A SOLIDFIRE BENCHMARK REPORT

The 2017 Storage Automation Report

How IT Professionals Are Utilizing and Benefiting
from Automation of the Storage Layer

■ NetApp®

What's in the report?

Conducted through an independent research organization, this report queried more than 250 global IT professionals to gain insight into how they use storage automation to realize a variety of benefits. Respondents vary across job role, industry, and company size.

This report details the drivers behind storage automation, what tools and interfaces IT professionals are using, preferences around storage management plug-ins and software development kits, and the benefits realized by implementing storage automation.

Introduction

Automation continues to echo throughout the information technology industry because of its impact on reducing complexity, improving efficiency, and nurturing innovation. The worldwide data center automation software market grew 13.7% in 2015 to total $2.3 billion[1] and is continuing to foster growth among enterprises and service providers. The 2017 State of Automation report[2] dives into which tools IT professionals are utilizing for automation today, and looks at trends for streamlining business in the future.

As the cloud continues to lend itself to improved accessibility across entire organizations, cloud teams are expected to see the biggest increase in infrastructure spending over the next year.[3] And as spending on storage infrastructure continues to grow to support the growth of cloud services, automation is essential to keep with the pace of the entire industry. Since on-premises private clouds grow at the fastest rate, automating the infrastructure behind them will allow for greater agility and scalability across organizations. Automation enables flexibility for organizations to continue to shift and stay ahead of the demands of the ever-changing market.

"Cloud is not only yet another delivery model supporting existing storage workloads — it is an essential enabler for development and proliferation of a broad range of next-generation applications and services."
- Natalya Yezhkova, Research Director, Storage Systems[4]

The demand for next-generation storage architectures will continue to develop with the demand for local, agile, cloud services. For industries born in the cloud like software-as-a-service (SaaS) companies, storage infrastructure has always been invisible to the end user. Behind the scenes, infrastructure can cause major growing pains for a scaling enterprise. The right programmable, scalable infrastructure is critical to your business's success. This report intends to deliver insights for your growing infrastructure, allowing you to better automate your business through automation trends and tools.

In this report, we highlight responses from SaaS-like companies. Computer software companies had the highest response rate among responding industries (35% of all respondents). These providers and their customers have no tolerance for slow, unavailable, or unresponsive solutions (or solutions lacking the most innovative and up-to-date features). To remain competitive, SaaS companies take advantage of automation tools to continue their agile business development, testing, and deployment. In addition to a high adoption of automation tools, SaaS companies are also more likely to seek out DevOps practices to deliver faster development practices alongside operational counterparts.

1   IDC. Worldwide Datacenter Automation Software Market Shares, 2015: Year of Suite Success. Available at: http://www.idc.com/getdoc.jsp?containerId=US40425216. June 2016.

2   The report was published at the beginning of calendar year 2017, during NetApp's 2017 fiscal year. For consistency, "this year" and 2017 refer to data collected at the end of 2016. "Last year" refers to the Storage Automation report published in calendar year 2015.

3   TVID: 9C4-3E2-E28

4   IDC. Worldwide Storage for Pubilc and Private Cloud Forecast, 2015-2019. Available at: https://www.idc.com/getdoc.jsp?containerId=US40702215. December 2015.

KEY FINDING | VMware vRealize continues to be a prominent tool for storage automation, with Microsoft PowerShell usage drastically increasing among respondents.

Respondents were asked which technologies they currently use to implement storage automation. VMware vRealize remained one of the most popular automation initiatives: 42% of respondents indicated usage in 2015 — a number that grew to 54% of survey respondents in 2017. Microsoft PowerShell saw the largest increase in usage: 54% of respondents indicated usage, up from usage of just 15% of respondents in 2015. This jump and continued growth with PowerShell is likely to do its support on more operating systems and containers. This figure is also consistent with IDC research findings, suggesting Windows represents a majority of the automation market. Automation initiatives also increased significantly for Microsoft System Center (51% of respondents) and for OpenStack (43%).

Due to the increased buzz around containers, this report takes a closer look at their impact in the market. They served as an automation tool for 22% of respondents. Overall, there is an increase in implemented initiatives and processes to increase storage automation for IT professionals.

