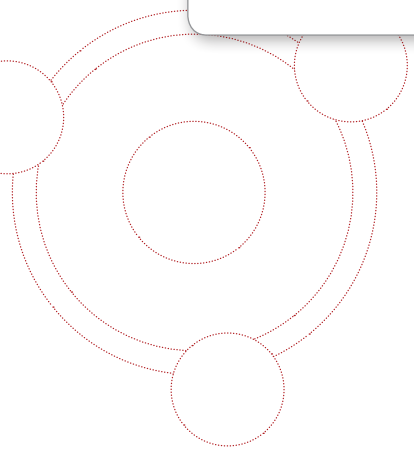
cloudscaling

WHITE PAPER

Elastic Cloud Infrastructure:

Agile, Efficient and Under Your Control



INTRODUCTION

Most businesses want to spend less time and money building and managing infrastructure to focus resources directly on adding value to the business. Elastic cloud infrastructure (ECI) built on OpenStack technology holds the promise for IT and business to collaboratively meet this challenge in an environment that enables new levels of business agility, greater cost efficiencies and rapid innovation—all without compromising security or control.

Having been designed to deliver highly optimized elastic cloud infrastructure on a large scale, leading public cloud computing services such as Amazon Web Services (AWS) and Google Compute Engine (GCE) are accelerating the shift towards on-demand cloud computing models. These public cloud vendors have fundamentally redefined enterprise IT agility by providing access to nearly unlimited compute resources in minutes versus days, weeks or months. For years now, application teams have increasingly engaged in 'shadow IT' by sidestepping internal (or central) IT to get their projects delivered. Computing resources for scalable web applications to big data analytics to dev/test support are being efficiently procured with credit cards via self-service portals with perfect chargeback transparency.

For most enterprises however, moving completely to the public cloud or allowing users to procure any computing resource they want on personal credit cards is not a viable option. Performance optimization, regulatory compliance, data security, governance and control are all reasons to use private cloud. So how do you marry the agility and economic advantages of elastic public cloud infrastructure with the control and IT governance of private clouds?

Enter the private elastic cloud, an approach which employs public cloud architecture behind the firewall in support of modern application architectures. Private elastic clouds are typically deployed alongside existing virtualized infrastructure in data centers to provide a cost-effective home for today's increasingly dynamic applications and a pragmatic path forward for agile, self-service IT delivery.

> ECI is architecturally and behaviorally consistent with leading public clouds like AWS or GCE, but lives in an enterprise data center under IT's control.

While enterprise virtualization made it easy to encapsulate and preserve physical data center complexity to enable server consolidation, the cloud model is about wiping the slate clean and, over time, replacing legacy complexity with cloud simplicity. Why? Simplicity scales.

Elastic cloud infrastructure enables IT services to be agile, efficient and abundant in support of rapid business innovation, with dynamic applications being deployed and refreshed in hours or days rather than weeks or months. Additionally, it helps bring shadow IT back into the light where it belongs.

Why Private Cloud?

In the traditional IT model, business applications are typically bound to a specific hardware stack or silo, resulting in low efficiency, utilization, and flexibility. In contrast, the cloud computing model allows applications to be dynamically deployed and scaled at runtime on commodity hardware. The elastic nature of cloud computing allows applications to easily scale up and down to lower costs while removing the need for hardware silo capacity upgrades.

IT departments are under continuous pressure to deliver computing services at the lowest possible cost. While they can select any combination of public and private infrastructure to meet the demand, many choose to deploy internal private clouds for security, regulatory compliance, control over quality of service, and capitalization of long-term costs. Private clouds allow IT departments to better secure data and address governance regulations—a major concern when storing sensitive data in external, public cloud infrastructure.

> A private cloud should equal a public cloud and enable IT to innovate faster.

Moving Beyond Virtualization with Elastic Cloud Infrastructure

Enterprise virtualization is focused on server consolidation to increase hardware utilization rates. It is different from elastic clouds exactly because it sought to encapsulate and preserve the complexity of existing enterprise stovepipes—all the silos of hardware, software, network and storage rather than the application, and in doing so, it requires expensive and often redundant hardware / software and a high level of effort to deploy and maintain.

In contrast, the elastic cloud model focuses on agility. It throws legacy complexity out the window in favor of simple, modular services. The cloud model reverses the paradigm by making applications responsible for their own fault tolerance to enable extremely scalable and reliable applications that run on commodity hardware with simplified operations.

