Technical Review

Automating IT Infrastructure with Dell EMC PowerOne

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Abstract

This ESG Technical Review validates the business value that Dell EMC PowerOne can offer organizations. We examine how PowerOne's automation features can significantly decrease the manual work typically required to configure, deploy, and administer data center IT architecture. ESG also discusses the results of our evaluation of PowerOne and how they can translate into competitive business advantages.

The Challenges

ESG research uncovered that 93% of organizations reported their IT environments are equally or more complex than they were two years before.[1] Reducing this complexity, especially in their data centers, remains a challenge, as they continue to use traditional do-it-yourself (DIY) architectures.

93% The percentage of organizations that reported their IT environments are **equally or more complex** than they were two years before.

50% The percentage of organizations with mature digital transformation initiatives that reported a shortage of **skills in IT orchestration and automation**.

As organizations seek to improve their response time to business needs, IT can take too long to fulfill requests for deploying and configuring the appropriate data center resources. Highly skilled IT staff still manually deploy DIY architecture, repeating numerous configuration steps for compute, storage, networking, and virtualization resources individually. Ensuring that these resources can work together for a given workload requires that IT support teams spend additional time on coordination and communication.

While organizations have begun to internally develop automation capabilities to remove the effort of repeating configuration steps, efforts have been limited to automating manual processes associated with individual data center resources; these efforts are not coordinated to deploy a complete set of resources for a given workload. Ironically, the investment into building in-house automation capabilities can eliminate any time and cost savings that automation offers in the first place. It also does not help that 50% of organizations with mature digital transformation initiatives reported a skills shortage in IT orchestration and automation.[2]

To become operationally efficient and increase business agility, organizations need a solution that will provide IT end-to-end automation and orchestration including deployment, lifecycle management, and expansion of data center resources for any workload.

The Solution: Dell EMC PowerOne

Dell EMC PowerOne encompasses a system lifecycle management solution that automates and orchestrates the deployment, provisioning, and administration of a VMware virtualization platform running on Dell EMC components. PowerOne is part of the Dell Technologies Cloud portfolio that supports organizations in creating hybrid cloud environments.

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[1] Source: ESG Master Survey Results, *2019 Technology Spending Intentions Survey*, March 2019.
[2] Ibid.

PowerOne's automation employs the observe-orient-decide-act (OODA) loop.[3] An IT generalist trained as a system operator declares the "end-state" of data center resources for a workload, and PowerOne's automation determines how to arrive at the desired configuration from the available pool of resources.

PowerOne is designed with Dell EMC infrastructure that has been engineered, manufactured, managed, and supported as one product with a VMware-validated design (VVD) software stack. Once the "end-state" has been declared, PowerOne delivers an automatically generated configuration complying with supported VVDs. Dell EMC currently supports multiple PowerEdge MX servers and PowerMax storage array models. Additional support for other Dell EMC storage and Dell compute offerings will be added as required.

PowerOne's automation engine consists of three modules, each dedicated to specific automated tasks and processes:

