SAP Cloud Migration

Understand some of the challenges you may face on the journey.

As they expand geographically, enterprises are turning to cloud computing to solve the increasing need to reduce costs and focus on maximizing IT efficiencies. Business units now want the agility to access applications and infrastructure on demand, and to run their operations better by taking advantage of changing market conditions and the global footprint of new technologies.

Enterprises can choose from different types of cloud computing models. Private, Public and Hybrid clouds are one group of options, but there are also cloud service models such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS).

Enterprises often find it challenging to build a strategic approach and determine the right cloud computing platform and cloud service models to fit their specific business requirements and objectives. Existing on premise IT infrastructure has to smoothly integrate with an ever-growing customized cloud computing environment, and businesses often struggle to address internal and external issues as they work through maintaining efficient business operations.

To add to the complexity, strategic planning for cloud services must be done in an environment of increased security, compliance, and auditing requirements, along with business re-organizations, consolidations, and mergers that can change assumptions overnight. Neglecting to plan for change can result in unexpected increases in capital expenses and significant delays to delivery.

SAP S/4HANA migration

As the end of support for SAP ECC looms, the option of migrating to SAP S/4HANA looks increasingly appealing to enterprises that run SAP. Hosting S/4HANA in the cloud simplifies and streamlines many aspects of migrating from ECC to S/4HANA. At the same time, moving SAP solutions to the cloud is a complicated and business-critical process which involves the transition of data, applications, and technologies from the local infrastructure to a remotely managed platform.

Your Cloud Service Provider (CSP) manages the infrastructure and takes care of maintaining the application itself. These two factors alone are potentially huge time and money savers for you. However, it is important to select the right CSP and define a migration strategy and program that is well aligned with your business needs and goals.

What are the key benefits of cloud adoption?

There are significant benefits to moving IT to the cloud:

- **Offers cost savings** through reduced labor and operating costs; optimized technology costs
- **Delivers flexibility and mobility**, yielding faster provisioning and higher frequency deployment
- **Promotes agility and transparency**, speeding time to market and moving closer to the edge
- **Minimizes disruption** to business operations and customer
- **Provides access to the latest technologies**, helping improve user and employee satisfaction

However, if a migration is not performed intentionally and strategically it can become an operational nightmare.

Cloud principles to remember

Verizon recommends keeping these five core principles in mind when considering a move to the cloud. Consider them when re-tooling your current cloud strategy, not only to achieve benefits but also to optimize current cloud environments:

Cloud isn't easy.

An intentional plan is critical to extract business value and advantage from the cloud. And it starts first with developing and adopting a cloud strategy. The plan will consider business requirements, value, application, DevOps, operating models, security, service and governance.

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2. By the numbers.

A business case is required to effectively deliver greater flexibility at a competitive cost. Financial discipline remains critical. Done well, it provides important insights that can move at the speed of business. The business case should consider current operating costs compared to total future state operating costs, initial investments, and ROI.

3. Who's on First?

A strong governance model with clearly defined roles and responsibilities is required to help keep adoption from turning into a comedy sketch. Successful cloud adoption requires a fresh look at the resource and administrative frameworks currently in place.

4. Turn it down.

Defining a process to provision cloud services is a quick and easy task, but tracking cloud services consumption and scale-down services is also a need for the business. Cloud provides the flexibility to provision just the right amount of resources needed for your business processes and applications to run optimally, often generating cost savings.

5. Keep in touch.

Cloud can often blur the lines of support, but organizations still require an integrated support model. This is not an option but a mandate for success.

Why Verizon

Verizon can act as a trusted advisor and technology partner for your cloud adoption program, helping build an expansive network that is cost-effective, optimized for cloud connectivity and performance, and scalable to meet your future business and technology requirements.

Our industry-leading network professional services practice provides end-to-end consulting expertise to help you:

- Understand your current network architecture and how it is performing
- Identify and recommend opportunities for improvement for cloud adoption/migration
- Create a strategy and implementation roadmap for the network based on your organization's objectives to embrace cloud adoption
- Guide you throughout the lifecycle–discovery, assessment, planning, designing, and implementing the network transformation for cloud adoption

Learn more

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enterprise.verizon.com/resources/events/partnering-for-innovation

The top 15 network concerns when moving to the cloud.

1. **Expecting to move an entire data center to the cloud in an unrealistic timeframe.**

Modern networks and application delivery platforms are complex. While on the surface a cloud migration can appear to be a simple project, the reality is that there are hundreds (or thousands) of interdependencies in modern systems. What about that 8 year-old database server running in the corner that no one knows what it does? Unraveling all of the requirements for a single legacy system alone can often take as long as an optimistic migration schedule from a cloud provider.

2. **Randomly moving interdependent applications without first discovering application dependencies.**

There are strong directives from leadership to move applications to the cloud as standard practice. However, due to interdependencies such as non-customer facing service applications, databases, and even horizontal traffic between customer-facing applications, performance can drastically decrease post-migration while costs increase. Wait a minute, how did that happen?

