

WHITE PAPER

Five Tips for an Optimal Virtual Desktop Infrastructure (VDI) End-User Experience

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Five Tips for an Optimal VDI End-User Experience

As the Technical Marketing Director at Xangati, I have worked with many customers on their virtual desktop infrastructure (VDI) deployments (including VMware's VMworld team on the Hands on Labs VDI) and have seen firsthand how critical management solutions are to the success of the initiative.

This white paper will provide insightful information with special focus on:

- Top 5 tips for an optimal end-user experience
- Complexity of tracking all the “moving parts” in a VDI environment
- Capturing end-user performance issues as they happen
- Analyzing your storage infrastructure performance in real-time
- Understanding the networked activity of your VDI sessions
- Establishing a cross-silo operational framework to proactively manage performance
- Details of case studies of enterprises who are leveraging these tips

To get you started, here are some of the “Smoking Guns” I've identified with our VDI customers affecting VDI user experience:

- Storage latency fluctuations
- AV updates bogging down desktop
- Back-ups running in middle of day
- Mis-configured IP storage traffic
- DHCP servers failing intermittently
- Outliers affecting VM density
- Mis-configured security gateway
- Congested WiFi network
- YouTube clogging VPN connection
- vSwitch introducing network latency
- Sessions routed over too many hops
- AV solution with architectural flaws
- Making solution non-viable for VDI

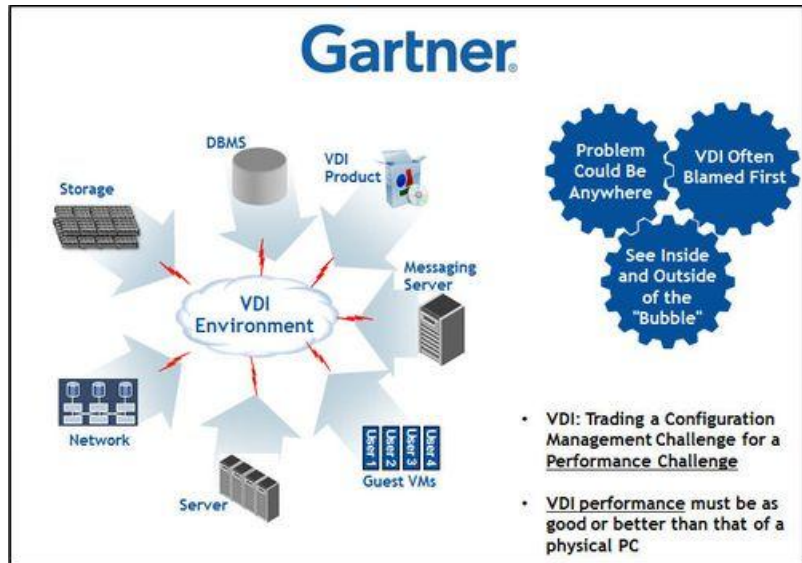


Five Tips for Your VDI Deployment

VDI Tip #1: Track all the “moving parts” in a VDI environment

It is essential for you to track all the moving parts in a VDI environment. It's not enough to just look at the hypervisor or just look at the storage or even just look at the separate management console. It is crucial to have the ability to track all of those moving parts together.

The Gartner Group has basically made the observation that in VDI you essentially need to combine: network, storage, servers, the guest VMs, and various other existing IT products and the problem could be anywhere when the end user has a problem. It's often the case that while the problem could be anywhere, VDI takes the blame as it's the newest part of the infrastructure.



Their critical observation is really that the end user expects the performance of a VDI Desktop to be the same or better than whatever the physical devices that they used to have on their desktop (whether it be a laptop or a tower). They expect that level of performance and in order to do that, VDI has been implemented as a completely different architecture.

In terms of architecture, it is challenging as with VDI, you are actually creating a dynamic environment. As each user logs in and logs out of the system, the architecture combines in real time to make that particular session happen.

With VDI, you have a wide variety of devices—everything from thin clients and phones to dedicated partner terminals to standard PCs and you have a mix of storage, physical servers, and network devices. You need to be able to see how these various devices connect and how the traffic is going across the network.

The interesting thing is that all of these elements are combined in real time to serve a particular user. Maybe it's a laptop or a virtual desktop, etc. and that's how their session is maintained and their user experience is defined by that particular architecture.

Just moments later, another connection will use these same items but potentially order them in a different way, attach to a different desktop on a different host and connect to a different storage the back end and still be able to function.

