Future proofing your cloud

Why workloads define cloud strategies.
Cloud computing changes how organizations think about their business and IT strategies. Companies ranging from enterprises and education institutions to Service Providers and Telcos realize the benefits of cloud and are now building their own public and private clouds. As organizations define their cloud strategies, it is imperative to think about the use cases and application workloads that will run in the cloud, as these will ultimately define your cloud architecture and which solutions to deploy.

Workloads themselves vary widely, ranging from traditional n-tier enterprise applications found in the typical datacenter to mobile and social apps born into the cloud. The types of workloads an organization will run in the cloud will be ever changing, as business and users’ needs change and evolve. To execute a successful long-term cloud strategy, organizations must holistically think about their workload requirements for present and future applications.

Different workloads, different architectures
Customers are adopting the cloud to increase efficiency, agility, and to fuel business growth by rapidly innovating and delivering new cloud services. While most businesses began using the cloud for distributed cloud native apps such as Big Data, gaming and social, our experience from powering over 200 production clouds has shown that businesses rapidly realize the need to also incorporate the vast base of existing enterprise application workloads such as database-driven and Windows applications into a standardized cloud architecture. These fundamentally different families of workloads each bear its own distinct set of hardware, storage, networking, availability and redundancy requirements and overarching uniquely different architectural characteristics.

Traditional scale-up application workloads

The majority of today’s existing enterprise applications that live in the datacenter fall into this category. They include, for example, such SAP® ERP, Oracle® database apps and Microsoft® Exchange. These workloads are typically client-server or n-tier applications built to run on a single server or a cluster of servers and databases. Traditional applications achieve scale by scaling up, that is, by increasing the size of the application and database infrastructure. The architecture of these workloads, as a result, is somewhat limited in its ability to scale; these applications typically serve tens of thousands of users and hundreds of concurrent sessions.
Enterprise workloads are also traditionally designed to run on reliable, enterprise-grade hardware, where the underlying servers and storage isn’t expected to fail during the normal course of operations. Complex enterprise technologies such as network link aggregation, storage multi-pathing, virtual machine (VM) high availability, fault tolerance and VM live migration are used to ensure reliability of these applications. Sophisticated backup and disaster recovery procedures are also put in place to handle the unlikely scenario of hardware failure.

Traditional workloads require fault tolerant architectures and are built using enterprise-grade infrastructure components, which can include repurposed components of the existing datacenter. Typical components include:

- Commercially supported hypervisors such as Citrix XenServer or VMware® vSphere™
- High-performance SAN devices for VM image storage
- Traditional physical network routers, firewalls and layer 2 switches
- VLANs to isolate traffic among servers and tenants
- VPN tunneling for secure remote and site-to-site access through existing network edge devices

Cloud native scale-out application workloads

The new generation of applications typically associated with cloud computing fall into this category. For example, they include rich internet applications like gaming and mobile apps, High Performance Computing (HPC), Big Data, social apps and batch processing. The rate of dynamic scaling and elasticity of these types of workloads would not be feasible or cost effective to achieve with traditional datacenter architectures. Instead, a new approach to application development and architectures was required to achieve “web scale”. Rather than purchase ever-larger servers as the primary strategy for scaling, it was preferable to scale applications across many loosely coupled, commodity grade computing, networking and storage nodes. By running multiple application servers in parallel, employing liberal use of caching strategies and replicating data to multiple traditional or distributed database servers, Internet companies such as Amazon, Google, Zynga and Facebook are able to cost-effectively support the load generated by many millions of users.

Built for infrastructure that isn’t expected to be resilient, these workloads are designed from day one with the intelligence to handle the failure of any given node simply and efficiently. Cloud native workloads assume that the underlying infrastructure can fail and will fail. Instead of implementing disaster recovery as an after-thought, multi-site geographic failover must be designed into the application using technologies such as MySQL, no-SQL and geographic load balancing. This new approach to architecting web applications became the basis for a new set of best practices for delivering cloud native workloads.
Cloud native workloads are designed to minimize cost rather than to ensure traditional enterprise reliability. Commodity and open-source components are typically used for cost-savings including:

- An affordable hypervisor such as XenServer, Xen or KVM
- Object store, EBS volumes, NFS volumes and inexpensive local disk for VM image storage
- Software Defined Networking (SDN) and L3 Security Groups used for workload and tenant isolation
- Elastic Load Balancing (ELB) or Global Server Load Balancing (GSLB) used to redirect traffic to servers in multiple availability zones

**Consider both workloads for long-term success**

Considering the vastly different characteristics of traditional scale-up verses cloud native scale-out application workloads, organizations thinking about building a cloud could have a critical decision to make. Should their strategy be focused on enabling traditional workload in the cloud and finding the most suitable cloud orchestration platform for enterprise applications? Or, should they be focused on the cloud native workloads they want to deploy and invest in a cloud platform more suited for scale-out architectures?

This all too common approach fails to meet the larger, long-term success criteria because it narrowly only focuses on the most present and tangible use cases. It is all too tempting to select an architecture that fits just one scenario, but down the road, when adoption and use cases expand, the cloud architecture proves to be ill-suited for handling all of an organizations cloud requirements.

