

Roll With the Changes

How to see clearly into your virtual environment

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Introduction

It's inevitable. Your virtual environment isn't going to remain static. With numerous IT professionals managing and adjusting your complex infrastructure, you may wonder how you are supposed to keep track of all the changes being made. An even more important question to ask is, "What's the impact of all these changes?"

Even the simplest of changes can have considerable impact on your virtual environment. But as IT managers, we are often unaware of the impact until our users tell us that something isn't working. Then we have to shift into troubleshooting mode to fix the problem. But instead of simply reacting when a change has a negative result, what if we start to become proactive — to think ahead and anticipate how certain changes may impact the environment?

Getting ahead of the game in terms of change management begins with understanding what is changing. It could be something within a virtual machine, but it could also be something happening outside of the virtual environment, such as running out of disk space.

Infrastructure changes used to have minimal impact. With physical servers, it was much easier to determine which change caused an issue because usually there were only a couple of IT admins managing each server — and a server is just a single box. Virtual environments, on the other hand, are fluid and often accessible by many more IT resources.

For example, vSphere 6.0 supports 64 hosts, and you can have up to 8,000 VMs in a single cluster. That's a lot — and a lot of points where change events might come into play. With physical servers, any change would only impact the resources running on that particular server — which might only be a single application. But now, even a simple change such as booting up a VM that wasn't previously booted up can impact multiple seemingly unrelated servers because they all inhabit the same virtual host. So answering the question "What changed?" is now as complex as the environment it's being asked about.

If you think about it, virtualization is like being on an elevator. In general, you can be in a crowded elevator and be fairly content with your personal space. Of course, if you are

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crammed way in the back, it's not as comfortable. But in an elevator, there is only so much space. It's difficult to move around, take your backpack off, bend over to get something out of your bag or do anything other than just stand there — any small change in your position can affect the people around you. Virtualization is the same: You have a finite set of resources and multiple IT admins making changes to the environment — and even a small shift can have a ripple effect throughout the entire environment.

So how can you become aware of all the changes being made? And more importantly, how can you understand the impact they are having on your virtual environment? Getting top performance out of your dynamic virtual environment demands keen attention and a few management best practices:

- **Know what's changing**
- **Understand the impact**
- **Take action**
- **Be proactive**

Know what's changing

First of all, what are the different types of changes? They could come from cluster events, data center events, data store events, host events, resource pulls, virtual machines — some events are even system-initiated such as from VMware Distributed Resource Scheduler/vMotion. You also might have VMware vCloud in your environment. Changes to any of these objects in your virtual environment could cause adverse impact when it comes to the performance and availability of your objects within the environment — even when a change is intended to help boost performance or solve a problem.

When troubleshooting issues — or analyzing your system for future change management — why not simply use the existing log data to get a grasp on what is changing? Sure, you can always use the virtual center to search for information in the logs based on keywords or a date. However, the log cannot help correlate how a

change to one aspect of your virtual environment will impact another. When it comes to troubleshooting and diagnostics, you really need as much information as possible. Otherwise, it will require a hands-on investigation involving many people and a lot of time to get to the root of the problem.

In environments with potentially hundreds or thousands of virtual machines, where large numbers of people are modifying and managing that environment, it's impossible for one IT professional to keep tabs on what everyone else is doing. Management tasks are spread out among teams and physical locations. To help with change tracking, some organizations develop a workflow system or protocol. For example, every time someone wants to make a change, he or she must submit a form. And junior-level staff members may need signatures and approvals from senior staff members before being allowed to make a change.

But sometimes these processes fly out the window when the system is down or administrators are dealing with a crisis. Sometimes changes can still go undocumented. And troubleshooting issues later can be nearly impossible without the help of tools designed specifically for change management.

In very large organizations, there can be as many as 10,000 virtual machines — often spread throughout production, QA and development environments. This many VMs can generate a lot of change events, and any one of them could potentially cause a problem for a mission-critical application or a virtual machine that is hosting such an app.

These kinds of enterprise-level organizations need more than just the typical virtual center or a manual way of keeping track of changes. Changes to objects are obvious, but changes to other virtual elements — such as reservations, limits and shares — can have a huge impact too.

