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Solution Brief

7 Common Pitfalls to Avoid When Migrating Applications to the Cloud

The growing complexity and unpredictability of hybrid IT makes it difficult to ensure cloud migration success.

Business leaders are increasingly relying on cloud technologies to enable digital transformation strategies and earn a competitive edge in today's global markets.

In fact, 95% of enterprises use public cloud services, and 44% have a cloud-first policy when it comes to deploying new applications. But a sizable number of organizations are looking to strike the right balance between public cloud and on-premises deployments as part of a hybrid approach.[1]

[1] ESG, 2022 Technology Spending Intentions Survey, Nov. 2021

But while cloud adoption has hit the mainstream, CIOs and other IT leaders still encounter several challenges when moving legacy workloads to the cloud. In this new landscape, there is a growing lack of predictability as apps, data, and users are everywhere, spread across multiple locations and networks. Compounding this unpredictability is a lack of strategic IT architecture, where legacy systems are retrofitted for cloud and other next-gen services they weren't designed to deliver.

A CIO's ability to navigate these architectural complexities is crucial to ensuring a smooth migration and harnessing the powerful benefits the cloud offers.

Here are 7 Common Pitfalls that Hinder an Organization's Ability to Successfully Migrate Applications to the Cloud:

1. Having an incomplete or outdated view of the infrastructure
2. Network bandwidth and latency constraints aren't known or understood
3. Legacy networks make it impossible to scale cloud deployments
4. Limited visibility impairs the migration process and ongoing performance afterward
5. The proper adoption tracking and performance criteria haven't been identified
6. Not enough time has been allocated for the migration to take place
7. Application, network, and security teams continue to operate in silos

Pitfall 1: Having an Incomplete or Outdated View of the Infrastructure

The situation

Lifting and shifting on-premises applications and getting them properly designed, mapped, and then migrated to the cloud is a complex scenario. The to-be-migrated applications may consist of hundreds of dependencies, make calls to multiple databases, and integrate with components from several different third parties.

IT needs to have a firm understanding of these components, and understand what services communicate with one another. Otherwise, the application delivery chain will break and some associated services may experience unexpected downtime or performance degradation.

Unfortunately, many IT organizations lack a current view of their application architectures. This is often the result of a sprawling, dynamic infrastructure where applications and services are continually added or modified, servers that are decommissioned or consolidated, and other changes and moves that aren't always clearly documented.

Relying on a clipboard audit and interviewing application stakeholders isn't enough. To mitigate risk and prevent unwanted outages, IT leaders must understand these critical, hidden dependencies and validate how application components actually talk before they start the migration process.

Recommended actions

Take principles and lessons learned from data center migrations and other consolidation efforts, and apply them to cloud projects. Introducing application dependency mapping software can significantly streamline the discovery and planning phase while providing IT leaders with a complete and accurate view of the entire application landscape.

Riverbed network performance management (NPM) solutions provide a centralized reporting and analysis console that combine network flow data with packet-based performance metrics. This includes a discovery wizard that creates application dashboards to automate the process of mapping transactions to their underlying infrastructure so that application definitions and interdependencies are accurate. Leveraging these tools, cloud migration planners can also create service maps, further accelerating the planning process.

Pitfall 2: Network Bandwidth and Latency Constraints Aren't Known or Understood

The situation

Moving applications and data to the cloud imposes new demands on the corporate network and impacts two performance constraints: bandwidth and latency. Not understanding the true ramifications on these two constraints can easily offset the expected business value of moving to the cloud in the first place.

During and after the migration, bandwidth utilization increases and traffic patterns begin to vary significantly. Quite often, network links become saturated, which can degrade the end-user experience of both existing applications and the newly deployed cloud application.

Moreover, in traditional network architectures, cloud-destined traffic is often backhauled to a central gateway located in the corporate data center for security reasons. As a result, cloud applications end up traveling a longer distance to reach users when compared to their on-premises equivalents. Therefore, the time it takes to complete a business transaction may increase, sometimes dramatically, due to the added latency.