If you design primarily for server virtualization workloads, how will you achieve optimal cost efficiency and scale when running a cloud native workload, say for example a new mobile application for your customers? Moreover, traditional workloads are already evolving to become more distributed and less dependent on traditional architecture, eventually becoming cloud workloads—making it even more important to have an architecture designed for both workloads.

Conversely, if you only build for cloud-era workloads, how will you extend this architecture to support your traditional enterprise apps? Based on customer evidence, organizations report that once their cloud becomes operational, IT favors a “cloud first” approach to all new IT initiatives regardless of workload type. Since the typical enterprise datacenter houses mission-critical applications that require 99.999 percent uptime, simply moving enterprise apps out of this resilient execution architecture into one designed only for cloud native apps isn’t an option.

This dilemma is reflected in the types of cloud orchestration platforms on the market, which typically fall into two categories:

- Those enabling an extension of server virtualization, such as VMware® vCloud® and Microsoft® Private Cloud
- Those designed for only cloud application workloads, such as Amazon Web Services and Microsoft Azure
Supporting separate private clouds for each workload style would be grossly inefficient and costly, as well as limiting your ability to modernize traditional workloads. To avoid this pitfall, organizations should holistically think about both their short-term and long-term cloud strategies to ensure they are selecting the most optimal cloud technologies. What you need is a single orchestration layer that lets you address both traditional and cloud native workloads.

**Future proof with Citrix CloudPlatform**

Citrix CloudPlatform, powered by Apache CloudStack, is the industry’s only future-proofed, application-centric cloud proven to reliably orchestrate both cloud native application workloads as well as traditional enterprise application workloads with a single control plane. CloudPlatform combines the best private cloud foundation for enterprise workloads like CRM and ERP with true Amazon-style scale, elasticity and operational efficiency for the new generation of cloud native workloads like social applications, big data and HPC. The mature, turn-key solution is based on open source Apache CloudStack and lets you leverage existing hypervisor, storage and network investments. CloudPlatform has been proven in over 200 production deployments and scales to over 40,000 servers per region.

An open-source software platform that pools datacenter resources to build public, private and hybrid clouds, CloudPlatform is unique in its support for both types of workloads in a single orchestration platform. This gives IT the flexibility to meet the scalability and reliability requirements of each type of application in the environment—enterprise or cloud native. For traditional enterprise apps running on proprietary infrastructure, CloudPlatform supports scalability to tens of thousands of users with 99.999 percent uptime. For cloud native apps and services running on commodity infrastructure, CloudPlatform supports scalability to millions of users and provides resilience for architectures designed to assume failure.

CloudPlatform simplifies the implementation of clouds by abstracting the network, storage and compute nodes that make up a datacenter and enabling them to be delivered as a simple-to-manage, scalable cloud infrastructure. To handle both types of workloads, CloudPlatform lets organizations group their cloud into multiple availability zones, each comprising resources in one or more physical datacenter.

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Within each availability zone, IT can designate the appropriate combination of hypervisor, storage and networking configurations to support a given workloads requirements. Each availability zone can also offer multiple, distinct levels of service, differing in reliability, scalability, security, compliance, performance, cost and other dimensions. The diagram above depicts what the basic architecture components of a traditional workload zone and a cloud native workload zone would consist of. To learn more how CloudPlatform enables traditional workloads and cloud native workloads, read How Citrix CloudPlatform enables enterprise workloads and How Citrix CloudPlatform enables cloud native Workloads. These papers take an in-depth, technical look at the features and capabilities of CloudPlatform for running different workloads.

**Design for today, and tomorrow**

Workloads are one of the key factors organizations need to consider when they are developing their cloud strategy and selecting a cloud orchestration platform. The workloads themselves will dictate the application delivery requirements and the underlying architecture required to support them. Taking a narrow view and only considering one type of workload can result building a cloud that fails to address the bigger, long term potential of your cloud. For enterprises, it can mean having to build a separate siloed cloud to run that new mobile app infrastructure you are rolling out for your customer. For Service Providers, it can mean a lack of competitive differentiation and lost opportunities when customers need to move to another provider who can handle their mission critical workloads.

Only CloudPlatform is proven to reliably orchestrate both today’s existing applications and tomorrow’s cloud native applications. Enterprise workloads and cloud native apps can each be delivered with the optimal infrastructure for their distinct requirements and cost models, while being managed in a unified environment through a single pane of glass. In doing so, CloudPlatform allows enterprises to quickly deploy private clouds that can orchestrate and automate existing workloads and infrastructure, while providing a path to the future via its best-of-breed support for next generation cloud workload architectures.

“One of the cool things about CloudPlatform was the ability to have different cloud models without having different products or architectures.”

– Ed Laczynski

VP of Cloud Strategy and Architecture
Interested in learning more?

- Citrix CloudPlatform for the Enterprise
- How Citrix CloudPlatform enables enterprise workloads
- Citrix CloudPlatform for the Service Provider
- How Citrix CloudPlatform enables cloud native Workloads
- CloudPlatform Deployment Reference Architecture