Tony Foster's Blog

Getting Some REST(ful APIs) - Part II

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In the last blog I shared about my start in the virtualization industry, scripting the deployment of ESX hosts, and the advancements made with RESTful APIs, like Redfish on PowerEdge Servers. In this blog, let's look at RESTful APIs for storage, networking, Dev Ops, and converged infrastructure.

Moving beyond servers, RESTful APIs are also available for storage. For example, in addition to using a GUI, one can access the Dell EMC PowerMax via a RESTful API. Using this API, you can orchestrate and monitor storage, as well as access diagnostic performance data, configuration data, and performing provisioning operations for the storage system hardware.

Imagine, when monitoring the capacity of various volumes, if one of them is running low on provisioned space: a common occurrence. The interface lets you extend the capacity quickly. Another volume needs a snapshot taken... If we scale that to a moderate sized data center like yours, the list keeps growing to include all the tasks that need to happen for day to day operations. Let's do the logical thing -- let's do some DevOps and automate it!

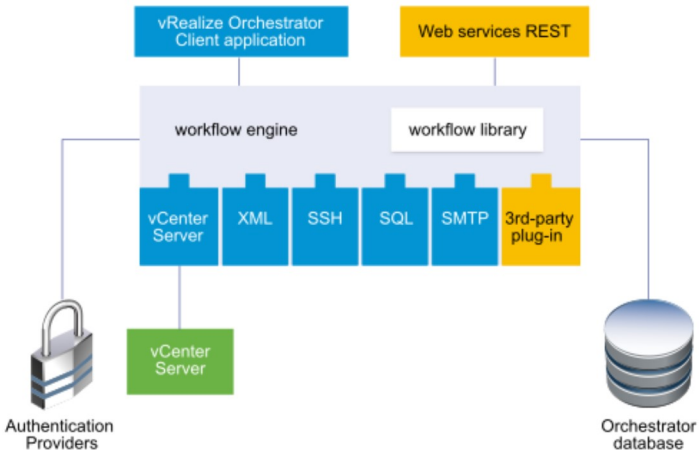
How do we do that? With the RESTful API of course!

Let's say the environment is a purely physical one, this can be done through a RESTful client (such as a web browser or a programming platform able to issue HTTP requests).For Example you could build a web page that may partially or fully automate expanding a volume as needed.

Remember all those servers from my previous post… I bet they need storage. Wouldn't it be great to have the BIOS configured properly and then fire off a new set of RESTful API calls to provision boot LUNs on the PowerMax? Provisioning storage can be done using the RESTful API. In fact it's one of the very first items covered in the "Dell EMC Unisphere for PowerMax, REST API Concepts and Programmer's Guide." You can get even more in depth information on the Unisphere for PowerMax RESTful API on the Dell EMC technical documentation page for PowerMax.

The programmers guide also provides information for protecting and managing Symmetrix® Remote Data Facility (SRDF) replicated storage. This makes Dell EMC Unisphere for PowerMax, REST API a very powerful tool – allowing data protection operations to become more efficient in an environment. For example, you can combine these operations with maintenance processes to capture a storage state before and after maintenance occurs. (RESTful APIs like this would have been wonderful to have when I first got started in IT.)

It's great to be able to monitor and control hardware, but most IT environments today are virtualized, which is where I started this story about RESTful APIs. A few years back, VMware introduced a RESTful API to vSphere. That means it's possible to automate the configuration and monitoring of VMware environments using VMware tools like vRealize Orchestrator (vRO) and vRealize Operations (vROPs), and also third party applications.



In other words, I could have written a front end (web page) to deploy a virtualization environment for customers and the deployment could have been super simple… Essentially it would have found all the hosts, set the BIOS correctly, provisioned storage resources accordingly, performed the ESXi install, and configured the virtual environment (they were all new virtual environments back then) all from a simple set of RESTful API calls.

If you are curious about what RESTful APIs are available in your vSphere environment, be sure to visit the VMware API Explorer.

It's great being able to automate compute, storage, and virtualization independently with RESTful APIs, and I know that's a lot of work… but… wouldn't it be great if you could bring them all together, especially for monitoring? (Remember from my previous post, RESTful APIs are more data driven?) Guess what! If you are using a VxBlock, you have a RESTful API built in as part of Dell EMC Vison Intelligent Operations software, making it possible to centrally collect information. After all -- it is converged! Why not bring it all together?

One of the biggest benefits of a single source RESTful API is correlation, in which the results show as an entire system, not just the individual pieces. This means if a VM keeps losing connection, it's possible to get the complete picture from the hypervisor all the way to the storage, providing a more comprehensive view into where the problem is likely to be.

