Virtuozzo 7: Overview

2016

Agenda

- Company Background
- Virtuozzo 7.0 Compute and Storage
- Business Opportunities and case studies
- What’s New in Version 7.0

Virtuozzo

- Founded in 2001, “spun out” of Odin/Parallels 2016
- Headquartered in Seattle, with offices in Moscow, London and Munich
- Over 170 employees, including 100+ engineers and 15 experienced kernel developers
- 120+ patents in container, virtualization, and storage technology
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Virtuozzo in 2015-2016

March 11, 2015
Accepted as Officially Supported Server Virtualization Product in OpenStack

March 24, 2015
Parallels Renames Service Provider Business Unit Odin

Q4 2015
Odin Separates into 3 Business Units:
Odin Service Automation, Virtuozzo, Plesk

Q1 2016
Virtuozzo elected as a board member of Open Container Initiative

March 13, 2015
Virtuozzo Provides Native Support for Docker

May 2015
OpenStack Board Approves Parallels as Gold Member of the Foundation

December 2, 2015
Parallels Announces Sale of Its OSA Platform to Ingram Micro

Open Source Projects And Technology Partners

- Key Open Source sponsor and/or contributor of OpenVZ, CRIU, P.Haul, runc, and Linux kernel

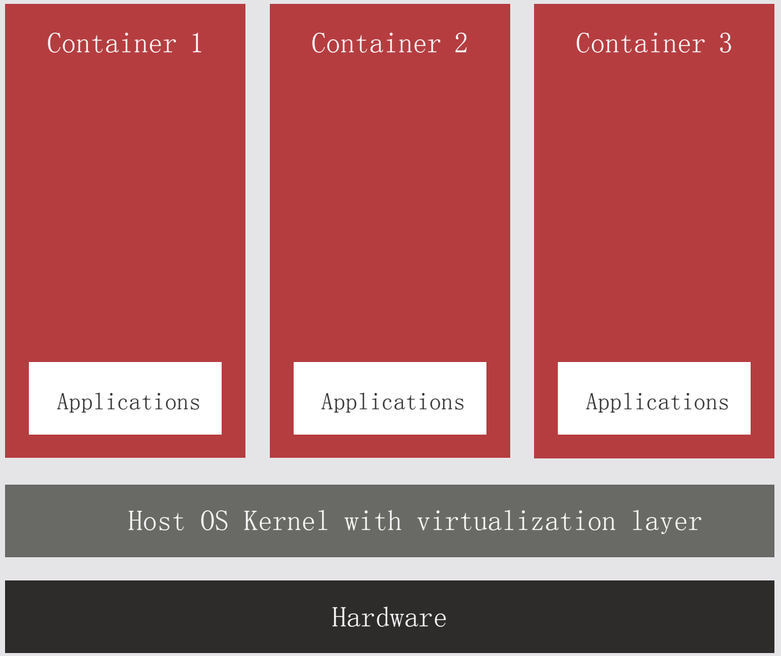


- Board members of Open Container Initiative, Cloud Native Computing Foundation, and OpenStack

