

A revolution in cloud networking: Citrix TriScale Technology

Executive Summary

An enterprise cloud network is one that embodies the characteristics and capabilities that define public cloud services. These include being 'elastic' so that performance can be scaled on-demand, the option to only pay for capacity that is being used, and the power to cost effectively scale the infrastructure to support a steadily growing number of applications and customers. Such a multi-dimensional scaling strategy is requisite to building a service delivery fabric for optimizing the delivery of web, mobile and cloud-based applications.

With its new TriScale Technology, Citrix® is enabling a genuine revolution for enterprise cloud networks by providing an unrivaled set of capabilities that smartly scale application and service delivery infrastructures, affordably and with no additional complexity. With Citrix TriScale Technology, organizations of all types, sizes, and levels of cloud maturity can:

- Scale Up – Increase network elasticity with up to 5x faster performance on-demand, without the need for additional hardware using NetScaler® Pay-As-You-Grow licensing
- Scale Out – Expand capacity up to 32x further with zero downtime and no idle network resources by leveraging TriScale Clustering
- Scale In – Simplify application delivery support to more applications and business units and put an end to device sprawl by consolidating up to 40 NetScaler instances on a single hardware platform

Traditional networking solutions cannot compete with the breadth and depth of capabilities TriScale offers Citrix NetScaler customers. Fixed capacity network appliances provide zero elasticity, while expensive chassis-based solutions that require new blades every time more capacity is needed don't deliver the flexibility and economics demanded by next-generation datacenters. Only NetScaler's software-based architecture enables businesses to:

- Leverage the network as an enabling technology that can actually improve IT agility and responsiveness when delivering applications and services
- Eliminate unused and under-utilized network resources with no reduction in reliability and lower total cost of ownership (TCO)
- Build enterprise cloud networks while also laying the foundation for service delivery fabrics capable of seamlessly delivering applications across enterprise, public cloud, and SaaS –based datacenters

Summary

- Scale up performance
- Scale out capacity
- Scale in for simplicity

The Scalability Challenge

Embracing cloud computing concepts and technologies when building next-generation datacenters not only makes good business sense, it is rapidly becoming an IT imperative. Remaining competitive requires a computing environment that is more agile yet less complex and costly to own than the traditional datacenter featuring dedicated infrastructure for each and every application.

IT managers should enforce these requirements across all major datacenter components, not just the server infrastructure. This includes building cloud-like scalability into the network itself. The best point to begin this transformation is the application delivery controller (ADC), which has become a strategic control point in many datacenters as a result of its ability to guarantee application availability, performance, and security, offload server infrastructure, and reduce datacenter TCO.

Organizations needing greater ADC capacity, however, have traditionally had limited options. Reactively responding with more capable, fixed-capacity appliances requires forklift upgrades that are expensive, time consuming, and highly disruptive. But the alternative isn't any better. Proactively over-provisioning consumes scarce IT capital budget, increases on-going support costs, and often results in substantial unused capacity.

What today's enterprises need instead is a cloud network that is more agile, affordable, and effective in responding to a range of common scenarios, including:

- Steady and predictable increases in application traffic
- Spikes in application demand that later subside (e.g., due to a seasonal event)
- Permanent, step function increases in performance requirements driven by precipitating business changes (e.g., a merger or other event that doubles the user population for a given application)
- The need to cost effectively extend application delivery capabilities to new tenants and/or consolidate under-utilized, dedicated ADCs already in use supporting existing tenants

Introducing TriScale Technology

Citrix NetScaler is an industry-leading application and service delivery solution that makes applications and cloud-based services run better. It delivers 100% application availability, enhanced end-to-end performance, advanced application-layer attack protection, and improved server efficiency – all in a single device, with a unified, easy-to-define policy. And now, with the introduction of Citrix TriScale Technology, the best solution for building enterprise cloud networks is getting even better.

