

EBOOK

IT Perspectives: Vision for a DevOps Platform



NetApp®



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Introduction

DevOps is part culture, part process, and above all, the combination of developers and operations teams working in a coordinated, efficient, and automated way to rapidly deliver production software changes without disruption. Two years ago, NetApp began its journey with a vision to build a DevOps platform to provide automation and CI/CD release models the application development teams need to create cloud native applications using microservices architectures running in containers. We call the platform “CloudOne” as it delivers one consistent user experience, irrespective of the cloud destination, either private cloud or public cloud.

This eBook covers the planning involved to determine what was identified as in scope as the team looked at the many things that positively impact enterprise apps delivery such as cloud, containers, microservices, and DevOps.





Three Steps to Defining a Cloud-First Strategy

MATT BROWN

EXECUTIVE DIRECTOR, NETAPP ON NETAPP/IT CUSTOMER ENGAGEMENT

As NetApp's business goals evolve, so must IT. We constantly look at ways to streamline IT processes to become more efficient in terms of cost and agility. When we looked to the cloud as a possible solution, we discovered the real conversation has evolved from "to cloud or not to cloud?" to "how to cloud and why."

Inside NetApp, we previously looked at the cloud as a static end state where apps were placed in the cloud on an individual basis. We then realized that we could leverage the cloud in a far more dynamic way. A dynamic strategy enables us to move apps in, out, and within clouds; adjust our course as workloads and factors change; and continually evaluate what apps are in the cloud and why. Our strategy is based on a blend of private and public clouds (which includes SaaS providers) and aims to displace the legacy data center concept.

One of the biggest mistakes an IT shop can make is to manage the cloud as if it were a project with an end date. IT organizations must acknowledge that they need the cloud as part of their new operating model. Adopting this new model

requires thoughtful planning in terms of agility, scalability, and supportability. Below we offer an approach to starting your own cloud journey.

Going Cloud

Many CIOs I talk with ask why NetApp IT decided to move to the cloud. My response is that all enterprises need to go to the cloud, whether it is private, public/SaaS or, most likely, a blend of all three. NetApp IT sees the cloud as enabling the agility to maximize technology investments, deliver business capabilities more rapidly, ensure greater supportability, and enhance the ability to leverage future technologies and IT services.

With the goal that many applications will end up in a cloud, we needed a framework to guide those decisions. A cloud decision framework is how we incorporated the cloud into the evolution of our daily operations. NetApp IT seeks to maintain flexibility in the cloud without vendor lock-in to meet the ever-changing needs of the business and maintain a competitive advantage. The framework addresses cloud placement for new apps and the evolution of legacy apps to the cloud.

In this eBook, we will discuss the development of our cloud decision framework to transition IT from a traditional operating model to one that is

Commodity Services	Innovation Services	Differentiation Services	Systems of Record
DEFINITION: Backoffice IT productivity applications and tools STRATEGY: Simplify by leveraging best in class SaaS with no customizations EXAMPLES: Office 365, ServiceNow, Zoom	DEFINITION: Applications and services that help us innovate and make products and services better STRATEGY: Enable business to try/fail/succeed fast, leveraging cloud-aware principles and DevOps practices EXAMPLES: New ideas, DevOps innovation	DEFINITION: Applications unique to NetApp and that differentiate NetApp from competitors STRATEGY: Enable business to release value faster, leveraging cloud-aware principles and DevOps practices EXAMPLES: Active IQ, AutoSupport Services	DEFINITION: Backoffice applications needed to run NetApp's business STRATEGY: Simplify by leveraging best in class SaaS, minimize customizations EXAMPLES: Workforce/HR, CRM, ERP

cloud-aware. We start with our first step:

Recognize that you're already in the cloud and learn from it.

Many IT organizations see the cloud as new technology when the reality is that they are already leveraging cloud-based SaaS business services, such as payroll, HR benefits, lead generation, and the help desk, which have been common cloud services for decades. It is also likely your business is using the cloud without IT involvement. Examples can be found in marketing, finance, and sales.

The goal here is to learn why your organization chose to use SaaS, validate that criteria, and then apply it to the rest of your application environment. More than likely you've chosen SaaS

because the apps/services were not core to your company's competencies. Core competency becomes the foundation of your cloud decision framework.

