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What Does Hyperconverged Mean to Storage?

Live SNIA ESF Webcast
March 15, 2017
10:00 am PT

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160
unique member companies

3,500
active contributing members

50,000
IT end users & storage pros worldwide

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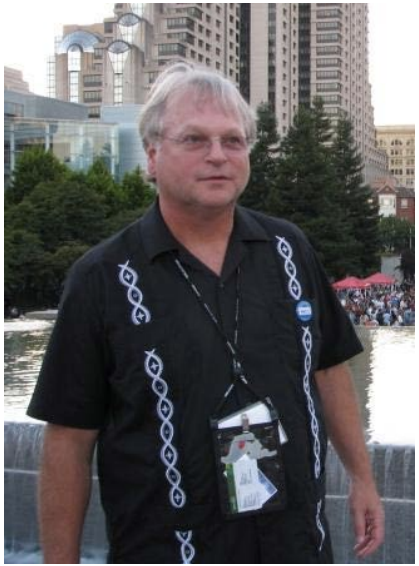
Today's Presenters



Greg Schulz
Founder Sr. Analyst
Server StorageIO®
@StorageIO

John Kim
SNIA-ESF Chair
Mellanox

Today's Agenda

- This is
- Our
- Discussion
- Agenda
- You will
- See today

- ✓ HCI storage and I/O considerations
- ✓ Fast applications need fast server storage I/O
- ✓ How to avoid bottlenecks
- ✓ Aggregated vs. disaggregated vs. hybrid
- ✓ Planning and decision-making topics
- ✓ Your questions and related interest items

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What Does Hyper-Converged Infrastructure (HCI) Mean To Storage?

Presented by Greg Schulz @StorageIO

www.storageio.com and www.storageioblog.com

Why do you want HCI (or CI)?

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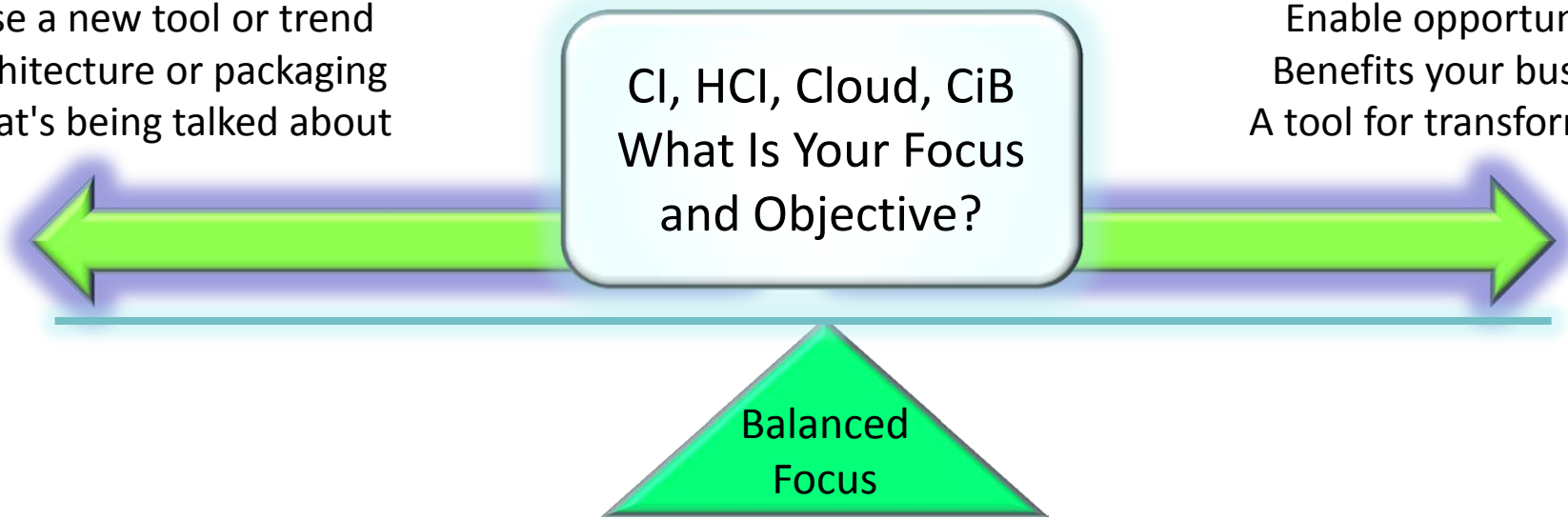
Technology

Leverage new technology
Use a new tool or trend
Architecture or packaging
What's being talked about

Outcome Result

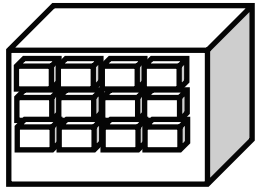
Address issues
Enable opportunities
Benefits your business
A tool for transformation



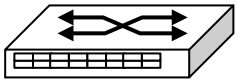
Why HCI/CI/CiB?

