



# Answers to Tough Questions about Virtualizing the Data Center (VDC)

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## Executive summary

While IT organizations have become comfortable deploying virtual servers for numerous workloads, many mission-critical application environments are often left in their own, siloed world due to questions and concerns about viability and on going availability once they "go virtual." In this white paper, we address a few common issues preventing IT organizations from fully embracing advanced virtualization. In the process, we also hope to advance organizations' ultimate move toward a virtual data center (VDC).

# 80-90% virtualized: Unrealistic or a foregone conclusion?

Embracing server virtualization and the subsequent development of a virtual data center (VDC)<sup>1</sup> is a common, intermediate step on many organizations' journeys toward a more service-oriented, cloud architecture.

Looking deeper within server virtualization itself, there are several evolutionary steps an organization may take:

1. Begin to replace physical servers with virtual servers, especially for file and print services, development environments, and many infrastructure control systems.
2. Start virtualizing other non-mission-critical applications. For example, those with unpredictable growth, such as web servers, fit well into a virtual infrastructure. Such applications are better able to grow and expand virtually.
3. Investigate or proceed with virtualizing many mission-critical applications.
4. Expand virtualization to encompass other aspects of the data center beyond servers. For example, storage and/or network virtualization increases resource utilization and savings, which form the basis of an emerging VDC architecture.

At Datalink, we've seen a growing number of IT organizations move through the first two steps in server virtualization. We've also seen many organizations progress to advanced virtualization in the third step, with as much as 80- to 90-percent of their application server environments now virtualized. Many have also since moved to the fourth step: embracing a VDC paradigm.

Yet, other organizations hesitate when it comes to advanced virtualization in step three. They are often stalled by concerns about virtualizing their mission-critical, Tier 0 or Tier 1 applications. This correlates to some reports<sup>2</sup> claiming IT organizations have virtualized

only about 50 percent of their servers. What separates the advanced adopters from their more conservative virtualization colleagues?

Some of the most common concerns regarding virtualization of these mission-critical environments include:

- **Availability:** If you virtualize your mission-critical applications, how will their performance be impacted?
- **Data protection:** How can you best handle backup and short-term recovery of mission-critical applications in a way that won't compromise performance of the applications or the virtual servers on which they run?
- **Disaster recovery:** If you have any significant data center-wide problems or outages, how quickly and completely can you get the mission-critical system back up and running, especially in a virtual or mixed virtual/physical environment?

## Getting answers where you need them most

We've worked with enterprise clients to answer many of these questions. In this paper, we not only offer you sound, general guidance to address each main area of concern; we also offer a glimpse into some of the tools and technologies that may help you assess your needs and requirements and address them accordingly.

Whether or not 80- to 90-percent virtualization is in your data center's future, gaining answers to these types of questions about virtualization will bring you closer to your optimal virtualization goals. It can also bring you closer to realizing your organization's VDC vision.

# Area #1: Questions and answers about availability

Sure, we all know by now that IT silos are antithetical to a modern, consolidated data center. Yet, in some cases, there remains a certain comfort factor in having your mission-critical application environment in its own, non-virtualized, non-consolidated silo. Why? Because maybe you typically trust the environment's performance and availability levels.

Unfortunately, having this silo probably requires a lot of extra resources that are used exclusively for that application. It may also not be as cost-effective as it

could be. And, it can lack some flexibility when the environment needs to be easily adapted or changed to address new priorities.

Yet, virtualizing a critical application environment doesn't always seem like a panacea, either, especially when it comes to availability. In Table 1, we cover some of the common availability questions we receive concerning virtualizing Tier 1 applications. We also give you a few answers that may help you move forward.

**Table 1. Common availability questions associated with virtualizing mission-critical applications**

QUESTION:	DELVING DEEPER:
How do I ensure application availability in a virtual environment, especially when critical applications have different availability needs?	Whether virtual or not, this question relates to how quickly you need the application to return to normal operation after a disruption. Your answer defines a certain availability service level needed, such as: <ul style="list-style-type: none"><li>• <b>Gold level:</b> True high availability with a few-second delay in service while the service is transparently transferred to a surviving "node"</li><li>• <b>Silver level:</b> Less than a minute to restart application services or components</li><li>• <b>Bronze level:</b> Minutes to restore services</li></ul>

**Advice:** Different solutions exist for different levels of availability:

- **Gold:** Many mission-critical applications might choose a gold level of availability. For virtual environments, this could involve running the same virtual machine (VM) on a pair of physical servers, with 50 percent of the workload running on one server and 50-percent running on the other server. To users, the application still looks like it's running from the same environment. However, if a disruption occurs in one VM on one server, all application workloads are easily transferred in seconds to the other server, with no noticeable effect on the application. One sample solution that manages this level of availability is Symantec™ Cluster Server.<sup>3</sup> As an added benefit, these types of solutions may also allow you to update VMs without taking the application offline.
- **Silver:** To bring back some applications in under a minute, organizations can use information management solutions to monitor the availability of application services in either a virtual or physical environment. This helps administrators track service operations or components operating in a VM and restart them early, in the event of any failure. One example here is Symantec ApplicationHA.<sup>4</sup>
- **Bronze:** If your application can wait several minutes before it returns to operation, you may opt to use built-in HA/SRM availability features within VMware® itself. For instance, if a VM (or an application running on the VM) dies, this allows you to restart another VM on another server. This might include transferring, then restarting an entire VM on a disaster recovery (DR) server.