Develop your cloud decision framework.

You will need a cloud decision framework to standardize and bring consistency to your delivery and operational process for the cloud. We recognized that core competency was an output of the first assessment. Now let's table that for a moment to ensure we can apply that criteria in the most meaningful way possible to your entire application portfolio.

In our environment, we were already using the [Gartner Pace Layering methodology](#) for IT governance to prioritize technology

“Core competency becomes the foundation of your cloud decision framework.”

investments. We recognized it could also help define our cloud decision framework and prioritize the order of cloud adoption. This methodology offers a structured approach based on roles that the applications play in the business, based on three categories. We added a fourth category called Commodity that captures common-use desktop- or service-based applications throughout the corporation. The categories are:

- **Systems of Record** - These apps are the single source of truth for data sets of information. Examples workforce/HR, CRM, and ERP.
- **Systems of Differentiation** - These apps are critical to the company's competitive advantage in the marketplace. One example is NetApp AutoSupport™ (ASUP™), our proprietary customer support system and Active IQ.
- **Systems of Innovation** - These apps are developed to exploit new opportunities in the market or improve internal efficiencies and require a fail-fast, proof-of-concept approach for testing new capabilities. The objective is to decide about investing in them as fast as possible.
- **Commodity Systems** - Any software that is used corporatewide. This includes email, help desk, collaboration, office tools, and web conferencing.

Place your apps into categories.

Upon understanding the classifications, the next step is to assign IT-supported apps into one of the four categories. This process

should be simple and take only a couple of hours. This is not a detailed exercise. The goal here is to identify the first categories of focus in the simplest way possible. For NetApp IT, the first logical focus was on our commodity systems and systems of innovation. Commodity systems are not a core competency and should already be in the cloud. NetApp IT is taking a very aggressive approach to making this a reality.

As you move commodity and innovation systems to the cloud, you will recognize that systems of record and differentiation are more complex to analyze. This is because these systems are legacy systems for most companies. These systems are usually highly customized and highly integrated, with very specific proprietary features. They should be part of your private cloud storage.

Many of the applications categorized as systems of record are not a core competency and should be evaluated against all your working business requirements to make a final determination for placement. As you go through this exercise, you will discover many of these systems will be candidates for SaaS-based solutions.

Once your apps are categorized, you can start developing your policies, such as requiring that all new apps be cloud-ready, with no proprietary constraints or customizations.

Supporting Business Agility

The cloud-decision framework is an effective tool for IT to standardize its approach for supporting core vs. non-core systems and utilizing the cloud as part of a dynamic hybrid cloud strategy. Just as importantly, the framework is a solid foundation for IT to evolve from a technology provider to a broker of services. •



