Graphics-Intensive Applications Progress Steadily Toward the Virtual Desktop

Virtual desktop infrastructure (VDI) has long seemed poised on the brink of explosive popularity. The question is: Will graphics light the fuse?

New research indicates that VDI may have finally reached the tipping point, thanks to a combination of technology innovation and growing IT needs to address security, management and multi-device support issues.

A recent survey carried out by IDG Research Services, and sponsored by Dell, NVIDIA and VMware, finds that both business executives and IT professionals are more receptive than ever to the benefits of VDI, once a few lingering perceptions related to user experience can be resolved. In fact, the solutions are already in place, but awareness has yet to match that reality.

VDI centralizes desktops in the data center, enabling them to be delivered over a network to any device. Doing away with client-based storage and processing has enormous security and productivity benefits. VDI enables organizations to control and protect intellectual property, simplify desktop IT, improve workforce mobility and collaboration, and deliver rich user workspaces to a variety of endpoints, including low maintenance, virus-immune thin clients. VDI can also transparently deliver the desktop applications and data users need to any device.

VDI hasn't yet lived up to its early potential, but the outlook is changing. Gartner has estimated that the global VDI market was nearly $3 billion in 2014, and TechNavio forecasts 32 percent compound annual growth through 2019.

One of VDI's historical limitations has been performance with applications that leverage graphics, ranging from Flash and YouTube videos to office productivity apps to engineering design software. Servers sitting co-resident with data center storage are much faster than PCs at loading and manipulating large files, but until recently they have been unable to deliver the same user experience as the powerful graphics processing unit (GPU) that is common on PCs.

Thanks to new technology, however, this is changing. VDI users can now access any application, anywhere, on any device, with the expectation of performance that is equal to or better than that of a PC — and often equivalent to high-end dedicated graphics workstations traditionally found in computer-aided design environments.
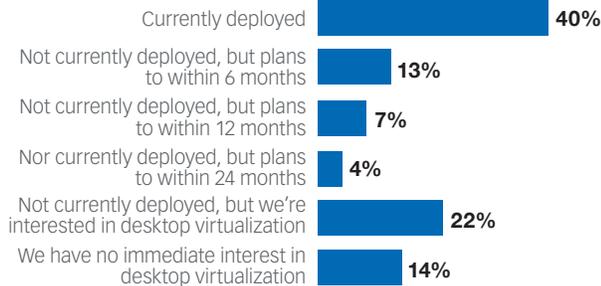
Summary Results

The IDG survey of IT executives set out to identify the importance of graphics processing to VDI decisions. It finds that both users and IT professionals are highly receptive to the use of VDI, with 40 percent of respondents deploying it currently and another 24 percent planning to deploy in the near term. However, the research also finds that only a little more than half of current VDI users are using a virtualized graphics solution. The principal barriers to adoption they cite are cost and lack of time or resources.

Performance is clearly an issue when it comes to application processing. Respondents express frustration with long load and save times when working with large data sets on workstations and PCs. In fact, the research reports that the median load time for large graphic files is 30 minutes, and a full one-third of respondents cite an average of more than one hour. Interestingly, the files that IT executives define as graphically intensive aren't always engineering diagrams or scientific visualizations; Microsoft Office is mentioned just as often.

One of the chief benefits of VDI is that it moves processing from the desktop to powerful servers and storage devices in the data center, which are orders-of-magnitude faster than PCs at loading and saving files. Operations that take minutes on the desktop can take seconds on a server, dramatically improving user productivity.