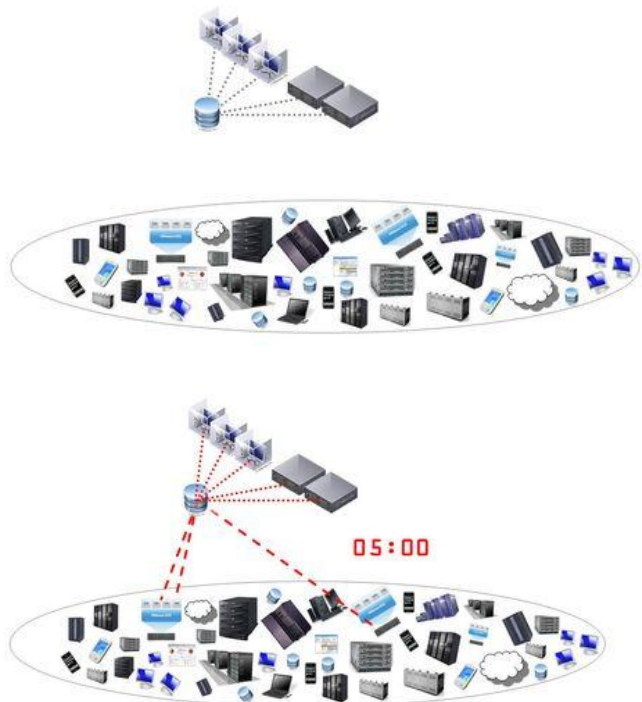
When you start piling on multiple systems like this, that are all defined at the time of login, and dynamically allocated, the whole architecture is built in real time to meet the needs of your user base. So, in this environment, how do you determine which things are taking which resources and how do you determine, when there is a contention issue, how to resolve it? How do you know when you see a storage latency spike that affects a particular VM, what are the other items that may be contributing to that dynamically in real time.

And, that is exactly what Xangati provides. Because of the transformational architecture that puts virtual desktops in a position of talking out of the network through physical servers, using resources from the cloud, and talking to a variety of end user devices and being dependent on a whole cluster of connection brokers: active directory, DHCP, DNS and other IP services, it becomes necessary to have tools that can actually monitor that entire environment. You start multiplying that out by dozens of hundreds of client devices and the complexity becomes such that you need to monitor the entire environment.

VDI Tip #2: Zoom in on storage performance

As we've been pulled in to help with dozens and dozens of VDI deployments at various stages of success, stall, or even failure—we've again and again found that storage performance has an outsized impact on VDI performance. In fact, the majority of deployments end up suffering from storage performance fluctuation.

For example, if you were to take a particular group of VDI desktops that live on posts or are connected to storage, they all make their connections as users in deployment in the environment, and things are working along just fine. In the course of just a couple of minutes, as users launch applications and connect to different resources, all of those interactions change. The bandwidth changes, the storage changes and these changes are all happening across the network. Over the course of a 5 min period, what's happened on the storage can vary widely. Where organizations get into trouble is that many traditional storage tools average their metrics over a five minute interval. And, so even though there might have



only been 30 seconds or a minute and a half of contention, on a five minute graph, it looks like a very smooth, flat line. Whereas during the actual contention event, it might have been a 3 or 4 or 500 milliseconds, in some cases we've seen fluctuations as high as 2 or 3 seconds, where storage is momentarily bogged down servicing a number of simultaneous requests. And, while that's invisible to a traditional monitoring tool, ultimately IT is left without the tools to spot the issue and resolve the problem.

What we've found is that dynamic interaction tracking is essential. If you don't track things dynamically, there is no context to understand why resources are being consumed the way they are. The storage team doesn't typically have any information available to them about how the hypervisor is perceiving their storage. So, it's necessary to have something that can show them what the perception of the VDI desktop related to storage. And, these quick searches have to be visible because they often come and go in 10 to 15 to 30 seconds. And, when they go unnoticed, it's very hard to understand whether observed storage latencies—are they tied to IOP surges where it's legitimate demand on the hardware—or are there back issues that may be taking place. We've seen things ranging all the way from very heavy usage causing storage latency to things like spanning tree problems on a network causing storage latency. So, being able to understand and quantify those differences quickly is essential.



For example, a Xangati customer, CBRE, were busy deploying about 2500 production VDI users at the point when they brought Xangati online and they were experiencing intermittent performance issues of the kind where they seemed to be jammed up and there was no clear pattern that could be observed. It was very hard to pin down. They were up against a wall of user resistance pushing their deployment further. Xangati came in and literally within hours of being deployed found several storage latency issues that were plaguing part of their virtual infrastructure.

The interesting comment from the designer and lead architect of that VDI deployment was that everyone should be doing VDI and they should be using Xangati.

VDI Tip #3: Analyze the networked activity of your VDI sessions

Our third VDI tip really talks about the network activity of the VDI session. This ends up being particularly important because in VDI, we've actually decomposed the desktop into several different constituent parts.