- Converged Infrastructure (CI) combines resources
  - Servers (compute), I/O network, storage, hardware, software
- Converged may be more expensive than ala carte
  - Value can be in saving time (acquisition, deploy, manage)
- Different size, type and focused solutions
  - One size or approach does fit all scenarios
  - Some CI/HCI are for smaller environments
  - Some CI/HCI are for larger environments
  - Watch out for hyper-compromised or hyper-complex

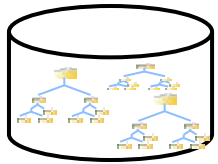
Management Tools



Servers



I/O

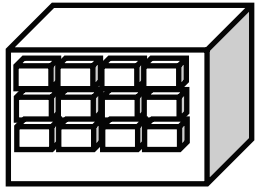


Storage

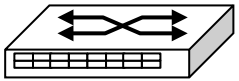
Why HCI/CI/CiB?

- What is your convergence focus?
  - Step back, look at your environment and applications
  - What is your workload today and tomorrow?
  - What type of performance and availabity do you need?
  - Different applications have various resource demands
  - Are you focused on:
    - Hardware (server, storage, I/O network)
    - Software (hypervisors, containers, operating system, file systems, cloud)
    - Data protection (backup, BC/DR/BR/HA, security)
    - Management tools (what aspect or focus area)
    - Vendor give away and free swag

Management Tools



Servers



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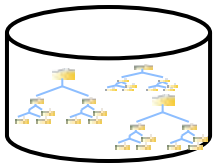
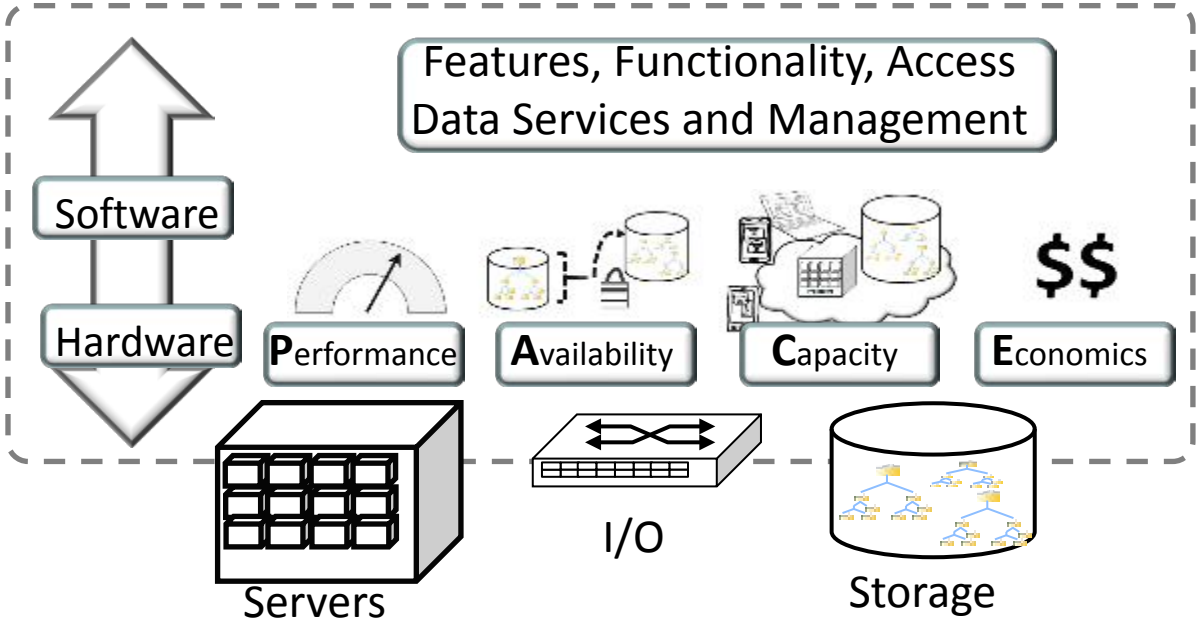


Storage

Focus On Applications

Applications include VDI, IoT, General Purpose, Database, Big Data, Little Data, Analytics, Email among others



What Are Your Application Resource Needs? Hardware and Software

Converged Decision Making

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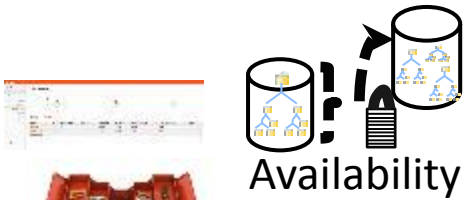
- What are your application workload PACE requirements?
  AI, IoT, File serve, VDI / workspace, Financial, Email/messaging, Database (SQL/NoSQL/Key value), Collaboration (SharePoint), Web, ERP, OLTP, Analytics, Hadoop, SAS, SAP, M1, Splunk, Media, Video Digital Evidence Management (DEMs), DevOps and others.
- How do you need (or want) to use CI/HCI/CIB?
- What resources do you currently have?
  - Hardware: Servers, storage, network
  - Software: Hypervisor, OS, applications, tools
- What are current server storage issues?
- What are growth resource usage needs?

