

Research Insights Paper

Cloud Migration Strategies

Mapping the Journey to Successful Cloud Adoption

By Dan Conde, ESG Analyst; and Leah Matuson, Research Analyst

June 2017

This ESG White Paper was commissioned by NETSCOUT and is distributed under license from ESG.

Contents

Executive Summary.....	3
Research Methodology	3
Key Takeaways	3
Research Findings	4
The Importance of Hybrid Cloud Architectures	4
The Challenges of Hybrid Cloud Environments.....	5
Service Assurance	6
The Importance of Improved Visibility in Hybrid Cloud.....	7
Navigating Hybrid Cloud Adoption	7
The Road to Successful Cloud Migration	8
Simple View Versus Comprehensive Service Assurance View.....	8
Key Success Factors for Cloud Migration	9

Executive Summary

In the first half of 2017, NETSCOUT commissioned Enterprise Strategy Group (ESG) to conduct a survey of 300 IT and cybersecurity professionals. This research project was undertaken to better understand current cloud migration practices, including preparation; cost estimates and actuals; application migration challenges; and issues associated with sourcing applications from the cloud. Respondents provided information on the successes and challenges their organizations have experienced to date, specifically as they relate to business assurance. The results give IT decision makers a valuable window into real-world experiences to use as guidance for their own journey to the cloud.

Goal: To understand the current practices and challenges of enterprise organizations as they migrate to the cloud.

Research Methodology

Survey respondents possessed significant personal responsibility for systems management, networking, applications and services, and/or cybersecurity at their organizations. Technology resources under management by these respondents were

Methodology: 300 IT and cybersecurity professionals surveyed at enterprises with more than 1,000 employees. All respondents were involved in planning, implementation, and/or operations of cloud services.

not limited to remote office and branch offices (ROBOs), but rather extended to corporate headquarters, large offices, and data centers. Additionally, all qualified respondents were knowledgeable regarding systems monitoring, as well as service assurance solutions deployed to support business-critical services.

All respondents work at enterprise-sized organizations (1,000 or more employees) based in the United States. To participate in the survey, all respondents must have reported that their organization

currently runs at least one business-critical service infrastructure as a service (IaaS) and platform as a service (PaaS) or have done so in the last two years. In addition, respondents must have indicated direct involvement in the planning, implementation, and/or operations of those services. Multiple industry verticals were represented, including manufacturing, health care, state and local government, financial services, and retail/wholesale.

Key Takeaways

The analysis revealed that well-executed service delivery and assurance are tightly linked to successful cloud migration strategies. In particular, the survey results highlighted the following:

Hybrid cloud is an important part of an organization's service portfolio.

Combining cloud's agility to deliver critical new business services and its cost-effective and elastic provisioning model gives companies a rapid, cost-effective business transformation tool.

A well-executed service delivery strategy is a core component of digital transformation (DX). Enterprises reported that successful service delivery strategies allowed them to maintain control over service performance and security across the entire hybrid cloud environment, independent of service delivery technology, application migration methodology, or cloud provider.

Successful service delivery strategies allowed enterprises to maintain control over service performance and security across the entire hybrid cloud environment.

Service quality, security, and pervasive visibility were the top three challenges of migrating applications and services to the public cloud reported by respondents. According to the ESG research survey, 39% of respondents cited a lack of organizational control over security as one of their biggest challenges. Twenty-eight percent of respondents noted lack

of control over service quality and performance as a challenge, while more than one quarter (26%) cited lack of visibility throughout the service stack. Indeed, it is apparent that an organization's ability to effectively address these challenges is essential to their success.

Service and application assurance is critical to hybrid cloud adoption. Service and application assurance include visibility into all services, applications, infrastructure, and associated interdependencies. It also allows companies to proactively identify service issues and resolve them promptly. Without optimal service assurance, organizations lose speed and service quality, and even migrate services back to on-premises systems. Moreover, cloud hosting costs can increase without service assurance since an organization does not have visibility into how applications consume cloud resources.

77% of respondents believe improved visibility would help accelerate public cloud service delivery while lowering cloud costs for their organization.

Smart data is key to improving visibility and mitigating risk. Smart data is generated by continuously processing traffic flow data, also known as wire-data, and application data at the source and in real-time. Without smart data, adding additional network security analytics tools across on-premises and cloud environments may not improve visibility or provide sufficient threat mitigation to secure the enterprise.

