Accelerate Software Development with DevOps and Hybrid Cloud
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td>3</td>
</tr>
<tr>
<td>The State of DevOps</td>
<td>3</td>
</tr>
<tr>
<td>Incorporating Agile Development</td>
<td>4</td>
</tr>
<tr>
<td>Hybrid Cloud Accelerates DevOps</td>
<td>5</td>
</tr>
<tr>
<td>The Power of DevOps and Hybrid Cloud</td>
<td>7</td>
</tr>
<tr>
<td>Consistency</td>
<td>10</td>
</tr>
<tr>
<td>Configurability</td>
<td>10</td>
</tr>
<tr>
<td>Collaboration</td>
<td>10</td>
</tr>
<tr>
<td>Control Over IT Resources</td>
<td>10</td>
</tr>
<tr>
<td>Combining DevOps with Hybrid Cloud</td>
<td>11</td>
</tr>
<tr>
<td>Automation</td>
<td>12</td>
</tr>
<tr>
<td>Self Service</td>
<td>12</td>
</tr>
<tr>
<td>Visibility and Control</td>
<td>12</td>
</tr>
<tr>
<td>Conclusion</td>
<td>13</td>
</tr>
</tbody>
</table>
Executive Summary

Organizations can accelerate the pace of software development, deployment, and innovation by combining DevOps with a hybrid cloud architecture and embracing Agile development methodologies. This whitepaper provides a brief overview of the state of DevOps and the organizational challenges that must be addressed. It also offers an overview of hybrid cloud computing and the business and technical advantages of combining DevOps with hybrid cloud architecture.

The State of DevOps

DevOps describes the working relationship between software development and IT operations teams and a method for bringing those two sides together in a more collaborative way. Software development teams and operations/system administrators have historically pushed each other in opposing yet complementary directions. While the development team focuses on delivering new features to end users, operations personnel generally focus on software deployment, minimizing liabilities and risks, and optimizing performance and reliability. The natural friction between these groups often creates a productive balance, but sometimes the teams can become resentful, each seeing the other as an obstacle to delivering new applications and features.

As an IT discipline, DevOps brings order to an otherwise chaotic and complex world of application/service development, testing, deployment, scaling, and monitoring. By minimizing turf wars between siloed, independent teams, DevOps enables a unified approach to enterprise software development and delivery that reflects the needs of the entire application lifecycle. DevOps strives for more collaborative, productive relationships between development and operations teams, with faster development cycles and reduced production risks.

DevOps carries many advantages over traditional development processes, including fewer bugs, faster fixes, and increased visibility. However, it also presents new challenges. A significant reorganization of personnel is required, and DevOps demands a greater degree of interdepartmental coordination.
Incorporating Agile Development

The Agile development model enables the enterprise to produce higher-quality software that is more in tune with user needs and offers swifter release cycles. However, enterprise IT environments are rarely optimized to leverage the software acceleration and innovation advantages of Agile release cycles. Not only are traditional development environments slow to provision, they are difficult to change once created.

Implementing Agile development requires a disciplined approach to managing the high amounts of automation involved. Virtualization technology can be used to run all aspects of the enterprise IT environment, allowing organizations to provide the elasticity to scale resources to optimize both Agile development and DevOps initiatives.

Implementing DevOps to increase acceleration and innovation requires adopting Agile development methodologies, and Agile development requires quicker and more frequent release cycles. The ability to tear down and rebuild a test environment in minutes — and then to do it over and over again — isn’t just a nice-to-have capability for Agile, it’s a necessity. Automating this process so that it is visible to change control, but doesn’t require intervention or special approval to implement, reduces the time needed for development.
Hybrid Cloud Accelerates DevOps

Automation is the key to accelerating software development and deployment. Provisioning a server in three weeks is no longer acceptable—organizations should be thinking about how to provision a server in about three minutes.

A hybrid cloud is a cloud computing environment where an organization integrates its private cloud environment with the scalability and flexibility of a public cloud environment. Hybrid cloud architecture allows the enterprise to accelerate DevOps by breaking down organizational barriers and eliminating silos. Software development and testing can be performed in a production-like environment, and applications can be deployed and scaled in hours instead of weeks.

Hybrid cloud allows the enterprise to take advantage of the scalability and cost-efficiency of public cloud computing without exposing mission-critical applications and data to third-party vulnerabilities. The enterprise provisions compute, storage, and networking resources delivered as a service, with self-service access via web interfaces and APIs. Hybrid cloud enables the enterprise to provision and release resources in minutes, and benefit from a pay-for-usage model that accelerates software development by allowing developers, testers, and operations personnel to gain quick access to the resources they need to perform their jobs.

