



CLOUD APPLICATION AUTOMATION – A REVIEW OF VARIOUS CLOUD AUTOMATION TOOLS

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ABSTRACT

Virtualization of applications, desktops and servers has taken off in the past few years because of the convenience and cost savings. Organizations are rolling these virtual servers out in the form of private cloud, public cloud, or hybrid cloud services. Many experts say automated application deployment tools are a requirement when hosting an application in the cloud. In this paper we reviewed the benefits of cloud application automation and the readers will learn what they need to consider and which tools they need when automating applications in the cloud. Not too many studies are conducted in this area of comparing various cloud automation tools. This paper helps organizations in choosing an appropriate automation tool.

Keywords: *Cloud Computing, Cloud application automation, Private Cloud, Public Cloud*

1. INTRODUCTION

Automated tools are essential when deploying applications to the cloud.

While automated deployment tools are nice to have when deploying applications, they are not considered as a necessity. However, that perception is changing as organizations see the benefits of automation. In fact, experts say automated application deployment tools are a requirement when hosting an application in the cloud. Because the tools used for on-premise deployment may not be capable of deploying to the cloud, organizational leaders should consider which tools they need when making the choice to host on-premise versus the cloud.

Oftentimes, organizations fail to consider how they'll get their applications to the cloud until they're ready to do so. "Deployment in the cloud is attached to the whole idea of running the application in the cloud. People don't say, 'Should I automate my deployment in the cloud?' It's, 'Should I run it in the cloud?' Then, 'How do I get it to the cloud?'" says Paul Burns, president and analyst, Neovise^[1].

Not only is deployment an afterthought, it is a surprising one at that, says Burns. Organizations find themselves having to either retrofit their

existing scripts and tools to work with the cloud or adopt an automated tool to get the job done. The preferred method: the use of an automated tool.

"I would argue that using a deployment tool regardless of where you're deploying is really a best practice," says Theresa Lanowitz, founder and analyst, Voke Inc. "You end up with much better quality if you're using deployment tools anywhere"^[2].

There are two types of tools that automate application deployment to the cloud: those that deploy existing applications that weren't designed to run in the cloud and tools that deploy new applications developed natively for the cloud. The tools designed for existing applications, explains Burns, put a "wrapper" around the application to insulate it from the cloud. The tool then pushes the application out to the cloud, and the application doesn't necessarily know the difference between where it's running, be it on-premise or in the cloud, says Burns^[1].

The tools used for deploying new applications built specifically for the cloud can "work with the whole stack," says Burns, "from the hardware up to the application and everything in between." For example, the tool may reserve the necessary servers and build them from the ground up, deploy the application across multiple servers, and adjust the rest of the IT environment, including switches, routers, firewalls, storage area networks, etc.