Better visibility could help deliver cloud services more effectively. Respondents believe they would gain more pervasive visibility based on source-code independent instrumentation, which in turn can help deliver cloud services more effectively. This is because source-code independent instrumentation does not require any code customization, is application-system-agnostic, and supported on a variety of operating systems.

68% of respondents agree that monitoring and achieving adequate visibility is more difficult in the public cloud than on-premises.

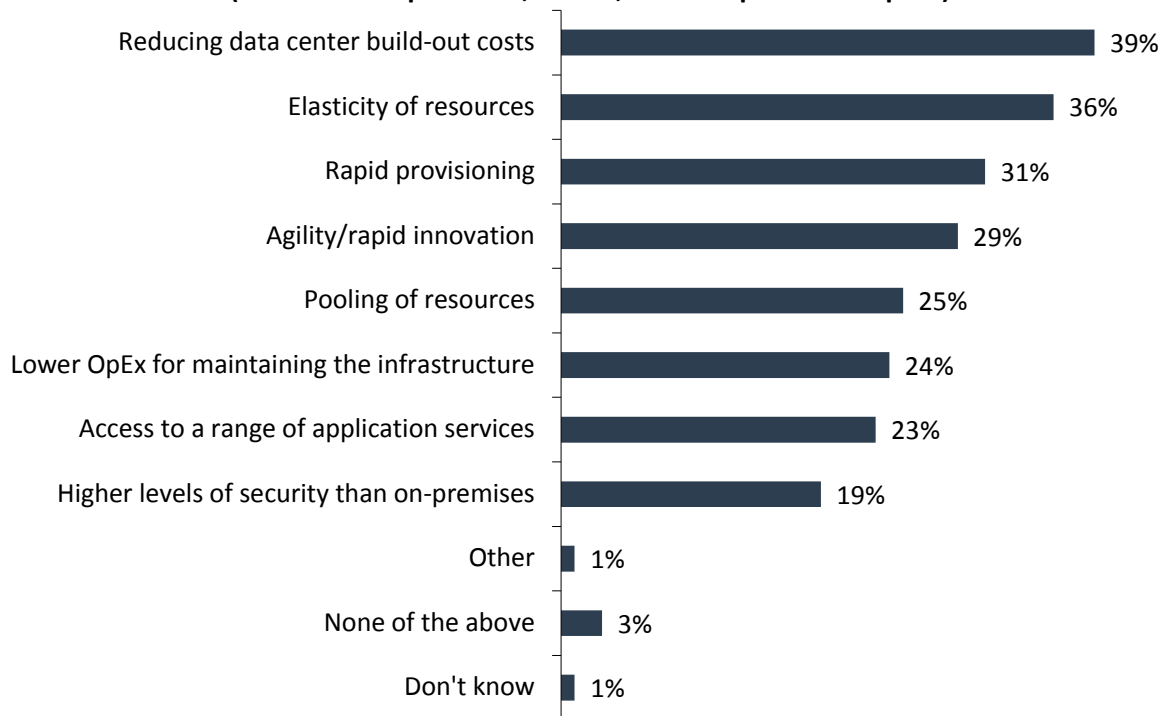
Research Findings

The Importance of Hybrid Cloud Architectures

Hybrid cloud is one of the pillars of DX. More than 80% of respondents said that it was important for their organization's service portfolio to move toward a hybrid cloud computing environment. Why? Hybrid cloud architectures can efficiently use the elasticity of public cloud, enabling enterprises to dynamically migrate compute, network, and storage workloads and applications across public clouds and on-premises data centers. Hybrid cloud also helps companies scale and accelerate delivery of new critical business services while retaining the flexibility to maintain certain workloads on-premises for compliance and risk management purposes. The biggest successes achieved as a result of migrating services to IaaS or developing services for PaaS include these elements, such as reducing data center build-out costs, elasticity of resources and rapid provisioning (see Figure 1).

Figure 1. Respondents’ Biggest Perceived Successes Associated with Cloud-migrated Services

Which of the following, if any, do you consider to be the biggest successes your organization has achieved as a result of its migrating services to IaaS or developing services for PaaS? (Percent of respondents, N=300, three responses accepted)



Source: Enterprise Strategy Group, 2017

Additionally, 39% of survey respondents cited reducing data center build-out costs as the biggest perceived success associated with cloud migration, while 36% indicated elasticity of resources, and close to one-third (31%) of respondents cited rapid provisioning.