What we've done in VDI is essentially taken a desktop and split it in between a screen display, the backend processing, and the storage for that desktop. These items are typically separated by a network

and when you do that, the workload of the network becomes a critical part of the actual end user experience. It becomes important to be able to see the network workload which is not something that typically falls into the desktop area for management but for VDI, it becomes critical to actually maintaining the end user experience.

Xangati is a tool that enables you to see not only what is going on in the virtual environment, but also in the physical environment and particularly to monitor latency to key remote sites and to verify that the kind of packet delivery that you're getting out of the network is suitable for a virtual desktop deployment.

One place where this was particularly important was at a large, national law firm. We installed our dashboard and within the first day were able to identify some pretty significant challenges. Interestingly, about 600 VDI users, most of

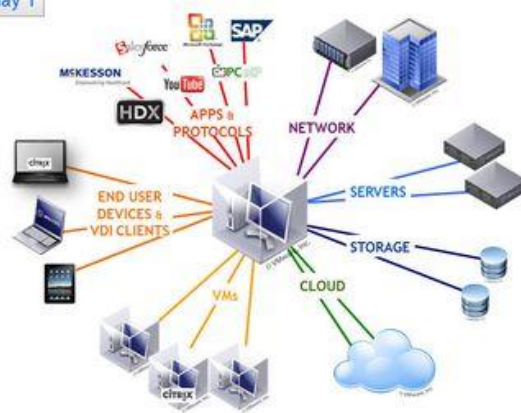
Sources of stall identified on day 1

Challenge

- 600 VDI users having issues
- Deadline to migrate 600 more users to VDI
- SolarWinds couldn't see problem

Xangati Solution

- Immediate identification of a single user hogging 20% of bandwidth
- A dozen other outliers found



them having issues on a somewhat random basis and yet they were only halfway to where they needed to go and existing network tools were not helpful. In fact, they had doubled the size of their WAN and dedicated half of it just to VDI and they were still having issues. Well, the fascinating thing that we noticed was a particular user was using about 12 mbps in their VDI session. And, there were about a dozen other outliers who were again using many mbps of bandwidth. It turns out that the users weren't doing anything wrong, it was that the desktop protocol needed to be optimized. There were many settings in the audio and video in particular that were just not optimal for what this organization needed. And, with a little bit of knob and dial twiddling inside the admin console and all of a sudden, everything was running smoothly. And, so, the source of the stall was identified quickly, allowing them to move on and meet their deployment goals.

VDI Tip #4: Record end-user performance issues

As we're talking about end user experience, this fourth tip is going to get directly at what's necessary to keep track of end user performance. There's no better way to track that than to record exactly what's happening for a particular user at the exact time that they are having a problem. This is so important because it's ultimately the end users who determine whether or not a VDI project will succeed.

Because the users are now depending on this shared infrastructure to do their job, if there's any problem with it, they are going to be very quick to complain about slowness, delays, etc. and any problem at all will get blamed on VDI.

In order to move forward with a strong push from the user community, you have to take this into account early in the deployment. This is particularly problematic for IT because with end user issues, you basically can't recreate them...an end user connects to a desktop in the pool but, the next time they connect, it might very well be a different desktop. And, when the reports of performance issues trickle in—maybe a day to a week after the incident, it becomes almost impossible to piece back together again what was the dynamic infrastructure used to support that user in a given point in time.

Xangati changes that model. We have something called a Visual Trouble Ticket that allows an end user to file their own infrastructure report. They put in their name, phone number, and a comment (ie. internet is slow, mail is broken, I can't access my application, etc.) and then click the "create visual trouble ticket" button and then a 15-minute recording is made of everything that user is doing: on the network, what their connectivity to storage is, which datastores, which desktop, what host it's running on – all of that information is collected and recorded with true to second accuracy so that during that time, you can simply grab a scroll bar and move backwards and forwards in the recording and isolate exactly the pieces of information you need to figure out what happened at that time. This is all done without any agents on the desktop and without any probes inserted in the network.



