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Virtual Storage & Backup Platforms

Q3 2023 - Frank Benke

www.hahnautomation.group

FRANK BENKE

HEAD OF IT

COMPUTER SCIENCE
UNIVERSITY TÜBINGEN

SINCE 1994 IN IT BUSINESS

ENTIRE SUPPLY CHAIN

- HEWLETT-PACKARD (1994)
- CERTIFICATION & TRAINING
- SUPPLIER
- MAGENTA SERVICE PROVIDER
- FINALLY END CUSTOMER (2014)

THE COMPANY

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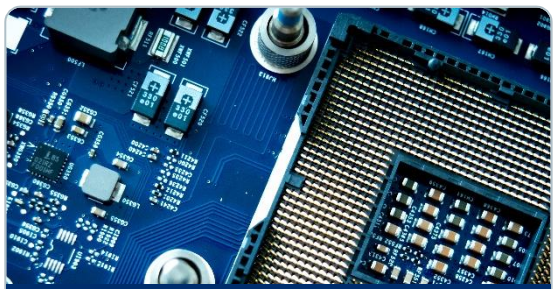
Industrial Assembly

Full Stack Development



Agile Business

Global Footprint

Virtual Comissioning

Market Strategy


9 Countries
3 Continents
1800 Employees
ca. 28% p.a. growth pre corona
23 Locations
> 250 MEUR Revenue

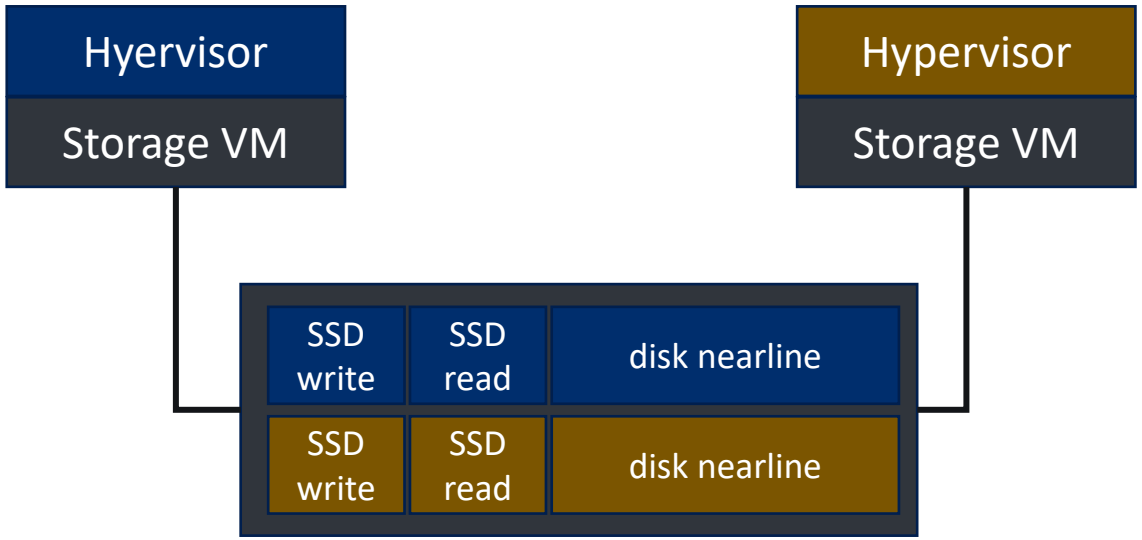
9 YEARS JOURNEY

OPERATIONAL IT STRATEGY

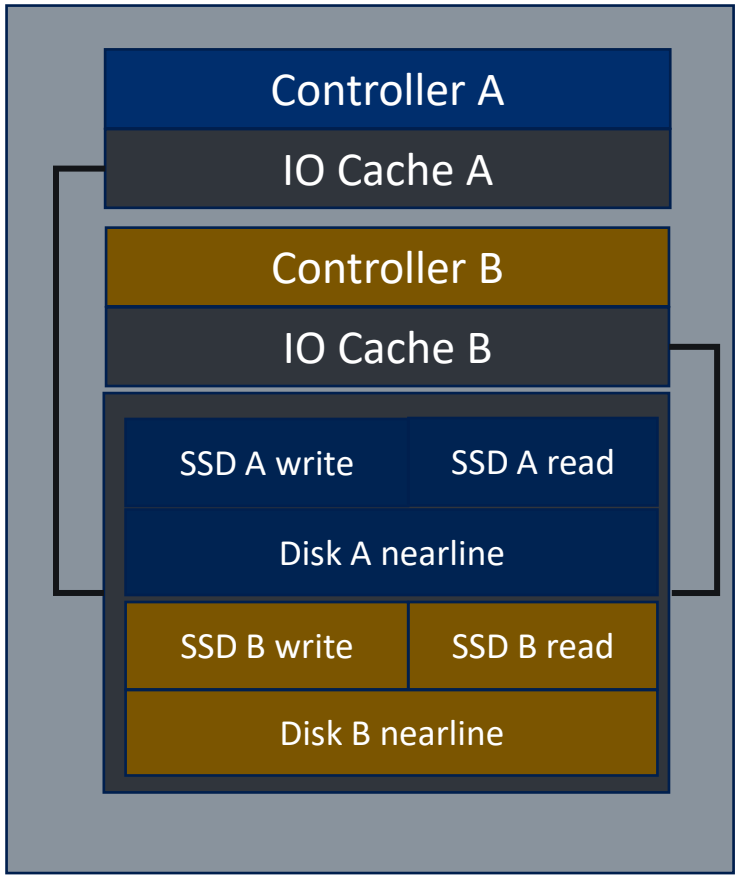
- 2014 Standardization
- 2015 Software Defined
- 2015 Hyperconvergence
- 2016 Generalized Infrastructure
- 2017 Strategic Vendor & Supplier Management
- 2018 IT Infrastructure Automation
- 2019 „Site Reliability Engineering“ (infrastructure as code)
- 2020 AMD & Single Socket strategy
- 2021 Virtual Engineering Private Cloud
- 2022 Dokumentation & Monitoring & Automation Integration
- 2023 Exception Elimination & Further Standardization