Deployment of Desktop Virtualization

Currently deployed	40%
Not currently deployed, but plans to within 6 months	13%
Not currently deployed, but plans to within 12 months	7%
Nor currently deployed, but plans to within 24 months	4%
Not currently deployed, but we're interested in desktop virtualization	22%
We have no immediate interest in desktop virtualization	14%

SOURCE: IDG Research Services, July 2015

There are answers for these performance challenges when using graphics-intensive applications. For example, the partnership between Dell, VMware and NVIDIA is enabling organizations to deliver the same workstation-class, rich user experiences through a virtualized environment as users have experienced with traditional physical "thick" endpoints. This is done through the virtualization of a GPU installed within the data center server hosting VDI desktops and apps, to effectively deliver the benefits of dedicated graphics processors to each virtual client. That delivers end-user experiences comparable to traditional desktops, notebooks and workstations while preserving the security, mobility and collaboration benefits of VDI. Users can expect the same superb experience with ISV applications using the Dell Precision Appliance for Wyse as on a traditional fixed or mobile workstation.

Analysis of Results

It's not surprising that Adobe Creative Suite and Autodesk AutoCAD are among the most-used graphics ISV applications cited in the research. However, Microsoft Office is also regularly used by more than two-thirds of the respondents.

IT leaders in the survey are clearly familiar with the benefits of desktop virtualization, as only 14 percent report no plans or interest in the technology. More than 40 percent are either currently using or plan to use virtualized graphics solutions within the next 12 months, and another 24 percent

express interest in the technology's potential. Only 27 percent of respondents say they have no immediate interest in VDI.

When asked about the benefits of VDI among both adopters and non-adopters, exactly half of all active users report that VDI has delivered improved productivity, improved mobility and flexibility, and better resource efficiency. The same three factors top the list of anticipated benefits among those who have yet to deploy.

The biggest disparity between the two groups is in the area of graphics acceleration, with 29 percent of active users citing it as a benefit, compared with 46 percent of potential users. This would indicate some disappointment by VDI adopters with the level of graphics acceleration in their solutions compared with expectations. This is probably a legacy issue related to display protocol technology, which has evolved considerably in recent years.

The research confirms the need for a virtual GPU solution in a wide spectrum of use cases. Graphic performance is becoming increasingly critical to end-user productivity for several reasons. Among them are:

■ Office 2013 uses graphics acceleration by default. While this feature can be disabled, doing so diminishes performance and functionality, and thus lessens productivity.

■ Adobe programs make extensive use of Flash as an integral component, a function that requires graphics acceleration for optimal performance.

■ Websites are becoming more graphics-intensive, with many now incorporating large images and video as basic elements. Lack of seamless graphics animation can make the Web browsing experience frustrating.

■ Online video is migrating toward high-definition standards like 4K, which delivers stunningly vivid imagery but requires intensive graphics processing.

■ Common desktop applications like PowerPoint are evolving to support richer forms of media for display on ever-larger monitors.

Furthermore, users are accustomed to graphics acceleration without necessarily being aware of it. Nearly every intelligent device today has a GPU, including tablets,

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smartphones and PCs. Applications assume this power is available. When the feature is disabled, the effect can be jarring. This probably explains the relatively low score existing VDI users assign to this area. While the load times may be significantly improved, rendering still lags.

Most Desired Features of Graphics Applications

The IDG survey drills down into the most important features users and IT executives look for in a graphics application. Security/disaster recovery tops this list, with 69 percent of respondents considering those features critical or very important. This is followed closely by shortened load and save time (67 percent), graphics acceleration to reduce pixelation and frame lag (63 percent), graphics capabilities in everyday environments like Microsoft Office (59 percent) and real-time collaboration with geographically dispersed colleagues (54 percent).

Security concerns are understandable. Graphics-intensive images such as engineering diagrams and even PowerPoint files may contain valuable intellectual property. Storing this data on personal laptops and mobile devices is a recipe for disaster given that loss of intellectual property, either intended or unintended, can often mean delays to new production introduction on the order of months or years.

Security is one of VDI's great strengths. Because data is hosted exclusively in the data center, the IT group can apply enterprise-grade replication and backup services. With VDI, employees never carry data with them, so there is no risk of intellectual property loss due to carelessness, which is often cited as the most common cause of security breaches.

