Journey to the Business-Defined Hybrid Cloud

Machine Learning as the Missing Link to OPEX Reduction

An ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) White Paper
Prepared for ZeroStack

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Written by Torsten Volk
Managing Research Director
Hybrid Cloud, Software-Defined Infrastructure and Machine Learning
Enterprise Management Associates
@TorstenVolk
Read Torsten's blog

Prologue: Utopia

In an ideal world, software development teams would simply provision their IT infrastructure without having to worry about operations management and security. In this utopia, there would be a "self-driving cloud" automatically deciding where an application should be hosted. This "self-driving cloud" would then deliver the desired experience at minimal cost.

Reality Check: Pitfalls of Utopia

Today, enterprises face the issue that only one half of utopia is real. Development teams can indeed provision their own environments without worrying too much about operations management and security and they do, as respective growth rates of 55 percent for Amazon Web Services and 100 percent for Microsoft Azure demonstrate. At the same time, OpenStack continues to be too complex to build and operate for most organizations. VMware's vRealize Automation has also failed to become a standard for private enterprise cloud.

35% Share of enterprises using 4 or more public clouds.

But There is Growing Hunger for Private Cloud

However, current Enterprise Management Associates (EMA) research found that 29 percent of organizations see private cloud as their number one investment priority in 2017, compared to only 16 percent of enterprises prioritizing public cloud. Altogether, 84 percent of enterprises evaluate their cloud requirements on a per-project basis, without a general preference for public cloud technologies.
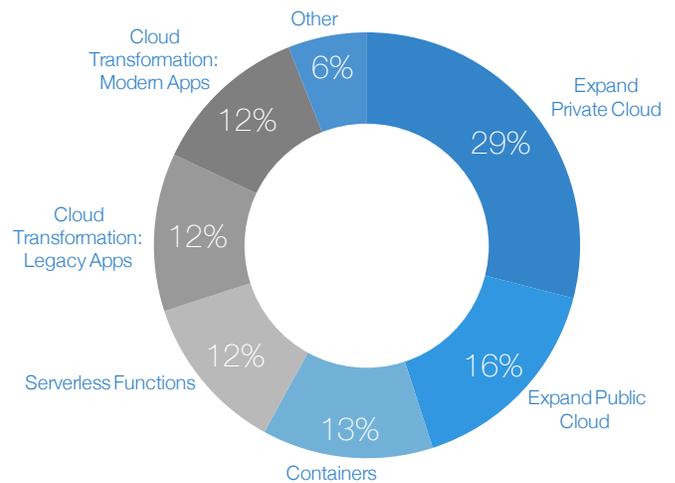
These enterprises are not asking for an on-premises or off-premises cloud solution. They simply require deployment targets that correspond with the security, compliance, performance, availability, and OPEX and CAPEX demands of each one of their applications. This means that the actual decision of whether to place an application in the data center or into cloud a, b, or c should be a fully rational decision, instead of stipulating a "public cloud first" strategy. When the CFO says, "we are not in the business of operating data centers," that does not mean that the organization has to shut down its own data centers and move everything to Amazon Web Services and Microsoft Azure. What the CFO really means is, "we need to lower the cost and risk of our IT operations." It's up to the IT guys to decide how to accomplish this.

#1 Investment Priorities for 2017

- Cloud Transformation: Modern Apps — 12%
- Other — 6%
- Expand Private Cloud — 29%
- Cloud Transformation: Legacy Apps — 12%
- Serverless Functions — 12%
- Containers — 13%
- Expand Public Cloud — 16%

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What Developers Want

In a nutshell, the success of public cloud is explained by the consumption-based IT approach that Amazon and Microsoft were offering to their customers while enterprise IT teams were still stuck in their "ops-first" paradigm. This consumption-centric paradigm is based on three key elements:

- **Comprehensive APIs:** Developers today require simple and comprehensive APIs. This pressure from line-of-business developers is the main fueling factor for the success of the three mega clouds (Amazon Web Services, Google Compute Engine, and Microsoft Azure). They regard standard private clouds (e.g., by VMware) as tools for IT operators, while they see the three mega clouds as developer tools. Providing such APIs and the workload interoperability that comes with it was OpenStack's initial claim to fame. While OpenStack failed to achieve mainstream adoption, its standardized APIs are here to stay, providing hardware-independent access to server, network, and storage infrastructure.