- **Launch Assist** helps organizations to initialize the racked data center resources from which subsets will be configured to support a given workload. This module executes tasks such as system validation, network setup, specifying IP address ranges, and component integration.
- **Lifecyle Assist** ensures that the performance of the Dell EMC system is maximized by facilitating the creation of cluster resource groups (CRGs), a collection of server, storage, network, and virtualization resources within a racked system that supports a specific workload. Tasks such as compliance scanning, hardware compatibility, software patching and updates, monitoring, and alerting are covered in this module.
- **Expansion Assist** facilitates the scaling of compute or storage resources when workload requirements change. This module can repurpose and reallocate these resources easily to new workloads without manually tearing down and reconfiguring them. Other tasks such as integration of new technology, like newer versions of hardware, are covered by the module.
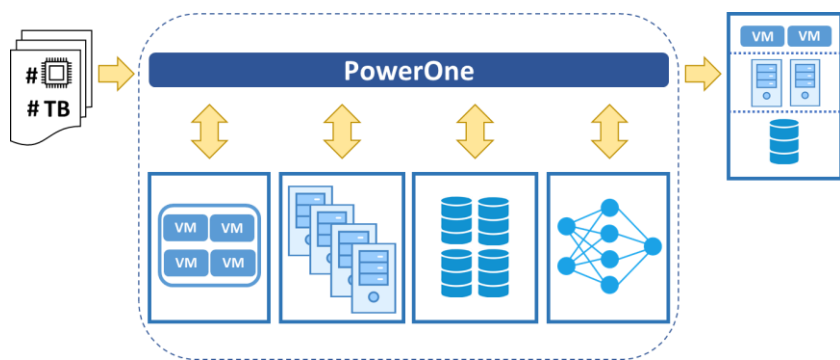
By leveraging PowerOne, organizations no longer have to focus on configuring workload resources one at a time. By declaring the workload requirements, PowerOne executes the otherwise manual and repetitive tasks for configuring the hardware and software of compute, storage, virtualization, and networking resources based on Dell EMC and VMware best practices. Once the appropriate IT infrastructure resources are configured, organizations can then provision and deploy a vSphere cluster as well as expand compute and storage resources for any workload, on demand. Because CRG's can be configured, torn down and repurposed easily, they can support migration efforts from legacy software such as SAP R/3 to its successor, SAP R/4HANA, in the same PowerOne system.

The software architecture behind PowerOne has also been developed to prevent unauthorized users from injecting malicious code into the automation engine. As commands are passed between different code elements to orchestrate the execution of steps, Dell EMC has built in the necessary controls to prevent tampering.

Because PowerOne automates and orchestrates numerous common and repetitive tasks via its three modules, organizations can potentially reduce the time spent manually configuring, updating, and managing VMWare virtualization-based systems by a significant margin. Configuration errors can be practically eliminated as repetitive tasks associated with the setup, management, expansion, and teardown of resources are executed. Time spent on ongoing management and administration of the Dell EMC hardware components can also be reduced. Organizations leveraging PowerOne's

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[3] Wikipedia, _OODA Loop_

automation engine can reduce investment for in-house development of automation capabilities related to data center infrastructure supporting VMware virtualization.

IT teams that currently write custom scripts for automating specific tasks can also achieve operational efficiency with PowerOne by leveraging its single system application programming interface (API). Instead of calling on APIs for each infrastructure component, IT can leverage the PowerOne API, simplifying integration into existing codified toolsets such as configuration management databases and DevOps environments. For example, adding or removing that would traditionally be completed using separate element managers can now be automated using the API.

While Dell EMC has designed PowerOne to orchestrate numerous steps for deploying and configuring IT infrastructure, it can also help organizations to flexibly consume IT resources as needed, then reallocate as new applications or workloads are required, without having to purchase new hardware or software. The automation and orchestration capabilities provide organizations with a cloud computing-like experience for their on-premises infrastructure, resulting in increased business uptime and agility.

ESG Validated

To validate PowerOne's automation capabilities, ESG first examined how PowerOne can reduce an organization's effort to deploy IT infrastructure by stating the desired end-state configuration. Using the PowerOne Navigator GUI, we first set up a CRG on an initialized system containing Dell EMC PowerEdge MX servers and PowerMax all-flash storage. Different CRG templates were presented, including a "default" option and options for other workload types, such as "Virtual Desktops" and "DevOps" (see Figure 1). We chose the "default" template, named it *test*, and selected "vSphere 6.5" from the drop-down menu.

ESG then stated the desired configuration of IT resources by keying in the amount of server CPU cores, server RAM, and storage (in TB) needed to support our workload. We saw PowerOne recommend the actual allocated number of cores, RAM, and storage based on the server and storage models available. We noted that PowerOne presented other Dell EMC hardware models to use if we did not want to use PowerOne's suggested resource allocation. We also could choose the exact servers or storage arrays based on cabinet location. For example, an administrator could distribute the workload across servers or storage arrays in either the same chassis or different chassis for fault tolerance purposes.