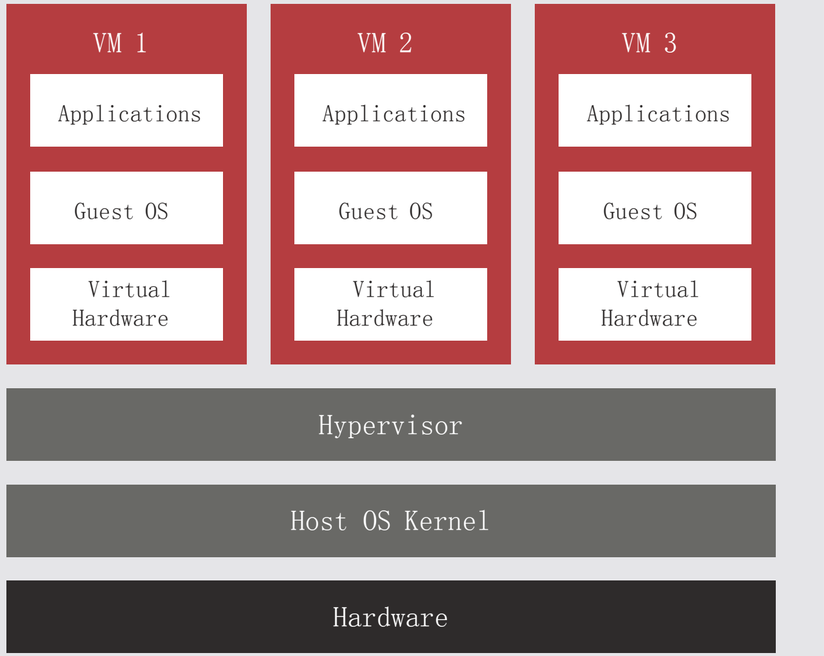
- Strong technology alliances

Compute Your Way

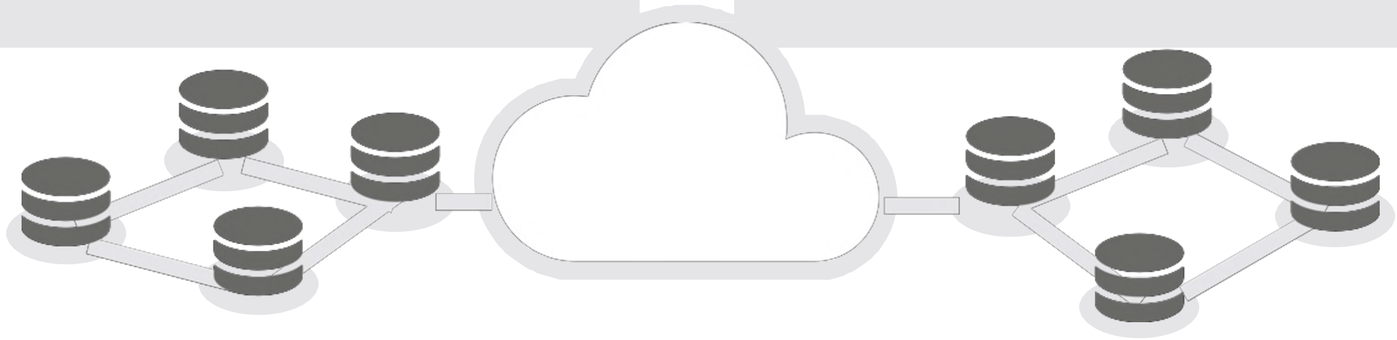
System Containers



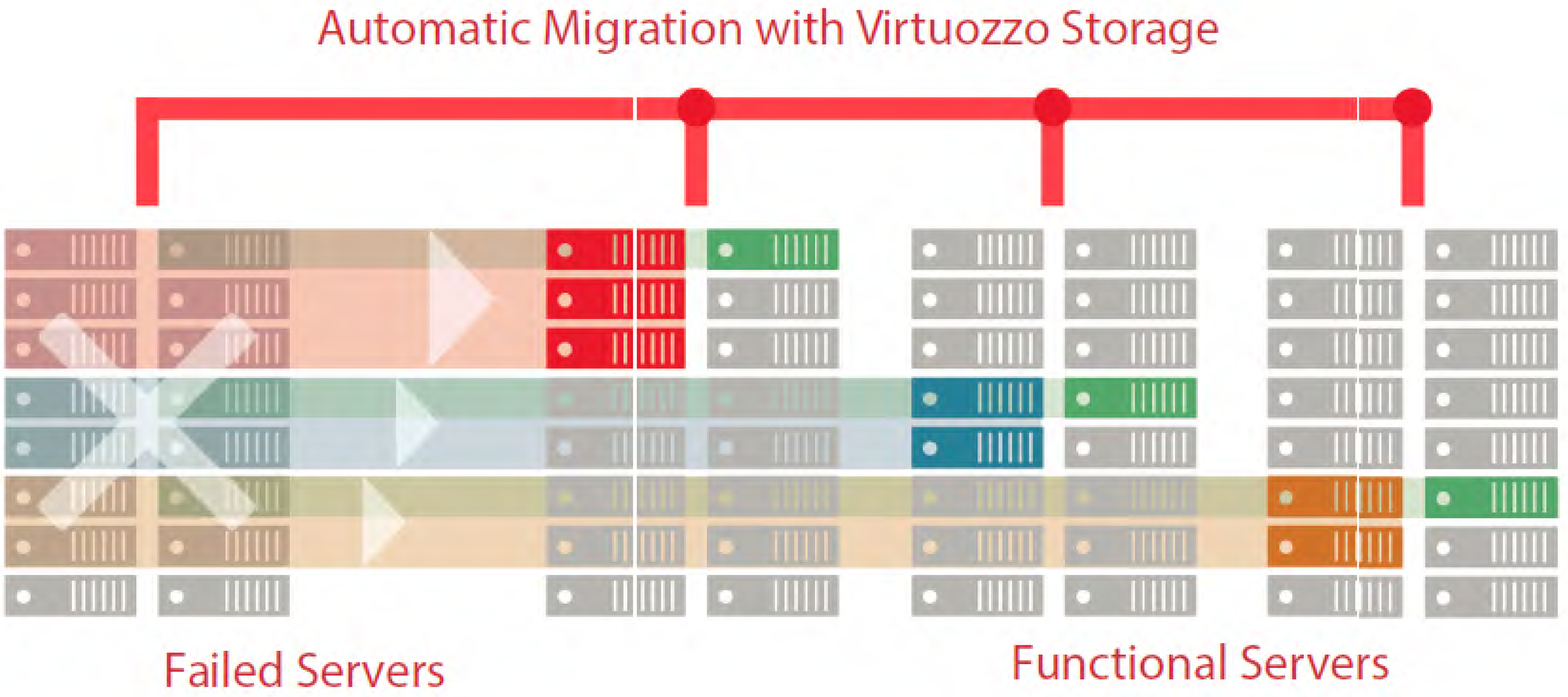
Optimized KVM



Virtuozzo Storage



High availability



Use cases

Hosting & Service Providers

VPS and Dedicated Hosting

Stable

Network Functions Virtualization in Containers

Emerging

Software as a Service

Secure Multi-tenant SaaS platform

Growing

Securing Docker containers and providing multitenancy for Docker orchestration platforms

Emerging

Enterprises

Containerizing Legacy Applications

Emerging

Replacing expensive VMware deploy- ments with KVM

Growing

Use cases

Challenge

Improve business critical application performance and capacity.

Apptio's application suite includes large, in-memory dataset calculations, which result in multiple tiers of cache in memory and are accessed from high performance storage. As Apptio's business grew, its technical operations team needed a way to stay on top of that growth by maximizing server performance, while securely isolating customer workloads. To solve the problem, Apptio evaluated commercial virtualization solutions and open source hypervisor solutions alongside Virtuozzo Containers.

Solution

Virtuozzo Containers and Virtuozzo Storage.

Only Virtuozzo could offer the level of performance that Apptio's business required. During phase I, Apptio deployed Virtuozzo Containers across the global Apptio server fleet. Virtuozzo provided a secure, high performing virtualization platform with containers that could securely isolate workloads, while increasing server density and performance.

Challenge

Improve Performance and Capacity During Peak Infrastructure Load

Global travel operator Thomas Cook relies on e-commerce to generate revenue and deliver outstanding customer experiences. During seasonal peak periods, the stability and reliability of its underlying infrastructure is critically important. netclusive, Thomas Cook's hosting provider, had a significant business opportunity to help them cope with the seasonal demand peaks that were impacting their e-commerce experience. With Virtuozzo powering their infrastructure, netclusive knew they could
give Thomas Cook better performance and exceptional storage capacity with a reliable, low cost virtualization platform

Solution

Virtuozzo Containers, VMs, and Virtuozzo Storage.

Virtuozzo's elastic computing performance, which can scale up or down in real time, is now helping Thomas Cook cope seamlessly with fluctuating demand.
Their entire e-commerce infrastructure, including multiple reseller and mobile websites, is now running smoothly on netclusive's Virtuozzo-based platform.

High Availability. Zero Disruption.

Using Virtuozzo's optimized and well-proven products, netclusive has been able to expand its business from one primarily built around web hosting services, to one that provides customers with complete infrastructure-as-a-service solutions.

Infrastructure reliability is critically important to e-commerce. Virtuozzo Storage's high availability ensured that Thomas Cook's e-commerce would always be operational, despite dramatic shifts in load. When it came time for system upgrades or migrations, Virtuozzo's rebootless update functionality provided built-in support for ongoing maintenance with no disruption
to service.

Use cases

Challenge

After deciding to refocus their business on meeting an increasing demand for IaaS, ServerNest needed to accelerate virtual machine creation without compromising the stability of their hosting platform. They also needed the maximum return on their existing investment in Odin Business Automation Standard, the ability to deploy hypervisors and containers on the same node, and the ability to quickly expand their offerings with new services including VoIP telephony and cloud storage.

Solution

To offer customers a complete IaaS solution based on low-cost containers, ServerNest decided to deploy Virtuozzo.

Virtuozzo provides a high-security, high-performance virtualization solution that combines containers, hypervisors, and storage to give ServerNest a single, cost-effective platform for delivering high-availability IaaS to its customers. The solution also features a built-in server migration functionality that makes it easy for ServerNest to migrate customers from expensive and proprietary virtualization solutions within a few weeks without service disruption.

Challenge

In 2009, Fast Hit was experiencing a few growing pains as its web hosting business expanded. Over the years, its server and storage inventory increased; however, many of these resources were isolated from each other, creating problems when it came to load balancing and resource utilization. When virtualization technology became an option, Fast Hit was quick to see this technology's potential in addressing their issues.

"It was not practical to be bound to hardware," said Chris Bauer, managing director at Fast Hit. "Every three months, we get a new server product that is cheaper and runs faster, so we need to be able to adapt, add different configurations of servers for different customers, and shift the workloads and storage over."

Solution

Virtuozzo provided Fast Hit with a cost-effective virtualization solution that has enabled it to grow with its customers and to launch new products and services.

Higher revenue per node, low license costs, rapid provisioning enable short times to market, flexibility, built-in high availability and disaster recovery.