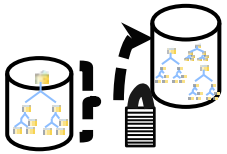


PACE = Performance Availability Capacity Economics

Converged Decision Making

- How will you protect your applications?
  - Security, RAS, Local, Remote, durability
  - Granularity (VM, Guest, File, database)?
  - Resiliency and faults to tolerate (FTT)?
  - Fault isolation, redundancy, self-heal?
- How will you scale-up and scale-out to support growth?
- Can you bring your own hardware or software licenses?
- Do you have (or need) to scale resources independent of each other?
- Will you violate warranties if you reconfigure CI/HCI systems?

Performance

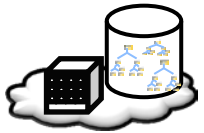


Availability

Management Tools

$$

Economics



Capacity

PACE = Performance Availability Capacity Economics

Converged Decision Making

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- What additional hardware, software, services or tools needed?
- Will you deploy, operate and manage as converged, or as legacy?
- What new tradecraft skills and education are needed?
- Do you need to handle mixed hypervisors?
- What tools do you use for testing, benchmark, simulations?
  - Best is your own application, second are those close to it
  - Be realistic with tools and their configuration to be applicable
  - Run multiple workloads at same time, it's a converged environment!
  - Since converged, look at converged impact, end to end vs. just device.

Staffing
Tradecraft (skills)

Management
Tools

HCI Scaling Considerations

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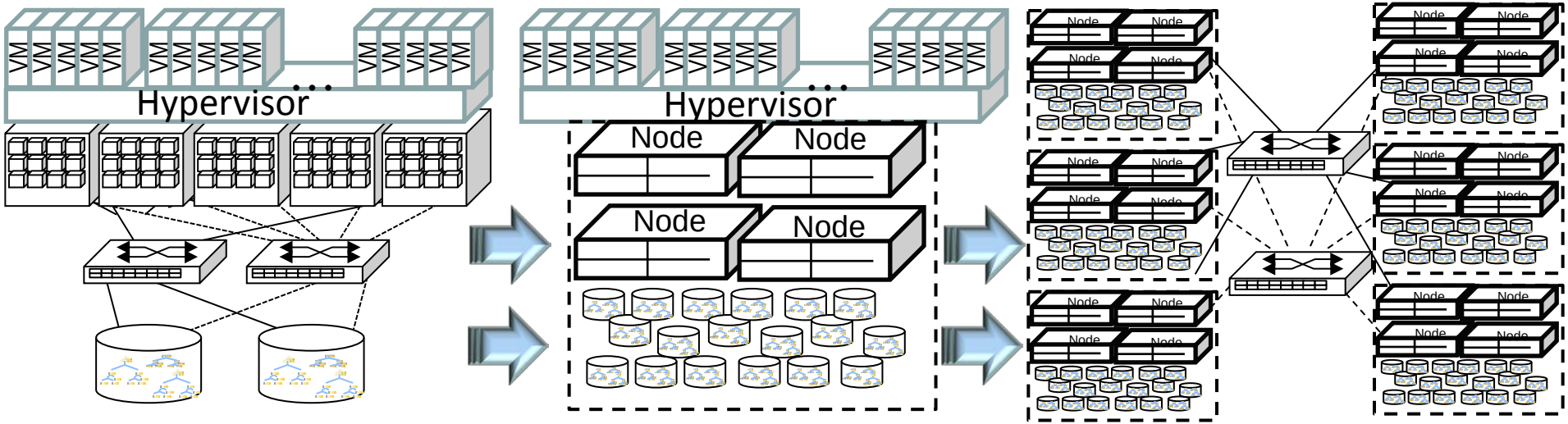
Watch out for hyper-compromise or introducing hyper-complexity when scaling