**Figure 1. PowerOne Wizard Steps for Configuring CRG**

Once we completed our selections, ESG directed PowerOne to create the new CRG. Immediately, we observed that PowerOne executed the job, as the progress screen noted the completion of each automation task (see Figure 2). PowerOne then presented the CRG configuration in terms of the actual amount and type of Dell EMC hardware, as well as their location within the racked systems.

Figure 2. Progress Screen for Creating CRG / Displaying CRG Configuration
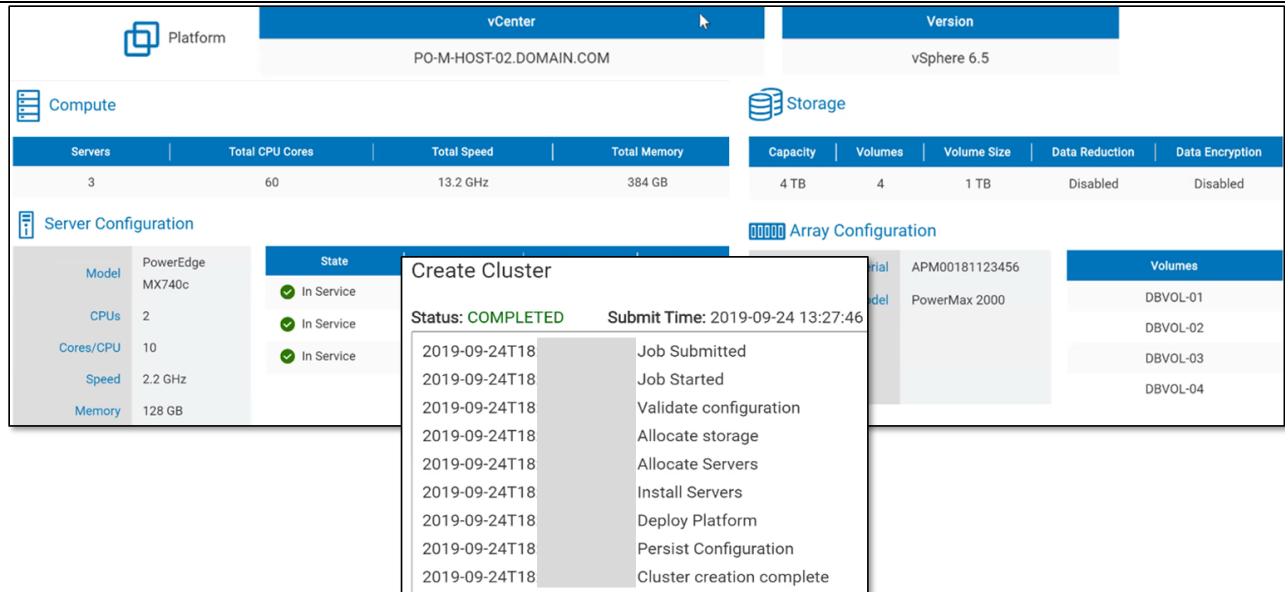
ESG then modified the CRG by adding compute capacity (see Figure 3). We navigated to the list of deployed CRGs, selected the *test* CRG, and clicked on **Modify**. We increased the number of servers from three to four. Scaling up the existing CRG was also automatically done without any manual intervention. We could also follow these steps for scaling storage capacity.