If you're interested in finding out more about what can be done with VxBlock RESTful APIs, you can get started here: https://cpsdocs.dellemc.com/bundle/S_PG_354/page/GUID-C102E7F2-4A2F-4980-AD48-0958B40B5B36.html

You may have heard an announcement from VMworld Barcelona this year. It was the announcement of Dell EMC VxBlock Central. Dell EMC VxBlock Central provides converged awareness, automation and analytics to simplify daily CI administration. It also exposes a set of RESTful APIs for orchestrating converged infrastructure. This includes automating daily operational tasks and a launch point to vRealize Operations to provide detailed analytics and an easy way to manage VxBlock storage capacity. Additional details will be available when VxBlock Central is released. (Yes, there are some cool RESTful API capabilities that I can't share just yet.)

You may have noticed I haven't mentioned networking yet. You're right I haven't and I haven't talked about any of the popular methods for calling RESTful APIs either. That's because I have a two for one special on RESTful APIs for Dell EMC networking using DevOps tools.

What do I mean by this? I mean RESTful APIs are available for Dell EMC networking components and there are several DevOps tools, like Ansible, Chef , and Puppet that simplify the configuration and automation of network devices (and many other things as well). If you are not familiar with these DevOps tools, be sure to explore further.

Being able to configure and monitor networks is probably one of the most significant things you can do with RESTful APIs. This is because one way or another everything traverses the network, making it the perfect place to implement DevOps for performance, planning, and security.

It reminds me of a conversation/joke I've heard several times over my career, it goes something like this. If there's a problem in the data center, whose fault is it? The networking team. It doesn't matter if the fire suppression system is going off or it's a failed drive: the networking team did it. It's not actually the networking team's fault but because everything touches the network, they become the scape goat. RESTful APIs and DevOps tools like Ansible help to create better information sharing and understanding amongst teams, so that not everything becomes "the networking team's fault."

To find out more about the different ways to drive DevOps and RESTful APIs in Dell EMC networks, be sure to visit the "How to automate Dell EMC Network devices with DevOps tools?" kb article.

This is probably the point where you might be asking, if I have different components in my data center can I use the same set of commands across all of them? Not necessarily. While all RESTful APIs use the same basic structure (get, put, post, and delete) the functions exposed by the RESTful API may not be the same. Not to mention the return values. Therefore RESTful APIs are not necessarily interchangeable across systems. Even though the API calls aren't interchangeable, it's still really cool that most IT systems now have a RESTful API and many even use it as the primary method of communication and configuration. This is a sign that traditional systems management is evolving: from static GUIs to dynamic systems capable of supporting the convergence of hardware and software.

Letting my imagination loose on this idea of RESTful APIs changing the operation of data centers, it opens up the possibilities for dynamic and intelligent architectures. No longer do system components act independently, they have the potential to act as a unified service to IT, wrapped in intelligence to reduce risk and accelerate the thoughtful delivery of resources.

Automated components would have to be thoughtful. Without intelligence, automation would gain us very little. It's sort of like an autonomous automobile. It should follow the speed limit wherever it is or the risk of an accident increases. For example if it's in a school zone it shouldn't speed, yet at the same time on the highway it shouldn't drive under the minimum speed limit (and probably near the posted speed limit if conditions allow). The vehicle can't just run a single speed, it has to have awareness. And for the same reason, data center infrastructure would need to be intelligent.

This intelligent delivery would be a dramatic shift in IT. The data center would become intelligent and capable of orchestrating its resources as a single unified system with minimal human interaction. This would allow IT to focus on delivering value for the organization.

The intelligent use of RESTful APIs, orchestrated as one, would also drive savings. Imagine it's a busy time of the year, like Black Friday. Today, it's possible to orchestrate spinning up and down virtual machines as the load increases. Wouldn't it be awesome to dynamically add or remove additional hosts for those virtual machines? This could help optimize the consumption of hardware. Instead of having multiple hosts standing by just in case a workload were to spike, they could be taken from a pool of spares as needed and returned when demand has returned to normal level, all without human intervention.

At least that's my dream of what RESTful APIs could unlock for IT. Wouldn't that be awesome?
Wow that's a lot of information, my head hurts just from writing it! I think I need some rest. From these two posts, you got to find out about my early years in the industry and how deploying, managing, and monitoring an environment can be made much easier with RESTful APIs across servers, storage, converged infrastructure, and networking. I also tried to include a great set of resources for you to find out more about the areas I touched on.

Hopefully this gives you a sense of the power at your fingertips. I strongly encourage you to get some REST and improve your data center. Maybe make your own data center dreams come true. If for some reason you just can't get enough REST(ful APIs) and want to find out more about them in Dell EMC offerings, be sure to contact your Dell EMC representative.

Till next time, may the lights of your data center stay off and your server fans keep humming.

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