BASIC STORAGE CONCEPTS

DIY HYPERCONVERGED STORAGE

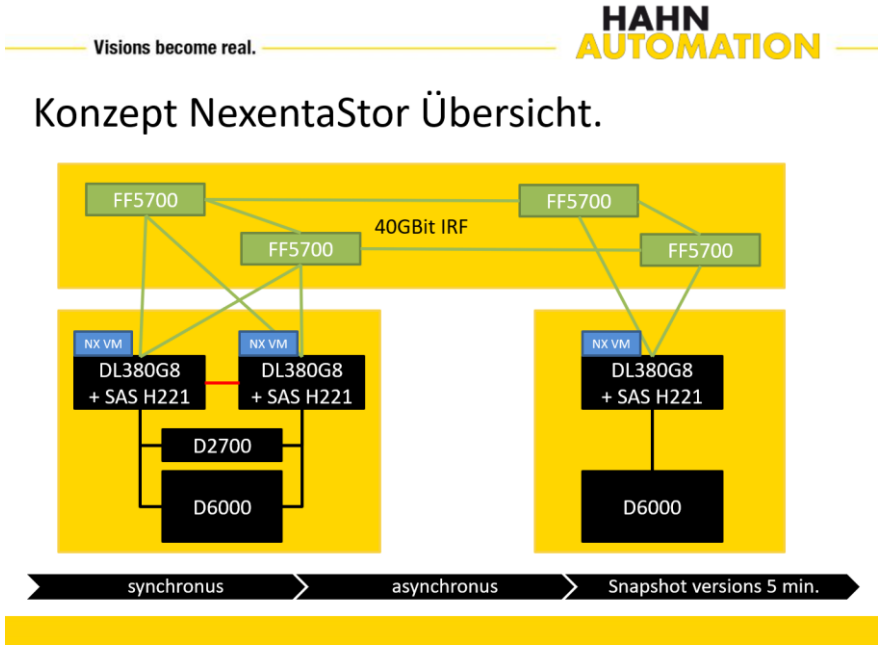


TRAD. STORAGE SYSTEM

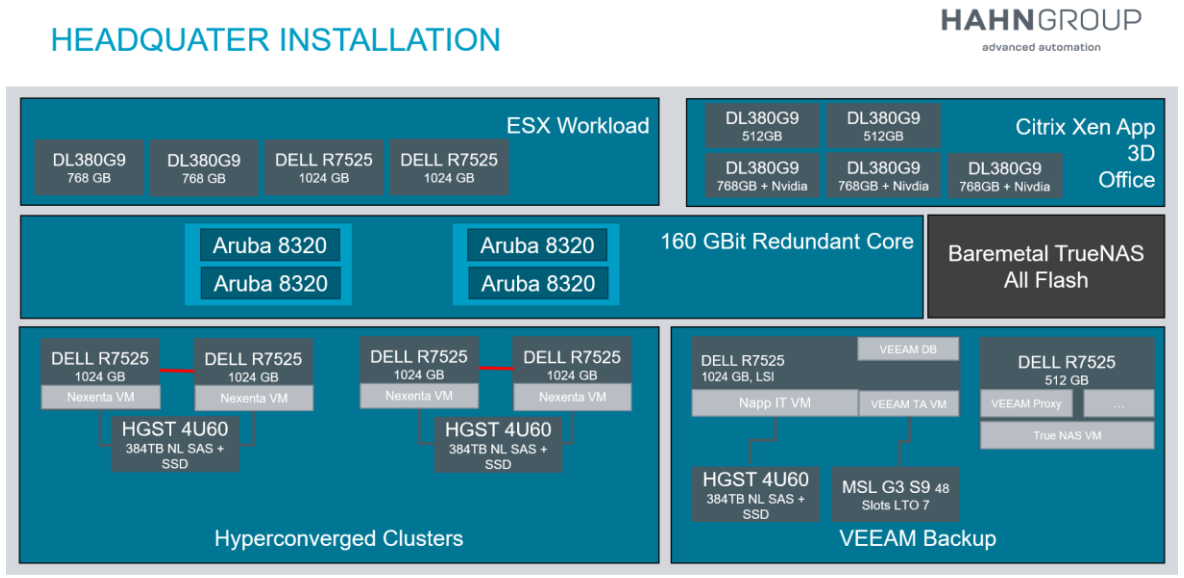


HYPERCONVERGED MILESTONES

In The Beginning 2015



Status S2D - 2022



PERSISTENT STRATEGY CONSIDERATIONS

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PRO:

- Predefined workloads
- Single socket AMD strategy
- ZFS preferred architecture
- Scale up vs. Scale out
- Hyperconverged & bare metal
- Remote snapshot option
- Budgetary options & €/GB

CON:

- Own responsibility
- Compatibility challenges
- Product roadmaps JBODs & media
- Release & product strategy software
- Reluctant suppliers

MANAGABLE

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THE PATH TO THE 2023 STORAGE ENVIRONMENT

ENVIRONMENT COMPONENTS

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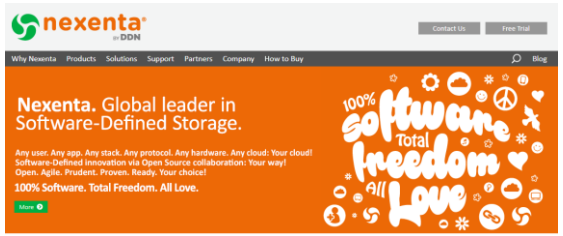