While computer software companies also automating their storage needs with PowerShell (57% of respondents), they also heavily utilize OpenStack (56%) for automating across their organizations. This industry, which includes many SaaS and SaaS-like companies, is most heavily utilizing a DevOps approach to align operations with application development (21%)[5] for increased automation.

Which of the following initiatives and processes are you currently implementing?

Storage automation in Microsoft PowerShell	54%
Storage automation in VMware vRealize Orchestrator/Automation	54%
Storage automation in Microsoft System Center	51%
Storage automation in OpenStack	43%
Storage automation in Containers	22%
Utilizing a DevOps approach to align operations with application development	14%
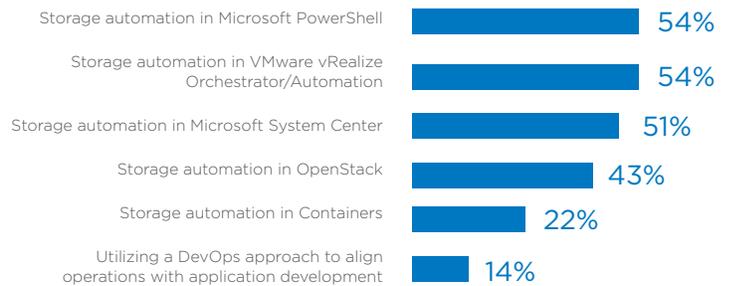
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KEY FINDING | Storage automation in Microsoft System Center, PowerShell, and VMware are the most popular initiatives considered for implementation in the next year. However, consideration of storage automation in containers will likely see the most growth.
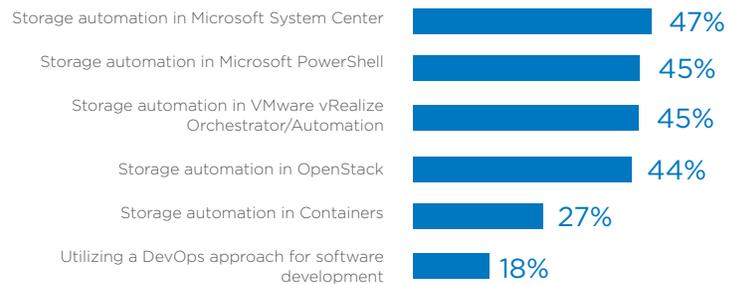
While the majority of IT professionals are continuing to consider storage automation in Microsoft System Center (47%), PowerShell (45%), VMware vRealize (45%), and OpenStack (44%) for the next year, consideration for both containers and utilizing a DevOps approach has also increased, showing a willingness to move beyond current implementations.

Containers are turning the most heads, with 22% of respondents currently implementing containers and another 27% considering implementation within the next year. The benefits of containers often derive from their speed and lightweight nature; many more containers can be put onto a server than onto a traditional VM. Containers are "shareable" and can be used on a variety of public and private cloud deployments, accelerating dev and test by quickly packaging applications along with their dependencies. Their shared, lightweight nature makes automation even more efficient, especially in fast-paced cloud or as-a-service business models.

Consideration for automation via DevOps tools continues to grow. While only 14% of IT professionals currently implement a DevOps approach, 18% are considering it for the next year. Companies embracing and implementing DevOps are able to fulfill continuous customer demand and deliver new solutions at even faster speeds. DevOps tools appear to be converging with traditional operations orchestration and provisioning solutions and thus are most likely influencing both containers usage numbers as well as open-source orchestration tools.

OpenStack usage is also expected to continue to increase. With 43% of respondents now utilizing OpenStack for automation and 44% considering it for next year, OpenStack usage is likely to continue as a key to automating the next generation data center. And 53% of IT professionals currently implementing storage automation via VMware vRealize Orchestrator say they're considering OpenStack for the next year,[6] indicating OpenStack will have no problem maintaining its "disruptor" status.