In order to return a result to the end user, the application may perform as many as a hundred transactions between different services, applications, and databases to compile the final result. Failure to consider the entire application communications chain when migrating applications can result in hidden bandwidth, I/O, and even storage fees with cloud providers while reducing performance due to these transactions taking place over the WAN.

3. **Not understanding traffic patterns and how they will change when an application moves to the cloud.**

Moving an application to the cloud without mapping application interdependencies can result in a large shift in traffic from the local area network (LAN) to the lower performance (and higher cost) wide area network (WAN). Combined with peering costs to get traffic out of your favorite cloud provider's network, you can find yourself with a lower performance, higher cost solution.

It is important to arm yourself with the data and understand how applications communicate between themselves and back-end services, as well as how your network is designed and capacity planned before making migration decisions.

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4. Not conducting link capacity analysis before moving an application to the cloud.

While planning your migration to the cloud, make sure that you're considering your existing network design, capacity, and scalability options. In order to do this, you need to take a holistic approach with the entire team responsible for delivering your applications. The team responsible for an individual application may be planning the migration, however everyone involved with the end-user delivery needs to be involved. For example, CDN providers managed by the network team may be caching against different points of the network, application updates and backups managed by an operations center may be flowing through a different path, and even the application traffic itself may start saturating existing links in order to communicate with back-end services operated by other groups. Unless all of this is considered a true capacity analysis cannot be performed – accompanied by potentially disappointing results.

5. Not understanding the impact of latency to applications and their dependencies.

Bandwidth is the size of the truck carrying your data. Latency is how long it takes the truck to make the journey. If your truck is too small, it has to make multiple trips. In an application that performs hundreds of back-end transactions to deliver the customer-facing data, this latency can compound on itself.

Typical 10 gigabit data center links have an average latency of .04 milliseconds. 1 gigabit links typically clock in around .4 milliseconds. Not bad. Normally you would measure this in microseconds, but we're using milliseconds in order to compare to wide area network (WAN) latencies.

Latency over the WAN is generally directly attached to the distances between resources, but not always. A typical WAN latency might range from 50-70ms in the continental US, around 100-150ms to Europe, and as much as 300ms to remote destinations such as Australia.

Applications in the cloud that have to reach remotely for many different transactions in a serial fashion – meaning one after the other – can find themselves with a large amount of network-induced delay. If all (or most) of the back-end transactions can be performed in parallel this can be greatly reduced, but the application can still end up performing many times slower for end-user content delivery even though the cloud edge is much closer to the end user. Proper planning and understanding of the entire system and network delivery are critical to guarantee the best user quality of experience (QOE).

6. Developing a complete WAN design after a subset of applications are already placed in the cloud.

Cloud application deployments can change the flow of traffic on the network to a much larger degree than people realize. For example, traditionally traffic flows from an origin-type site to caching nodes on a CDN, and the majority of user traffic is serviced from these caching points – aside from dynamic content that has to be generated on the fly for each user session. In cloud deployments, this can change drastically with subsets of applications – especially when these subsets aren't chosen with the underlying application dependency mapping in mind. Large additional East-West traffic loads can be necessary as application subsets communicate with each other over the WAN to generate dynamic content for end users. It is important to take these factors into account in advance, and carefully map out potential new network paths applications will use to complete their workloads. Without a complete design in place in advance, these links can be overrun causing outages and end user quality of experience (QOE) delays.

7. Bolting security on to the WAN design instead of developing it as an innate component of the design.

Security is something that every organization talks about doing the best possible job with, but very few organizations actually do. Security as a bolt on afterthought does not allow the engineering staff to properly place security resources, and leads to a compromised approach. The logical traffic path and inspection points are potentially indistinguishable between a cloud deployment and a traditional network. Just because cloud environments are elastic and flexible does not mean that day two engineering and deployment of security attributes can be successful. It is important to develop security solutions with the overall design. Otherwise your security policy enforcement points and detection/prevention nodes could find themselves on the outside looking in.

8. Training engineers in the cloud during, or worse yet after, applications have been deployed to the cloud.

Cloud training is a vital part of a deployment, aside from the obvious issues of support and break-fix operations. While cloud environments are quite resilient in comparison, failures sometimes do occur. However, because the model is so different – from a standalone computing model to a pay as you go service – design patterns and business needs are different with a cloud model than a traditional environment. Without training for the cloud platform your application is deployed in, engineers can have a difficult time correctly using all of the tools available to the business.

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9. Not using Infrastructure as Code (IaC) (i.e. CloudFormation, etc.).

Uniformity of provisioning between resources, elasticity, and flexibility are some of the largest advantages to a cloud deployment. Instead of being tied to a pre-set infrastructure limit, resources can be mirrored, re-configured, and brought online while the older resources can be sunset with no end-user impact. In order to do the same thing in a traditional environment, new hardware would have to be purchased, installed, and provisioned.