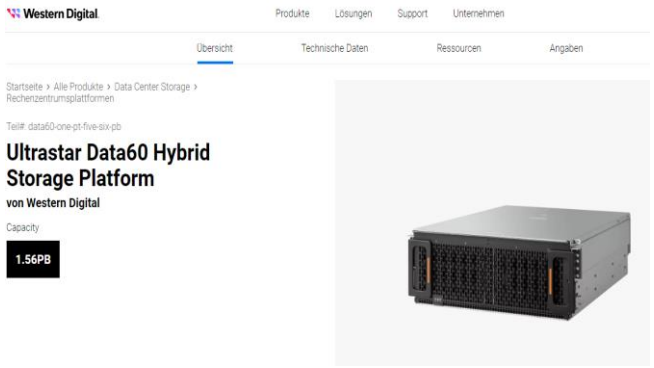

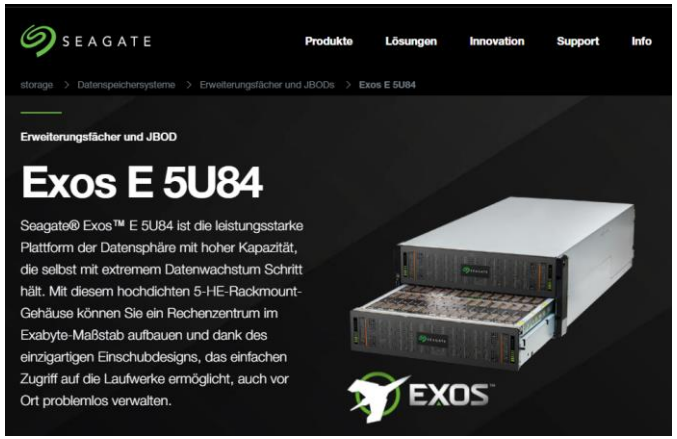

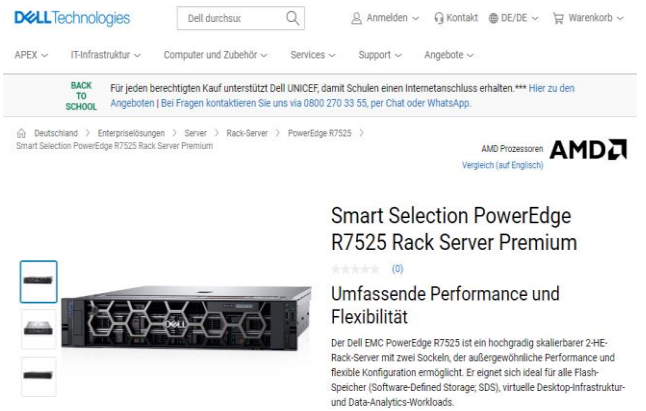

LIVE STORAGE OPERATIONAL MODELS

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Gen	Tier	Hypervisor	JBOD	HA	Software	Capacities	IOpS	Systems/
1	1	VMWare	WD	Yes	Nexenta	350 TB	> 40 K	3
1	1	VMWare	Internal	no	True NAS	100 TB	> 30 K	4
1 *1	1	Baremetal	WD	Yes	Nexenta	350 TB	> 100 K	1
1	2	VMWare	Internal Flash	Yes	True NAS	20 TB	> 120 K	1
2 *2	1	VMWare	WD	Yes	Open-E	250 TB to 350 TB	> 120 K	2
3	2	Proxmox	Seagate	No	True NAS	1.2 PB	> 50 K	3
3 *4	2	VMWare	Flash DAS	Yes	VMWare	40 TB	> 100 K	1
3 *3	2	VMWare	Seagate	Yes	Open-E	1.2 PB	> 50 K	1

*1 Blade environment - SAS interconnect missing
*2 Migration from Nexenta after increasing support & roadmap issues
*3 large cheap fileservices and archive storage