Use cases

Challenge

As it broadened its portfolio to include web development, email hosting, and server hosting, BizMaC wanted to empower its customers with self-service capabilities and provide hosting services that offered greater flexibility in server configuration and functionality. From an operational perspective, BizMaC aimed to minimize server management overhead and avoid downtime due to hardware problems.

Solution

To achieve these objectives, BizMaC decided to use Virtuozzo for managing client web hosting and delivering on-demand infrastructure services. Virtuozzo simplifies web management activities to align with the way infrastructure is used today for hosting websites and web applications. As the most widely used web management solution, Virtuozzo provides everything a web professional needs to set up a website quickly and securely – including a WordPress Toolkit, an easy-to-navigate control panel, server level automation, supportability tools, and complete protection with a server-to-site security core.

Virtuozzo supports high-density containers and enables service providers to offer high-security and high-availability VPS solutions. By combining container, hypervisor, and storage virtualization into a single offering, Virtuozzo increases revenue, application performance, and ease of management, while reducing server maintenance and management costs.

Challenge

With a continued focus on superior hardware and intelligent automation systems, Conetix provides enterprise-grade solutions ranging from basic web hosting to advanced application and desktop delivery. With a rapidly expanding system, Conetix needed to find a way to easily scale their capacity and performance. However, traditional storage area network (SAN) platforms led to an uneven balance of cost versus performance.

Solution

The consolidation of Conetix's IT environment to Virtuozzo was a significant step toward addressing their challenges. Virtuozzo enables both containers and hypervisors to be deployed on the same physical server. By using this virtualization platform, Conetix can take advantage of container scalability and streamlined operations, while still providing hypervisors for customers who need control over all aspects of their virtual server.

Virtuozzo also includes a distributed, shared cloud storage that offers SAN-like performance and scalability but runs on the existing compute infrastructure. This eliminates the need for separate storage systems.

"Through Virtuozzo, we have a reduced server footprint which means fewer racks, lower power consumption, and lower ongoing costs," said Jamin Andrews, Conetix managing director.

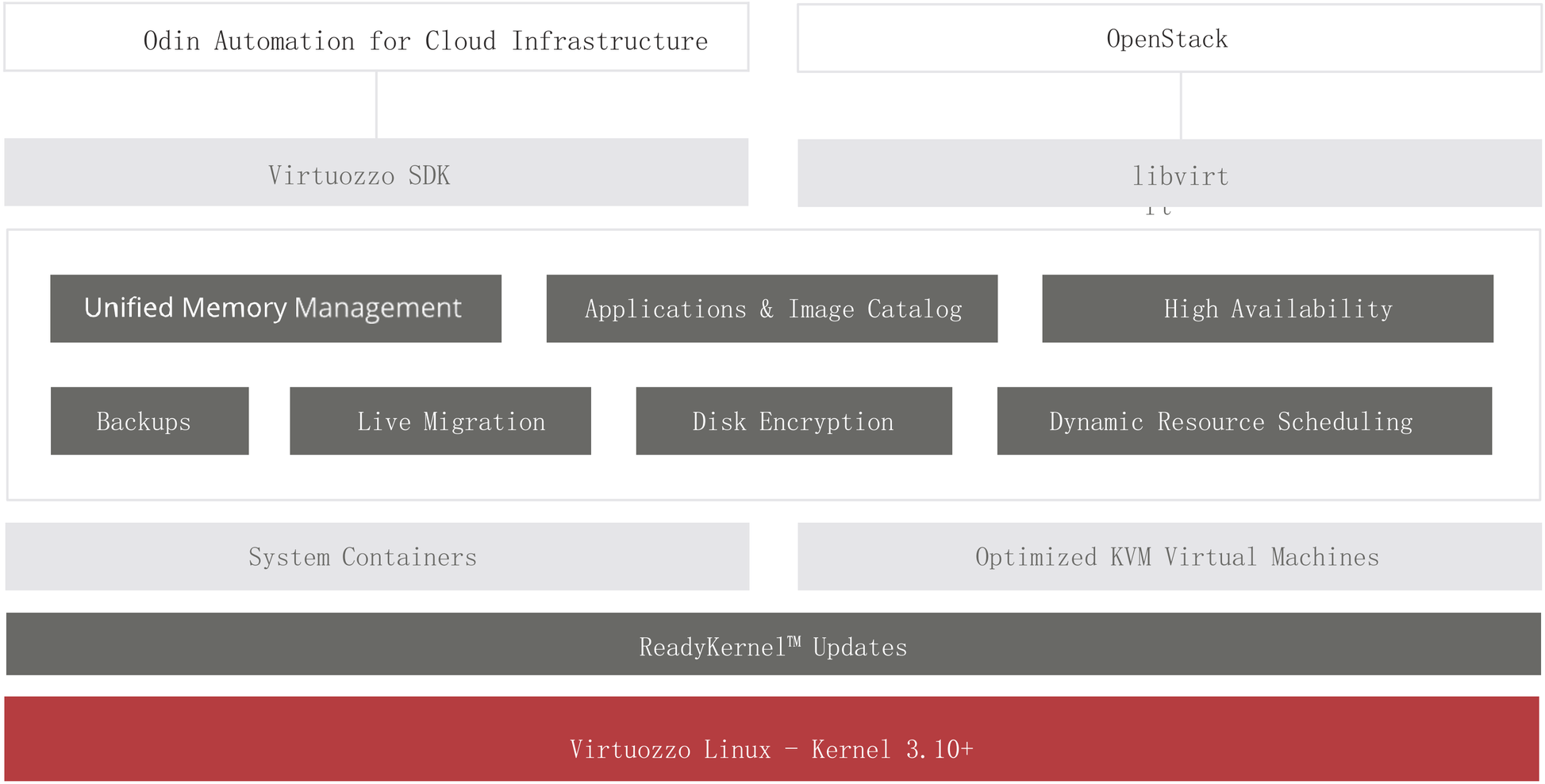
Virtuozzo

What’s new in Virtuozzo 7.0

Virtuozzo 7: What’s new?

- New high performance system containers
- Optimized KVM
- Adaptive memory management
- Live migration in userspace
- libvirt andOpenStack Nova APIs
- ReadyKernel live patching
- Flat licensing model
- Disc encryption coming soon

Virtuozzo Compute



Virtuozzo Storage

Virtuozzo 7 Containers: What’s new?