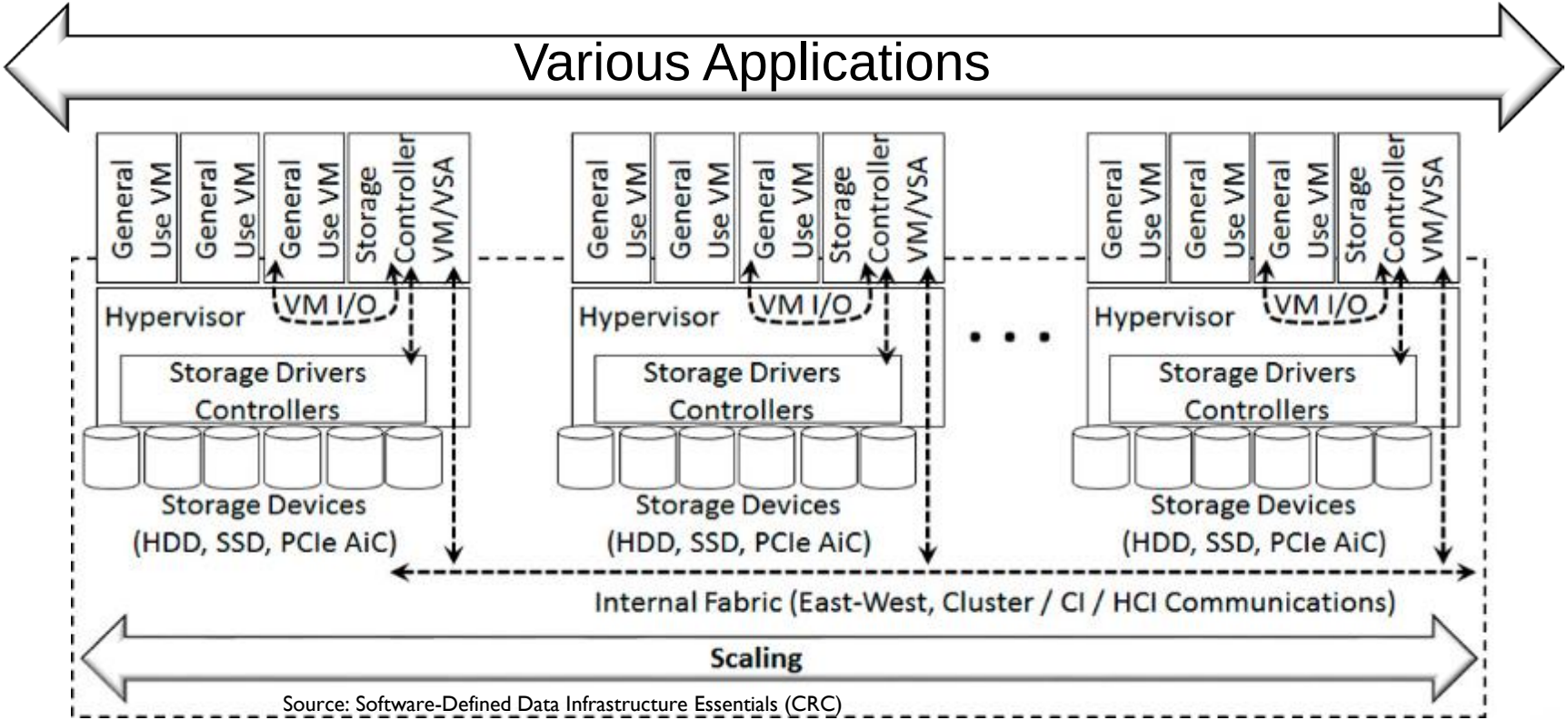


Most Initially Simplify

Some May Introduce Complexity

StorageIO

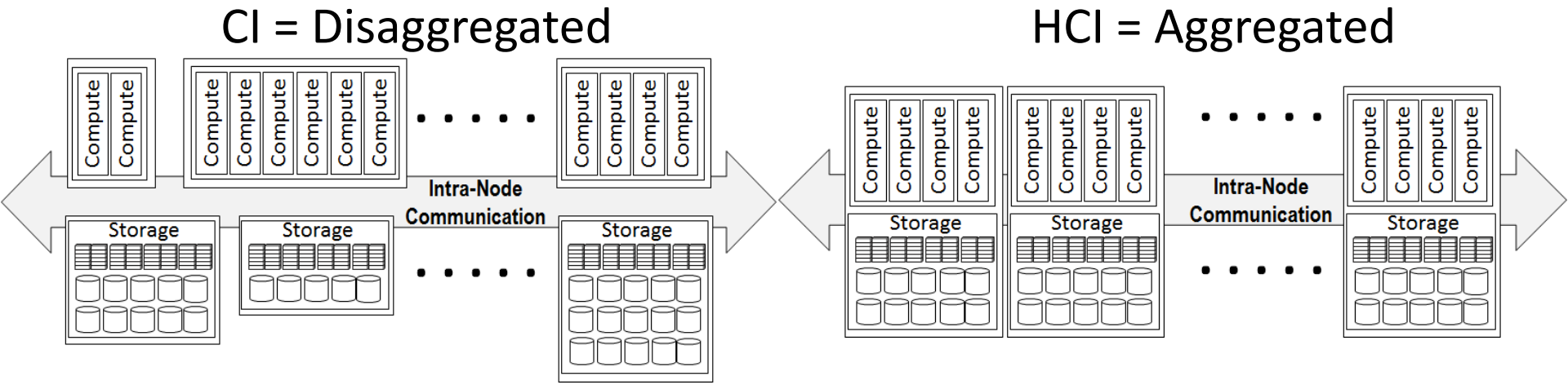
HCI Supporting Applications



Source: Software-Defined Data Infrastructure Essentials (CRC)

HCI vs. CI which is best?

