Operationalizing Elastic Applications

The continued virtualization of the data center coupled with the adoption of private and hybrid cloud computing models is driving a need for more automation and orchestration. An integrated F5 and VMware solution offers organizations improved reliability and consistency in application deployments as well as improved operational efficiency.

White Paper
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Introduction

In their virtualized and cloud computing environments, organizations have primarily focused automation efforts on the initial step of the application deployment process: provisioning virtual machines.

The subsequent steps of this process are generally accomplished manually, which can drag out the deployment for weeks or even months. This is a reality noted by 27 percent of respondents in a recent virtual machine deployment survey commissioned by Infoblox.[1]

This unbalanced mix of manual and automated application deployment methods results in lost opportunities to gain operational efficiency. Additionally, relying on manual configuration processes can introduce errors and inconsistencies, and make it nearly impossible to successfully duplicate deployment processes. This ultimately undermines the reliability of the underlying infrastructure, which in turn affects application availability and performance. This instability can also impinge on operations' ability to reliably scale applications up and down to meet demand.

As scalability and performance are often considered core benefits of cloud and virtualization, organizations that are adopting these technologies should prioritize deeper and broader automation of deployment tasks in the context of the application.

F5, in conjunction with the VMware vCloud Ecosystem Framework, is operationalizing elastic application deployments. Deep F5 and VMware integration offers a highly collaborative, responsive, and automated way to make deployment tasks reliable, efficient, and repeatable. This enables organizations to reduce operational costs, so operations can effectively manage complexity and mitigate operational risks that can impede productivity and availability.

Integrated F5 and VMware vCloud Ecosystem Framework Solution

VMware vCloud Ecosystem Framework is designed to allow third parties to integrate with VMware vShield Manager, which can then integrate with vCloud Director for private or public cloud deployments. This enables organizations to provision and configure infrastructure services when an application is deployed. Provisioning a virtual machine is the trigger that begins an orchestration comprising multiple automated tasks, including end-to-end application deployment, which necessarily includes the provisioning and configuration of the Application Delivery Network.

The F5 and VMware solution also works with non-cloud deployments using VMware vSphere.

The Implementation

The F5 and VMware solution automates a process that is simple on the surface, but actually comprises many individual configuration steps. Encapsulating these steps in an automated set of tasks boosts efficiency and eliminates the possibility of misconfiguration.

The collaborative solutions that result from the F5 and VMware partnership ensure organizations can seamlessly provision both application and application delivery services such as load balancing, acceleration, security, and optimization—all on-demand—as well as automate the end-to-end application deployment process. Through VMware vCloud Ecosystem Framework, F5 Enterprise Manager, F5's single-pane-of-glass application delivery infrastructure management solution, integrates with VMware vShield Manager, enabling vCloud Director to ultimately instruct F5 BIG-IP devices to deploy application delivery policies.
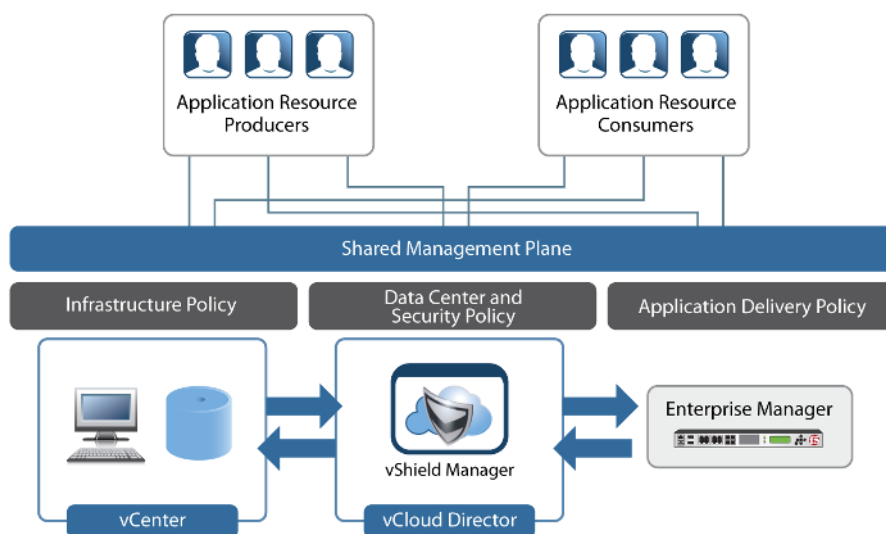