Figure 3. Modifying a CRG
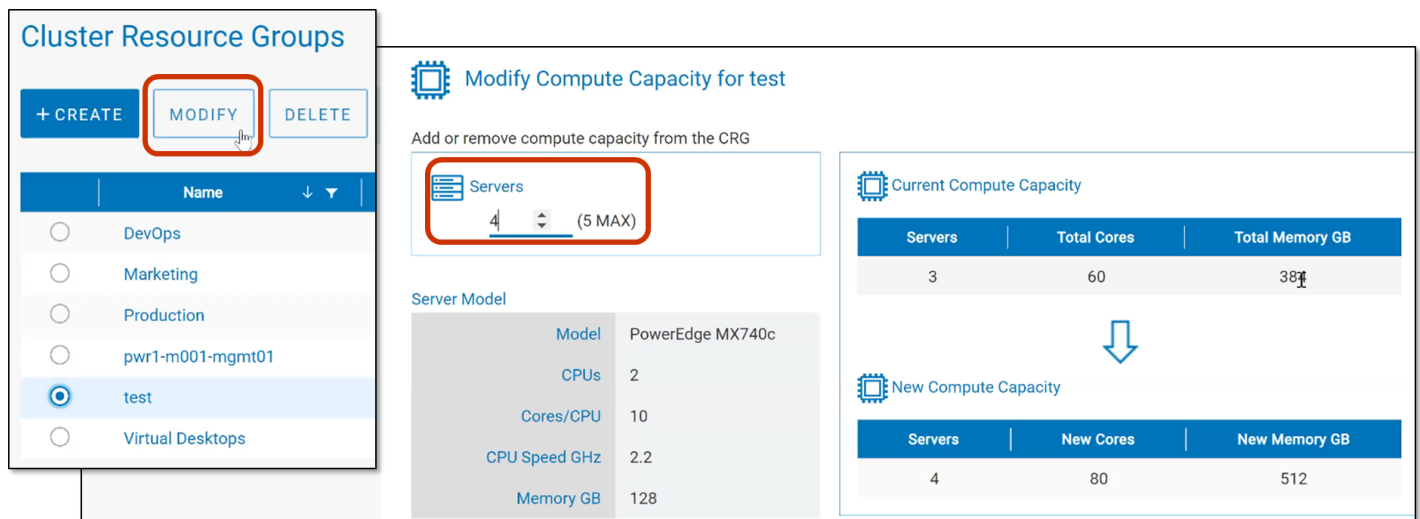
Creating and scaling up a CRG showed ESG that PowerOne can significantly reduce the amount of manual effort required to perform similar tasks. ESG saw how PowerOne's automation engine eliminates the need for an administrator to perform multiple steps. Also, the need to wait until one step of a specific task is completed to perform subsequent steps is eliminated, allowing an administrator to focus on activities that add value to the business. While elapsed times for configuration may vary depending on the number of cores, storage capacity, or nodes to be configured, we see that less

effort can be spent on performing and coordinating manual, error-prone tasks, as well as verifying that the resulting configuration is based, tested, and optimized on Dell EMC and VMware best practices.

Using the PowerOne Navigator, ESG notes that IT does not need to navigate multiple interfaces associated with server, storage, networking, and virtualization resources for common setup and operational tasks. Navigating multiple interfaces not only adds time, but also increases the likelihood of errors. For example, CRG configuration is accomplished with a few clicks with PowerOne, while the built-in orchestration reduces configuration risk. In large enterprises in which IT support for server, storage, networking, and virtualization resources are separate, the decrease in configuration time can be particularly significant. Rather than relying on these multiple support organizations to communicate and coordinate their activities, PowerOne uses centralized automation to orchestrate all required configuration and other lifecycle management tasks.

ESG then assessed the reduction in manual tasks needed to initialize a PowerOne system before an administrator can create CRGs. For our analysis, we tested a system comprised of one PowerMax array, four PowerEdge MX Chassis (each with six server blades), two management switches, and two fabric switches. We also directed the PowerOne controller to install VMware vSphere, NSX-V, and NSX-T.