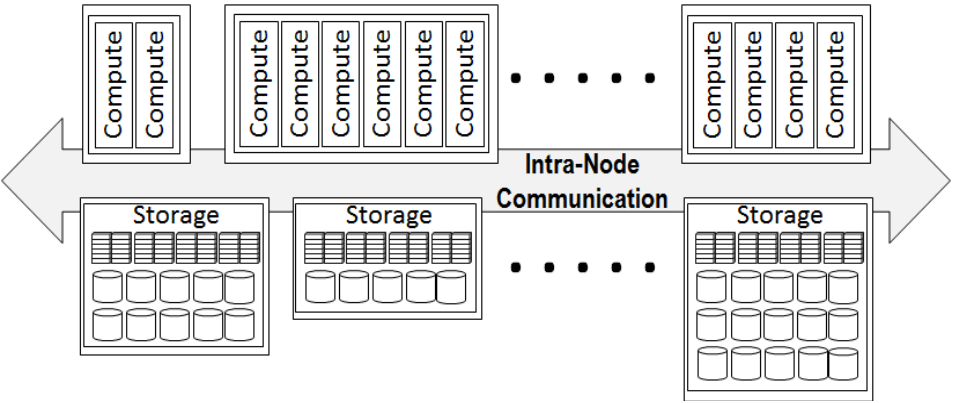
Watch out for hyper-compromise or introducing hyper-complexity (e.g. avoid the hype ;)



Source: Software-Defined Data Infrastructure Essentials (CRC)

Converged Infrastructure (CI)

CI = Disaggregated

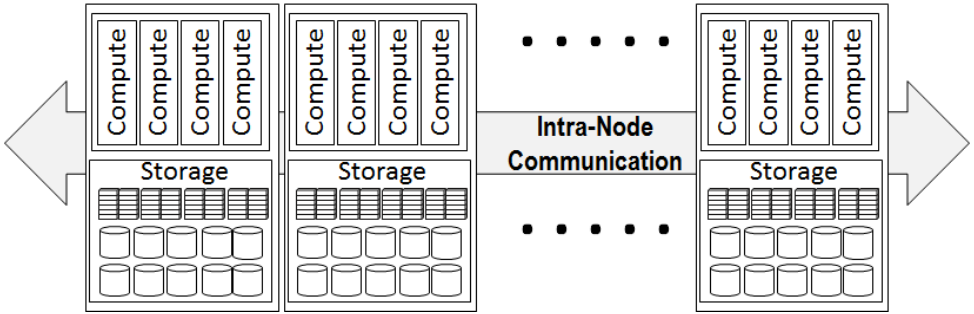


Source: Software-Defined Data Infrastructure Essentials (CRC)

- Converge compute, I/O and storage
- Scale compute independent of storage
- Tightly or loosely packaged (DAS or SAN)
- Can be packaged with or without hardware
- Similar to traditional bundled solutions
- Align resources to application needs
- From small SMB to large rack-scale
- Can you bring your own hardware?
- Can you bring your own licenses?
- How does solution scale with stability?
- Can make changes without warranty issues?

Hyper-Converged (HCI)

