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Flip the Switch to Container-based Clouds

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Datera at a Glance

Founded 2013

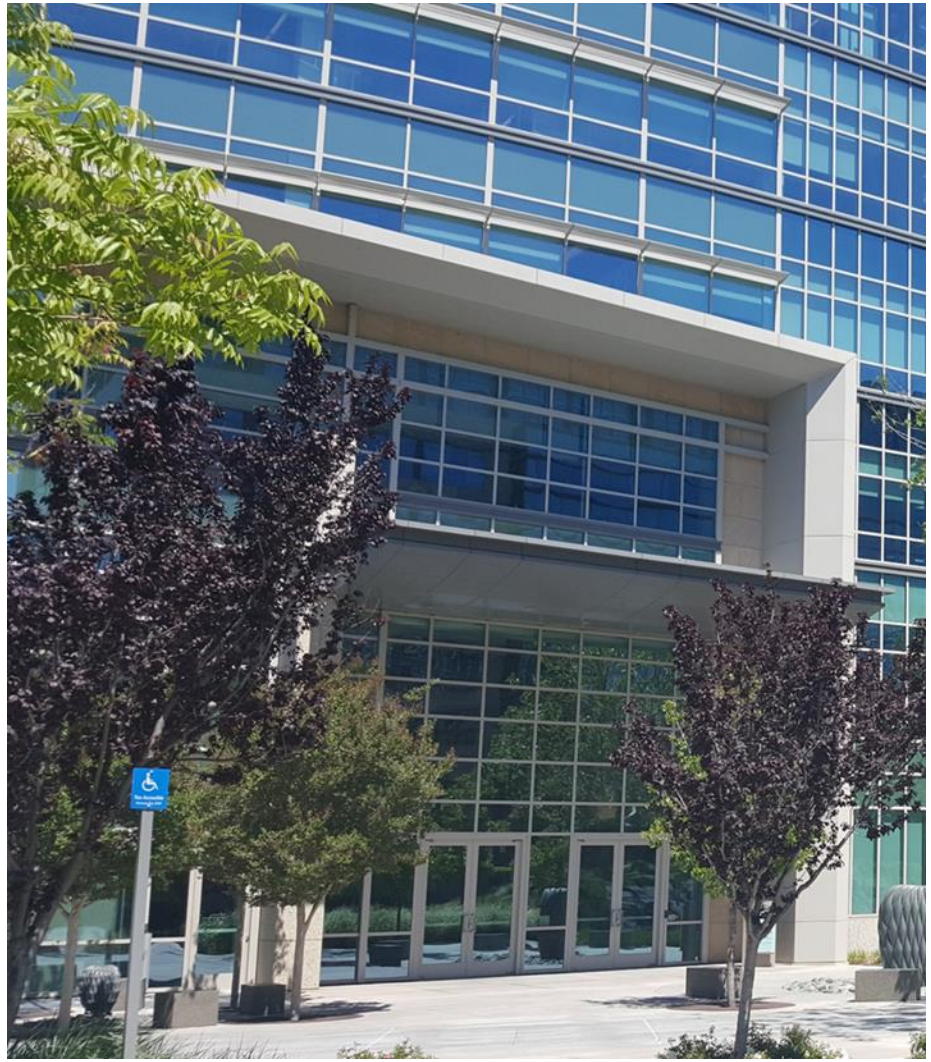
- Smart storage for clouds from enterprise to edge
- Tier-1 investors & industry thought leaders

  Khosla Ventures, Samsung Ventures, Andy Bechtolsheim, Pradeep Sindhu

Launched April 2016

Broad Datacenter and Cloud DNA

- Cisco UCS, Microsoft Azure, Nicira, 3PAR, NetApp, EMC, Riverbed
- Creators of industry-standard Linux-IO block storage stack (‘LIO’)



If it Were Easy, Everyone Would Do It…

It's easy to define the cloud in simple terms

- Someone else's server or a service you rent or borrow
- The underlying technology is invisible

But making the cloud simple is not as easy!

- Self-service
- Resource segregation
- SLA enforcement
- Billing

Clouds are not just about the "what", but the "how"…

But Container Clouds Can Help Make it Simpler!