A separate ESG research survey on enterprise IT spending further illustrates the importance of hybrid cloud environments. This research found that 44% of respondents consider both on-premises technology resources and public cloud services equally when deploying new workloads.¹ In comparison, slightly over a third of respondents used a cloud-first policy, while 19% deployed on-premises first. Organizations aged 10 years or less favor a cloud-first policy compared to older organizations, but hybrid cloud policy findings apply to organizations of all ages.

The Challenges of Hybrid Cloud Environments

While hybrid cloud is an important pillar of DX, it also creates new challenges for enterprise IT organizations seeking to maintain control over quality and performance of services. Cloud management platforms, which work only in the cloud, do not allow companies to maintain control of enterprise-wide service assurance, limiting their ability to see across the entire network. As a result, companies struggle with limited network visibility and inadequate monitoring of network and application performance, which makes vital tasks like security and regulatory compliance extremely difficult.

For many, the answer lies in service assurance.

¹ Source: ESG Research Report, [2017 IT Public Cloud Computing Trends](#), March 2017.

Service Assurance

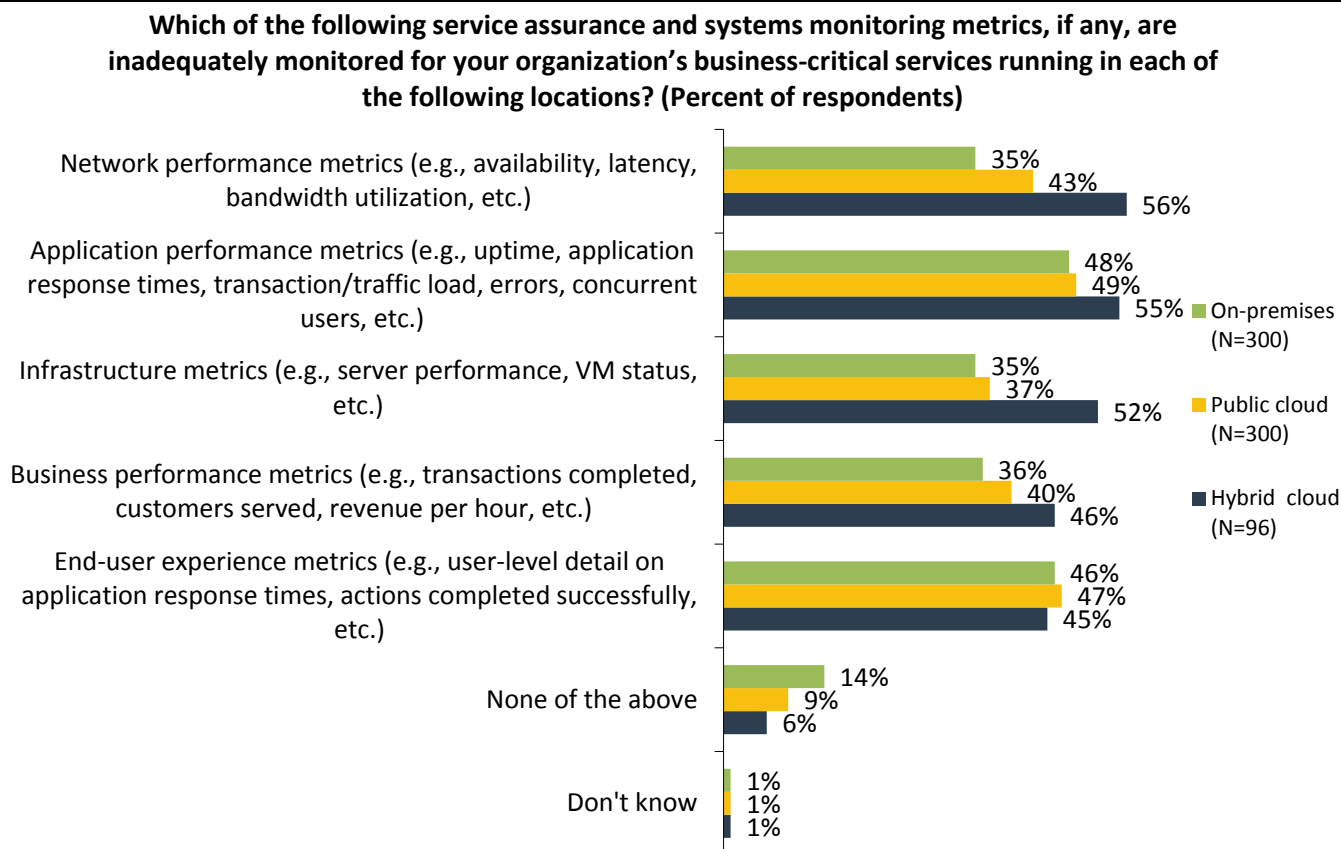
ESG defines service assurance as the ability to provide visibility into metrics such as network and application performance, infrastructure, end-user experience, and business performance. A single metric alone is not sufficient to be called “service assurance” because many vital insights come from analyzing interdependencies. For example, end-user experience can be impacted by network, application, or server performance. End-user experience can also be impacted by business performance based on performance indicators such as revenue per user and customer churn. A comprehensive service-dependency map based on end-to-end visibility is therefore an important tool for service assurance. Without optimal service assurance, an organization can lose speed and quality of service, deciding to migrate services back on-premises. Moreover, without service assurance, cloud hosting costs increase because an organization does not have visibility into how applications are consuming cloud resources.