Fig. 2: Hybrid cloud architectures provide the enterprise with increased scalability and flexibility on a pay-per-use model.
Internal infrastructure is slow to provision, difficult to change, challenging to share, and costly to maintain. Some enterprise workloads are better suited for in-house infrastructure, while others are better suited for the cloud. The hybrid cloud becomes a secure, IT-managed extension to your existing internal IT infrastructure and delivers the best of both worlds:

» Developers are enabled with the self-service, on-demand, elastic nature of a public cloud
» Enterprise IT readiness equals control, visibility and security of on-premises resources

Predictable workloads are preferable for enterprise data centers, while dynamic workloads are ideal for cloud computing. Predictable workloads are core to IT operations and require dedicated IT resources, with IT staff managing the application changes. But enterprises are increasingly moving dynamic workloads to the cloud because they have unpredictable capacity needs and require collaboration and frequent changes.

For example, a software development process entering into the late stages of performance testing will require increased computing and networking resources. IT would either need to have spare capacity handy and idle or would need to rapidly procure, prepare, and provision new equipment to meet these demands. In today’s volatile economy, few businesses are willing to plan and purchase IT resources based on a forecasted “high-water mark” of demand, only to have this equipment remain otherwise underutilized most of the time. The hybrid cloud model provides for dynamic capacity management, and automated solutions decrease the IT support burden.

Skytap Cloud for DevOps

How do you get access to a scalable, ready-to-go hybrid cloud DevOps environment quickly, easily, and securely? Skytap Cloud empowers developers, QA, and IT operations with scalable virtual data centers. Bring your existing applications, tools, and processes completely intact to Skytap Cloud and create multiple development environments in seconds, run them in parallel, and customize them to meet your needs. You can publish specific environments to your remote testing teams, and test engineers can scale performance and load testing capacity on demand.
The Power of DevOps and Hybrid Cloud

Combining DevOps with hybrid cloud architecture breaks down the traditional barriers between development, QA, and IT operations organizations and removes the silos that constrain enterprise development. Enterprises are dramatically accelerating software delivery by integrating dynamic, flexible, and easily shareable cloud-based environments that are available on demand. By adapting enterprise IT architectures to include cloud computing resources that enable Agile development, empower software development teams with self-service, and support DevOps, companies can change their software development paradigms and rapidly increase software delivery timeframes.

Reducing Provisioning Time from Days to Minutes

Cushman & Wakefield is the world’s largest privately held real estate services firm. After moving its development and test environments to the Cloud and creating an Agile IT environment, it was able to reduce provisioning time from days to minutes. The company was able to double the number of projects supported in less than four months while improving collaboration across distributed teams and enhancing productivity.

By integrating cloud-based services into the overall IT architecture strategy, software development teams are better able to create, change, and scale complex computing environments as often as needed. At the same time, IT is able to retain the full visibility and control required for security and operational governance over these environments. By leveraging cloud automation as part of an overall IT strategy, enterprises can effectively extend their existing data centers and manage the cloud as an extension of their existing computing environment.
Accelerate Software Development with DevOps and Hybrid Cloud

Fig. 3: Cloud automation removes traditional barriers to enterprise software development and deployment, accelerating delivery and enabling innovation.

Organizations can build on a foundation of Agile development to drive continuous integration and continuous delivery throughout the application lifecycle. Cloud automation enables greater linkage between development and operations functions. With it, teams can avoid clumsy handoffs between the software release and deployment stages, as well as historical cultural clashes that have occurred when operations personnel felt that developers ‘threw code over the wall’ that they then had to figure out how to operate reliably. Cloud automation also enables continuous development and delivery of enterprise applications across the entire lifecycle, making the entire continuous delivery process seamless and frictionless for developers, testers, and operations personnel.
Fig. 4: Enterprises can accelerate software innovation by building on Agile development and enabling continuous integration and continuous delivery when they combine DevOps with a hybrid cloud environment.

Building Complex Systems in a Few Minutes Versus 16 Hours

OSIsoft is a global leader in enterprise infrastructure software for management of real-time data and events. In their former process, building a new multi-machine system could take up to 16 hours. The company determined that a cloud-based solution was needed to augment existing development, testing, and support infrastructure. OSIsoft adopted the Cloud to provide seamless access to cloud-based resources, and can now build complex multi-machine systems in minutes.

Organizations benefit from the scale and flexibility of hybrid cloud environments, and can accelerate software development and increase software innovation by improving:

» Consistency
» Configurability
» Collaboration
» Control Over IT Resources
CONSISTENCY

DevOps requires the ability to automate and provision in consistent environments and avoid manual configuration errors. In traditional enterprise data center environments, this has been an ongoing challenge because of the inconsistent environments used by development, testing, and operations organizations, and because of the high risk of manual configuration errors, particularly in complex applications. By combining DevOps with a hybrid cloud architecture, the enterprise can rely on libraries of templates to ensure consistency and self-service provisioning to avoid manual errors and accelerate the accurate, consistent creation of software environments.