Understanding the impact

Let's look at a seemingly small type of change that is commonly made in the virtual environment. Say you



have a mission-critical application that doesn't have enough CPU cycles. All of a sudden, the application comes to a halt. Then you get a phone call from a user saying, "My application isn't working." In terms of resource reservation, maybe you configured your virtual machines with 4GB of RAM each, but you limited this app to only one VM and it ran out of memory. Without enough resources reserved, users across the entire organization are impacted. Luckily, it's possible to monitor changes and keep track of resources proactively to help limit this impact.

In a virtual environment where everyone shares resources among different objects, any change can potentially harm the other objects, even if a particular change may greatly benefit one object. So you have to look closely at the potential impact of every change you make. Ideally you would measure that impact before deployment and then monitor it after deployment. Over time, you can more proactively predict the impact of common changes.

Add to the equation that in large organizations many IT admins make changes every day, and the potential impact expands considerably. When putting out a fire, such as the need for more memory on a particular virtual machine, many admins will simply check to see if there is enough memory available and then add it to the VM in question — without realizing that that small change could cause a domino effect. Putting out fires is critical, obviously, but understanding how your actions might actually cause a new fire for someone else is equally important.

Take action

Once you identify the impact that certain changes are having across your virtual environment, how do you figure out what actions to take to fix the problem? First you need to know exactly what happened — all aspects of what changed — and then develop a new script that will correct the problem. Sometimes you may just need to undo the most recently

introduced change and revert back to a previous setting. But even that is not an easy task, especially in a complex environment where numerous admins are introducing a lot of changes — sometimes all at once.

Some changes are easy to make and then undo or change in another way to fix problems — such as adjusting the number of CPUs allocated to a VM, if you know there are plenty of resources available. But once you are troubleshooting nitty-gritty change events, such as resource reservation, limits and shares, it gets a little trickier. Even just reverting a change without knowing exactly what changed can be difficult.

Understanding the impact of even the smallest change from all angles goes a long way in helping to fix problems should they arise in another area. For example, let's say you turn off a VM. Do you know for certain that it is not being used? What is the standard deviation of resources consumed by that VM? And how much energy does it take to power the VM back on? Now imagine a more complex change, and consider it from all angles.

Being proactive

Part of being proactive involves experience — knowing the impact of certain types of changes and being able to apply that knowledge over time. It's often called "tribal knowledge." But with people working remotely and teams spread across the globe, formalizing that knowledge can be nearly impossible. So much is learned on an individual basis when someone (or some team) is in crisis mode. Going back to share what was learned can be a challenge, even though it's critically important. Also, countless changes are made on a regular basis with no precedent and no tribal knowledge to draw from. That's when best practices and tools designed for change management are crucial.

Many issues go undetected until a user calls for help. If you don't have a way of measuring the impact of a change event, you can't be proactive because you would have to wait until

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someone calls you and tells you there's a problem.

As we've outlined, being proactive first requires that you capture all the change events that are being introduced into the environment. Then, you need to understand the measure of the impact. Once you've done that, you need to figure out how to take action to fix problems that are introduced.

Being proactive about change management ultimately comes down to being disciplined and having a process that everybody follows. Typically, multiple administrators are managing thousands of VMs. So you have to have some kind of audit trail in place, even if it's manual. You may have to set up submission forms and approval logs that track most of the changes being made. Virtual tools such as digital data logs and search capabilities can help keep track of changes. And sometimes, hands-on investigation may be necessary.

Conclusion

Using solid processes and setting up a good change management protocol — then building your virtual tribal knowledge — is feasible but not optimal. To take things to the next level more quickly, and more easily, consider streamlining the entire process to make use of virtual tools designed specifically for change management. For example, Dell Foglight Change

Analyzer allows you to track changes in your virtual environment and understand their potential impact on performance and availability. It captures and reports on changes to VMs, hosts, clusters, data stores and resource pools within a selected environment. It also allows you to compare VMs to a "gold standard" VM or template and alerts you when changes cause their configurations to drift from the standard. Now that's how to roll with the changes.

Foglight Change Analyzer 5.6.16 comes pre-installed and enabled on Foglight for Virtualization, Enterprise Edition 8.3, and can be installed on certain Foglight Management Server versions.

Author bios

Hassan Fahimi is a senior-level professional with more than 15 years of experience in information technology and product management. Fahimi's experience includes working with databases, enterprise applications, IT tools and virtualization. Fahimi has been involved with managing many aspects of software products, and in his current role, he is responsible for the following functions in Foglight for Virtualization Enterprise: Citrix VDI monitoring, optimization, capacity management, change management, chargeback, Microsoft Exchange and Microsoft Active Directory.

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