ESG noted the number of tasks automated by PowerOne. (We assumed that a task was the act of performing a step on the PowerOne Navigator.) We then mapped the number of steps to be performed and manually repeated each automated task if PowerOne was not used, assuming that up to four GUIs are used when manually executing steps. Figure 4 shows the reduction in the number of times an administrator would potentially perform a step via a management interface, accounting for repetitive tasks. The top row represents the steps completed manually and repeated, while the bottom row represents the number of tasks an administrator would complete with the PowerOne Navigator. Our analysis revealed that the number of GUI interactions decreased by almost 98%.

**Figure 4. Reduction in Number of Steps for Configuring an Installed Dell EMC System**
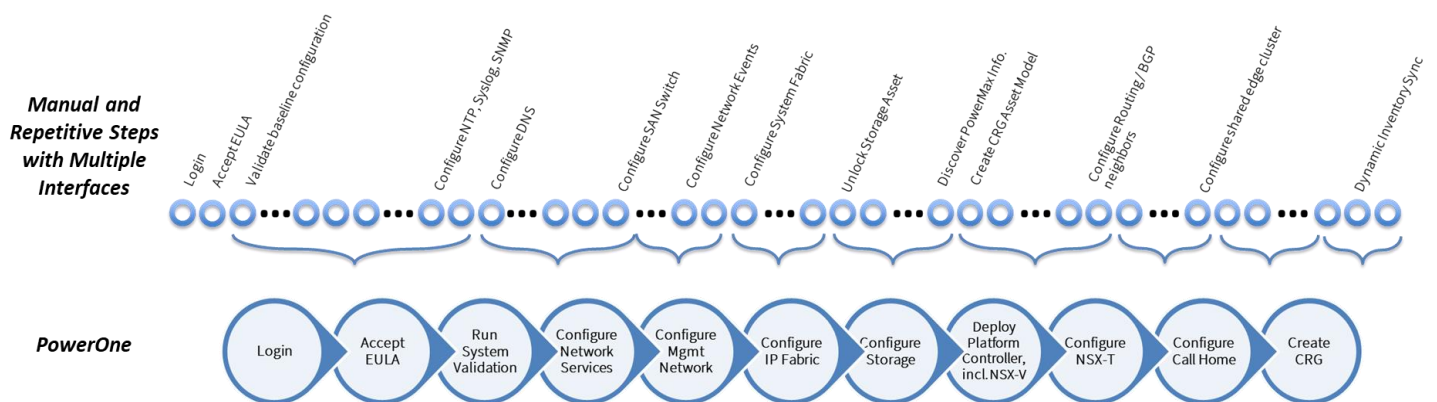
Source: Enterprise Strategy Group

While the reduction will vary due to the number of hardware and software components to be initialized, ESG can see how the reduction in both manual steps and management GUIs used can decrease an organization's time to reliably deploy a new PowerOne system. Even though elapsed times were not measured for each step, ESG can see how PowerOne's elimination of time spent navigating between multiple GUIs, selecting items from multiple menus, and repeating steps can decrease time spent on configuration.

ESG also notes that if this were a real-world deployment, IT support personnel specializing in compute, storage, virtualization, and network resources would not be available at the same time. Even though legacy ticketing systems automate some workflows, IT specialists still need to coordinate efforts to configure or reallocate resources for workloads. With PowerOne, we can see how organizations can further save time and reduce errors, as the need to coordinate efforts and schedules is minimized.

Using Launch Assist, ESG also executed a configuration of a system consisting of two Dell EMC Power MX7000 chassis with eight server blades and one PowerMax 8000 storage array. After performing the system setup via PowerOne, the elapsed time was slightly over eight hours. We note that the time accounted for management interface time, automated execution time, and time for verifying configurations. If we consider the total elapsed time for configuring a similar system using DIY infrastructure, IT can easily spend weeks, if not months, if PowerOne's automation were not available. Note that the reduction in time (down to hours) will vary depending on the number of components comprising the system to be configured.