## Area #1: Questions and answers about availability (cont.)

QUESTION:	DELVING DEEPER:
<p>How do I ensure availability and ease of management for my mission-critical application components in situations where the application is either:</p> <p><b>A.</b> Spread across multiple VMs (with each VM performing a different function)?</p> <p><b>B.</b> Still operating in a mixed virtual / physical environment (where some components operate from non-virtualized physical hardware and others are on virtual servers)?</p>	<p>Many critical application environments consist of multiple servers, multiple applications, and one or more databases.</p> <p>For various reasons, the database portion may never be virtualized while related web servers or order entry applications may exist across multiple virtual servers.</p> <p>In other cases, different components of the application may reside on more than one VM.</p> <p>Whatever the configuration, all application components need to be managed to ensure all aspects of the environment remain available.</p>
<p><b>Advice:</b> When dealing with a more complex, mixed virtual / physical environment or a larger virtual server footprint for tier 0 and tier 1 applications, look to information management solutions that let you holistically view, report, and manage both physical and virtual elements from one single pane of glass. This lets you keep a finger on the pulse of all aspects. It also gives you an early warning system to identify or correct availability risks before they take down your environment. Symantec Cluster Server's Virtual Business Services (VBS) feature is one example in this area.</p>	

## Area #2: Questions and answers about data protection and DR

Virtual servers are easy to install. In some distributed environments, VMs can be so easy to install that you may not always know exactly how many VMs you have running and for what purpose. Protecting and recovering data and applications from your virtual environment is also easier to accomplish than ever.

However, before you can be sure your virtualized data and applications can be adequately recovered, there are some remaining factors to consider. Similar to our description of availability levels in Table 1, many backup and DR solutions can be deployed once you determine the levels of data protection and DR that each application requires in a virtual environment – from your mission-critical applications to more everyday applications. As with non-virtual discussions on backup and DR, your focus should begin with the specific recovery time objectives (RTO) and recovery point objectives (RPO) for each application. For example, you might define different RTO service-level tiers as gold (for application recovery in seconds to minutes), silver (for recovery within several hours), or bronze (for recovery within several days). Yet RTO is just one aspect to consider. Other considerations for both virtual and non-virtual environments include:

- **Scope of disruption:** There's a difference between restoring one or more files due to corruption or accidental deletion versus restoring an entire system after a data center-wide disaster. Planning for backup and DR of a virtual environment should take both of these extremes into account.
- **Amount of data involved:** Recovering a few hundred gigabytes of laptop data or a few deleted files might allow for a several-hour recovery (RTO) versus the need to restore a full machine with terabytes of data, possibly running on multiple VMs.

- **Granularity of your recovery point:** How much data can you lose in the event of a failure? Your answer may differ depending on the situation. If you're using a virtual server as a file share where users store their documents and spreadsheets, you might determine backup once a day is acceptable. This gives an RPO window as high as 24 hours where data cannot be recovered if it's lost in the span between backups. On the other hand, you might have a critical transactional database on virtual servers, which can't tolerate more than an RPO of a few hours or a few minutes. This is a shorter time that data can be lost between the time of the outage and the time service is restored.

Depending on the size of your enterprise infrastructure, the right backup and DR solution for your virtual environment may require a careful assessment of needs and expert insight into the technologies and approaches available, followed by clear deployment recommendations for the right mix of software, leveraged by appropriate hardware and managed services. There's a lot of ground to cover here. It pays to seek guidance on which mixture works best for your applications and your own virtual environment.

Along with these considerations, Table 2 covers a few other questions to ask about protection or recovery of high-profile, virtual environments.

## Area #2: Questions and answers about data protection and DR (cont.)

Table 2. Common questions associated with data protection and recovery in a virtual world

QUESTION:	DELVING DEEPER:
<p>In a growing virtual environment, how do I ensure all VM data remains successfully protected?</p>	<p>You may have multiple departments or individuals able to roll out VMs – from application developers and business-line IT units to more centralized IT. Keeping track of what's out there and what needs protection in a virtual world can be a challenge.</p>
<p><b>Advice:</b> Focus on a data protection solution that routinely discovers and automatically backs up any new VMs on your network.</p>	
<p>I've heard backing up applications in a virtual environment can make our backup window longer, require more resource overhead, and cause more contention for CPUs on the server. Is that true?</p>	<p>This can be true with some backup / recovery solutions that are not designed well for virtual environments. These solutions load a client backup agent into the VM needing protection. The overhead comes from the resource needs of the client agent.</p>
<p><b>Advice:</b> Look for solutions optimized to protect applications in a VM environment. Specifically, look at solutions that directly leverage virtual storage APIs. This provides agentless backup, which requires less client overhead and more scalable performance. It also gives you a better chance of achieving your environment's desired RPO.</p>	
<p>Protection is all fine and good, but what about how well I can recover files or data from a virtual environment?</p>	<p>Whether virtualized or not, whenever you talk about data protection and DR, granularity in the recovery is always a critical factor to consider.</p>
<p><b>Advice:</b> Focus on solutions that leverage storage APIs to create a single backup for both file recovery and full DR. Avoid solutions that require you to perform multiple backups to address recovery and DR.</p>	