Figure 1: Intra-infrastructure integration in this F5 and VMware architectural solution enables end-to-end application deployment automation.

Two separate workflows are necessary to automate the end-to-end application deployment process: one for the provider and one for the consumer. A provider is considered either (a) an IT infrastructure owner in an enterprise, for example, an ADC team, storage team, networking team, or security team, or (b) the public cloud provider that controls all the resources. The consumer role is associated with the application owner.

Policy creation

The provider must create and make available both the appropriate vApp and F5 iApps Templates.

The policy must be codified in the VMware solution—as a vApp—and within F5 Enterprise Manager as an iApp. The vApp contains the metadata required to provision a virtual application, and the iApp contains service-specific configuration that associates security-, performance-, and availability-related policies together to contribute to delivering on service level agreements, as appropriate for the application. iApps are customizable and easily support multi-tenant environments. Providers can directly associate iApps with specific tenants. During the deployment process, tenants choose from among the iApps allowed by the provider.

Process creation

The consumer associates a vApp and an iApp with the automated process before activating it.

The consumer, when preparing to deploy an application, chooses a vApp and an available iApp and provides answers to any specific configuration questions required by the provider's iApp configuration. The consumer then executes the process. The virtual application and its supporting infrastructure services are provisioned and configured according to the policies described in the associated vApp and iApp.

This includes application delivery services and associated application-fluent monitors as well as functions such as persistence and network and application layer security policies; access management; and performance-related services.

Ongoing operations

Activating the deployment process triggers an ongoing operational process that ensures application elasticity.

If the vApp is modified at any time, F5 Enterprise Manager is notified and the iApp is executed again. This includes modifications notifying systems of the addition or removal of a virtual machine. In this way, elasticity is operationalized; scalability is automated and operations is relieved of the need to manually adjust infrastructure services as virtual machines are launched or taken offline.

What is iApps?

F5 iApps groups together the many profiles and configuration objects required to deliver an application.

Read F5 iApps: Moving Application Delivery Beyond the Network to learn more.

Benefits

Given the increasing virtual machine density within organizations, the ability to operationalize elasticity and scalability in ongoing operations is paramount to constraining operational costs. As part of the larger transformational effort focused on cloud computing, infrastructure services are more mobile and fluid when consumed through centralized policies. Organizations can better realize the benefits of cloud and virtualization when policy management workflow spans hardware consumption, data center connectivity, security, and Application Delivery Networking.

By improving the production of the service policies that address these issues and streamlining the workflows into a unified, flexible, API-driven consumption model for consumers, F5 and VMware enable organizations to operationalize across the data center, making IT better able to respond to business needs.