Being able to do this in a few clicks is the strength of an Infrastructure as Code (IaC) approach. Consistency of provisioning, and (nearly) instantaneous deployment of complex infrastructure while skipping all of the traditional costs, delays, and headaches of re-building traditional environments. Often overlooked while initially building cloud environments, the simplicity of managing a few (or even a few hundred) resources in the cloud can be refreshing when compared to dealing with physical infrastructure. Don't miss the opportunity, or as you scale to thousands (or even hundreds of thousands) of resources you will miss out on some of the cloud's most powerful features.

10. Not completing an IPAM design prior to beginning build work in the cloud.

The hierarchical nature of IP addressing makes it easy to do address planning. Carve out your address space and assign it based on current needs and future growth projections. While this sounds simple, there are other things to consider. While in the traditional sense it is not a big deal to later add some additional non-contiguous IP space to your routing table later to cover for unplanned growth, the real casualty of this approach is your routing summarization.

Routing summarization allows you to describe many single host addresses, with a single "network" address. Once you add non-contiguous IP space to your routing table for a particular network however you can no longer describe it with a single address.

Due to the size, complexity, and memory requirements of cloud networks most providers have a limit on the size of your routing table in any individual instance. Some allow you to go over this by charging premium prices, but in the long run it pays large dividends to plan your IP addressing in advance before breaking ground on your cloud deployment.

11. Deploying applications that do not inherently support HA to the cloud and expecting a HA result.

If an application does not have provisions for high availability (HA), whether it be state or transaction synchronization between instances of the application or another approach, moving it to the cloud will not improve this behavior. While cloud resources are highly flexible and scalable, they can't make an application do something it wasn't designed to do.

There are some things that can be done, such as utilizing cloud DNS services, rapid deployment of virtual machines, and other features orchestrated using an Infrastructure as Code approach (IaC) to greatly speed up recovery times. But you can't check the "HA" checkbox for an application that doesn't support it. It's important to understand the capabilities of applications before cloud migration, otherwise the results may not meet the expectations.

12. Not documenting a clear policy or change process for cloud management.

In a traditional environment, clear change management policy is essential to a living, breathing application delivery platform. Hundreds or even thousands of changes can happen per year, and in the event of unwanted or overlooked side effects of changes it is imperative that a record of changes exists so that reversion to a known state is guaranteed quickly. With the breadth of management and monitoring tools available in the modern cloud provider it would be easy to think change control almost takes care of itself. However, it is even more critical that these rules be setup in the beginning and adhered to by engineering and operations staff. Due to the cross-discipline nature of cloud environments, Network Engineering, Systems Engineering, as well as Storage and other disciplines are potentially all managing the same portals and areas of responsibility. Without clear and documented policies and procedures it's easy to find yourself underwater with changes made by multiple groups to the same resources – with no clear rollback path.

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13. Underutilizing cloud-native services (Route53, WAF, etc.).

When an organization migrates their platform to the cloud it is natural to treat it as a like-for-like move, where each service is migrated individually. However, because cloud computing works differently than traditional approaches it is important to re-design services where appropriate and implement them in the cloud as opposed to migrate.

Scalability, flexibility, elasticity, and rapid deployment are all things we think of when the cloud is mentioned. Automation – such as elastically scaling resources based on load require integration with those services in order to dynamically reconfigure your cloud resources. By utilizing these cloud-enabled services as opposed to legacy applications running on your own instances, you can really take advantage of the cloud – and reduce your costs as well.

14. Unrealistic user expectations.

It used to be that only technology development companies were reliant on the underlying technology they developed to drive their business – today it's every business. Progress towards simplifying the end-user experience is ever ongoing, however the problem with this is that systems become more complicated every year, and there's no end in sight.

Just because an application or set of applications have been migrated to the cloud does not mean that they will miraculously attain five nines (99.999%) uptime. Cloud applications can and do fail due to the very same reasons they fail on traditional systems – the weakest link can still take you down. The cloud isn't the silver bullet cure for application availability, but it sure can help.

15. Expecting immediate cost savings over on premises without designing for the cloud.

Cloud computing works differently than traditional data center deployments. Simply migrating all of your servers, networking/connectivity assets, security devices, etc. and expecting large cost savings overnight is not guaranteed. In fact, without adjustments to the model it may actually cost more!

Services such as backup servers are a good example – paying for instance time of a backup server, and storing that data could be much more expensive than utilizing AWS Glacier or Azure Cool Blob data storage services. Instead of running your own database server instances, try Amazon RDS – or for really large databases maybe Redshift could be the way to go. In the Microsoft world take a look at Azure SQL. These services are billed on a usage-based model which can be very beneficial, and also do not require administrative costs to keep running.

A full technical analysis of your existing data center, and subsequent business analysis based on available cloud services can reveal strategy changes that can not only improve performance, but lower costs as well.
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