- **Plug & play services:** Public cloud vendors are much more than just "VM vending machines" offering business services such as analytics, machine learning, IoT management, data streaming, voice interfaces, or image recognition that can be consumed directly by developers without the need to manage infrastructure resources. This consumption-based paradigm provides customers with the speed and agility they need, while keeping down OPEX.

- **Rapid app deployment:** Public cloud customers report that app deployment times were often cut from weeks to hours or even minutes. Developers can self-serve and provision resources and services. This technology advancement is a result of the simplification and automation built into these public cloud platforms. Additionally, there are no organizational and cultural hurdles complicating these releases.

The Price of Developer Freedom

Based on EMA research, the key priority in IT operations for 2017 is cost control for public cloud. High on the list of public cloud pain points are "lack of integration with corporate systems," "ongoing cost overruns," and "vendor lock-in."

- **Lack of control and governance:** Business units typically pay for public cloud services and corporate deployment, and monitoring and management solutions often insufficiently govern those services. In addition to security and compliance challenges, this can lead to unpredictable performance, difficult root cause analysis, unclear availability, and insufficient disaster recovery metrics.

- **Cost overruns:** Unexpected cost overruns are the number one pain point in IT operations for 42 percent of enterprises in hybrid cloud. Drilling down into the root causes for this issue, EMA research identified the following key factors:

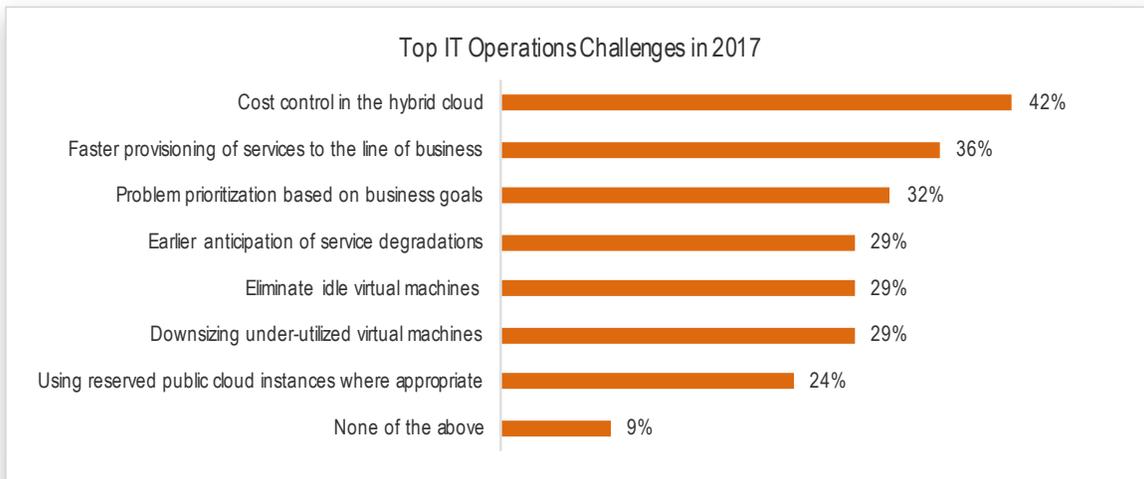**#1** Top public cloud pain points: security and legal compliance