Based on these considerations, the ESG survey evaluated how service assurance metrics measure up when compared across different hosting methods (on-premises, public cloud, and hybrid cloud).

Inadequate Monitoring Leads to Poor Visibility

According to the survey, 56% of respondents believe network performance metrics in hybrid cloud environments are inadequately measured. By contrast, 35% cite inadequate on-premises network performance metrics, while 43% say their network performance metrics at public cloud locations are inadequate. Similarly, application performance metrics, business performance metrics, and infrastructure metrics are most often considered inadequate in hybrid environments (see Figure 2). Unsurprisingly, such low-quality metrics inevitably lead to limited visibility into the network and lead to low-quality information.

Figure 2. Service Assurance and Systems Monitoring Metrics Inadequately Monitored in Each Location



Source: Enterprise Strategy Group, 2017

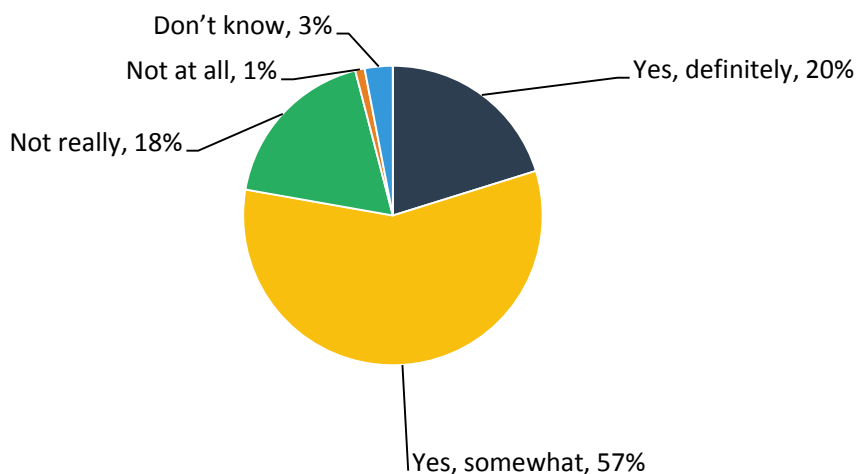
The Importance of Improved Visibility in Hybrid Cloud

What are the implications of such limited visibility? Slow service, increased exposure to risk, and the inability to consistently meet compliance, just for starters. On top of that, it would be difficult (if not impossible) to find a cloud provider that could offer service assurance across hybrid cloud environments. The implication is that unless enterprise IT steps in, organizations will lose control over acquiring insights into their workloads' behavior, which will negatively impact the effectiveness of enterprise service assurance as a whole. In fact, the survey found that lack of control over service quality and performance was one of the two most-cited perceived challenges of migrating services to IaaS or developing services for PaaS, mentioned by 28% of respondents. The other is security, with 39% of respondents citing it as a top concern.

Ultimately, improved visibility and monitoring capabilities will support DX strategies. More than three-quarters (77%) of respondents believe better instrumentation could help accelerate cloud service delivery, a key DX component (see Figure 3).

Figure 3. Better Instrumentation Could Accelerate Service Delivery or Reduce Cloud Operational Costs

Do you believe that better instrumentation, which allows for improved visibility and monitoring capabilities across legacy and cloud infrastructure using wire data (a.k.a IP traffic), could help your organization accelerate service delivery and/or reduce cloud operational costs? (Percent of respondents, N=300)



Source: Enterprise Strategy Group, 2017

Navigating Hybrid Cloud Adoption

Just what is the right path to hybrid cloud adoption? We explored the critical importance of hybrid cloud for DX, and the pivotal role service assurance plays in cloud migration. Given this, the ability to instrument workloads and applications that migrate to the cloud for end-to-end visibility in hybrid cloud environments is paramount. Companies with such pervasive visibility will experience fewer performance issues while gaining the critical capacity to examine workloads that run natively on cloud services as well as workloads that run on-premises.