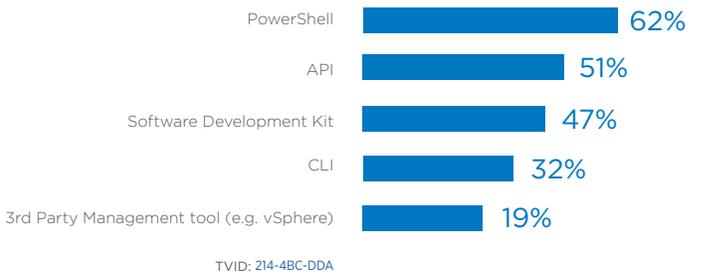**Which of the following initiatives and processes are you considering implementing in the next year?**

Storage automation in Microsoft System Center	47%
Storage automation in Microsoft PowerShell	45%
Storage automation in VMware vRealize Orchestrator/Automation	45%
Storage automation in OpenStack	44%
Storage automation in Containers	27%
Utilizing a DevOps approach for software development	18%

TVID: 062-BOA-ABB

6 TVID: AB1-479-4D3

KEY FINDING | IT professionals are increasingly choosing PowerShell tools for storage automation.

IT professionals prefer PowerShell for storage automation overall (62% of respondents). This reflects a large shift from last year's preference for storage automation through third-party management tools. PowerShell's maturity in the market and ability to automate across platforms makes it a popular language for storage automation. Its ease of use and consistent experience for automation make it a popular choice. VMware users and Microsoft users alike prefer PowerShell in their respective current use segments.[7] OpenStack users still prefer API control (70%) for automation,[8] where interface integrations use APIs, and scripting is less of an operational tool. Among those already deploying containers, PowerShell is also the preferred interface.[9]

Computer software companies report similar use in the overall segment, but API use remains highest for storage automation (57%).[10] By using existing APIs and SDKs, developers don't have to wait on operations teams for storage to be reconfigured. This more streamlined, automated approach builds on the DevOps mentality and empowers developers to build their own environments through virtual machines, containers, etc.

How likely would you be to use the following interfaces and tools for your storage automation?
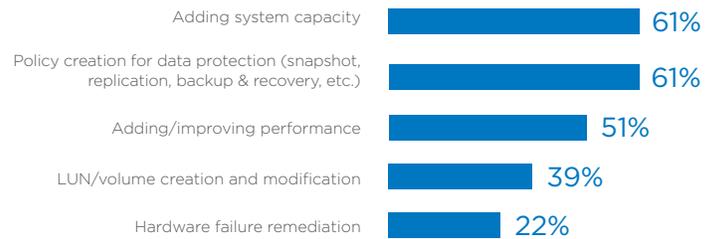
Interface	Percentage
PowerShell	62%
API	51%
Software Development Kit	47%
CLI	32%
3rd Party Management tool (e.g. vSphere)	19%

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7 TVID: C75-937-41B; TVID: 28A-2F1-DAD

8 TVID: EB0-249-ED3

9 TVID: 532-0CC-E3E

10 TVID: D4F-23D-E96

KEY FINDING | IT Professionals are already automating the addition of system capacity and policy creation for data protection.

IT professionals are looking to automate a number of storage tasks. Across the pool of respondents, IT professionals are currently automating or planning to automate adding system capacity (61%) and policy creation for data protection (61%) within the year. OpenStack and PowerShell users have been more likely to prioritize automating adding system capacity over automating creating policies for data protection,[11] while VMware users are more likely to prioritize automating policy creation for data protection via snapshot, replication, or backup and recovery.[12] While the top choice of storage automation is strong for both adding capacity and protecting data, the top priority for the different platforms may reflect the varying strengths, mindsets, and capabilities of open-source vs. legacy platforms.

Computer software companies are more likely to automate policy creation for data protection (64%).[13] By automating as many storage tasks as possible, including the automation of building and protecting new data environments, these companies are validating their DevOps mentality.

Which of the following storage tasks are you currently automating or planning to automate in the next year?