Building a Cloud-Aware Enterprise Inside NetApp

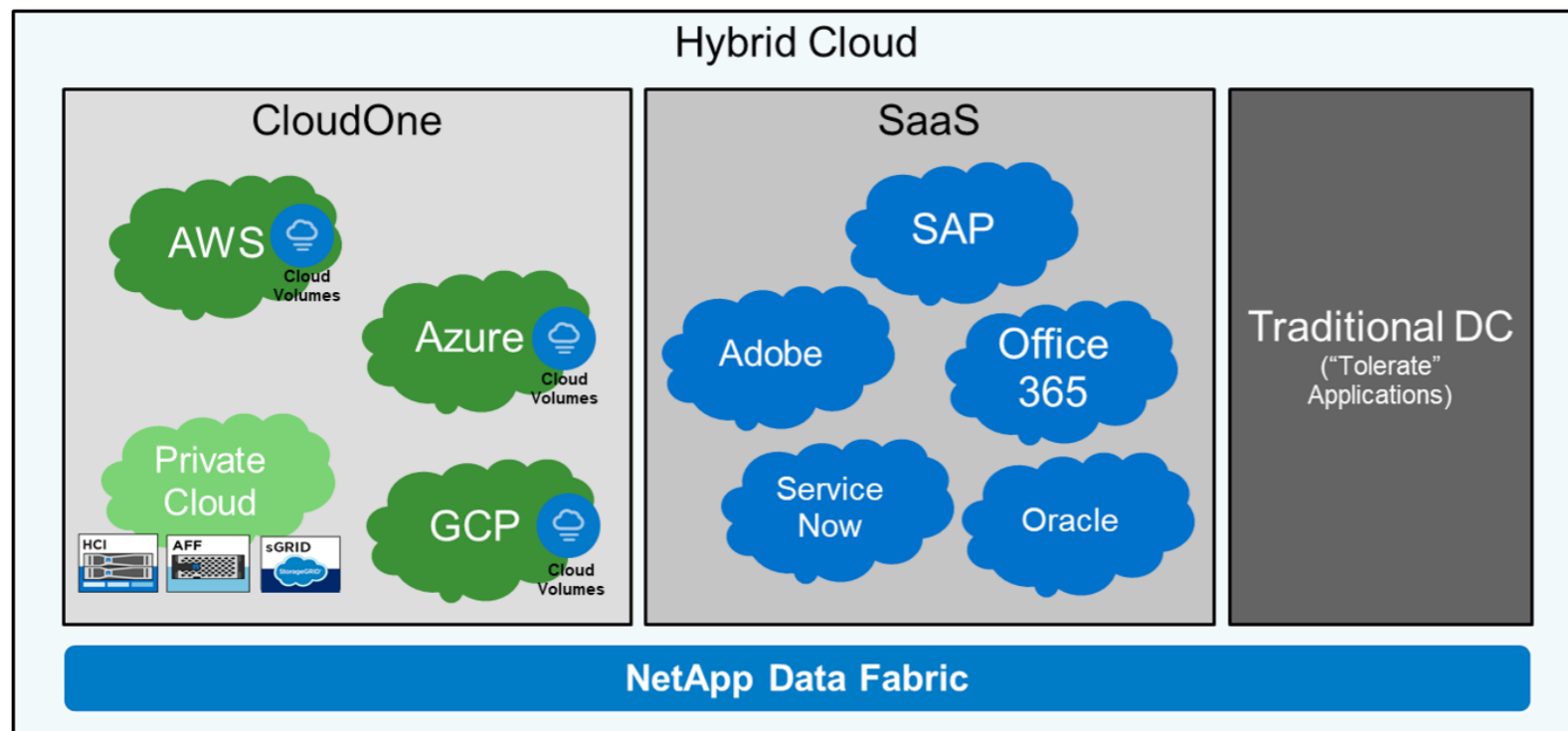
MICHAEL J. MORRIS
SR. IT DIRECTOR, TECHNOLOGY, STRATEGY, AND INNOVATION

Our future uncentered data center

When the NetApp IT team was challenged by our CIO to build a future, next generation vision of our data centers using NetApp technologies, we were certain of one thing: no longer is there a center of data. Data is no longer centralized in a brick and mortar data center. It has become uncentered and resides with SaaS providers, hyperscalers, private clouds, and co-location facilities.

As part of internal debates and discussions, the team decided a proper definition must start with an evaluation of NetApp's enterprise application portfolio to determine the best target end-state infrastructure. Applying [Gartner's TIME](#) (tolerate-invest-migrate-eliminate) model to assess our enterprise application portfolio, it was determined:

- 27% of the application had a tolerate status, i.e. no incremental investment and keep running until no longer needed;
- 36% of the applications are “invest-strategic” and require investment to deploy new capabilities and/or enhance current functionality;
- 32% of the application have functionality



that must migrate to a different application or platform; and

- 5% of the applications need to be eliminated to free up resources and reduce costs.

It was this evaluation that led the team to develop a vision for our CloudOne DevOps platform for the applications that fell into the “invest-strategic” and “migrate” categories.

Over the next three to five years, NetApp IT’s enterprise architecture team sees 70% of the “invest-strategic” and “migrate” apps migrating to software-as-a-service (SaaS). Considering that NetApp IT is a

relatively typical enterprise IT shop, we want to take advantage of the common business processes which are automated and packaged by SaaS providers.

The remaining 30% of applications are unique to NetApp, providing a competitive advantage which cannot be rented from a SaaS provider. These applications will need a software controlled and orchestrated development platform that allows developers to build and run cloud-aware applications using advanced methodologies like DevOps and CI/CD delivery models. This is CloudOne. This platform consists of cloud service providers, including AWS, Azure, and

even our private cloud using NetApp technologies like StorageGRID, Hyper Converged Infrastructure (HCI), and ONTAP All Flash FAS.