- Based on RHEL 7 (3.10+) kernel + 10% to performance
- Complete transfer to cgroups and namespaces
- Improved container naming (UUID or names instead of IDs)
- Advanced memory management (4th generation)
- Support Docker inside system containers with bare metal performance
- Support container management for libvirt and OpenStack

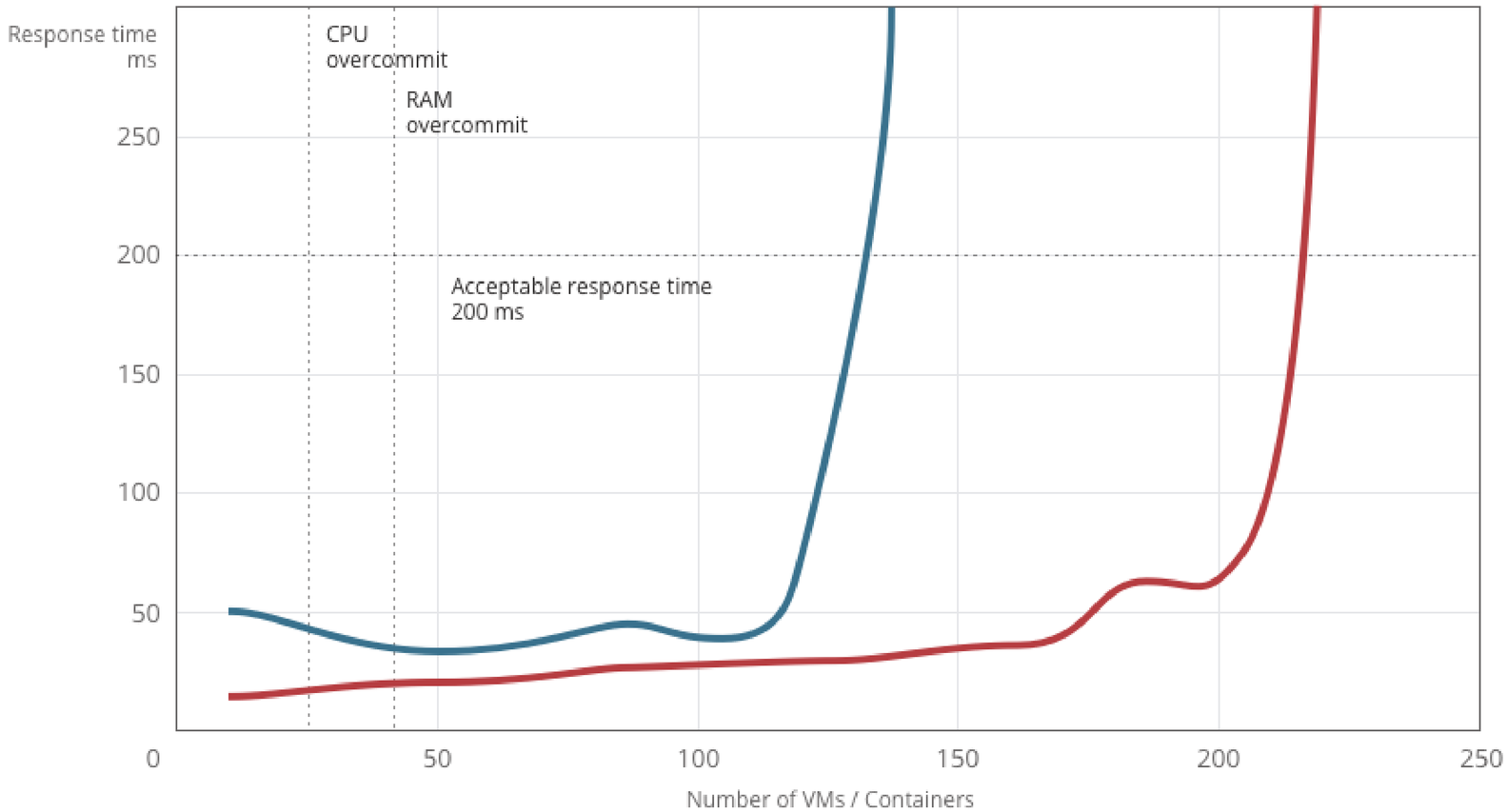
System Containers Density

up to 63%

greater density
compared to
CentOS 7 KVM

up x2

better response
times



Optimized KVM

- **40% better** performance and up to **2x better** density vs CentOS KVM
- **Advanced memory management** with auto ballooning component
- Upstream compatible and commitment to open standards
- Based on CentOS7 KMV and modern version of QEMU: 2.3.0
- Kernel same-page merging (KSM) is enabled by default
- KVM/QEMU cache optimizations
- Set of kernel patches improving performance
- Hyper-V compatible Windows drivers
- Backporting the latest KVM/QEMU components to 3.1 kernel
- Powerful guest tools and Cloud Init support