Task	Percentage
Adding system capacity	61%
Policy creation for data protection (snapshot, replication, backup & recovery, etc.)	61%
Adding/improving performance	51%
LUN/volume creation and modification	39%
Hardware failure remediation	22%

TVID: 1A8-4A0-C97

KEY FINDING | Increasing employee productivity is the top driver behind storage automation.
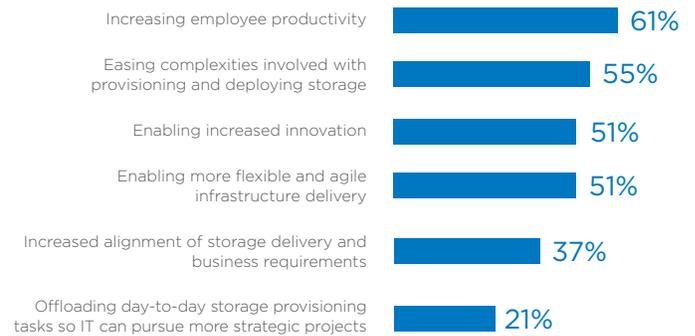
Of the many drivers behind an organization's deployment of storage automation, easing complexities for employee productivity (61%) was most common, followed by easing complexities involved with provisioning and deploying storage (55%). Compared with previous findings, easing complexities remained relatively important, dropping only slightly from the most important driver to the second most important driver, proving its lasting relevance in automating storage. With the adoption of simpler platforms, priorities for automation continue to shift.

Employee productivity as a driver increased dramatically in the same time frame, increasing to 61% of respondents. Enabling increasing innovation also took a leap of importance (51%). Both of these changes show the increased importance of the employee to responding organizations.

Computer software companies strengthened these top drivers for automating — 63% of computer software respondents led with automation for increased employee productivity, followed by 57% of these companies automating to ease complexities involved with provisioning and deploying storage.[14] In a SaaS environment, freeing employee time from hardware management is critical for developing a leaner, better software product that is competitive in the marketplace. Additional time allows for a more feature-rich experience for the end user — ultimately helping the SaaS company retain and grow revenue with existing customers.

IT professionals currently deploying OpenStack have similar needs for storage automation. Even more so, this subset wants to increase employee productivity (73%) and ease complexities involved with provisioning and storage (72%).[15] This large focus across platform users and industries to increase employee productivity aligns well with the increased interest in DevOps. Applying DevOps principles improves the company culture by accelerating time to value, improving quality, and increasing productivity for the business.

What are the top drivers behind your organization's deployment of storage automation?

Driver	Percentage
Increasing employee productivity	61%
Easing complexities involved with provisioning and deploying storage	55%
Enabling increased innovation	51%
Enabling more flexible and agile infrastructure delivery	51%
Increased alignment of storage delivery and business requirements	37%
Offloading day-to-day storage provisioning tasks so IT can pursue more strategic projects	21%

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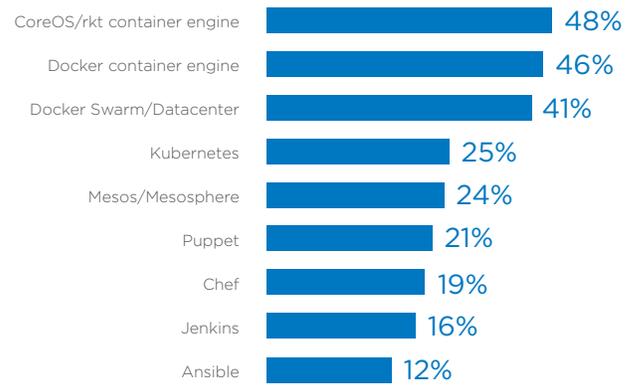14 TVID: 2D4-88B-9E6
15 TVID: E28-E92-AAB

KEY FINDING | Container engines are popular tools currently in use or in consideration for use among IT professionals.

Among the diverse collection of tools currently in use or in consideration for use in the next year, both container engines, CoreOS/rkt (48%) and Docker (46%), yielded the most interest. Containers, which may be seen as an alternative or replacement to traditional VMs, are rising in popularity. This concentrated response to container engines reiterates the growing interest. Among the different orchestration tools listed, Docker Swarm/Datacenter had the highest interest for IT professionals at 41%. The interest in this tool has nearly doubled since last year's automation report. While the majority of these users are likely utilizing Docker Swarm with the Docker container engine, the spread of interest across other orchestration and developer tools suggests IT professionals are utilizing, or considering utilizing, more than one tool to automate their storage environments.