## Area #2: Questions and answers about data protection and DR (cont.)

QUESTION:	DELVING DEEPER:
What should I be aware of when it comes to protecting or recovering virtual applications from the cloud?	<p>There are many cloud variations that could involve backup and recovery of your applications running on VMs. Some include:</p> <ol style="list-style-type: none"><li>1. Working with an external (or public) cloud service provider who offers backup-as-a-service or DR-as-a-service for your data center's own virtual application environment.</li><li>2. Working with an external cloud service provider to host your applications on virtual servers from their own data centers.</li><li>3. Managing backup within your own data center (or your own private cloud) with DR from your own secondary DR site.</li></ol>
<p><b>Advice:</b> Virtualization technology can be highly effective for rapid recovery of your applications from a secondary site, whether or not the site is managed by you or by an external service provider. The challenge comes in knowing specifically how it will work if you ever need to recover, and whether or not all the necessary components will be there. Some specific things to consider:</p> <ul style="list-style-type: none"><li>• If you are just using a cloud provider to back up your data to an external cloud, it may take a long time to restore large amounts of necessary data from the cloud. This will affect your RTO.</li><li>• If you are using a cloud provider, it may make more sense to have them host VM resources from within their cloud so you can quickly switch from your data center to application operations in their cloud in the event of a disaster.</li><li>• If you are using an external provider and need to temporarily restore operations of both virtual and non-virtual applications, see if your backup or DR solution (or service) can handle virtual applications as well as physical-to-virtual (P-to-V) restores.</li><li>• Make sure your DR provider supports and can manage the DR and availability solutions you use in-house. It's also a good idea to ensure such solutions can be supported remotely.</li></ul>	
Can I recover a VM and the applications residing on it directly from a backup?	<p>There are backup applications that allow you to not only restore from a backup appliance or backup folder, but actually run the virtual application and the VM while pointing to the backup appliance itself – all while core data is being restored.</p>
<p><b>Advice:</b> This scenario can save significant time getting back to application availability while the VM is restored to its original location in the background. This allows you to bring end users back online faster. You must be clear on the steps involved in doing this, however. Ensure you have the right set of hardware and software to accomplish this type of fast-track return to operation.</p>	

This paper gets you started. Datalink can help you finish.

This white paper summarizes a few of the questions associated with advanced virtualization. Beyond availability, data protection, and DR, you may wonder how to best determine application dependencies crucial for your recovery environment. You may have other virtualization questions regarding compliance or security for your environment. You may also have questions on how to virtualize other aspects of your data center. Whatever the case, our professional services can give you expert answers when and where you need them.

Our IT resiliency services offer a framework to improve the availability of critical applications and safeguard the interests of your organization. With more than 25 years of data center experience, we combine deep technical expertise with best practices in business continuity and DR, virtualization and consolidation, data protection, and advanced network infrastructures to help you mitigate risks. Our business and IT professionals provide a full suite of services, including IT consulting, analysis, design, implementation, management, and ongoing technical support.

- 1 To learn more about how server virtualization fits with other aspects of a virtual data center, reference the Datalink white paper, "Moving Toward a Virtual Data Center," <http://datalink.com/Library/DownloadMedia.aspx?ID=763443435>
- 2 Charles McLellan. "Virtualizing the Enterprise: An Overview," ZDNet, August 1, 2013. <http://www.zdnet.com/virtualizing-the-enterprise-an-overview-7000018110/>
- 3 For more information, see <http://www.symantec.com/cluster-server>
- 4 For more information, see <http://www.symantec.com/application-ha>

## About Datalink

A complete data center solutions and services provider for Fortune 500 and mid-tier enterprises, Datalink transforms data centers so they become more efficient, manageable, and responsive to changing business needs. Datalink helps leverage and protect storage, server, and network investments with a focus on long-term value, offering a full lifecycle of services, from consulting and design to implementation, management, and support. Datalink solutions span virtualization and consolidation, data storage and protection, advanced networks, and business continuity. Each delivers measureable performance gains and maximizes the business value of IT. To learn how Datalink can help your organization use today's evolving technologies to improve the overall efficiency of your data center and deliver dramatic ROI to your organization, call 800.448.6314 or visit [www.datalink.com](http://www.datalink.com).

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