The decrease in the number of steps performed manually when initializing a Dell EMC PowerOne system is particularly significant when considering typical elapsed times for deploying DIY architecture, which could span weeks, if not months. Time is consumed when ordering separate components (server, storage, networking, and virtualization hardware and/or software), racking hardware, installing software, and then configuring and testing separately and as a whole system before placing in the production environment. Even if IT teams have tools (typically developed in-house) to simplify some deployment tasks, they may not remove significant amounts of time from the deployment process, especially when having to coordinate tasks completed for individual data center components.
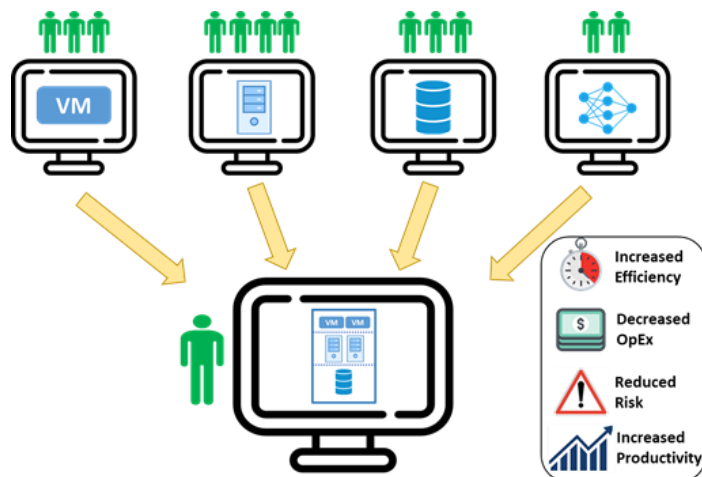
ESG's previous observations of CRG configuration and modification indicate that organizations can also achieve operational efficiency with PowerOne. Task automation and the use of a single management GUI can help IT to simplify operational processes, such as resolving trouble tickets. If an end-user encountered an issue, up to four trouble tickets could be generated, as IT would have to pinpoint exactly where the issue lies within the existing IT data center infrastructure. Any combination of server, storage, networking, and virtualization support teams would spend time identifying exactly where the problem arose, then coordinate efforts to resolve the issue. With PowerOne, end-users can submit one trouble ticket, and IT would only need to address that single ticket.

Adminstrators can simplify processes focused on software maintenance, patches, and updates with PowerOne. During our testing, ESG updated the vSphere version of the *test* CRG. After selecting the *test* CRG and clicking on **Actions**, we chose **Update Software** and were shown a screen to update vSphere to version 6.7, preselected by the system. Note that PowerOne would update vSphere while automatically moving the virtual machines to other physical servers, eliminating the need for an administrator to manually complete that coordination work. Because the system is validated before being shipped to the customer,

vSphere 6.7 is confirmed to be interoperable with the assigned server, storage, and networking resources assigned to the *test* CRG. The system recognizes software versions that are allowed, eliminating the configuration risk that can occur when incorrectly installing incompatible software.
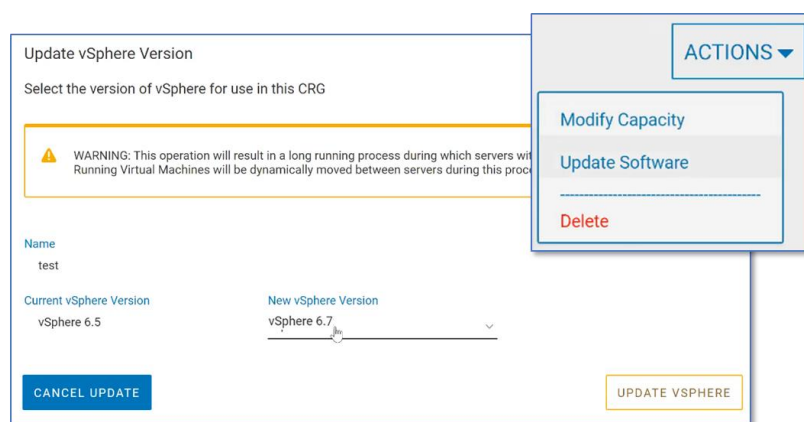
ESG can also see how the operational efficiency achieved with PowerOne can ultimately save on IT costs. Because PowerOne automates significant portions of processes related to installing, deploying, configuring, and maintaining data