Elastic cloud infrastructure is not an enterprise server virtualization platform with cloud management layered on top. It's a purpose-built, hypervisor-neutral solution designed to help IT deploy clouds the way the world's largest and most successful public clouds are built. Elastic cloud infrastructures are open, flexible and deliver compelling price-performance for not only deploying and managing cloud applications, but also efficiently scaling services up and down based on demand. By designing this capability into the services that are deployed, IT no longer needs to over-provision infrastructure capacity to accommodate spikes in load.

To better understand this, think about what the Internet giants have been doing. Instead of building custom stovepipes, they build commodity layer cakes, where they have a whole stack of services that support each other from the concrete up to the software layer. Their portfolio of applications then leverages the entire commodity stack. This approach caters to greater scalability for both the apps and the infrastructure. Instead of managing large numbers of heterogeneous stovepipes, operators manage scalable apps deployed on homogenous infrastructure spread across the entire load. ECI mirrors these design principles.

People commonly want to create 'clouds' by sprinkling 'automation' into virtualized datacenters. The problem is that if it was just an automation issue, IT would have cracked the code on cloud a long time ago. Automation has consistently failed unless it is combined with homogeneity. The homogeneous infrastructures at Google, Amazon, Twitter, etc. allow automation to finally work. With a layer cake, automation actually works. With silos you are back in element management and hardware/software complexity hell which cannot be automated.

Below is a summary comparison of enterprise virtualization and elastic cloud computing:

	ENTERPRISE VIRTUALIZATION	ELASTIC CLOUD
Applications	Traditional & Legacy	Dynamic
Scaling Architecture	Managed silos	Horizontal
Technology stack	Heavy & Proprietary	Distributed open components
Performance/Price	Low	High (4-7x better)
Failure Domains	Large	Small
Provisioning	Slower/manual	On-demand/100% API
Best For	Consolidating dedicated physical servers to lower datacenter management costs through virtual server pooling.	Newer cloud-ready and scale-out applications that request and consume virtual infrastructure on-demand.

Elastic cloud infrastructure is built on OpenStack—an open and scalable operating system for building public and private clouds that is quickly becoming the standard cloud amongst leading IT vendors. It provides organizations an alternative to closed cloud environments, reducing the risks of lock-in associated with proprietary platforms. With a foundation built on OpenStack, ECI is designed to innovate quickly, scale faster and ultimately produce better outcomes across the user base.

Similar to the openness, scalability and innovation Linux offered developers and users over the "walled garden" approach of early vendors like Microsoft, OpenStack is bringing more flexibility and a larger community together to innovate and improve cloud technology in a collaborative fashion. An impressive, broad level of support for OpenStack includes 140 + companies including leading enterprise vendors such as EMC, IBM, Dell, Cisco, HP, Intel, NetApp, Brocade as well as Linux distributors such as RedHat, SUSE and Canonical.

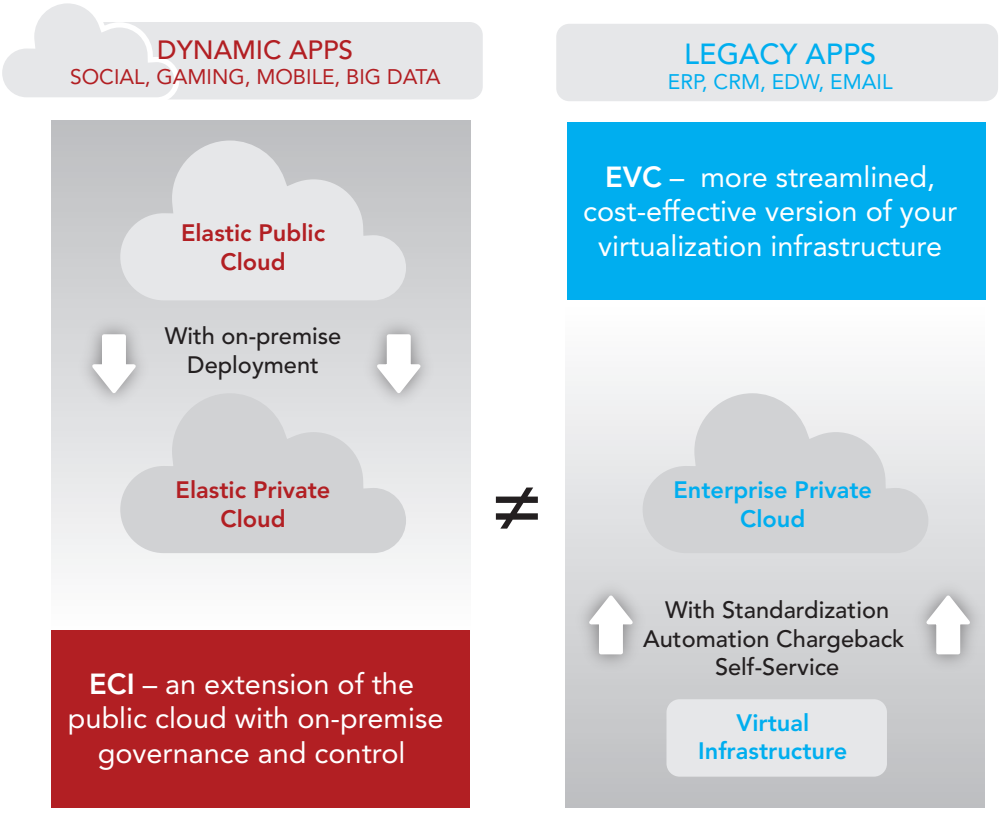
Dynamic Applications: Enabling A New Kind of Agility