OpenStack users have a much stronger preference for the Docker container engine (68%) and Docker Swarm/Datacenter (50%), while VMware and PowerShell users both prefer the CoreOS/rkt container engine (60% and 57%, respectively).[16] Interestingly, the tool with the most interest for both VMware and PowerShell users after container engines was still Docker Swarm/Datacenter. Kubernetes remained a highly popular tool across all platforms, with 27% of respondents using PowerShell expressing interest as well as 34% of OpenStack and VMware users. Puppet, Chef, and Ansible continue to have relevance for automating applications and infrastructure, though they are more commonly tied to traditional application frameworks. This is likely to increase as container technologies and configuration management tools continue to mature.

SaaS companies are more likely to use container engines than the average IT professional surveyed (TVID: 6C7-98C-C68). Of IT professionals working in the computer software industry, the CoreOS/rkt container engine (56%) is more likely to be used than the Docker container engine (49%). As thus, SaaS companies are less likely to utilize Docker Swarm (38%) and show a more balanced usage across orchestration tools, from 24% utilizing Chef to 27% utilizing Kubernetes.

Which of the following tools are you using currently, or considering in the next year?

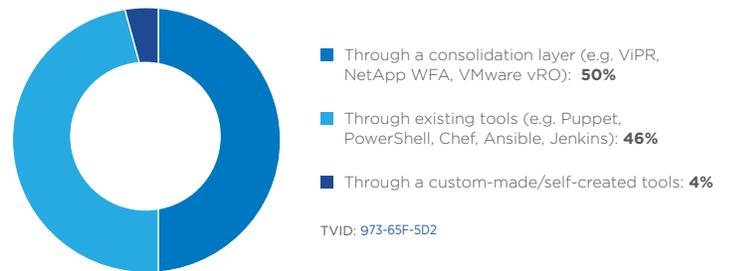| Tool	%
CoreOS/rkt container engine	48%
Docker container engine	46%
Docker Swarm/Datacenter	41%
Kubernetes	25%
Mesos/Mesosphere	24%
Puppet	21%
Chef	19%
Jenkins	16%
Ansible	12%

TVID: B59-52C-E0B

KEY FINDING | APIs are evenly consumed through consolidation layers and existing tools.

When asked which method was preferred for consuming APIs, respondents were fairly split between consuming through a consolidation later (50%) and through existing tools (46%). Current implementers of OpenStack and VMware prefer API consumption through a consolidation layer, with OpenStack users having a stronger preference (69%)[17] over VMware users (57%).[18] IT professionals currently implementing containers prefer to consume APIs through existing tools (55%).[19]

While there is no doubt of the importance of APIs in automating a storage environment, APIs also improve automation between platforms. From previous findings, IT professionals are utilizing a number of platforms, with interest for others only increasing. APIs benefit automation between these different tools as well. It appears that IT professionals are happy to consume APIs, whether they are accessed through a consolidation layer or through the tools themselves.

Computer service companies may slightly prefer consuming APIs through a consolidation layer, such as ViPR, NetApp WFA, or VMware vRO (57%).[20] By doing so, the API is no longer directly consumed, which may be a result of looking for standardization between systems, platforms, or vendors.

What is your preferred method for consuming storage APIs?

■ Through a consolidation layer (e.g. ViPR, NetApp WFA, VMware vRO): **50%**

■ Through existing tools (e.g. Puppet, PowerShell, Chef, Ansible, Jenkins): **46%**

■ Through a custom-made/self-created tools: **4%**

TVID: 973-65F-5D2

17 TVID: E38-EFF-160

18 TVID: 2F0-7E7-2E8

19 TVID: E12-7CB-13C

20 TVID: 136-C2A-CF7

KEY FINDING | Java and JavaScript remain the most utilized languages among respondents.

JavaScript (71%) and Java (66%) are the most popular software development kits (SDKs)/languages utilized across all platforms. As tools that enable the creation of applications for particular platforms or frameworks, including hardware, SDKs can significantly accelerate the development process.