Organizations should look for a software-based instrumentation solution, such as NETSCOUT's solution, that converts high-volume network and application traffic into highly structured, multi-dimensional smart data in real time to provide granular end-to-end visibility and insights into interdependencies across all service assurance metrics, on-premises or off-premises, without requiring specialized hardware.

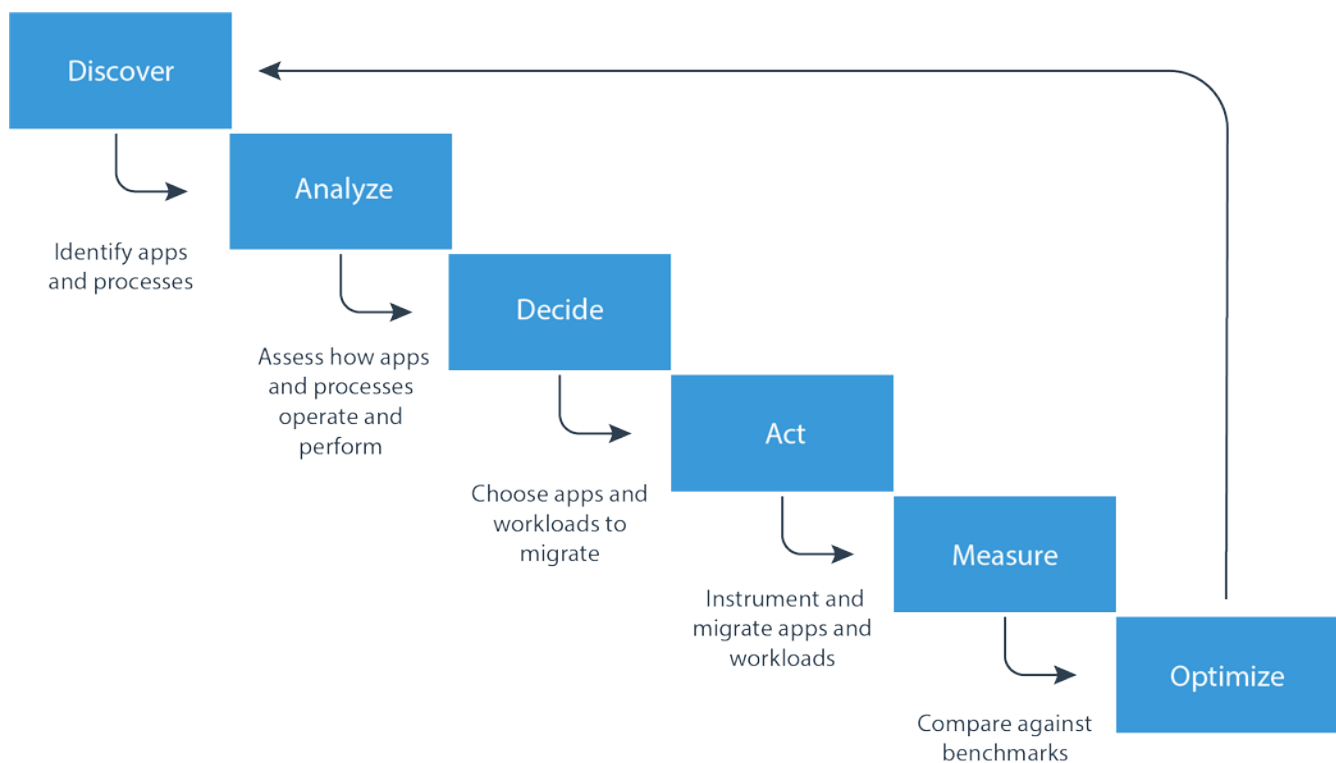
The Road to Successful Cloud Migration

When it comes to hybrid cloud environments, service assurance is the ounce of prevention that is worth a pound of cure. A successful migration process incorporates service assurance to yield the best results in terms of cost, agility, and quality of new services. This process should be based on pervasive visibility and insight into an organization's IT environment before, during, and after cloud migration. Therefore, ESG recommends adopting or incorporating the following phases as part of your cloud migration process. These phases are aligned with classic IT project methodologies, and can be adapted to those already being used (see Figure 4).