Cloud computing is upending traditional application development processes and infrastructure. A new generation of dynamic, cloud-based applications is driving the need for an elastic cloud infrastructure optimized to handle them. By definition, dynamic cloud-based applications are highly scalable and highly distributed with rapid release cycles to accelerate innovation. Applications built natively in the cloud are not tied to any single hardware stack. Because they are built independently of the hardware that run them, they can be enabled and spun up to meet scaling challenges and demands on the fly and in real time. Unlike legacy applications, they manage their own availability by detecting failures, replacing virtual servers and replicating data as needed.

The workloads most likely to benefit from an elastic compute infrastructure include:

- Scale-out web applications: social, mobile, collaboration
- PaaS running packaged and custom business applications
- Big Data Processing and Analytics
- Dev/Test
- Hybrid Cloud applications
- Backup / Disaster Recovery

These workloads are also top candidates for the "shadow or rogue IT" process so prevalent in businesses today. Elastic cloud infrastructure presents an opportunity for an enterprise to really change the dynamics of how IT gets delivered to satisfy both technical and business user requirements. With a strategy that embraces ECI, IT can enable a new kind of agility by making it easier to move workloads securely between public and private clouds.



Elastic and virtual clouds are different on several levels—workload, architecture, economics, skills—and deliver vastly different benefits to the business.

When the architecture of a company's on-premise private cloud is compatible with AWS or GCE, it doesn't require massive re-engineering to redeploy applications (in either direction). Elastic cloud infrastructure reduces that friction. For example, a company can test and develop new features and products on a private cloud. When they're ready to go into production, the company can deploy them in a public cloud like AWS or GCE in a matter of minutes. For developers who start in AWS or GCE then want to run the production version in-house for reasons of security, reliability or cost, ECI provides an AWS and GCE-like cloud in their own data center.

Moving to elastic clouds is not arip and replace proposition, but rather a pragmatic and parallel enterprise path forward that will provide a cost-effective home for today's increasingly dynamic applications. The path and pace of each organization's cloud journey depends

A new wave of dynamic cloud applications are powering companies to drive new revenue streams, deliver greater business agility and achieve competitive advantage.

on individual business circumstances, competitive pressures and strategic priorities.

Forward looking IT executives are embracing private elastic cloud infrastructure in order to support the evolution towards a dynamic computing environment which does not compromise security, reliability, control or cloud economics. The challenge is to develop the right mix of private and public cloud solutions—one that will work today and into the future.

Key Takeaways

1. **The industry is shifting and moving away from IT that is largely manually operated,** slow and tightly coupled with physical infrastructure, to one which is highly automated, software driven and rapidly responds to user self-service requests.

2. **Elastic clouds push IT's value beyond delivering the benefits of virtualization** (cost and consolidation) towards achieving faster time to delivery of applications, better IT business alignment, less shadow IT projects, reduced infrastructure costs & complexity and enterprise-wide agility.

3. **Modern, dynamic cloud-based applications require elastic infrastructure.** ECI delivers the agility and efficiency gains of public cloud infrastructure coupled with the security, control and governance inherent to your own private cloud.

ABOUT CLOUDSCALING *Cloudscaling is the leading elastic cloud infrastructure company, delivering cloud software for on-premise Infrastructure as a Service (IaaS). Our product, Open Cloud System (OCS) powered by OpenStack, is designed to meet the requirements of critical production applications. OCS delivers the agility, performance and economic benefits of leading public cloud providers, but deployable in the customer's data center and under the IT team's control. Cloudscaling is backed by Trinity Ventures and headquartered in San Francisco. For more information, please visit www.cloudscaling.com*

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