Opting for a flexible, software-based architecture rather than a hardware-centric appliance design or rigid chassis-based systems, Citrix has already made NetScaler the most economical solution for building enterprise cloud networks. TriScale Technology extends this advantage by fully meeting the diverse and demanding scalability requirements of the modern datacenter.

Citrix TriScale Technology uniquely incorporates multiple complementary methods for dynamically scaling application delivery infrastructure in response to changing conditions. Depending on an organization's specific needs at any given point in time, IT managers have the option to Scale Up, Scale Out, and/or Scale In.

Summary

- Build cloud scale
- Increase ADC capacity
- Citrix TriScale technology

- Scale Up – With NetScaler Pay-As-You-Grow licensing, administrators can increase application delivery performance on-demand, up to the limit of the underlying appliance. There's no need for additional hardware, or to pay for excess headroom in anticipation of future needs.
- Scale Out – With TriScale Clustering, IT can easily configure up to 32 NetScaler appliances to work in concert to deliver one or more applications. An implementation can start small yet scale beyond 1 Tbps in total capacity.
- Scale In – With NetScaler SDX, up to 40 fully isolated NetScaler instances can run on a single physical platform. IT can scale the number of new tenants being supported, while simultaneously simplifying the network by consolidating dedicated, often under-utilized ADCs deployed for existing tenants.

Another important characteristic of TriScale Technology is that the options for scaling Up, Out, and In are not mutually exclusive. IT managers can take advantage of them in whatever combination best meets their requirements. Furthermore, the solution is applicable to any enterprise regardless of whether it's continuing to operate a traditional-style datacenter, actively transforming to an enterprise cloud, or embracing the concept of a full-featured, service delivery fabric.



Summary

- Pay-As-You-Grow
- Clustering
- Consolidation

The net result is an order-of-magnitude change in capabilities that further solidifies NetScaler's position as an industry-leading application delivery solution and the best option for developing cloud-centric computing environments.

Scaling Up with NetScaler Pay-As-You-Grow

Traffic levels are steadily increasing as a matter of routine for most enterprises as new users, features, and functions are added to existing applications. On top of this, numerous events, not all of which are predictable, routinely cause temporary spikes in demand.

To continue to meet strict performance SLAs despite these conditions, today's IT managers require the ability to tactically make incremental adjustments to their application delivery performance. Ideally, this capability should be on-demand and should not require additional hardware, disruptive forklift upgrades or costly over-provisioning. In this regard, hardware-based Pay-As-You-Grow offerings are typically a poor fit because they invariably require either expensive up-front investment in capacity that might ultimately go unused, or reactive acquisition and installation of new hardware – a process that can take weeks to accomplish.

NetScaler Pay-As-You-Grow is a simple, 100% software based, on-demand licensing model that breaks the hardware dependency of competing offerings. With Pay-As-You-Grow, customers can purchase a NetScaler solution that meets their needs today, confident they can quickly and easily 'scale up' in the future without the need for costly and disruptive hardware replacements. All it takes is a simple software license upgrade to increase performance by up to 5x.



Summary

- Scale up
- Cloud elasticity
- 5x performance

Buy only what you need
Elasticity with Pay-As-You-Grow

The related Burst Pack licensing feature delivers additional flexibility and unparalleled elasticity by enabling a temporary, 90-day boost in performance. Datacenter managers can efficiently handle both expected and unexpected spikes in demand, while thoughtfully assessing the need for longer-term upgrades – all without getting locked into expensive and potentially unnecessary hardware investments.

NetScaler Pay-As-You-Grow and Burst Pack – Pay only for the performance you need when you need it.

Scaling Out with NetScaler Clustering

Pay-As-You-Grow provides on-demand scalability up to the physical limit of a single NetScaler appliance. But what about situations where even greater capacity is required? Perhaps an application already operates at multiple gigabits/sec and the specific app delivery policy is pushing appliance resources to the limit. How can an organization continue to leverage its existing investment while seamlessly increasing capacity to support major changes to the business, such as a merger that suddenly doubles or triples the user population for a critical application?