Reduced operational costs

Manual application deployment processes require significant collaboration and many often interdependent steps to complete. Seventy-five percent of operations teams' time is spent on managing application release cycles.[2] This time is divided among packaging, configuring, and testing the deployment; rooting out inconsistencies; and tweaking configuration across the entire application delivery chain.
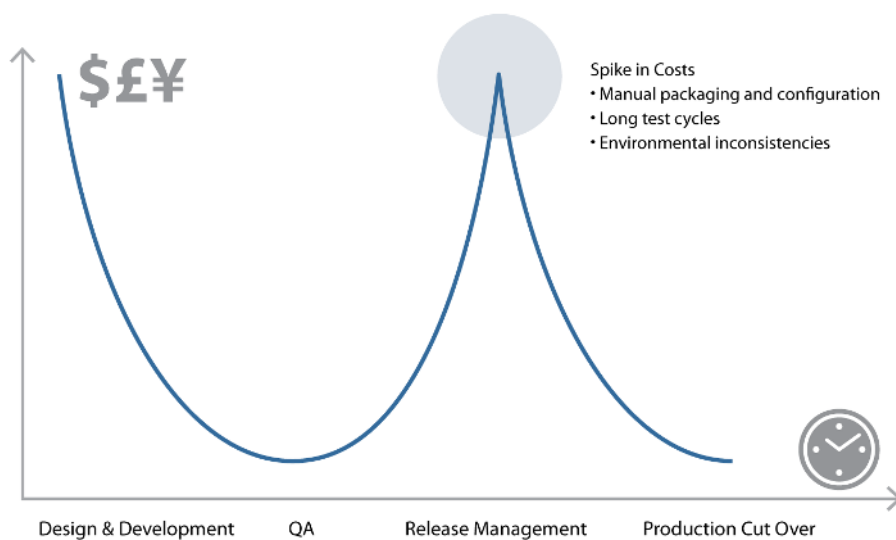

Spike in Costs
• Manual packaging and configuration
• Long test cycles
• Environmental inconsistencies

Design & Development   QA   Release Management   Production Cut Over

Figure 2: Typical application deployment release cycles see significant spikes in costs during the release management phase.

These manual processes incur significant costs, much of which can be addressed through the development of repeatable, automated processes.

Using VMware vApps and F5 iApps, organizations can develop repeatable application and Application Delivery Network service packages to reduce the time and costs typically associated with the release management phase of an application deployment.

Additionally, F5 BIG-IP support for application multi-tenancy reduces operating costs both for application owners and providers by distributing the cost of infrastructure across constituencies.
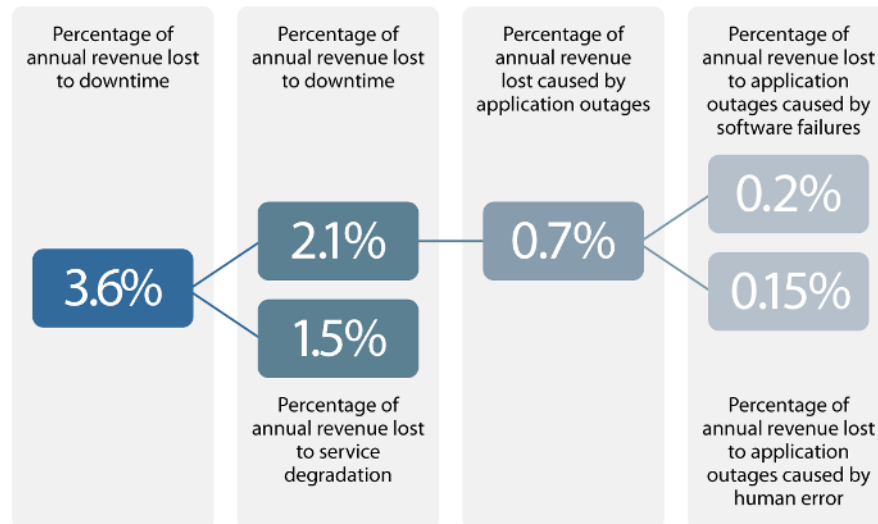
Managed complexity

Human error is consistently the most cited reason for outages. An Infonetics Research study fingers human error as responsible for 22 percent of application downtime costs.[3] A Forrester Research survey discovered human error was the cause of significant disruptions for 16 percent of respondents.[4] This should not be viewed as condemnation of operations, but rather the result of the complexity inherent in the systems being configured. Regardless of the cause, 24 percent of respondents in a Forrester Consulting survey indicated application deployments suffered a significant problem in year preceding the survey.[5>] Increased complexity in application deployments is a significant contributor to deployment-related issues.