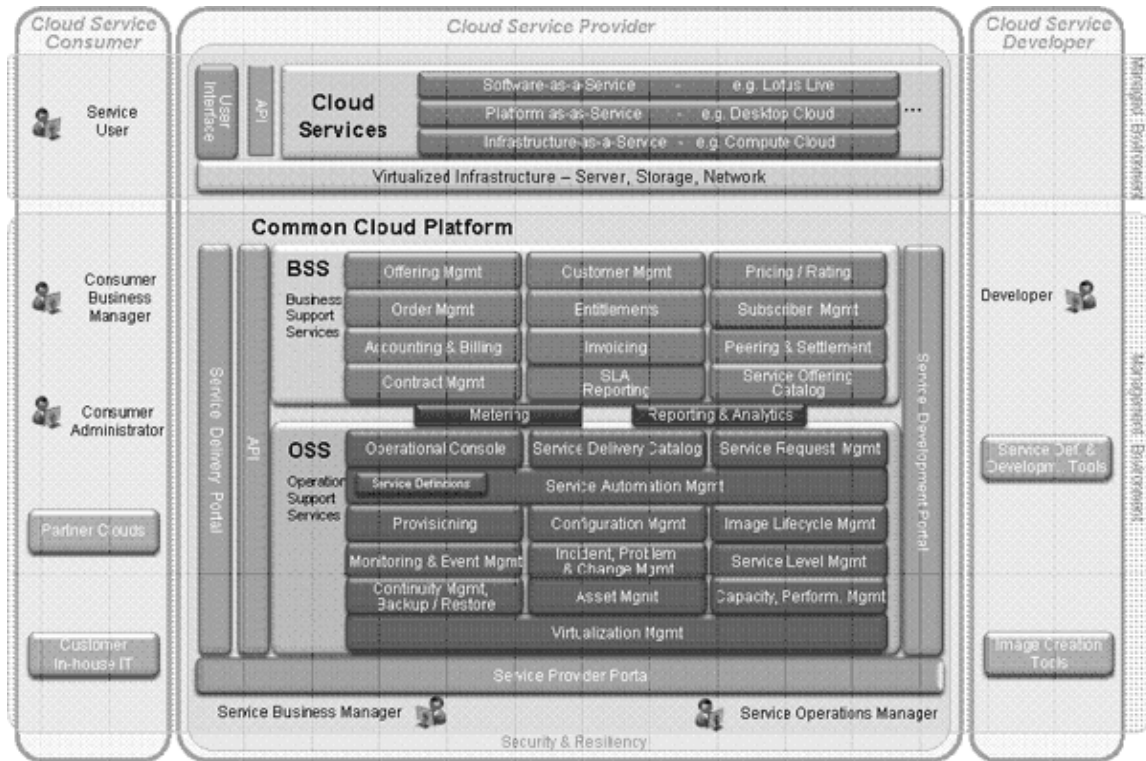


Figure I. Cloud Architecture

2. BENEFITS OF USING AUTOMATED DEPLOYMENT TOOLS

Automating each of these steps in the deployment process offers significant benefits, including efficiency. “You could do these things manually, but it is time consuming,” says Burns. “The productivity difference is really high”^[1]. For organizations that are accustomed to developing and deploying applications that are hosted on-premise, setting up automated deployment tools does introduce a new step in the software development process that has a learning curve and an investment associated with it. “But the payoff is pretty quick because every time you do a round of development, you can quickly deploy out to the cloud and do the test process,” says Burns. “Getting things set up for the first time is a challenge, but it’s totally worth it.” Automating application deployment also improves overall software quality^[3]. “Using good tools across the entire lifecycle, and that includes deployment, minimizes the amount of human intervention that we actually have; the time we depend on some person doing something manually. When you can remove that, your quality becomes more predictable, it becomes better,” says

Lanowitz^[2].

2.1. CONSIDERATIONS WHEN CHOOSING A TOOL

There are a couple factors that organizations should take into consideration when choosing an automated application deployment tool for cloud-hosted apps, and they depend largely on internal development processes and strategy. One factor to think about, says Burns, is change and configuration management capabilities. “Can the tool replace one part of the application without having to replace the whole thing? A pitfall would be having a tool that doesn’t allow you to handle ongoing changes,” says Burns – if that’s the approach you want to take^[3]. Some tools require you to redeploy the entire application after changing any part of the application. “It’s a benefit if you can change one piece,” says Burns. “But some people are saying, ‘Hey, forget that whole mess... these tools are fast enough. Deploy the whole thing.’”^[3]. Ultimately, says Burns, it’s up to you, but you need to choose a tool that supports your internal change and configuration management strategy. Another factor to consider when evaluating a tool is whether or not it supports multiple public clouds.

“You can get a tool that’s all fancy and nice and quickly deploys your application to Amazon, but will it do the same thing for Rackspace?” says Burns [3]. Again, this requires some forethought and understanding of future plans for application deployment.

Burns advises organizations to try free editions of the tools before making a purchasing decision. But, eventually, you will need to buy something. At that point, he says, “Instead of buying everything upfront, buys it as you use it” [3].