Recommended actions

Visualize and quantify these end-to-end network constraints on a pre-migration basis. Using Riverbed's predictive analysis and network modeling tools can help evaluate current performance and determine areas for improvement by pinpointing where excessive time and bandwidth are spent within the infrastructure as key business transactions are tested. By running "what-if" scenarios, you can predict the impact of change on application response times before you migrate to the cloud, and then assess the effects of adjustments made to network and application parameters.

Once those baselines are completed, explore alternatives to buying more bandwidth when addressing overtaxed links. For instance, Riverbed's industry-leading WAN optimization solutions can streamline the movement of large chunks of data, reducing bandwidth utilization by up to 97% while increasing business transaction throughput. Moreover, for leading SaaS applications, such as Microsoft 365 or Salesforce.com, or custom applications running in Amazon Web Services or Microsoft Azure, Riverbed can provide up to 33x faster performance.

Pitfall 3: Legacy Networks Make It Impossible to Scale Cloud Deployments

The situation

To offset the bandwidth constraints cloud applications often impose on traditional enterprise networks, most organizations are complementing MPLS links with more cost-effective options like broadband Internet. The resulting hybrid network should allow customers to send a portion of their traffic over the public Internet, thus reserving limited MPLS capacity for mission-critical applications.

However, the problem with these hybrid networks is that they are complex to manage using legacy, router-based approaches to networking. Current networks are built on thousands of routers and time-consuming CLI configurations. This means it takes weeks or months to implement enterprise-wide network changes, making it difficult to keep pace with business demands as new apps or services are migrated to the cloud.

What's more, controlling which apps should take which network path—across all locations, users, and business rules—is nearly impossible using legacy approaches to routing. And, as previously mentioned, many companies backhaul Internet traffic, which impacts end-user experience. However, the alternative—going direct to Internet—usually involves installing and managing additional on-premises security devices at every business location, which is an expensive and burdensome proposition.

The bottom-line is that nearly 60% of businesses experience frequent cloud-related network issues due to legacy infrastructure [3], which impedes their ability to migrate to cloud-first architectures and operations.

Recommended actions

Transforming legacy enterprise networks to a software-defined WAN (SD-WAN) is critical for enabling cloud-first strategies. In fact, 91% of organizations agree that their cloud strategies will only reach full potential with a next-generation architecture [4], attracted by the prospect of improved operational agility, simplified network management, and reduced costs, among other benefits.

Riverbed SD-WAN provides an intelligent and intuitive approach to designing, deploying, and managing distributed networks. Combining the simplicity of a cloud-based management console with secure, single-click connectivity to cloud providers like Azure and Amazon Web Services empowers IT teams to seamlessly scale cloud deployments.

[3] Riverbed Future of Networking Survey 2017
[4] Ibid

Moreover, Riverbed SD-WAN allows users to securely go direct-to-net with native firewall capabilities and integrations with best-of-breed cloud security solutions. When combined with business-intent policy orchestration and automation, this provides CIOs the ability to control network consumption by dynamically steering applications over the best path based on performance service-level agreements (SLAs), security requirements, and link health or availability. This not only reduces network costs, but also results in higher performance for cloud applications by leveraging multiple network paths and faster broadband connections.

Pitfall 4: No Visibility into Application Performance Throughout Migration and Beyond

The situation

When performance problems do occur, IT leaders need the ability to quickly pinpoint and resolve the issue. However, the cloud introduces an order-of-magnitude increase in complexity when trying to mitigate the impact of performance problems.

Why? Because now that the application has been migrated or is in the process of being moved to a cloud provider's environment, IT is relinquishing some administrative control. The enterprise no longer owns or has direct access to the infrastructure upon which its application is now hosted.

And while cloud providers offer performance SLAs, those stop at the edge of the cloud. Yet, IT is still responsible for the ongoing performance and security of cloud apps or services.

Recommended actions

Bringing back some level of visibility and control is critical to maintaining performance and a consistent user experience in the cloud—throughout the migration process and beyond.

Having the proper application and network monitoring tools in place allows IT organizations to decrease mean time to resolution (MTTR), reducing support tickets and cutting technical costs related to migrating and supporting the cloud application. And when performance issues stem from the cloud provider's services, it allows IT to quickly escalate and hold the providers accountable for agreed-upon SLAs.