F5 engineers developing guides for deploying application delivery services specific to Microsoft Exchange, for example, must configure five different devices comprising 1,200 different network attributes to complete a deployment. The potential for misconfiguration increases in proportion to the elasticity of the application being deployed. Organizations can codify the configuration of application delivery services via F5 iApps, making the provisioning process highly consistent and ensuring applications are fast, secure, and available.

Total Sites Across All Domains (2000–2012)

Data source: The Cost of Enterprise Downtime, North American Vertical Markets 2005, Infonetics Research

Figure 3: Human error contributes to annual downtime costs.

Reducing and managing this complexity will have the biggest effect on downtime. End-to-end consistency in provisioning and deployment processes offers a significant reduction in complexity, translating directly to fewer human errors and less downtime.

Enhanced productivity

The F5 and VMware architectural solution enhances overall productivity for providers and consumers alike. Providers benefit from a unified management approach with a single-console view of resource management. Consumers are empowered to provision applications via self-service and choose from a menu of advanced application delivery services, cutting down on application deployment time and enabling deployment of best practice policies that improve delivery performance without requiring solution-specific knowledge. Consumers are not required to select individual services such as web acceleration and optimization; rather they can simply select the appropriate application policy to automatically realize benefits of the packaged services.

By enabling providers and consumers to codify best practices and security policies, both are relieved of the need to meet and discuss these policies for every application deployment. The repeatable nature of vApps and iApps make policies portable across applications, ensuring consistency in enforcement and improving productivity.

Mitigated operational risk

Reliability is as much a mathematical metric as it is the more nebulous measure of the trust end users have in an application. Application ability is paramount, as is recognizing that availability affects overall performance—only available applications can perform consistently.

The more reliable the underlying release infrastructure, the more reliable the applications deployed on it will be. When moving to the dynamic infrastructure needed to support the elasticity and volatility of today's virtualized data centers, the ability to automate tested, proven processes on the production infrastructure is critical to maintaining the reliability of the data center's foundations. Using an integrated, automated solution mitigates the operational risk associated with failure by enabling visibility into application and virtual machine health. F5 Enterprise Manager shares application status data with VMware vCloud Director to ensure timely action in the event of increased or decreased demand or failure. This visibility enables organizations to better respond to provisioning and application delivery events to ensure continued availability of applications to end users.

The unified nature of this solution centralizes operational control to ensure compliance with corporate polices, resulting in more reliable security policy enforcement, and directly mitigating risk. Consistent enforcement of security policies is critical for compliance and to defend against the persistent threat of attack. Consumers are freed from the need to directly manage the processes required to deploy appropriate security policies as provider-defined processes automatically associate the correct policies with resources, ensuring compliance with corporate standards.

Sixty-two percent of respondents in a 2012 Electric Cloud survey say manual steps lead to deployment errors.[6]

Conclusion

Studies consistently show that the release management phase of an application lifecycle contributes to the majority of deployment issues, increasing both costs and time. Errors in the deployment process then propagate into ongoing operations, duplicating the issues when applications are scaled up or down based on real-time demand.

The integration of F5 with VMware vCloud Ecosystem Framework offers a consistent, repeatable, and reliable deployment process by enabling automation and giving organizations the visibility they need to react to environmental changes. By codifying best practices and security policies, providers and consumers can realize improved productivity in addition to automated compliance with corporate policies. Empowering consumers to self-service provision both application and application delivery services reduces the time to deploy.

By integrating the management of application and application delivery services into a comprehensive, repeatable, and optimized deployment process, organizations can realize the efficiency promised by virtualization and cloud computing.

[1] Infoblox VM Deployment Automation and Collaboration Research: Results. Enterprise Management Associates, Inc. March 29, 2012.

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[3] Large Companies Lose 3.6% of Annual Revenue to Network Downtime. www.prnewswire.com. Retrieved on July 24, 2012.

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