HCI = Aggregated

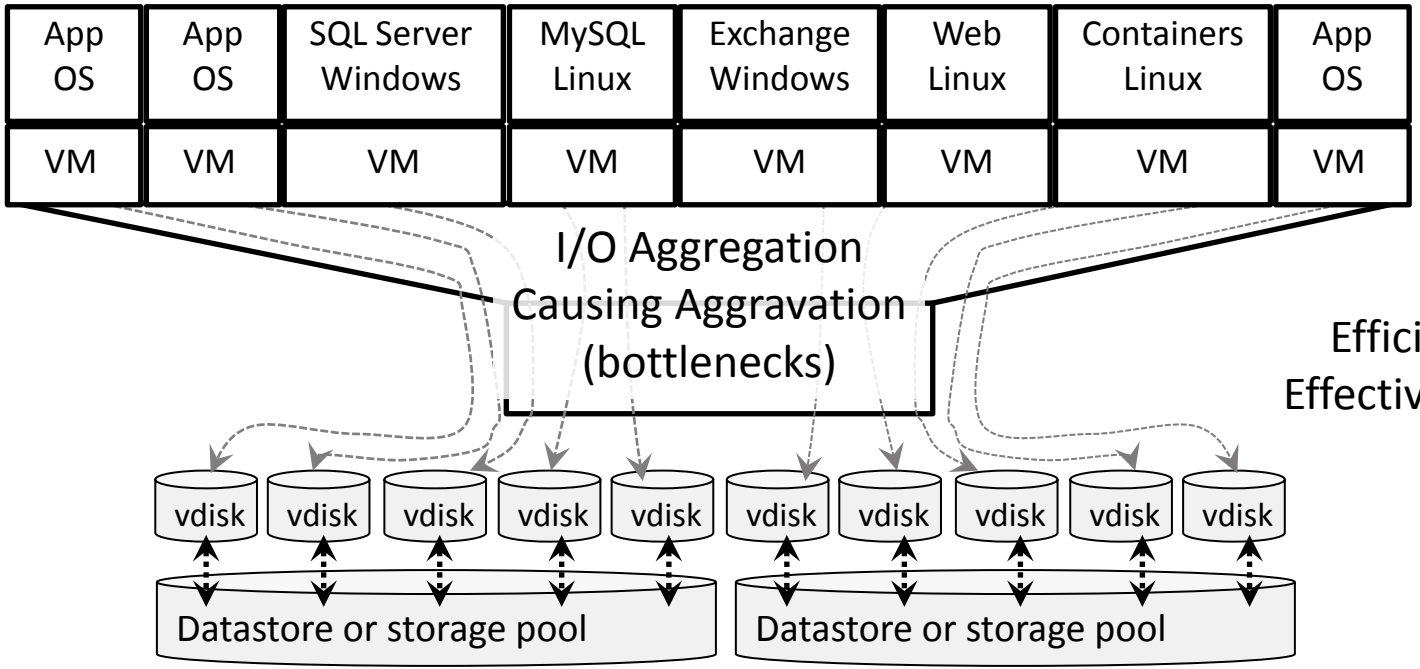


Source: Software-Defined Data Infrastructure Essentials (CRC)

- Converge compute, I/O and storage
- Various packaging options
- Scale compute with storage
- Scale storage with compute
- Reduces resource integration complexity
- Ease of use and ease of acquisition
- Usually homogenous across resources
- Can you bring your own hardware?
- Can you bring your own licenses?
- How does solution scale with stability?

Addressing I/O Bottlenecks

Watch out for creating new islands of complexity



More hardware?
More software?
Efficiency (utilization) vs.
Effectiveness (productivity)

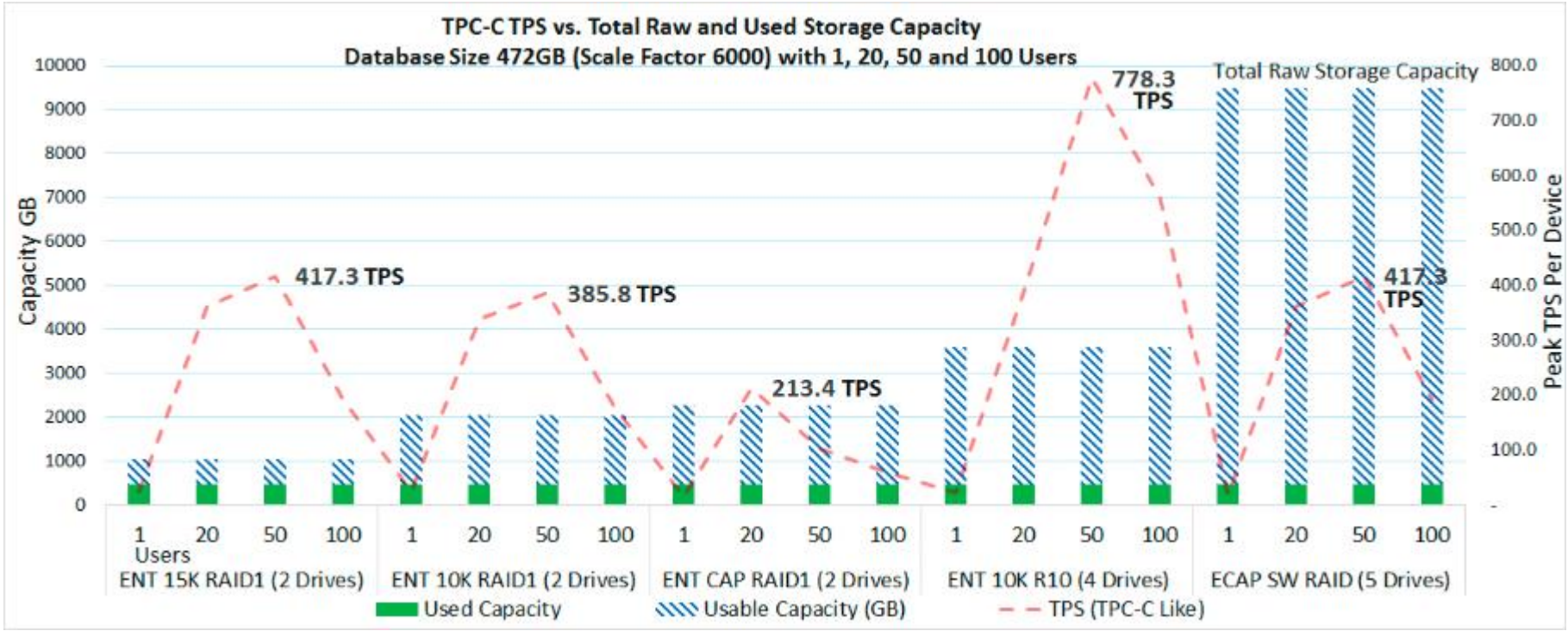
Source: Software-Defined Data Infrastructure Essentials (CRC)