CloudOne is part of our complete hybrid cloud portfolio, which also includes SaaS providers and a dramatically downsized traditional data center to house the aforementioned “tolerate” applications. The NetApp Data Fabric provides a competitive advantage by tying these different ecosystems together and providing the right mechanisms to share data between the environments.

At this point; the proper hybrid cloud is complete, allowing IT to bring the traditional enterprise IT business process to bear, but in a much more flexible, agile and efficient way. We can then do things more rapidly, more automated, and more flexible because we have a better technology ecosystem on which to run all applications. •

“Data is no longer centralized in a brick and mortar data center.”



Determining What Enterprise Apps Go Cloud

RAJESH SHRIYAN
DIRECTOR, IT ENTERPRISE ARCHITECTURE

NetApp has been in business for over 25 years, long before the Internet became popular and cloud-aware application architecture came into existence. Many of our enterprise applications at NetApp are customized from their original form with spaghetti-like integration points and add-ons. These complex, heavily customized apps complicate business processes, increase operational costs, magnify security exposures, and reduce our IT agility. We must simplify our enterprise application portfolio by consolidating onto major platforms and maintaining a deliberate hybrid cloud evolution to decide what goes cloud and what stays home.

As a first step to simplify our enterprise business application portfolio, we identified all apps that are potentially cloud eligible. We filtered out any IT (homegrown) monitoring tool and any R&D app managed by our sister Engineering team at NetApp. It was also not necessary to analyze our major applications or core platforms that have existing cloud roadmaps like HR and CRM/Field Sales. The next step assessed each in-scope application for business value and

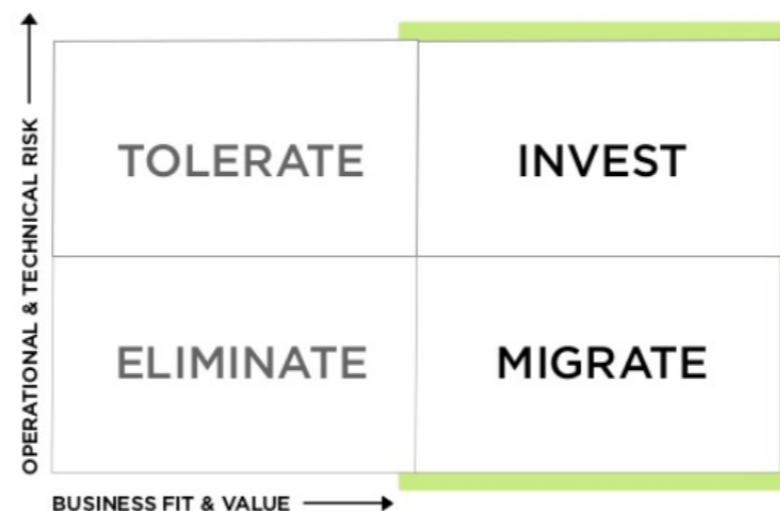
technology risk/effectiveness based on [Gartner's TIME model](#): Tolerate, Invest, Migrate and Eliminate.

Tolerate applications represent an existing valid business process within NetApp that cannot be eliminated, but also do not require an incremental investment. These applications will be tolerated; they will continue to run, and IT will continue to maintain them. Approximately 27% of our enterprise apps were categorized as Tolerate.

Eliminate applications represent a business process that isn't valuable to NetApp anymore. They may be old and/or unsupported, allowing us to sunset the application and free up resources. Eliminating applications is easier said than done, as business leaders still using the apps must be consulted first. Less than 5% were identified as Eliminate.

Migrate applications represent valid business processes that are needed at NetApp, but the apps that automate them may be old, unsupported, or operating on end-of-life infrastructure. These applications require an investment to migrate functionality to a different application. About 32% of our applications have functionality that can be migrated to another app.

Invest-strategic applications represent



good business processes running on good applications and good platforms. The IT team aims to do more with the apps that fall into this category, like deploy new capabilities or enhance current functionality. Roughly 36% fell into this category.