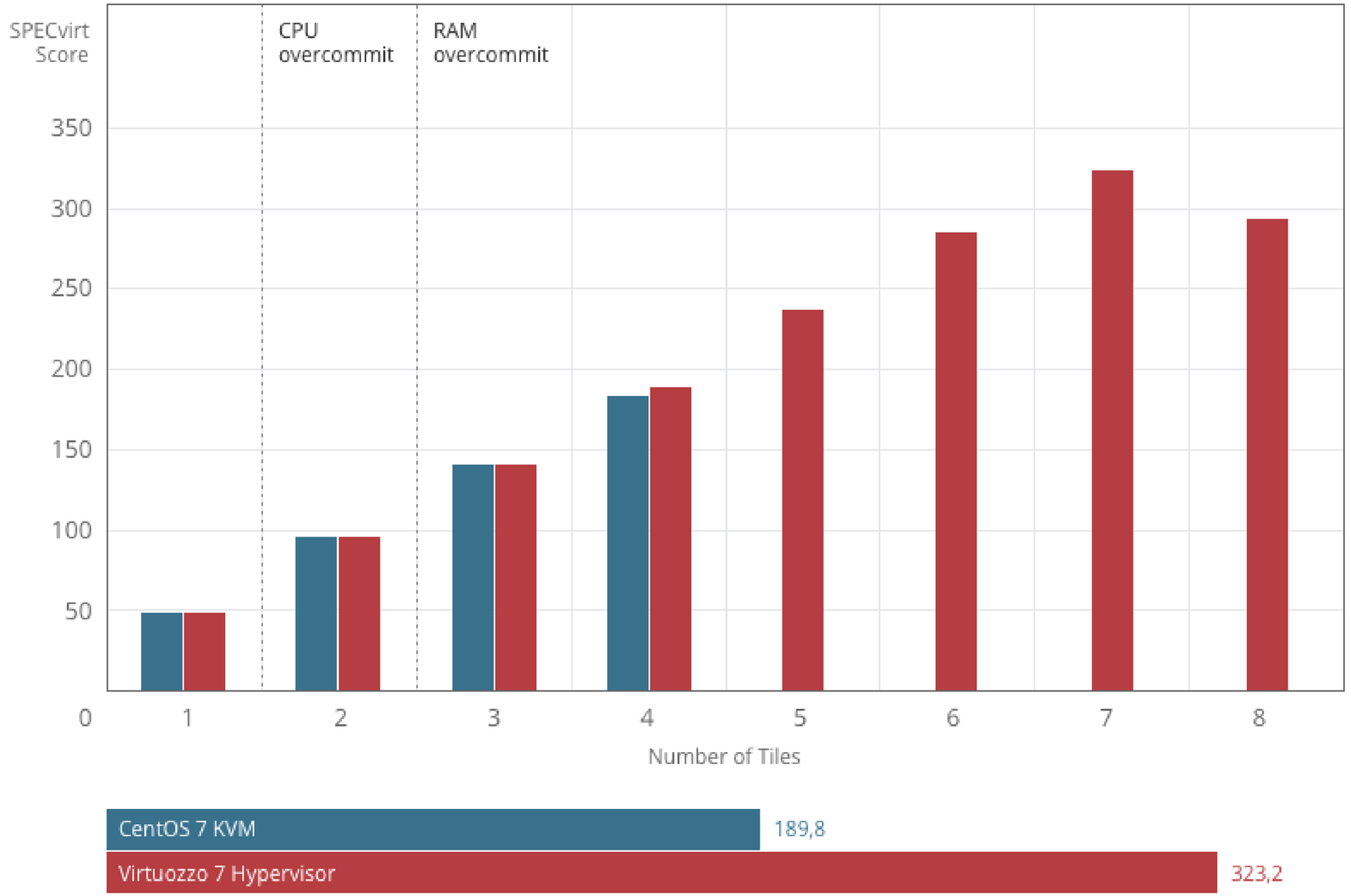
Virtuozzo Optimized KVM and CentOS KVM

40%

better performance

up to **2x**

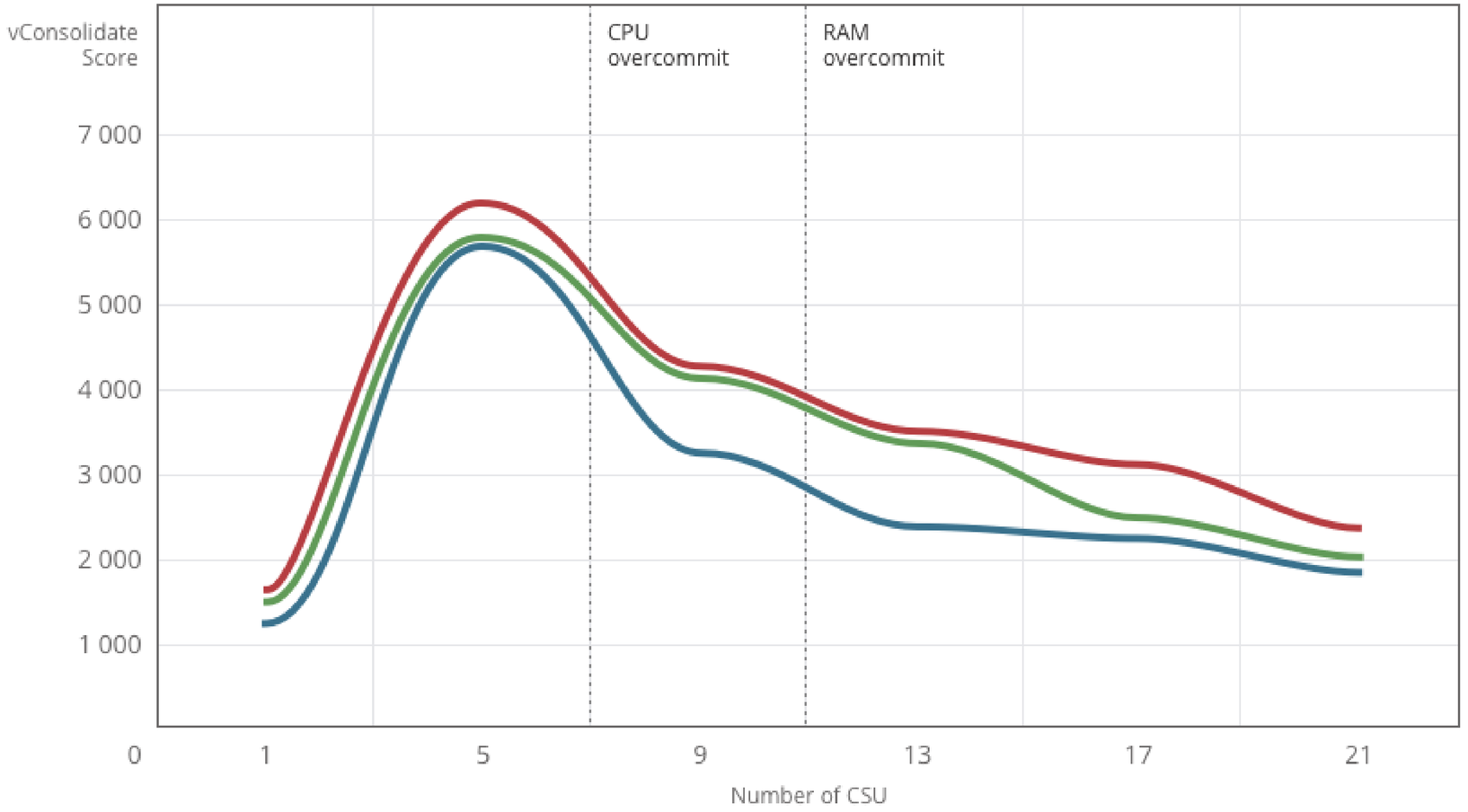
better density



Windows Guests

33%

better performance results



Docker Support

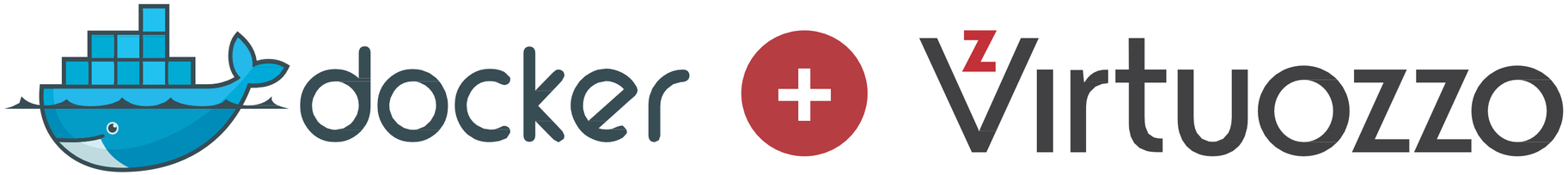
Security
and multi tenancy

Resources management
and isolation

Easy to integrate in
build, test, ship,
debug cycle

Application packaging
and dependency management

Docker Support

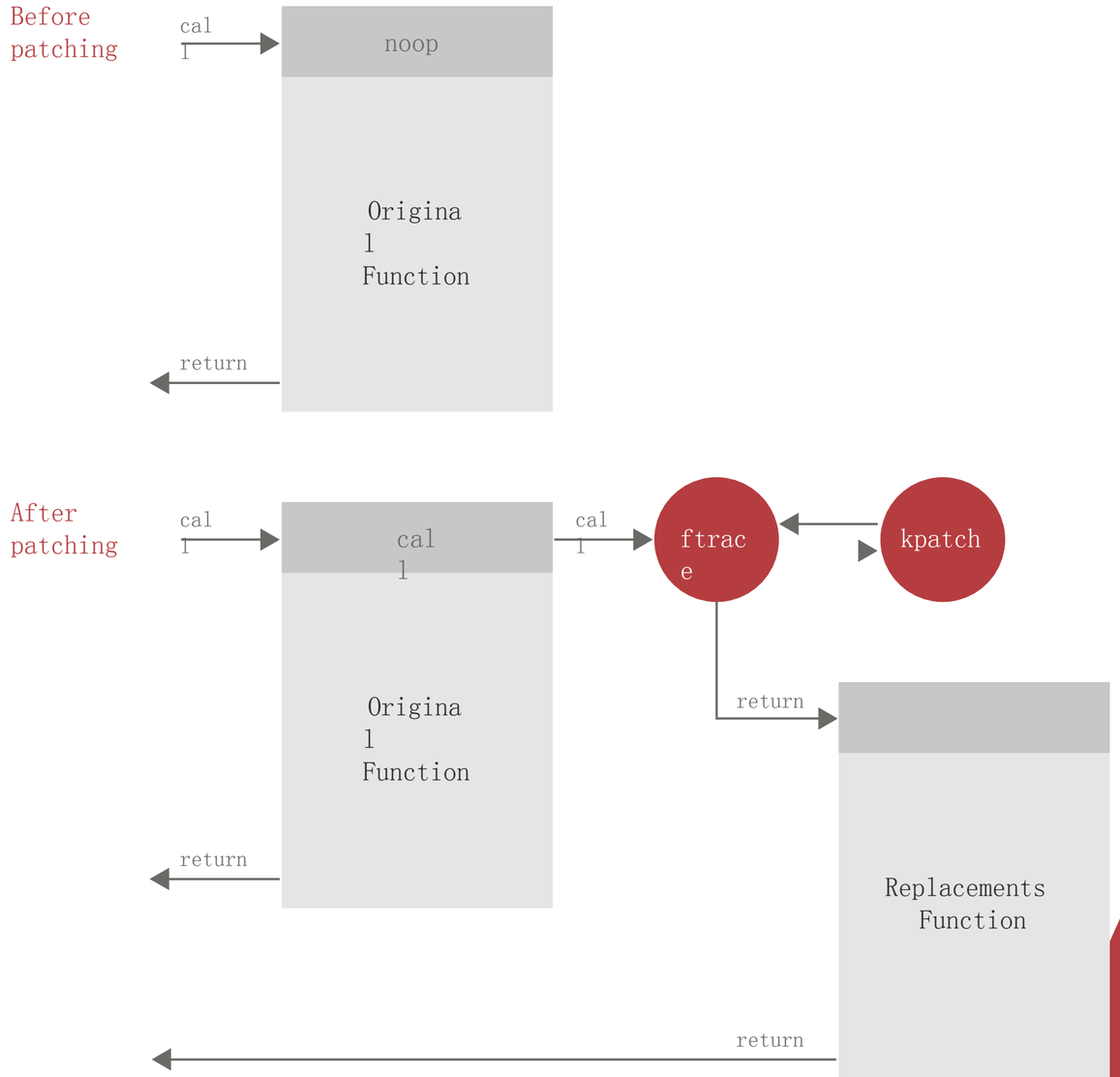


- Run Docker in privileged mode without security risk
- Bare metal performance without VM up to 60% penalty