The traditional response to these situations has been to pursue forklift ADC upgrades to achieve substantially greater throughput. Or to segment the network so that traditional high-availability (HA) pairs of ADC appliances are sufficient to handle a subset of the application's overall traffic requirements. What enterprises need instead is the option to fully leverage multiple appliances as a single logical ADC, and thereby benefit from the resulting aggregate capacity. An ideal solution should:

- The right ADC software-based architecture that allows multiple appliances – physical or virtual – to work in unison to deliver one or more applications
- Preserve the transparency that has made advanced ADCs so valuable in today's datacenters by having the ADC cluster appear as a single resource (i.e., single virtual IP address) to all users
- Enable capacity to be adjusted incrementally (i.e., one appliance at a time) to match network capabilities to actual traffic requirements
- Gracefully add (or remove) nodes without impacting existing user sessions
- Expand application delivery capacity as measured by all key performance metrics, including total traffic throughput, transaction rate, concurrent user count, SSL transactions, and more.
- Completely eliminate the need for idle or unused resources while preserving the reliability of traditional HA appliance pairs
- Provide a single, consistent policy management view for the entire cluster so that all aspects of ADC administration remain constant, even as the cluster expands to meet future growth.

Summary

- Scale out
- 32x capacity
- No idle resources

TriScale clustering meets all of these requirements. IT managers can Scale Out their application delivery infrastructure by clustering as few as two and as many as 32 physical or virtual NetScaler appliances. Overall capacity can be increased incrementally – one appliance at a time - from a few Mbps to more than 1 Tbps, all without discarding existing infrastructure investments.

The entire NetScaler cluster operates as a single entity to simplify operational management tasks. Policy changes are made just once and are automatically propagated across all nodes. Additionally, the TriScale cluster architecture aggregates all performance and traffic statistics for all nodes so that the NetScaler administrator maintains a single view of all activity and events. Other notable strengths include:

Linear scalability – Adding or removing nodes from a cluster results in a predictable, linear change in aggregate capacity.

Seamless elasticity – Adding (or removing) nodes from a NetScaler cluster requires minimal effort and incurs zero downtime. New nodes added to a cluster advertise themselves and automatically begin to absorb their share of the load. Alternately, if a node is slated for removal, connections are automatically bled off in a way that doesn't impact active sessions.

Native high availability (and low TCO) – Clustered nodes automatically synchronize session information so the failure of any one node does not result in an application user having to restart their session. The reliability benefit of a traditional active-passive HA pair is preserved – but without the inefficiency of idle hardware.

High flexibility and efficiency – Multiple methods for distributing traffic among nodes in a cluster enables IT managers to select the mechanism that best meets their application and datacenter needs. In addition, cooperative health checks ensure web servers are monitored efficiently by avoiding the practice of having every node interrogate the status of every back-end server.

TriScale Clustering not only provides organizations with a highly functional, flexible, and cost-effective approach for scaling out application delivery infrastructure, it also complements Pay-As-You-Grow licensing. With this unmatched combination, IT managers have the power to scale up to the limit of an individual appliance, and then seamlessly scale out using a multi-node cluster to achieve even higher levels of capacity, all while preserving associated policies and configuration details.

Summary

- Zero downtime
- High efficiency
- Built-in reliability



Start small. Grow forever. Expandability with Add-and-Go

Scaling In with NetScaler SDX

Being able to increase performance and capacity are relatively well understood dimensions of scalability. An emerging requirement, however, is the ability to scale the number of application or business units that can be supported. This need has traditionally been met by deploying dedicated application delivery infrastructure for each and every application and/or business unit. The result, predictably, has been appliance sprawl and steadily increasing network complexity.

What organizations need instead is a way to support multiple tenants with a single physical device that can also be used to consolidate any existing, under-utilized ADCs. This is particularly true as enterprises seek to collapse dedicated application silos in favor of a more cost-effective, shared infrastructure model.