OpenStack users had a stronger preference for Java (78%), and were most likely to utilize Python and PowerShell (41%) users.[21] VMware vRealize users are more likely to prefer Javascript (76%) and were most likely to utilize C# (42%).[22] Unsurprisingly, PowerShell users were most likely to take advantage of PowerShell SDKs (50%).[23]

Computer software companies, like those deploying OpenStack, prefer Java SDKs (75%) over JavaScript (70%). The next most popular language for this industry was C# (41%).[24]

Which programming languages and/or Software Development Kits (SDKs) would you be most likely to utilize?

Language	%
Javascript	71%
Java	66%
PowerShell	38%
C#	32%
Python	29%
Ruby	17%
Go	13%
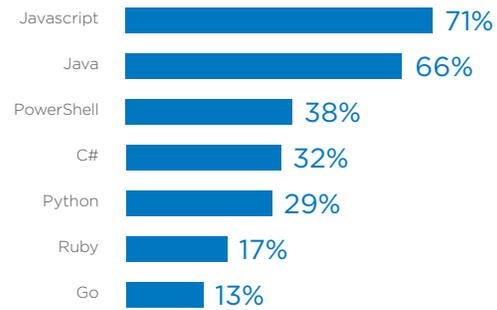
TVID: 048-9B2-5ED

21 TVID: 9AB-9CC-389

22 TVID: BED-3E4-B9A

23 TVID: A4B-504-54D

24 TVID: 484-1DE-4EC

KEY FINDING | A majority of IT professional complete tasks at least 6x faster after automating.

The majority of IT professionals are seeing more than 6x gains in the speed at which they perform a variety of management tasks after automating (nearly 70% of those surveyed reported at least a 6x-7x gain after automating). 54% of respondents completed LUN/volume creation and modification 8x-10x times faster with automation; 75% of respondents completed adding system capacity 6x-7x times faster with automation.

OpenStack users see greater gains in automation across all tasks, with a majority of tasks seeing 8x-10x gains with automation. 65% of OpenStack user respondents saw an 8x-10x gain in LUN/volume creation and modification with automation, and 79% saw at least an 6x gain in the same task.[25]

Similarly, 63% of SaaS-like respondents saw an 8x-10x gain in LUN/volume creation and modification with automation, and 79% saw at least a 6x gain in the same task.[26]

After automating, how much faster can you complete the following tasks?

	Over 10x faster	8x-10x faster	6x-7x faster	4x-5x faster	Up to 4x faster
LUN/volume creation and modification	27%	27%	19%	17%	10%
Policy creation for data proection (snapshot, replication backup & recovery, etc)	15%	31%	26%	19%	9%
Adding system capacity	17%	30%	28%	15%	10%
Adding/improving performance	19%	28%	23%	20%	10%
Hardware failure remediation	19%	26%	22%	18%	15%

TVID: 555-7A2-DEB

25 TVID: 182-7A2-EC6

26 TVID: 07B-B55-39F

Conclusion

A variety of IT organizations continue to streamline management and improve efficiencies through automation. IT professionals are relatively homogenous in their approaches and hoped-for outputs around automation, with computer software companies, which are increasingly cloud-based, often having a stronger conviction of the observed trends. Three main takeaways around tools and trends related to automation include:

Several noteworthy findings include:

1. While the market majority utilizes VMware solutions, IT professionals are increasingly integrating open-source solutions to further automation efforts. The readily available number of APIs available through both consolidation layers and existing tools allows the end user more opportunity to integrate platforms. Automation, as it stands today, allows companies to complete tasks 6x faster.
2. Likely due to its maturity in the market and ability to integrate across platforms, PowerShell usage has increased. IT professionals are utilizing automation tools, like PowerShell, to add system capacity and policy creation for data protection.
3. Containers are increasing in consideration and usage across organizations. These companies are looking to continue to increase storage automation to improve employee productivity through solutions like SDKs. A DevOps approach, most readily embraced by SaaS companies, not only improves employee productivity, but also the delivery of continually improved products to the marketplace.

As storage automation continues to evolve through next-generation tools, employees and organizations alike will reap the benefits of a more agile business to develop and improve with the continually adapting marketplace. Automation tools and practice adoptions will continue to enable more seamless deliveries of information and resources for an ever-increasing, on-demand world.