center resources, IT spends less on related costs. PowerOne can especially help IT teams that need to expand their existing Dell EMC systems. Since IT can deploy available data center resources efficiently for workloads via PowerOne, the risk of over-purchasing additional compute and storage capacity for future growth can be minimized; IT can expand the existiing infrastructure only when needed.

> ### ⓘ Why This Matters
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> The setup, deployment, configuration, and maintenance of data center components (compute, storage, virtualization, and network) create bottlenecks for organizations that wish to increase their business agility. What organizations need is a solution that will enable simplified on-demand provisioning of these resources for their VMware virtualized data center infrastructure.
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> ESG validated that Dell EMC PowerOne, with its automation engine, removes the bottlenecks by automating and orchestrating the majority of manual and repetitive tasks associated with provisioning and configuring compute, storage, virtualization, and networking resources for a given workload. We found that PowerOne can significantly reduce the amount of manual intervention typically required when installing and configuring a pre-engineered Dell EMC PowerOne system of compute and storage resources to support an organization's workloads. The reduction in manual intervention can subsequently simplify processes related to installation, configuration, decommissioning, and maintaining these resources, thus reducing overall operational expenses.

The Bigger Truth

As organizations modernize and expand their data center infrastructure to accommodate more data and workloads, deploying and configuring the necessary resources remains a bottleneck. Using traditional tools and processes when bringing up a DIY infrastructure consumes time that organizations cannot afford to waste, especially when pursuing digital transformation efforts. The typical times for installing, deploying, configuring, and troubleshooting data center infrastructure can span weeks to months, preventing organizations from responding to business needs quickly and effectively. To eliminate that wasted time, organizations need a solution that will expedite lifecycle management activities of compute, storage, networking, and virtualization resources.

Dell EMC PowerOne has been developed to automate the numerous manual steps that organizations face when configuring server, storage, networking, and virtualization components in their IT infrastructure. Instead of leveraging multiple management GUIs to assign and setup these components separately and coordinate tasks to ensure interoperability of data center resources, PowerOne's automation engine only requires the input of the desired "end-state"—the amount of compute and storage capacity—to determine how these components are configured for a specific workload.

ESG validated that PowerOne indeed only requires declarative input to deploy and configure compute, storage, networking, and virtualization resources, as we deployed these resources for a sample workload by stating the amount of compute and storage capacity required. We then analyzed how PowerOne's automation can eliminate the manual execution of hundreds of steps associated with configuring data center infrastructure. We verified that the number of times to complete a step via a management interface decreases significantly when compared to performing a task with the PowerOne Navigator, as the automation engine executed multiple steps associated with each task. Based on the reduction in manual effort, ESG sees how organizations can make IT operations more efficient, subsequently reducing operational expenses.

Organizations can employ Dell EMC PowerOne's "intent-based" automation to save time and money when deploying, configuring, and managing data center infrastructure. ESG suggests that you look closely at Dell EMC PowerOne should you want to leverage automation to boost your digital transformation efforts.

The goal of ESG Validation reports is to educate IT professionals about information technology solutions for companies of all types and sizes. ESG Validation reports are not meant to replace the evaluation process that should be conducted before making purchasing decisions, but rather to provide insight into these emerging technologies. Our objectives are to explore some of the more valuable features and functions of IT solutions, show how they can be used to solve real customer problems, and identify any areas needing improvement. The ESG Validation Team's expert third-party perspective is based on our own hands-on testing as well as on interviews with customers who use these products in production environments.

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