Server-centric design is also relevant to the next item on the most-desired list: file-level performance. Because files in a VDI environment are loaded and saved by powerful servers and high-performance storage infrastructure, all of which sit in close proximity to each other, the speed of both operations is far greater than on the typical desktop accessing large designs over a network. This not only directly affects employee productivity because of less time spent waiting for files to load, but it also reduces the risk of data loss due to local storage or network failure. In a VDI environment, critical data never traverses the network, only that which is needed for remoting the user's display.

The third item on the list — improved rendering performance — can now be addressed with the use of virtual GPUs, making the VDI experience equal to or better than the PC's.

Collaboration Dividend

The fourth and fifth items on the list, which relate to collaboration and the use of standardized office applications, merit special attention. The ability to collaborate more effectively with other people — whether it be in the same facility, across the country or across the globe — is greatly enhanced by VDI/graphics virtualization because huge data files don't need to be shipped back and forth. In design and engineering scenarios, these file transfer delays can be significant, often imposing hours of delay as very large files travel between work groups.

The growing trend toward collaboration in agile development environments stresses the need for work in progress to be shared quickly for testing, feedback and iterative improvement. Extensive file transfer delays thus slow the speed of business and inhibit innovation.

Businesses are also more likely than ever today to rely on contractors, part-time workers and temporary "tiger teams" to work on short-term projects. These people must be given necessary permissions, software and access to files. In a traditional desktop or workstation environment, that process can be long and labor-intensive, often involving testing and provisioning of individual workstations. Multilayered security protocols must

also be implemented when providing temporary workers access to sensitive data.

With VDI, resources are managed centrally and users on-boarded or off-boarded as business needs dictate. Teams can scale up and down virtual desktop capacity quickly to support new members. For example, one large engineering firm brings in 100 new interns every summer on a temporary basis. Not only does each person need to be supplied with technology, many of them also want to use their own devices under bring-your-own-device policies. With VDI, permissions and applications can be provisioned from a single console, and any endpoint device can be supported without modification. Users get a fluid, seamless, dynamic experience that presents the right applications at the right time on the right device, anywhere, securely.

Impediments to VDI

Despite the many compelling benefits of VDI, old perceptions remain that the technology is costly and difficult to manage. This has been borne out in the IDG research, which asks about the top challenges to deployment. Just more than half of respondents cite cost/budget concerns, and 41 percent note lack of time or resources. Difficulty calculating ROI is mentioned by 36 percent.

Cost concerns are more of a historical artifact than a current problem. Because servers and storage arrays are more expensive than PCs, VDI requires a larger up-front investment compared with rolling out individual workstations. New data center solutions leveraging consolidated infrastructure packaging of server, network and storage (also known as hyperconverged infrastructure) are helping attack the capital expenditure pain point. The payoff is that VDI unquestionably delivers improved productivity and

lower total cost of ownership over time.

In addition, technologies such as VMware Horizon are now removing traditional cost barriers with embedded capabilities that use a reduced storage footprint, and offer rapid startup and simplified management. Customers are able to spin up virtual infrastructure in minutes instead of days or weeks. With the enhanced productivity and security benefits of a VDI solution, it is clear that the benefits far outweigh the initial implementation costs.

Summary & Conclusions

The recent VDI survey by IDG confirms what other recent research has established: Desktop virtualization has reached mainstream awareness, and IT organizations fully understand its flexibility and productivity benefits. However, concerns about costs and graphics performance linger.

Technology has already addressed many of these perceived shortcomings. The graphics performance issue has been solved; performance-accelerated virtual desktops from the partnership of NVIDIA, Dell and VMware now deliver a native-like user experience for any app on any device, anywhere.

The perceptions that have impeded the adoption of VDI in the past are now giving way to the reality of a secure, manageable cloud solution that supports any application on any device while providing IT with visibility and control that is all but impossible to achieve in a typical client/server scenario. As virtualization technology continues to improve, the barriers to the use of virtual desktops and graphics-intensive applications will continue to fall. ■

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