Container clouds offer distinct advantages

- Reduced complexity & greater flexibility
- Scale-out design for better performance & reliability

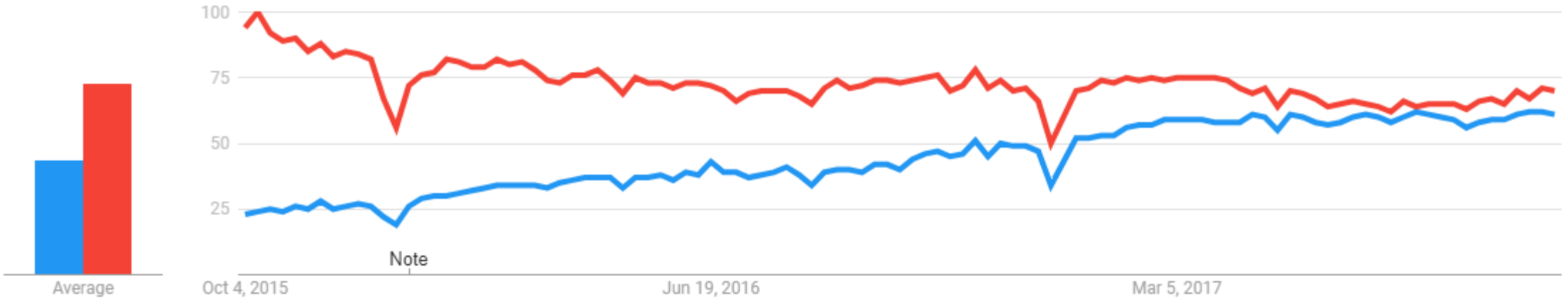
Implementing container clouds:

- Will impact traditional infrastructure and requires application support
- Needs strong internal alignment and communications

Understanding the choices & trade-offs is essential!

The World According to Google – Docker vs. VMware Popularity

Docker (in blue) is gaining in searches vs. VMware (in red)



Container interest is growing quickly, but why?

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There and Back Again!

The container concept is not a new idea

- chroot
- BSD jails
- Solaris zones

VMware virtualized the x86 world

- Drove a shift from bare metal to VMs

Docker is now driving microservices

- Applications migrating from monolithic design to microservices architecture

So, how do I choose which to use when?

Virtual Machines vs. Containers – How Do They Differ?

Virtual Machines	Containers
Per-VM kernel space	Shared kernel space
Per-VM memory space	Shared memory space
Per-VM networking space	Shared networking space
Per-VM file system	Overlay file system
Persistent storage as a device	Persistent storage as a mount point
Isolated image approach	Shared image approach
Per-VM patching	Global patching
Provisioned at VM level	Provisioned at process level

- VMs offer superior flexibility but are less resource efficient
- Containers offer superior provisioning but require orchestration

Containers Can Create New Challenges for Infrastructure

Element	Challenge
Network	Containerized apps may consume 10 – 100 IP addresses
	North-South traffic patterns move to East-West patterns
Compute	Becomes an automated, uniform pool of resources
	Becomes stateless to simplify deployment
Storage	Rapid provisioning pushes limits of traditional storage
	Rack-scaling breaks traditional scale-up models
	Storage must be agile, extensible and performant!

How can we address these challenges?

Preparing for Containers: Some Practical Advice

Element	Recommendation
Network	Deploy L3 networks with BGP routing at the host
Compute	Avoid server-level redundancy
	Rack-scale deployments only
	Optimize for your power envelope
Storage	Latency, not IOPS, should define tier boundaries
	Offer local storage for ephemeral needs
	Use general purpose storage for light, stateful workloads
	Provide low-latency storage for business critical applications

So, what's the bottom line?

It’s All About the Applications…

Containers offer significant benefits:

- Simplifies complex applications via microservices
- Descriptive deployments for better repeatability
- Scales out to achieve performance and reliability

Containers offer significant challenges:

- Fewer tuning opportunities
- More parts to manage
- Devs and Ops must be aligned
- Will break traditional infrastructure

So, how do I get started?

Doing This at Home – Some Key Questions & Considerations

Key Questions:

- Who is your target user? Are they internal or external?
- How effective are communications between your Dev and Ops teams?
- Can you dictate standards?

Key Considerations:

- Docker is root, thus containers have root privileges
- Limited multi-tenancy, user security or segmentation within a cluster
- OpenStack or VMware can provide resource segmentation, user authentication and network management

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For more information, see us at booth #209!