Our TIME evaluation, performed in conjunction with the business, led the team to define how to evolve our hybrid cloud and set a vision for our CloudOne platform. This is especially true when looking at those applications that fall into the “invest” (strategic) and “migrate” categories. In the two right quadrants, 70% of the applications will move to software-as-a-service (SaaS) providers as we recognize it's best to rent commodity software for things like email, collaboration, ERP, and CRM.

The other 30% of our enterprise apps are going to CloudOne which involves cloud providers like AWS, Azure, and private cloud. These apps must be cloud aware, i.e. stateless, dynamic, microservices-based, and created using DevOps and CI/CD delivery models in a software-controlled and orchestrated hybrid cloud ecosystem.

By completing this 4-quadrant application rationalization, we can now evolve our hybrid cloud and continue with our cloud first strategy. It validates that SaaS is the right solution for commodity services like payroll and benefits, and perhaps even for some systems of record apps like finance and revenue recognition. CloudOne will come into play for those applications that differentiate and give NetApp a competitive advantage while our traditional, brick-and-mortar data centers will host the tolerate applications.

At NetApp we are not just fork-lifting our business enterprise applications from our traditional data center into a cloud. We are taking the time to do an application rationalization, to build a proper supporting ecosystem, and to ensure our apps are deployed to the appropriate environment. •



Making Legacy Systems Work in a Hybrid Multicloud Enterprise

ROBERT STUMPF
SR. DIRECTOR, IT BUSINESS APPLICATIONS

As NetApp transforms its current hybrid cloud, NetApp IT has prioritized building a development platform for cloud aware applications using cloud aware application architectures through DevOps and automated deployment cycles.

The team has set a target via application rationalization for the next 3-5 years, that 70% of its apps will be Software as a Service (SaaS), like SAP HCM, Cisco WebEx, and MS Office365 and Sharepoint. The remaining 30% comprises apps that IT will use DevOps methodologies and cloud-aware referenced architectures to convert its remaining enterprise applications to use hyperscalers or private cloud.

There are many things impacting applications in IT organizations, including cloud, containers, microservices, DevOps and more. For our cloud-first strategy to run optimally, we need to change the way we create applications in IT to ensure that NetApp captures to the economic benefits of cloud.

App Architecture Factor	Cloud Aware App	Enterprise App
Design Model	Standardized microservices architecture with APIs Highly portable with infrastructure abstraction	Customized, stateful, monolithic services with middleware integration
Development	Agile with DevOps, faster time to market	Waterfall with release windows, slower deployments
Delivery	Continuous delivery with standardized blueprints and automated workflows	Planned monthly/quarterly release windows with manual touch-points
Resiliency and Scalability	Infrastructure agnostic with intelligence at application layer; cost, resource and failure aware with elastic scaling and recovery	Infrastructure dependent with dedicated hardware for resiliency, scaled to max capacity with high cost
Change Management	Smaller and frequent incremental changes, lower change risk and minimal downtime	Long planned release cycles and downtime with dependency on vendor custom code
Storage Medium	Heavy object storage usage with NoSQL DBs	Traditional volumes and LUNs with files and RDBMS

Why create applications differently?

Hypothetically, NetApp IT could take the existing enterprise architected applications and forklift them up to Amazon, where it's certain that they will run. Yet you must recognize that these applications were built to run in an enterprise class data center on capital intensive hardware that's depreciated over three years and intended to run constantly forever. They

are not designed to take advantage of the capabilities of a cloud.

In this situation there is no resource awareness or dynamism. By taking existing app architectures and development models and “forklifting” them into a cloud, a lot of money is spent with the cloud provider, who then becomes the one to capture the economic benefits of the cloud—not IT.

If we change the way we build applications and move to a cloud-aware application architecture, we ensure that IT captures the economic benefits of the cloud.