- Single copy of images per cluster
- Highly available volume storage solution
- Fine grained resources management and isolation
- Flexible resource allocation between multiple Docker clusters

ReadyKernel™

ReadyKernel™ is a live patching of a running Linux kernel:

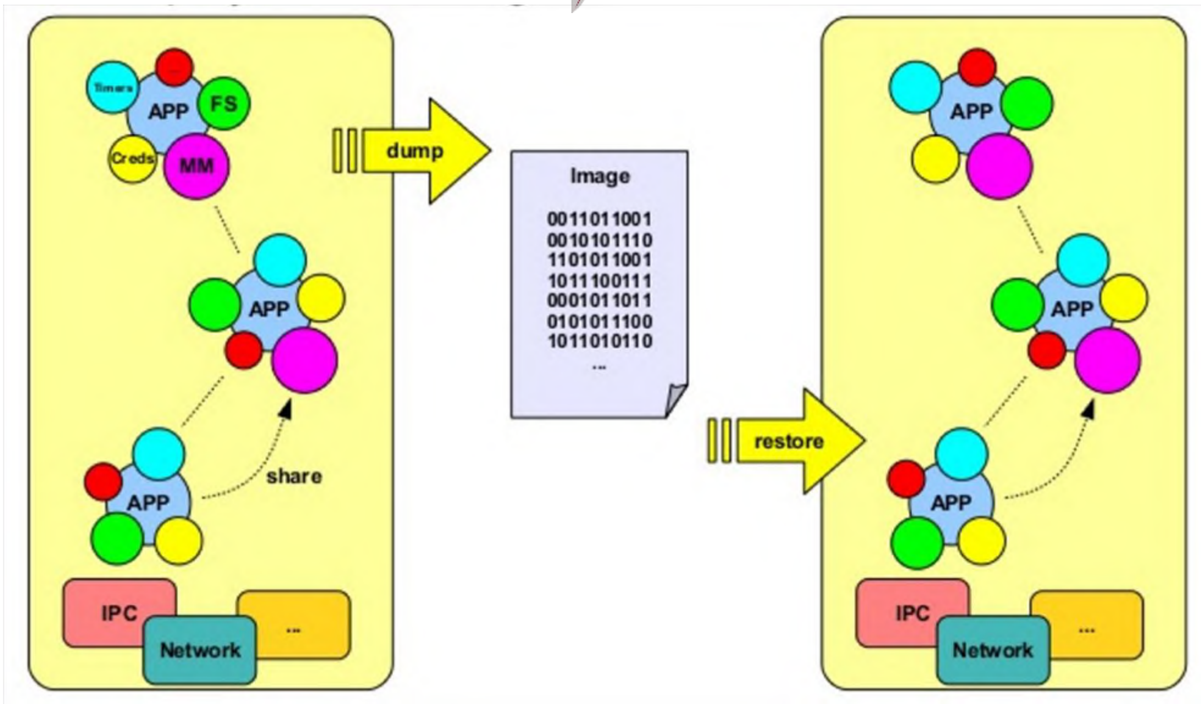
- No downtime or freeze
- Applied in a seconds
- Most of kernel hotfixes and CVEs could be fixed with kpatch
- Patch will rollback automatically if it is not successful
- Based on kpatch technology
- An update is prepared manually by Virtuozzo Kernel team