3. AUTOMATING CLOUD COMPUTING SERVICES:

What decision makers should know Virtualization of applications, desktops and servers has taken off in the past few years because of the convenience and cost savings. Organizations are rolling these virtual servers out in the form of private cloud, public cloud (like Amazon’s EC2/AWS or GoGrid) or hybrid cloud services (combinations of private clouds and public). The configuration and ongoing management of these services pose a number of challenges. These are identified along with a number of solutions currently available in the market, providing those managers who are making decisions about cloud services with the information they need to make an informed choice.

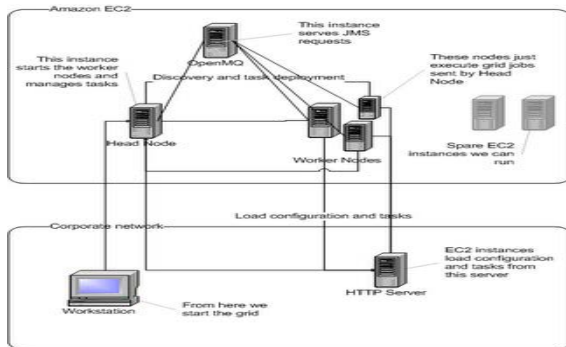


Fig II. Amazon EC2

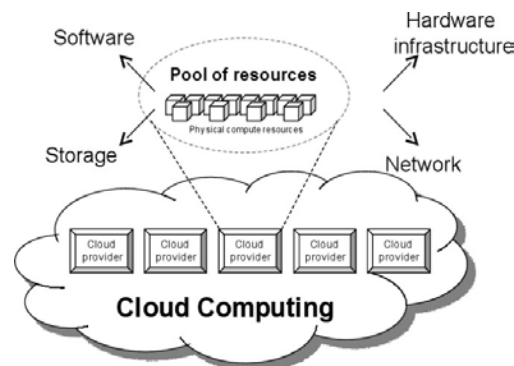


Fig III. Amazon GoGrid

4. CHALLENGES IN AUTOMATING THE CONFIGURATION, ROLLOUT AND ONGOING MANAGEMENT OF SERVICES:

4.1 DYNAMIC SCALING:

Many businesses are rapidly moving towards online sales of products and services from a brick and mortar, physical store sales model. Seasonal sales ramp-ups may mean that they need extra Web and database servers to be brought online when needed and released when not. This kind of dynamic scaling may need to happen quickly and automatically as you see traffic increase. Hybrid clouds are set up mostly for this reason using their own servers during normal demand and press public cloud servers only when additional compute power is needed.

4.2. REBUILDS OF ENVIRONMENTS:

If a university provides computing resources including application software for various courses for their students, they may need to rebuild a custom environment for each student each semester or quarter, depending upon what courses they have signed up for. Cloud management tools need to support easy and rapid rebuilding and rollout of virtual computing environments based on master templates.

4.3 ONGOING MONITORING AND AVAILABILITY MANAGEMENT:

Ongoing monitoring and management of servers are keys to removing non- functioning servers and services and pressing new ones into operation, automatically.

4.4 SECURITY:

The same levels of security that may be available on private clouds need to be extended to public or hybrid clouds. The cloud infrastructure automation tools need to be capable of monitoring and reporting on breaches or suspicious activity on all of the cloud services used, public or private.

4.5 MULTI-TENANCY:

Multi-tenancy may need to be supported by the cloud infrastructure automation tools. They may be needed if the IT organization provides

computing services to many external organizations or multiple, internal divisions within the same organization.

4.6 SIMPLICITY:

Cloud infrastructure automation tools need to be simple to configure and use, given the possible mix of different kinds of servers – Windows, Linux or other UNIX platforms, the variety of database management software – MySQL, SQL Server, Oracle, Sybase and others, and applications software that may need to be set up and deployed.

4.7 LANGUAGE SUPPORT:

Many cloud based services may need support for specific language environments like Java, Microsoft C++ or C# technologies, PERL or Python. Cloud infrastructure automation tools need to be either agnostic or provide seamless support for these.