70% HIPAA, PCI, SOX, and ITIL are key for app placement

58% Security is a key selection criteria for hybrid cloud and container technologies
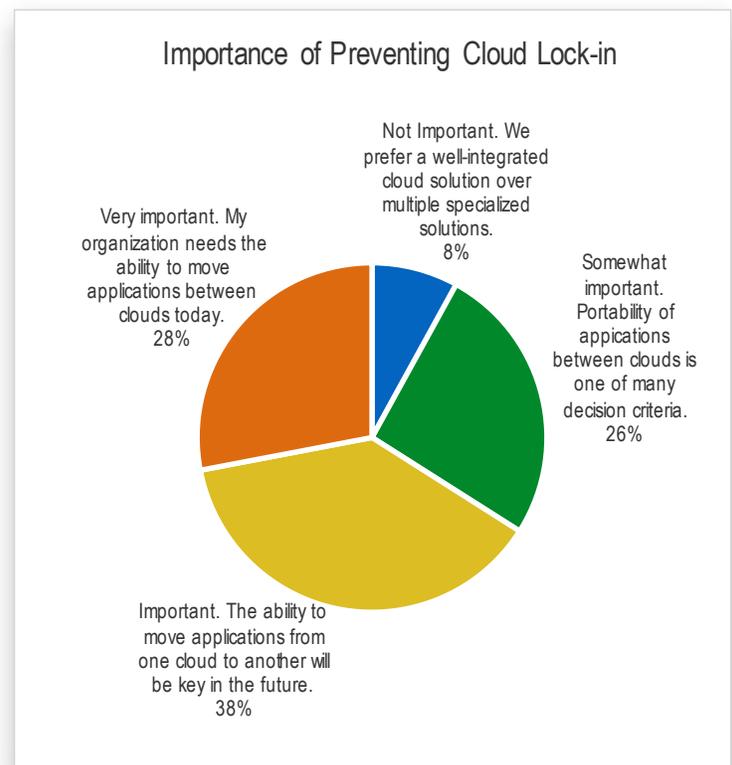
- Ill-understood workload characteristics. Different applications show different consumption patterns for network, storage, and server resources.
- Non-transparent pricing models by cloud providers.
- Overprovisioning as an "insurance policy" against performance issues.
- Selecting unsuitable VM sizes and not taking advantage of reserved instances.
- Zombie resources that are unused.

Top IT Operations Challenges in 2017

Challenge	%
Cost control in the hybrid cloud	42%
Faster provisioning of services to the line of business	36%
Problem prioritization based on business goals	32%
Earlier anticipation of service degradations	29%
Eliminate idle virtual machines	29%
Downsizing under-utilized virtual machines	29%
Using reserved public cloud instances where appropriate	24%
None of the above	9%

- **Lack of integration with corporate systems:** Approximately half of public cloud users have experienced significant challenges resulting from a lack of integration between clouds and corporate data centers. These issues typically occur in directories, databases, security, compliance, monitoring, software lifecycle management, and endpoint management. While Amazon follows a "retail model" that aims to provide independent best-of-breed solutions, Microsoft Azure addresses the integration issue in a more determined way while accepting user lock-in as a side effect.

- **Lock-in:** 92 percent of enterprises are concerned about public cloud technology lock-in resulting from consuming vendor-specific APIs (e.g., Amazon Lambda, Microsoft SQL Server, or Google Vision API). Lock-in is even a concern for container environments, as application containers often cannot be easily moved from one container framework to another.
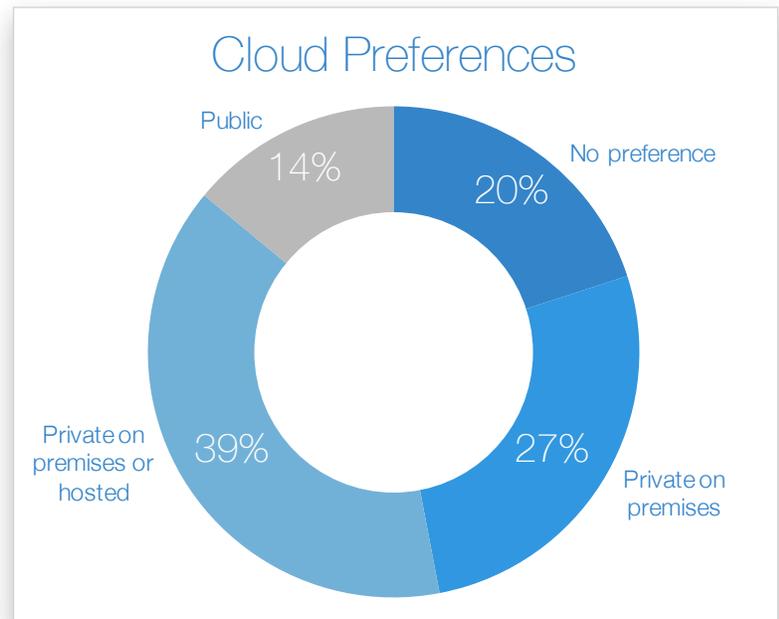
Importance of Preventing Cloud Lock-in

- Not Important. We prefer a well-integrated cloud solution over multiple specialized solutions. 8%
- Somewhat important. Portability of appications between clouds is one of many decision criteria. 26%
- Important. The ability to move applications from one cloud to another will be key in the future. 38%
- Very important. My organization needs the ability to move applications between clouds today. 28%

Hybrid Cloud: The Pendulum is Swinging Back

After the private cloud hype around OpenStack came to an end because of the unfulfilled expectations regarding deployment, upgrades, and operation in general, the pendulum strongly swung in the direction of public cloud in the form of AWS and Azure.