VDI Tip #5: Establish a cross-silo operational model to proactively manage performance

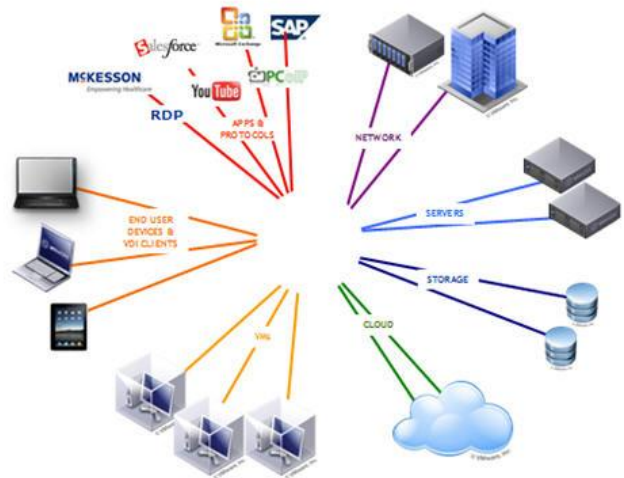
Our fifth tip talks about the need to have capability that looks across the silos and enables you to be proactive in management. When we look at these interactions, it's important that we don't just look at them one at a time—that is that a particular desktop is talking to a particular user and using 150K of bandwidth—it's also important to know at the same point in time what usage level is going to the storage. What is the use of different application ports and protocols that may be contending with the

desktop protocol? And, it's important to see all of this information at once and that's exactly what a Xangati dashboard provides.

Take a look at this diagram and consider the idea that any one of the items on the outside of this wheel could be placed at the center so that we could see the whole world from the perspective of a virtual desktop. We could see the perspective of the world from a storage array looking back at the desktops or at other servers. We could look at a particular protocol and see what devices were implementing or using that protocol. It's this 360 degree visibility that actually enables you to traverse the whole virtual infrastructure and quickly spot problems in a proactive and meaningful way.

For example, if we put the virtual desktop in the center of the universe. We understand how it talks to other virtual machines, it's back end storage and what network issues may be affecting its application delivery. On the other hand, we could just as easily put a protocol into the center of the world and understand how PCoIP is being affected by perhaps file sharing traffic going across the WAN or a large corporate video chat that is happening at the time.

Similarly, we could put the storage into the center of the universe and understand how the desktops may be contending against a particular data store or how a large request by a particular user may actually be causing storage latency for other connected users.



Bonus VDI Tip: Beware of anti-virus “in the wild”

Be especially careful about anti-virus as you go through your deployments. The thing that happens is when you take a user's disk and remove it from the machine and put their storage on a SAN, most traditional anti-virus products are not aware of that transition. And, many of them are used to making near constant access to the disk. And when that happens on a shared SAN environment with hundreds of desktops sitting on that SAN, performance bottlenecks spring up all over the place.

Happily, most of the anti-virus products on the market can be tuned to work better in a VDI environment. And, there are often ways to go ahead and set updates and scans and whatever else has to happen on a staggered basis. So, I would encourage you to track your anti-virus architectures carefully,

to monitor those servers closely, and particularly when you're in your pilot phase, to watch how your pilot desktops are performing on the SAN with respect to anti-virus and you will definitely help to avoid difficulties we have seen others experience.

For example, I'd like to tell you about a Large Oil and Gas Company that was using one of the major big three anti-virus vendors as part of their VDI deployment. The Xangati tool was actually used to identify a major scaling issue for them. They had 600 VDI users and were in the process of going to 2000. There was some miscellaneous slowness in the environment that wasn't a showstopper but, they were concerned it would expand and get worse as they more than doubled and even tripled their user population.

What Xangati found was that the particular way this anti-virus product was scanning the drive, if they had put 2000 users on the network, it would have literally filled an entire 10 Gig Ethernet Pipe. As you know, you're not going to get 10 Gigs of Ethernet performance out of a SAN...the poor thing would die under a load like that. The reality was that they needed to do some work with their anti-virus vendor to really re-architect the way that the anti-virus scanning was happening in order to enable them to actually scale and get beyond the place where they were starting to have the first hint of a problem to the place where they would have had a complete show-stopping event. So, when we suggest that checking out anti-virus is a good thing to do—it really is a good thing to do!

About Xangati

Xangati, the recognized leader in Infrastructure Performance Management (IPM), provides unparalleled performance management for the emerging and transformational data center architectures impacting IT today, including server virtualization, cloud computing and VDI. Its award-winning suite of IPM solutions accelerates cloud computing and virtualization initiatives by providing unprecedented visibility and real-time continuous insights into the entire infrastructure. Leveraging its powerful precision analytics, Xangati's health performance index provides a new way to view and manage performance—in real-time—at a scale previously not possible.

Founded in 2006, Xangati, Inc. is a privately held company with corporate headquarters based in Cupertino, California. Xangati has been granted numerous technology patents for its 360-degree comprehensive approach to Infrastructure Performance Management. Xangati is a VMware Technology Alliance Partner and certified Citrix Ready Partner and supports both VMware View and Citrix XenDesktop, as well as other virtualization environments. For more information, visit the company website at <http://www.xangati.com>.