Riverbed | Aternity's application performance management (APM) tools provide this full-stack visibility, on and off the cloud, empowering you to take back control of application performance. Easy to install and use, Riverbed APM can query and analyze billions of transactions to discover bugs, draw business insights, and help deliver a superior experience in the cloud.

Moreover, you can extend performance monitoring into applications running in SaaS environments by integrating with Riverbed WAN optimization appliances, which collect performance telemetry across the entire network. This provides the only solution that measures end-user experience for both optimized and non-optimized enterprise web and SaaS applications for faster, more effective monitoring and troubleshooting.

Pitfall 5: The Proper Adoption Tracking and Performance Metrics Haven't Been Identified

The situation

When IT leaders make a significant investment in migrating an application to the cloud, they should be able to tie end-user adoption and performance back to business outcomes. How many users are leveraging the cloud-based application? What does their usage profile look like? Or are they still using the legacy or on-premises version of the application?

Defining key user adoption and performance metrics helps IT measure the success of the migration and the new application. And for organizations that are in the first stages of their cloud adoption strategy, such data points are critical for validating or adjusting strategies and justifying future cloud spend.

The problem, however, is that many organizations fail to establish clear metrics and usage policies before the rollout begins. As a result, they only define these metrics on a reactive basis, when it's time to report back to key stakeholders. And even when those metrics are defined, the proper instrumentation to collect actionable intelligence is often still missing, as point monitoring solutions only tell part of the story. This includes an inability to capture the perspective that matters—the end user's.

Recommended actions

Meet with project stakeholders—from both the business and IT—and clearly define usage requirements, expectations, and success criteria as part of the migration-planning phase. Next, evaluate what tools are available for collecting the adoption- and performance-based metrics, and determine what gaps in monitoring and reporting exist.

With that assessment in place, finish instrumenting the infrastructure with a fully integrated performance management solution that provides actionable insights across the entire infrastructure—including end-user devices.

Riverbed integrates APM and NPM solutions with real end-user experience monitoring, creating a centralized, dynamic view of cloud performance and the underlying digital experience. This holistic view gives operational teams a single source of truth when troubleshooting issues, reporting on historical usage, and targeting areas for ongoing service improvements.

More importantly, this gives IT and business leaders clear insights into the end-user experience by monitoring apps from the point of consumption—the users' devices, including any physical, virtual, or mobile form factor. In other words, end-user experience monitoring can validate the impact of cloud migration from both a productivity and revenue perspective, while keeping cloud vendors more accountable for established SLAs that support key business activities.

Pitfall 6: Not Enough Time Has Been Allocated for the Migration to Take Place

The situation

Migrating a critical workload to the cloud won't take place overnight. In fact, when organizations start moving data, they often find that it moves slower than expected. That data migration, in essence, becomes the bottleneck to the entire project.

A perfect example is migrating from legacy email systems to a more collaborative platform like Microsoft 365. Here, migrating the mailboxes alone can consume significant network resources. In one customer's case, Riverbed found that an initial inbox synchronization for just 10 pilot users ate up 10% of the Internet link. So imagine what happened when 1,000+ users migrated a few days later.

Also, keep in mind that as users are exposed to feature-rich capabilities—such as Skype for Business for voice, video, and screen sharing—more bandwidth will be consumed, as all applications compete for a finite amount of WAN resources. This means that constraints are intensified, timelines are thrown off, costs increase, and IT struggles to deliver the intended business value on schedule.

Recommendations actions

As previously mentioned, understanding bandwidth and delay constraints before the migration starts will provide critical insights for successfully estimating timelines, allocating resources, projecting costs, and forecasting risks. So build more than adequate time into project timelines. Also, consider conducting pre-migration studies with the expertise of Riverbed Professional Services to analyze delay and bandwidth constraints when migrating the data and workloads themselves.

Next, prioritize your limited WAN resources accordingly—upgrading circuits and hoping things go well isn't a strategy. Bring some reliability and predictability to the project by factoring in a WAN optimization component to help migrate data faster, and reduce the load on the WAN path by around 75% or more. And tune QoS strategies so that batch migrations can take place during the workday without affecting critical business traffic or congesting the network.

That way, cutovers aren't confined to nights or other non-peak times, thereby expediting the migration. Lastly, identifying, marking, and shaping appropriate cloud applications is key for ensuring a great user experience, gaining adoption, and reducing help desk calls as users are cut over.