4.8 RAPID DEVELOPMENT OF MOBILE BACK ENDS:

Mobile apps, especially enterprise ones, invariably demand mobile backend servers that may need to be configured and rolled out quickly. Cloud infrastructure automation tools may need to support this kind of emerging requirement, increasingly.

5. SOME POPULAR COMMERCIAL CLOUD INFRASTRUCTURE AUTOMATION TOOLS:

5.1 OPSCODE:

Opscode provides cloud infrastructure management as a Software as a Service (SaaS) offering. Another option is to install the same software in an organization’s private cloud that works within their firewall. Opscode provides automation of cloud server setups using scripts (master templates) and security is managed with multiple role based logins^[4].

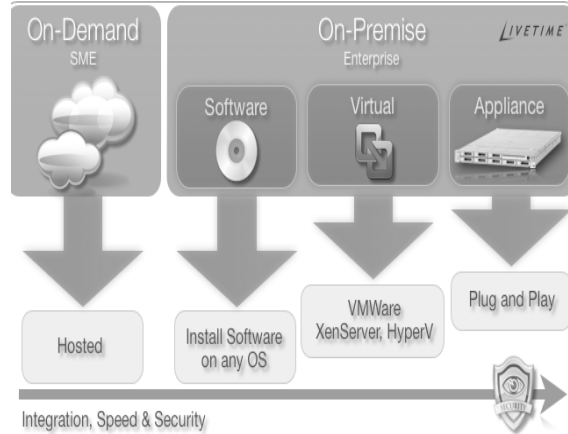


Fig III . SaaS Deployment Model

5.2 KINVEY:

Kinvey is a startup company targeting specifically the task of building and managing back ends for mobile apps. The emphasis is on speed of building and scaling the backend for mobile apps. They, in turn, use Microsoft Windows Azure for database management, Amazon Web Services for compute services and Rackspace for the physical servers. Since they automate the entire setup and management, user visible management functions are minimal^[5].

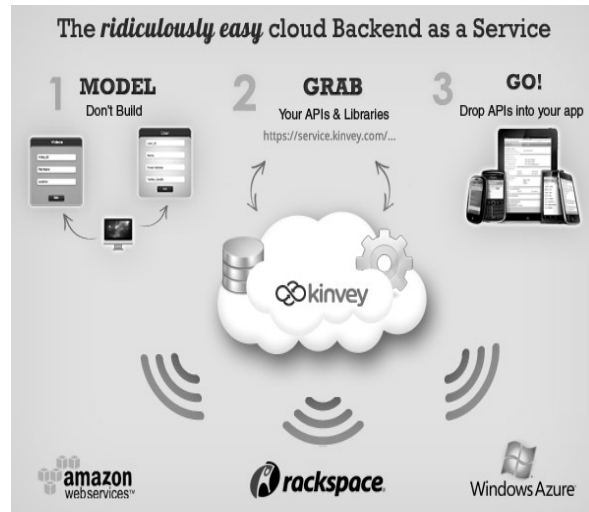


Fig IV : How Kinvey Works

5.3 RIGHTSCALE AUTOMATION:

The RightScale automation tool helps manage hybrid clouds. The automation tool provides auto-scaling based on rules that you configure. Automatic scaling happens according to these rules when monitoring detects certain conditions that can indicate that more capacity is

needed with computes, storage or Web servers. Failover rules can be set up using this automation tool and tested out ahead of time.

5.4 HP HYBRID DELIVERY:

Hewlett Packard Hybrid Delivery Automation Management tools provide the ability to configure, set up role-based security, roll-out applications, monitor and make adjustments to hybrid clouds. HP also provides outsourcing services that can do all of the management with their consultants.

CA Automation Suite for Clouds: This is an interesting extension of their IT management portal to the cloud, private, public or hybrid.

The software treats laptops, desktops, or company nokia phones, the same as a virtual server inside the company (private cloud) or external (public cloud) to the company. You can then set up security, configuration and apply monitoring, alerts and actions as if they are one of the other resources the organization is using^[6].