CONFIGURABILITY

The enterprise needs the ability to rapidly scale development and operations resources up or down quickly, and change computing environments easily and predictably. But the enterprise data center is naturally constrained by capital budgets and resource allocation requirements. By combining DevOps with a hybrid cloud architecture, the enterprise benefits from configurable virtual data center resources and the ability to configure an elastic hybrid cloud.

COLLABORATION

To dramatically accelerate software development, silos have to be eliminated and resources need to be shared. Developers need to share copies of their lab environments with QA and system administrators, and cross-departmental teams should be able to organize their work in projects, invite specific project members to participate, and assign specific roles or access points to each participant based on roles (e.g., user, manager, database engineer) or status (e.g., employee, contractor). Hybrid cloud computing enables this secure, role-based collaboration that can drive accelerated software development and delivery.

CONTROL OVER IT RESOURCES

DevOps requires role-based permissions, auditable actions, and optimal utilization of resources. By combining DevOps with hybrid cloud, the enterprise can ensure security and access policy management with detailed audit and reporting, and benefit from pay-as-you-go flexibility for clear visibility into resource utilization that enables full control over IT resources.
Combining DevOps with Hybrid Cloud Architecture

DevOps becomes even more powerful when combined with a hybrid cloud. A hybrid cloud architecture provides tools for sharing information and coordinating projects, helping to dramatically extend the advantages of DevOps. Teams can not only share files with each other through cloud-hosted shared drives, they can also duplicate and share virtual machines (VMs), allowing QA and development teams to rapidly exchange test environments. The speed with which these VMs can be provisioned helps DevOps organizations make the most of their limited time before each release cycle.

Since VMs can be torn down as quickly as they are created, any major errors can be rapidly worked around. The fact that errors happen in production environments external to the master copy of the VM ensures that critical data is never compromised, another necessity if an organization using DevOps is to stay on schedule. Cloud virtualization can also offer significant savings over physical production environments, where constant stress testing and changing requirements can lead to frequent replacement of expensive hardware. The cloud enables DevOps teams to work faster, with more flexibility, and at a higher rate of total efficiency for the following reasons:

Reducing Build Download Times from 3.5 Hours to 4 Minutes

Ellie Mae, Inc. provides software and services for the mortgage industry, connecting loan originators to customers, partners, lenders, underwriters, and service providers. The company adopted the cloud for its global application development and testing platform and reduced software build times from 3.5 hours to 4 minutes. Ellie Mae shortened set-up and tear-down time for new environments by over 85%, reduced bug reproduction time by 80%, and improved team collaboration between the U.S. and China via a shared cloud environment.
AUTOMATION

The cloud is driven by the automation and virtualization of infrastructure. Cloud automation solutions like Skytap Cloud enable the enterprise to deliver dynamic IT workloads by utilizing scalable, efficient cloud computing resources accessed and managed through a self-service web user interface. Dynamic workloads are critical for accelerating software development and testing. However, because traditional IT infrastructure lacks the agility and flexibility required to support these dynamic workloads, project delays have become the norm. Cloud computing enables Agile infrastructure to support today’s dynamic workloads—providing DevOps teams more agility for application development and testing.

SELF SERVICE

DevOps teams need self-service cloud resources that accelerate development and enhance collaboration across geographically dispersed teams. The cloud empowers DevOps teams with key requirements such as configurability, collaboration, visibility, and control. Self-service cloud solutions let DevOps teams utilize these features with the business and technical applications they already know and use. This capability is especially important for DevOps teams that don’t want to rewrite applications currently in use.

VISIBILITY AND CONTROL

DevOps teams using cloud resources still need to maintain important corporate policies and procedures. Cloud solutions with built-in management capabilities can help teams achieve that goal. Hybrid cloud solutions can provide detailed usage reports and control mechanisms to manage deployment, monitoring, failure recovery, operating system maintenance, system configuration, and overall performance. No matter the size of the enterprise, these solutions offer teams greater visibility and control while managing computing resources, quotas, and security policies. All of this can be achieved even as the technologies empower DevOps teams with more self-service autonomy, providing more agility for faster and better software application delivery.
Conclusion

While integrating software development, QA, and IT operations enables increased visibility and accelerated software development and deployment, implementing DevOps only serves as a strong first step for enterprises seeking to accelerate software delivery cycles and enable innovation. But by concurrently implementing Agile development and combining DevOps with hybrid cloud architecture, the enterprise can dramatically accelerate software development and innovation without the need to allocate additional capital expense resources.

The ability to provision new systems and architectures on demand and in minutes dramatically reduces the time required to build a software environment, and automating the DevOps process allows the enterprise to benefit from the scale and flexibility advantages of a hybrid cloud. Organizations that want to profoundly accelerate their abilities to deliver innovative software can embrace DevOps, Agile development, and hybrid cloud to break down traditional barriers between development, testing, and IT operations departments, enabling breakthroughs in both software innovation and time to delivery.

Skytap will be publishing new content regularly on this important topic. Bookmark or subscribe to our blog to stay current on the latest DevOps and hybrid cloud developments.