Pitfall 7: Application, Network, and Security Teams Continue to Operate in Silos

The situation

Moving a workload to the cloud must be considered a real IT transformation and requires disparate IT teams to work as a cohesive unit for sustained success. But all too often, application, network, and security teams only focus on their individual domains:

- The application team leaders are concerned with maintaining productivity and a consistent, superior user experience.
- The network side is responsible for managing one of the key constraints in the end-to-end enterprise architecture; that application must not break everything else in the mix.
- The security team ensures application and network usage policies coincide within the established framework that was put in place to protect sensitive company information.

However, the cloud is driving many considerations for revamping the enterprise architecture and, as a result, responsibilities become blended efforts. For example, what team is charged with troubleshooting issues? In some cases, it's the network team, even if the impacted service is a SaaS application.

As a result, the war room scenario becomes more complex. And instead of finger pointing within a single "country," stakeholders from multiple countries must have seats at the table, which introduces more politics and policy.

The implication here is that completing a cloud migration project, and then maintaining a superior end-user experience moving forward, is a shared effort. When it comes to forming and executing a successful enterprise-wide cloud adoption strategy, unity across IT becomes even more imperative.

Recommended actions

Tearing down these silos and developing a cross-functional taskforce helps organizations become more prepared and ensures a smoother rollout. Take what's been successful in DevOps with regard to collaboration, speed of improvement, and a culture of efficient responsibility and apply it across all of IT.

Think about the manufacturing process of continuous improvement. While manufacturers have different teams working within a plant, they have an extremely efficient and effective strategy that focuses on maximizing end-to-end business productivity and profitability.

Separate IT teams become aligned when their collective focus is on delivering business value and efficiency as a team, rather than just focusing on their technical project as the end result. Remember, the cloud is not a magic panacea. It's part of an end-to-end system that impacts all teams and is a means to deliver transformational business results.

Take the Uncertainty Out of Cloud Migrations with Riverbed

Mitigate risk, ensure superior performance, and deliver predictable business results

Riverbed is uniquely positioned to help IT leaders rapidly and consistently deliver value to the business through the cloud. With the following cloud-enabled solutions, enterprises can increase agility by seamlessly moving workloads to the cloud while controlling costs, maintaining or improving the performance of mission-critical cloud applications, and defending networks, data, and users from security threats.

1. **Cloud Networking**: Improves enterprise agility by allowing customers to bring new sites online in minutes, not weeks, and includes one-click cloud connectivity. Unified connectivity from W/LAN to WAN to cloud to data center—across all locations—is managed centrally, not router by router, for increased efficiency. And integrated performance monitoring plus application acceleration ensures dependable app performance. The results: improved agility, performance, AND reliability.
2. **Digital Experience Management**: Blends end-user experience, infrastructure, application, and network monitoring for a holistic view of digital experience. This allows IT to proactively manage performance across the entire application stack—including in on-premises, cloud, and mobile environments—for quicker problem resolution and to identify areas for improvement. The results: better visibility, AND control over user experience, on and off the cloud.
3. **Software-Defined Edge**: Centralizes and protects all data in the data center or cloud for better compliance and business continuity. Moreover, by reducing reliance on branch servers and storage, organizations achieve greater operational efficiency and agility. Lastly, users benefit from fast, secure access to apps and data, no matter the business location. The results: reduced risks, AND improved performance.

What Are Customers Saying about Riverbed's Ability to Deliver Value in the Cloud?

"Without Riverbed, I don't think we would have had the foundation we needed to move to the cloud."

Sampath Perumbuli, Head of Group ICT, Brandix Lanka

"With all our apps in the cloud, we get high-quality products to market faster. Riverbed makes it possible."

Tim Weaver, CIO, Del Monte Foods

"We have accelerated application delivery up to 300 percent, resulting in sub-second response time for Microsoft 365. We have also been able to reduce bandwidth upgrade costs by two-thirds."

Branko Ceran, CIO, MTC Australia

"Delivering business-critical apps over the Internet saves us millions without sacrificing performance. Riverbed makes it possible."

Edward Wagoner, CIO, Americas, JLL

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