Unlike most offerings currently available in the market, an ideal solution should:

- Provide substantial consolidation density by supporting a high number of tenants
- Completely isolate individual application delivery instances
- Maximize consolidation opportunities by supporting a full set of application delivery capabilities
- Not require additional hardware of any type, including chassis blades
- Enable both unified and delegated approaches for policy management and enforcement

Summary

- Stop appliance sprawl
- Multi-tenancy
- Shared platform

The third component of NetScaler's TriScale Technology, NetScaler SDX, was designed specifically to address all of these core requirements, and more. A next-generation service delivery platform, NetScaler SDX features an advanced virtualized architecture that brings simplicity and consolidation to the network by supporting multiple NetScaler instances on a single hardware appliance. Key strengths and differentiators include:

High consolidation density – Up to 40 NetScaler instances can run on a single NetScaler SDX appliance, enabling support for even the most ambitious consolidation initiatives.

Full isolation of ADC resources – All critical system resources, including memory, CPU and SSL processing capacity, are assigned to individual NetScaler instances. This helps guarantee performance SLAs by ensuring demands made by one tenant are unable to negatively impact other tenants on the same system. Complete isolation of traffic on a per-tenant basis also helps satisfy security and compliance mandates, while administrative isolation delivers independent version control and policy management.

Full ADC functionality – Support for 100 percent of the application delivery capabilities available on NetScaler MPX and NetScaler VPX platforms enables consolidation of all existing ADC deployments without any policy constraints or compromises. The ability to accommodate 3rd-party capabilities further maximizes the potential for both horizontal and vertical ADC consolidation (i.e., across and within different application silos).

Simple Scalability and Management – With integral support for Pay-As-You-Grow licensing, organizations can scale individual NetScaler instances up to 18 Gbps, on-demand. In addition, a robust management architecture enables both single-instance and unified cross-instance configuration and monitoring through a single control plane.

The net result is an unparalleled opportunity to Scale In – to accommodate new tenants while simultaneously reducing ADC footprint and TCO, all without having to cut corners or make compromises.



Summary

- 40:1 consolidation
- Full isolation
- Simple management

End appliance sprawl.
Simplicity with many in one.

Conclusion

Citrix TriScale Technology accelerates the transformation from traditional computing infrastructure to enterprise cloud networks by making NetScaler the first and only application delivery solution to natively meet the full scope of scalability requirements for today's most demanding datacenters.

With TriScale's complementary capabilities, enterprises can Scale Up, Scale Out, and Scale In their application delivery infrastructure to quickly and cost effectively respond to incremental changes in application demand, transient bursts of activity, the need to support additional tenants, and even business-level events that drive the need for major increases in capacity. In comparison, architectural limitations typical of rigid, hardware-centric and chassis-based solutions make it practically impossible for competing offerings to achieve a similar breadth and depth of on-demand scalability.

The net result is that TriScale Technology not only represents an order-of-magnitude advance in application delivery technology, but also provides real value for enterprise customers in the form of an unprecedented – and in many cases unmatched – ability to:

- Leverage the network as a resource that enhances (rather than impedes) IT agility and responsiveness to changing conditions
- Substantially reduce TCO by eliminating unused and under-utilized application delivery resources
- Build enterprise cloud networks while also establishing the foundation for next-generation service delivery fabrics



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About Citrix

Citrix Systems, Inc. (NASDAQ:CTXS) is the company transforming how people, businesses and IT work and collaborate in the cloud era. With market-leading cloud, collaboration, networking and virtualization technologies, Citrix powers mobile workstyles and cloud services, making complex enterprise IT simpler and more accessible for 250,000 enterprises. Citrix touches 75 percent of Internet users each day and partners with more than 10,000 companies in 100 countries. Annual revenue in 2011 was \$2.21 billion.

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