5.5 EMC IONIX:

EMC Ionix management suite manages physical, virtual and cloud servers with a single set of tools. They incorporate VMWare’s management software within Ionix. They help you configure, rollout, monitor, and manage servers of the above type using a model based approach. You define a model of the services you need from a server (policies) and configuration happens according to this model. Monitoring and alerts are based on deviations from this model in real-time^[7].

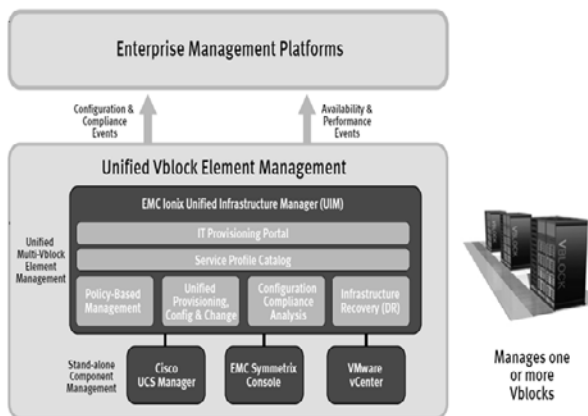


Fig V: How EMC Ionix Unified Infrastructure Manager

5.6 ENSTRATUS:

enStratus is a cloud configuration and management platform that allows you to set policies and configuration rules.

Based on this, systems are configured and rolled out. The interesting twist in this tool is that this allows you to set budgets for resources for various departments and applications and dynamic scaling happens for each department with additional cloud resources and does not diminish resources from others^[8].

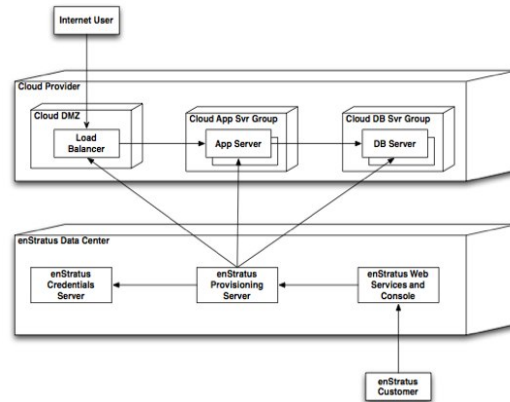


Fig VI. enStratus Architecture

5.7 BMC CLOUD LIFECYCLE MANAGEMENT:

BMC Software offers a Cloud Lifecycle Management tool that can help configure, roll out, monitor and manage cloud servers. They use the concept of a Service Governor that monitors and sends alerts about deviations from policies set up through a portal. You can register service providers for physical servers, cloud resources, storage or network resources^[9]. You can then configure the resources you need, provision, use, monitor and then act on alerts that you get.

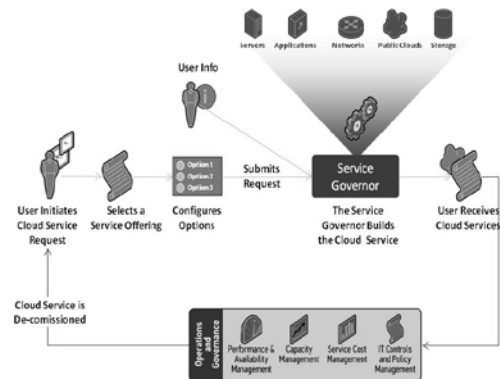


Fig VI. BMC :Managing cloud services from request to retirement

6. CONCLUSION:

Cloud resources, whether private, public or hybrid, require comprehensive policy management, master template management, roll out, monitoring, alerting and actions on those alerts. They need to support automatic dynamic scaling, enforce uniform security, and support a variety of platforms and external cloud services and be simple to use. There are a number of tools that provide the features needed to help organizations and it is the responsibility of them to choose and implement the cloud solution that's best suited for them.

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