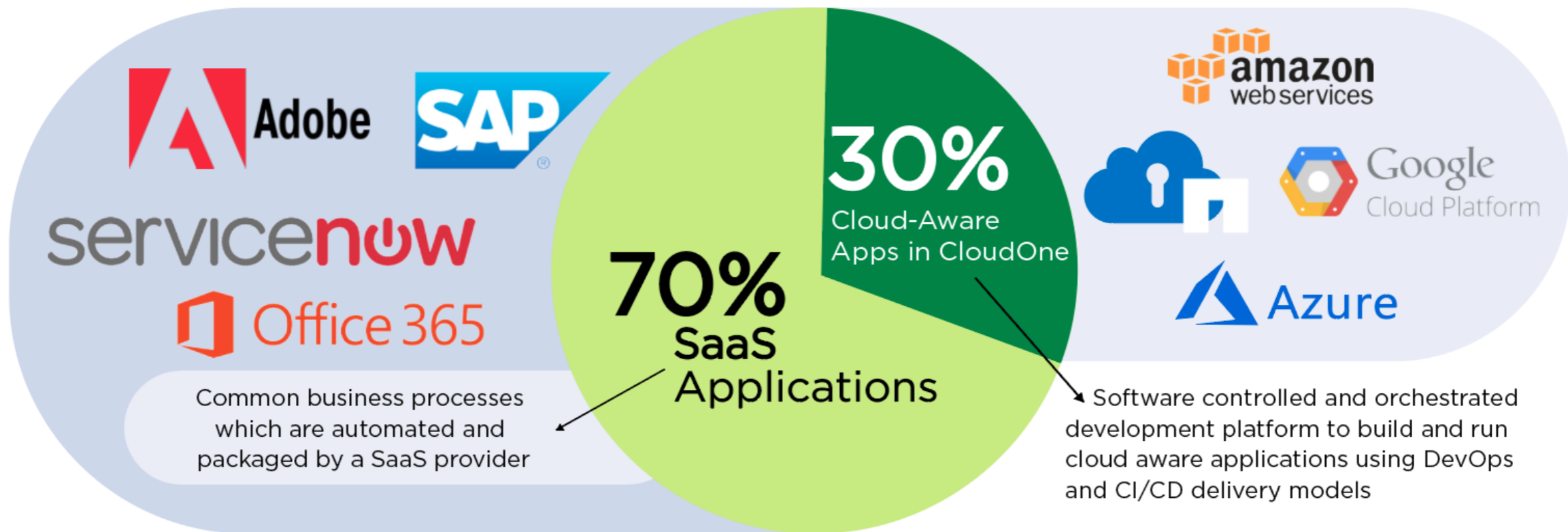
The potential benefits of cloud aware applications include:

- Ability to dynamically scale applications on demand and not have assets installed at max load—even better with microservices
- Shorter development cycles because of increased release velocity, greater developer flexibility, and reduced risk with smaller changes
- Better fault isolation with independent microservices
- Ability to deploy and decommission application environments on demand, e.g. no need for multiple development, test or stage environments
- Portability with containers that provide ability to code and deploy applications anywhere and eliminate vendor lock-in

The Role of NetApp Technology

To accelerate our journey to building a cloud aware enterprise, we rely on three important NetApp products: NetApp Cloud Volumes for data storage in the hyperscalers, NetApp Hyper Converged Infrastructure (HCI) for containerized applications with combined storage,

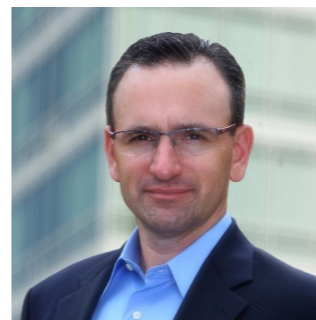
FUTURE IT PORTFOLIO



networking and virtualization compute, and AFF All Flash Arrays for demanding workloads, data analytics, and databases. Looking to the future, our CIO envisions business process automation through machine learning, federated cloud, bots and more. CloudOne and cloud-aware application architecture will serve as a catalyst to accomplish this goal. •



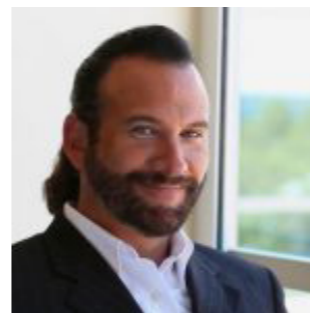
Authors



Michael Morris



Robert Stumpf



Matt Brown



Rajesh Shriyan

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