HCI Storage (SSD, HDD)

	(IOPs) i/o rate	MB/sec 1024**2	bytes i/o	read pct	resp time(ms)	read resp(ms)	write resp(ms)	resp max(ms)	resp stddev	queue depth	cpu% sys+u	cpu% sys
8K 100% Seq. 100% Write												
4TB 5.4K HDD	1570.07	12.27	8192	0.00	80.992	0.000	80.992	305.655	38.656	127.2	5.1	1.7
NVMe PCIe SSD	44069.48	344.29	8192	0.00	2.878	0.000	2.878	1205.039	11.187	126.8	41.8	24.4
8K 100% Seq. 100% Read												
4TB 5.4K HDD	59184.16	462.38	8192	100.00	2.156	2.156	0.000	1624.718	10.984	127.6	32.9	24.1
NVMe PCIe SSD	91562.29	715.33	8192	100.00	1.391	1.391	0.000	1369.334	8.392	127.4	58.8	43.1
8K 100% Random 100% Write												
4TB 5.4K HDD	56.17	0.44	8192	0.00	2240.453	0.000	2240.453	5912.785	1493.667	127.6	1.2	0.3
NVMe PCIe SSD	39462.39	308.30	8192	0.00	3.227	0.000	3.227	1464.869	17.303	127.3	42.3	25.5
8K 100% Random 100% Read												
4TB 5.4K HDD	653.25	5.10	8192	100.00	194.842	194.842	0.000	2016.777	256.913	127.6	1.8	0.6
NVMe PCIe SSD	94770.49	740.39	8192	100.00	1.339	1.339	0.000	1512.827	7.676	126.9	60.5	46.3

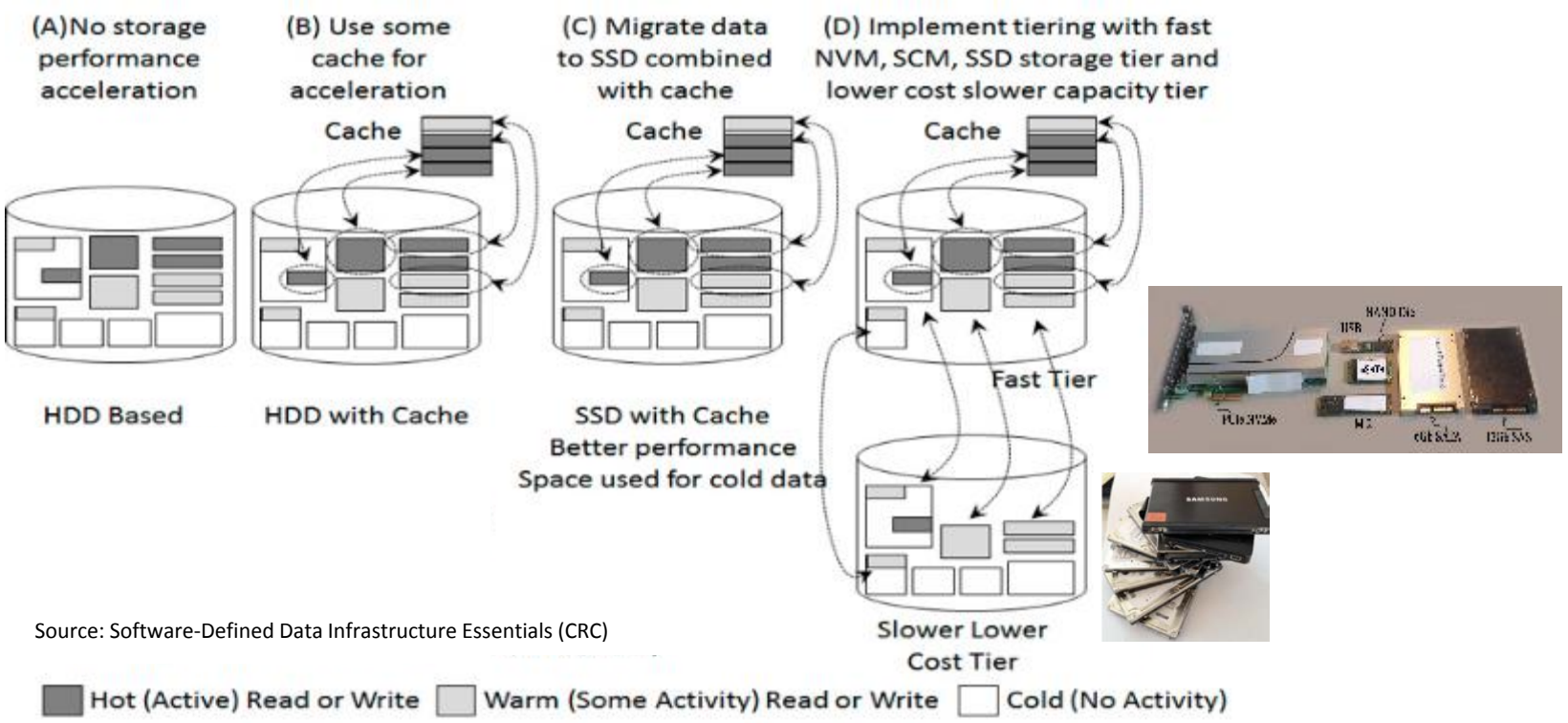
Source: Software-Defined Data Infrastructure Essentials (CRC)