Live Migration in Usespace

Benefits

- Less restrictions than Kernel migration
- Stable and secure



Adopters and contributors

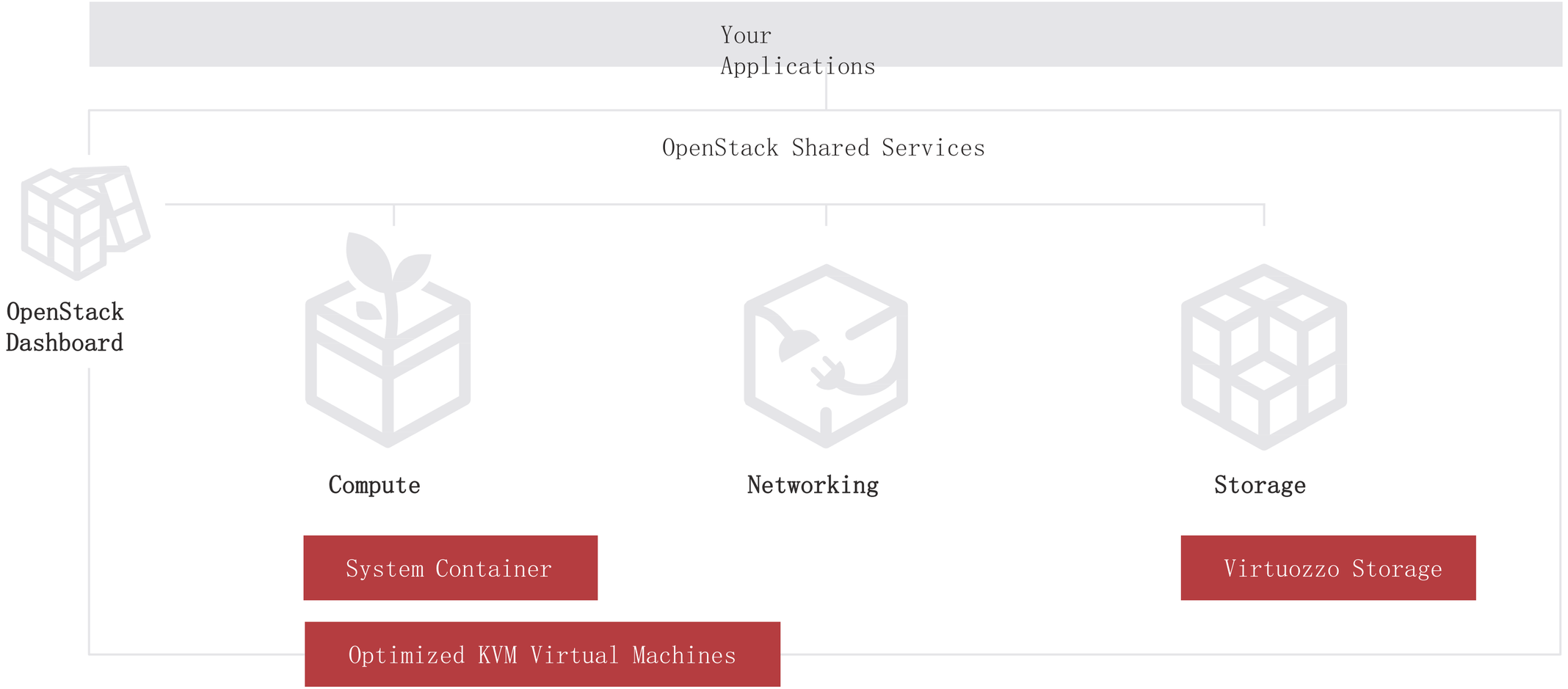
Google

ubuntu

docker

Virtuozzo

OpenStack and Virtuozzo



OpenStack as a Platform

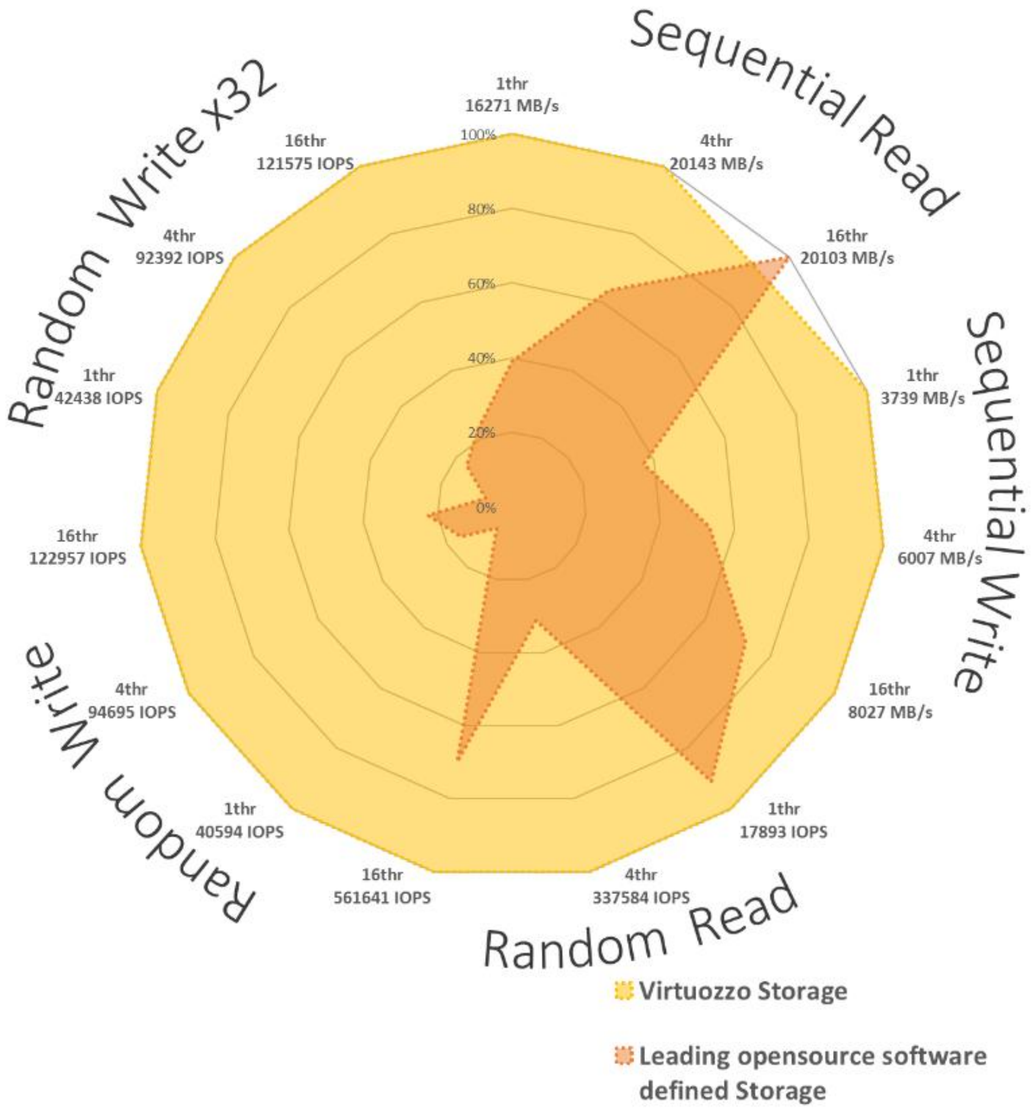
OpenStack is a promising candidate for universal infrastructure platform:

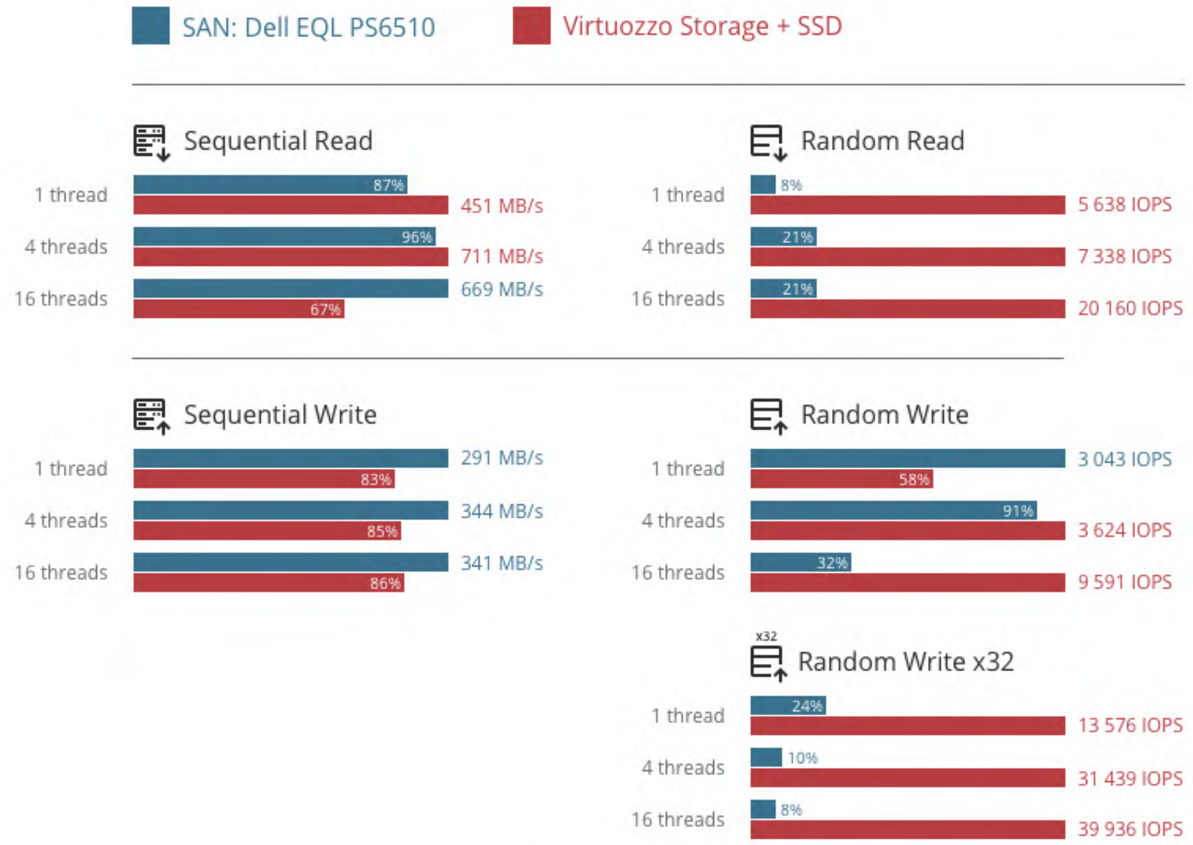
- Classic VPS and Dedicated Servers offering
- New Virtual Datacenter offering
- Platform for a future services like: CaaS, VNF hosting, etc…

It cannot compromise performance by following “default” options :

- Generic KVM (- up to 40%)
- No support for system containers (- 60%)
- ceph as a storage (-10x performance)

Virtuozzo Storage





Virtuozzo is faster than HW SAN

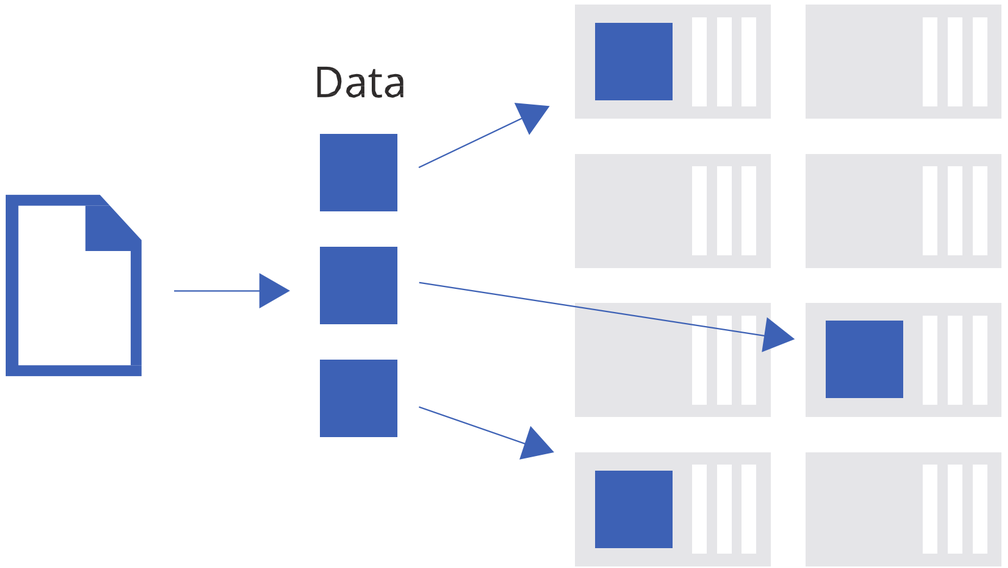
Just 10 nodes VZ storage cluster faster than DELL EQL SAN ($97000) in most workloads

Virtuozzo Storage Vs CEPH

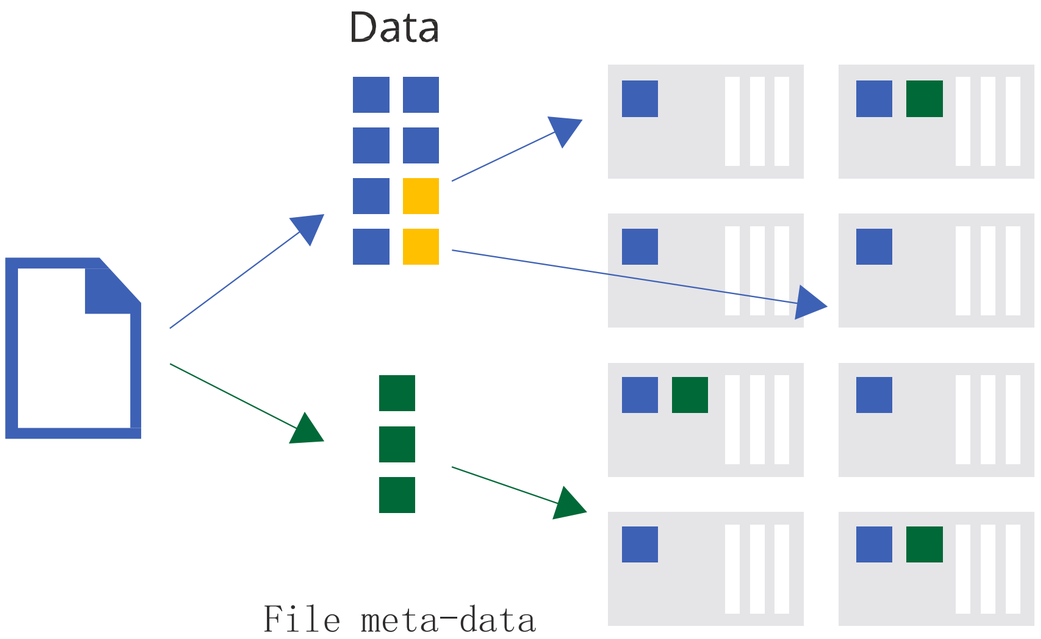
up to 10x
times faster

Two ways of saving data

Replicatio n



Erasure Coding 6+2



Erasure Coding

Pros

- Reed-Solomon (x1.25) storage efficiency instead of x3
- Fast on write even without SSD
- Resistant in 2+ nodes failure
- Easy geo-replication (future)
- Storage level snapshots, linked clones (future)
- Easy deduplication andcompression (future)

Cons

- Relatively slow sequential reads
- Recommended 1 CPU core per node
  - Recovery process
  - Garbage collection

Virtuozzo

Thanks for your attention