Simple View Versus Comprehensive Service Assurance View

Data gathered prior to migration provides insights into the application structure and interdependencies. A simple view of how servers communicate may be sufficient to examine high-level behavior, but a comprehensive service assurance view includes identification of services, applications, sessions, and relevant interdependencies with network and infrastructure. A comprehensive service assurance view enables the organization to convert raw data into actionable insight as part of a structured view of how services run, as well as their dependencies on IT and Cloud infrastructure and other service assurance metrics. The following chart outlines the six-step path to cloud migration.

Figure 4. Six-step Path to Cloud Migration



Source: NETSCOUT, 2017

1. **Discover** – Identify the applications and business processes that utilize your IT environment and discover how services are consumed by communities of users and their respective dependencies.
2. **Analyze** – Assess how applications and business processes operate and perform in your existing IT environment. Start the process with physical and virtual assets on-premises before cloud migration; and hybrid cloud after

migrating workloads to the cloud, including applications, network, servers, service enablers, databases, and all their interdependencies. Complete the analysis by evaluating the cost.

3. **Decide** – Choose applications and workloads to migrate to and from the cloud, or keep on-premises based on performance, speed and agility, security, and cost considerations.
4. **Act** – Instrument and then move workloads according to the decisions made in the prior step, while maintaining control and end-to-end visibility with pervasive and source-code independent instrumentation.
5. **Measure** – Compare performance of migrated applications against the original benchmarks identified in the discovery phase. Once measurement is performed, if needed, return to a prior stage to reevaluate decisions based on empirical performance data (probably to stage 2, if you need to reevaluate your decisions, or to stage 3 or 4).
6. **Optimize** – Proactively manage and ensure application performance and security to quickly fix service degradations and fine-tune application performance in the new environment. Optimization should be a continuous effort with organizations consistently repeating the preceding steps in the migration path over time as new applications are rolled out, existing applications are updated, and new service delivery options become available.

The process is iterative, so one can go back to step 1 to achieve continuous improvement and optimization.

Key Success Factors for Cloud Migration

The goal of running in a hybrid cloud is generally dictated by organizational or financial needs; and many organizations that employ cloud technologies may be doing so as a foundational step towards achieving their DX goals. To ensure overall success, cloud migration must be carefully monitored and managed to ensure continuation of service and the best business outcomes. These business outcomes are measured by metrics such as the quality of customer experience and speed of new service innovation and business agility, reflecting the predictability and resiliency of delivering these services to the market in a timely manner.

An organization should seek to migrate workloads to the cloud in such a way that they run efficiently, inexpensively, and with greater flexibility than can be achieved in legacy environments. It is critical to these goals that organizations have the right depth of visibility into workload performance and service levels.

Therefore, achieving success in deploying cloud-based production workloads requires:

1. Service assurance designed into the cloud migration planning stages. This cannot be an afterthought, and must be incorporated into the planning stages.
2. Investment in performing pre-work that is worthwhile. This results in lower OpEx, higher service quality and performance, and the agility to deliver new services. In other words, what seems like an upfront cost is an investment that pays off over time throughout the deployment cycle.

A hybrid cloud needs measurement of services delivery metrics.

Because every organization has its own unique goals and requirements, each can adapt best practices to better align with their specific cloud objectives. The multi-step migration path presented in this paper is just one way for an organization to benchmark its progress against what other successful organizations have done. Proper planning, combined with informed decision-making throughout the migration process, will ultimately result in: lower costs, shorter migration time, and improved metrics reporting. This leads to the most important benefits of service availability, reliability, and responsiveness.

All trademark names are property of their respective companies. Information contained in this publication has been obtained by sources The Enterprise Strategy Group (ESG) considers to be reliable but is not warranted by ESG. This publication may contain opinions of ESG, which are subject to change from time to time. This publication is copyrighted by The Enterprise Strategy Group, Inc. Any reproduction or redistribution of this publication, in whole or in part, whether in hard-copy format, electronically, or otherwise to persons not authorized to receive it, without the express consent of The Enterprise Strategy Group, Inc., is in violation of U.S. copyright law and will be subject to an action for civil damages and, if applicable, criminal prosecution. Should you have any questions, please contact ESG Client Relations at 508.482.0188.



Enterprise Strategy Group is an IT analyst, research, validation, and strategy firm that provides actionable insight and intelligence to the global IT community.

© 2017 by The Enterprise Strategy Group, Inc. All Rights Reserved.