Which HDD (if you need them)



Source: Software-Defined Data Infrastructure Essentials (CRC)

Cache, Micro-tier and Tiering



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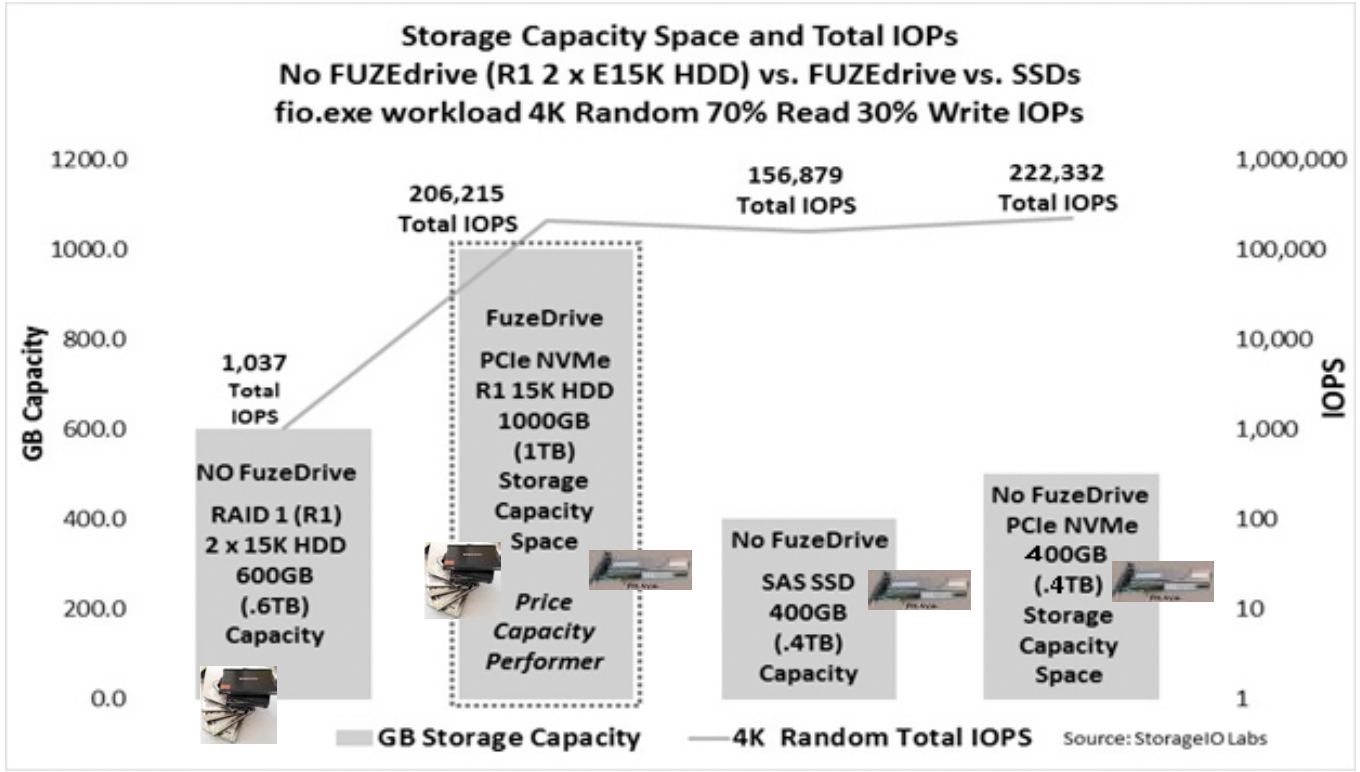

Closing Comments

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How will your servers and storage be converged

- What are you converging, hardware, software or management
- Look beyond software defined storage wrapping and hypervisors
- Start focusing on server, storage management and automation
- Keep your applications workload and resource needs in mind
- Many variations of CI, HCI as well as apples to oranges
- One approach, protocol, solution or service does not fit all needs
- Learn more at www.storageio.com and www.storageioblog.com
- Follow on twitter @StorageIO email greg@storageio.com

Staffing
Tradecraft (skills)

Management
Tools

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- A full Q&A from this webcast, including answers to questions we couldn't get to today, will be posted to the SNIA-ESF blog: sniaesfblog.org
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Thank You!