Today, the pendulum is swinging back toward a compromise that offers a combination of the simple management, low-cost operations, infinite scalability, and comprehensive APIs offered by public cloud and the governance (security, cost predictability, performance monitoring, and easy root cause analysis) of private cloud.

Cloud Preferences

- Public: 14%
- No preference: 20%
- Private on premises: 27%
- Private on premises or hosted: 39%

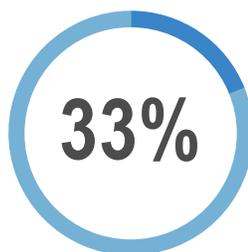## Machine Learning: The Secret Sauce for OPEX Reduction

ZeroStack addresses operational complexity and at the same time ties public and private cloud together. ZeroStack leverages machine learning to provide customers with an on-premises, scale-out cloud infrastructure that is self-monitoring and self-healing. ZeroStack's cloud operating system (Z-COS) transforms servers into a distributed cluster on-premises, keeping both data and the control plane behind your firewall. The ZeroStack learning engine, called Z-Brain, is located in the cloud and analyzes operational data of on-premises customer clusters. It provides enterprises with a centralized management panel for all of your deployed ZeroStack clusters and enables one-click system upgrades, capacity planning, performance management, and data protection without taking enterprise data offsite. Addressing one of the major shortcomings of OpenStack, ZeroStack minimizes the risk and downtime of system upgrades, adding smaller features to the SaaS control panel on an ongoing basis and centrally handling major system upgrades of the execution nodes. ZeroStack APIs are similar to the ones offered by Amazon EC2.

KEY PAIN POINTS ADDRESSABLE BY MACHINE LEARNING

Enterprises complaining about how long it takes to build development and test environments	No automatic deployment capabilities in place	Suffer from inconsistencies between dev/test and production	Concerned about regulatory compliance
42%	33%	39%	39%
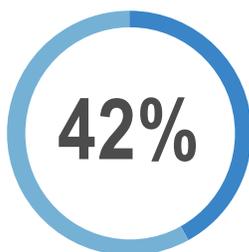
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No cloud is an island, and ZeroStack understands this; hybrid cloud means you can connect to other clouds and make decisions based on performance and cost. To that end, ZeroStack offers bidirectional integration with public clouds like AWS and has showback/billing capabilities that it plans to extend to helping users make optimization decisions.

In essence, ZeroStack offers a turnkey, on-premises, scale-out cloud solution without the significant deployment and management requirements that come with traditional private cloud platforms. If customers need more capacity, they can simply add the required RAM, CPU, and storage in the form of generic bare metal hardware and leave the provisioning to the Z-Brain resource scheduler.

EMA Perspective

With ZeroStack, on-premise infrastructure is consumed via a SaaS-based user interface, running in the cloud. The SaaS interface offers a robust self-service portal, as well as an administrator portal with monitoring and troubleshooting capabilities, capacity planning, showback, and many other enterprise-friendly features. This includes a big data layer that stores and analyzes rich telemetry using AI and machine learning, which take the guesswork out of capacity planning, upgrades, ongoing management, and troubleshooting. All of this addresses the OPEX and governance concerns that EMA's latest research revealed.

First, IT was all about operations. That's when VMware became the dominant player for data center virtualization. Wait times for infrastructure resources were long and scaling happened during the annual capacity planning sessions.

Then came OpenStack to eliminate these wait times. OpenStack also brought the promise of scale-out and the elimination of the VMware tax through the use of the KVM hypervisor, but the solution was too complicated to operate and often impossible to upgrade.

This fueled the growth of Amazon Web Services (AWS) into a $12 billion company and created a $60 billion public cloud market within only a few years. However, not all applications are suitable for the public cloud, which is where vendors such as ZeroStack come in to offer a hybrid solution that delivers on the original OpenStack promise of low operating cost combined with a scale-out model that provides the speed and agility of a public cloud.

About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst firm that provides deep insight across the full spectrum of IT and data management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help EMA's clients achieve their goals. Learn more about EMA research, analysis, and consulting services for enterprise line of business users, IT professionals, and IT vendors at www.enterprisemanagement.com or blogs.enterprisemanagement.com. You can also follow EMA on Twitter, Facebook, or LinkedIn.