range (HDR) video. Among other things, this is thanks to new protocols, faster connectivity, and new interfaces such as DisplayPort.

Many of the benefits commonly cited for virtual and hosted PCs apply just as much, if not more, to remotely-accessed rack workstations. Almost all of them revolve around removing hardware from the user's office (or other working environment) and instead putting it in a location that can be better managed, secured and controlled. Let's look at some of the key ones in more detail.

Manageability

Locating systems in the data center, instead of the office, allows them to be managed and even orchestrated like any other data center system. For example, some rack workstations

are equipped with server-grade management controllers and software, providing enhanced security and image management capabilities. This can ease the task of carrying out updates, as well as making it simpler to redeploy a workstation as a distributed processing resource, once its primary user has gone home for the evening.

Geofencing

Many areas of business now require data to be held in specific countries or regions, typically for legal or regulatory reasons. At the same time, with tasks such as CAD and video animation you want to work on local data whenever possible. This is because of the size and complexity of the files and models involved, and the volume of data traffic involved in loading and unloading them. With remote access to a rack workstation, you can keep the data (and the workstation) in one country, even if the user is in another.

Network (un)loading

That desire to work with local data can add significantly to the load on your local and wide area network infrastructure. That is because files need to be moved onto and off the workstation from shared central storage, and of course the workstation must be backed up. Putting it in a data center rack moves all that traffic to the high-speed network within the rack, or at least within the data center's high-speed core network.

Hardware and software flexibility

The ability for users to access the same system from a variety of locations can both cut costs and be immensely useful. It means for instance that an engineer could work from home or a remote office without having to change to a second workstation with a second set of software licenses. The only requirement is an access device (viewer) in each location, suitably equipped with keyboard, video, mouse and appropriate connectivity.

Access the same rack workstation from multiple locations, or share it between multiple users

This can also allow a single workstation to be shared, perhaps by users in different time-zones or where they only need intermittent access to the full power of the machine.

User access to hardware

Rack workstations remove users' ability to directly access the hardware. Not only can this have management advantages, but it can also help with risks such as data leakage.

Leakage is a particular danger in application areas such as M&E (media & entertainment) and product development, where early edits of films or as-yet unreleased product concepts and designs might be copied via USB. It is a concern for any organization though, as the unauthorized release of financial data, personal information or intellectual property can be highly damaging, whether the risk is financial, reputational and/or legal.

Environmental issues and efficiency

Having powerful computer systems in office-type environments almost inevitably brings noise and heat, especially once you add in the high-end graphics cards needed for top-quality video. Moving those systems back into a controlled location means that these issues can be better managed.

Indeed, it can even improve energy efficiency. Today's rack workstations, like other data center systems, can operate at relatively high temperatures, even above 30°C. This is higher than would be permissible in an office environment, but in the data center it can bring efficiency by reducing the need for forced cooling.

Free up workspace at the desk

Lastly, putting the workstation in a remote rack not only gives the user more workspace at the desk, it also allows the size and environmental footprint of the unit to be reduced by eliminating much of the external casing. The resulting workstations can take up as little as 1U in a rack, while still being as powerful as most of their deskside cousins.

Capabilities and caveats

What features and options should you look for when considering the rack workstation route, and what potential pitfalls might you need to watch out for?

Manageability

Check what level of remote system management is supported and would be useful to you. For example, while Intel vPro is good for managing client devices, rack workstations are data center systems and are considerably more capable than PCs. The acceptable minimum in this case is likely to be an IPMI (Intelligent Platform Management Interface) subsystem, comprising dedicated remote system management hardware and software, plus lifecycle management software to manage system images and updates.

Remote connectivity

You can access a rack workstation using thin client (viewer) software, perhaps running on a laptop or an older PC or workstation, or via thin client devices. The latter are significantly less expensive than workstations because they are comparatively simple, but if existing hardware such as a laptop can meet your needs, then clearly that will be cheaper still.

There are several different remote access protocols or infrastructures in use, for example from software suppliers such as Citrix, Microsoft and VMware. Ensure therefore that it all fits within the context of your wider IT environment, and that the rack workstations and thin clients that you are considering support all the protocols you need.

Performance and expansion

Does your chosen rack workstation support the latest graphics cards and at least as many monitors as you want or need to run, at suitably high resolutions? Can it hold enough

memory and will you need multi-processor systems? A 1U rack workstation may only support a single processor, for example, albeit a multi-core one with six, eight or 20-plus cores, while a 2U rack workstation should have room for dual or even quad processors.

Conversely, while many applications can take advantage of multi-core processors, some benefit more than others from high processor clock speeds. If you have applications like these, check that you will be able to use suitably fast processors. The important question is what does your application genuinely require, and can the rack unit deliver that?

Supplier capabilities

Of course it is essential to have the right level of technical support, but there are of course other areas to assess and understand when choosing a supplier, such as the availability of managed services and financing options, should you want them.

A key requirement if you are adopting rack workstations for the first time may be the supplier's ability to provide effective and experience-based implementation advice. This is because while the detailed dependencies, such as network requirements, system management, thin client configurations and so on, are readily surmountable, they may be unfamiliar to the new user.

Some typical use cases

Rack workstations have been used to address technical challenges and business risks that can be found in many industries and applications. For example, systems of this kind are already in use in areas such as:

- Mechanical CAD, in automotive, aeronautics, etc.
- Media & entertainment, e.g. video editing, animation
- Visualization and simulation
- Videowalls, for financial trading data, surveillance, etc.

This list is by no means exhaustive, and we expect to see more use-cases emerge as the technology continues to evolve.

In conclusion

Many users no longer need a physical PC on their desk in order to get their work done, and the same is now also true of workstations. However, while a virtualized PC can satisfy most users' needs, that is not the case with workstations.

The rack workstation therefore combines the advantages of having a system remotely located from its users, with those of the user having access to the full power of dedicated hardware. Not only can this provide significant operational benefits in a number of use cases, it can also help to mitigate a number of business and technical risks.

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