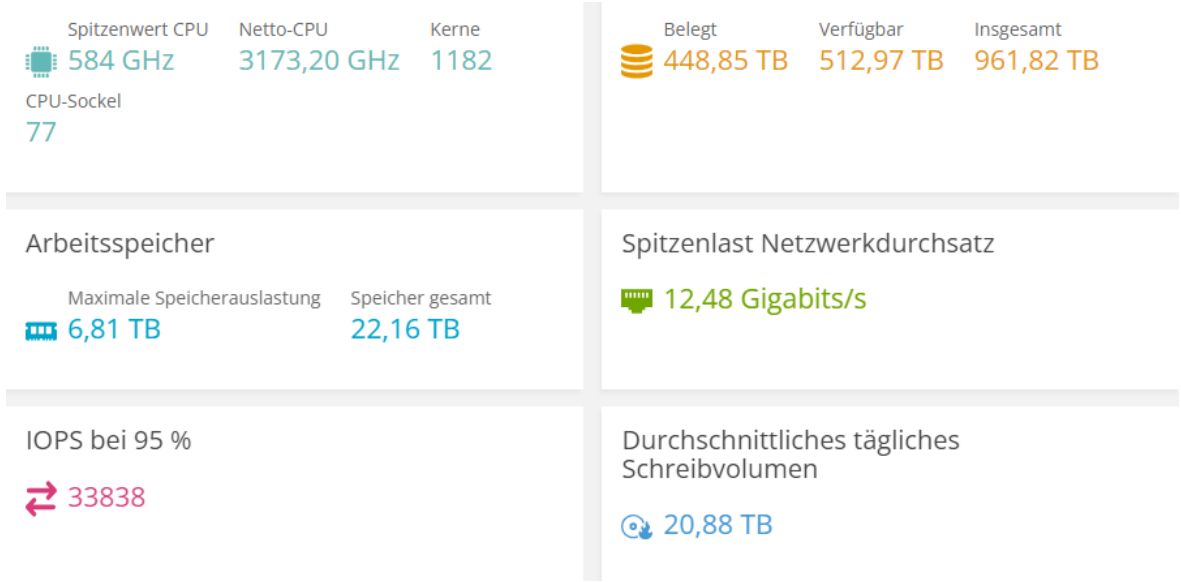
THE SYSTEM ENVIRONMENT

- Self hosted and self operated
- 100% virtualized
- Global virtual clients (11 Citrix hosts)

- 30 TB main memory server capacity
- 7.3 PB installed storage capacity
- 160 GB network rings in datacenters

- Global unified service catalogue
- 100% transparent tennant cost

SUMMARY VMWARE PART ONLY:

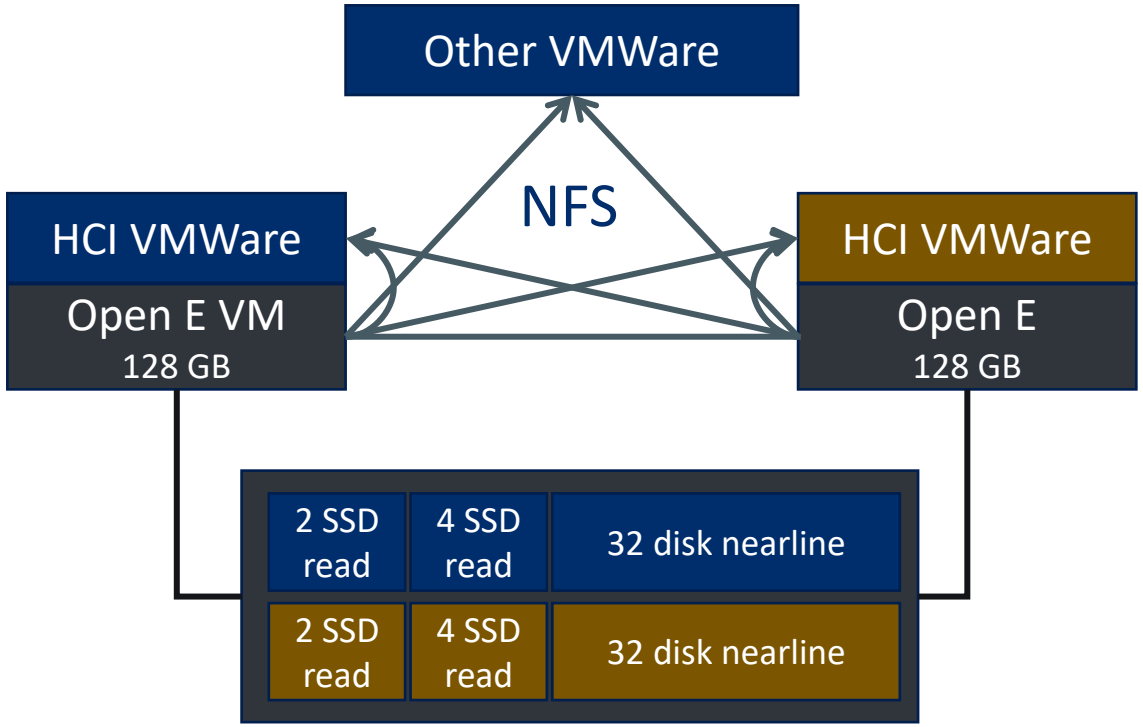


LATEST CAPACITY DRIVEN DESIGN

- DELL AMD EPYC R7525 rackserver
- single socket with 32 cores as fast as possible
- 1TB or 512GB main memory
- 2*2 10 GBE SFP+ Ethernet (Intel Xseries)
- 12G SAS

- Seagate EXOS 5U84
- 64 * 20TB disk
- 8 * 20TB disk hot spare
- 2*2 SSDs write opimized – as cheap as possible
- 2*4 SSDs mixed use – as large as possible

- Open E Jovian ESS gold with RAID-Z2



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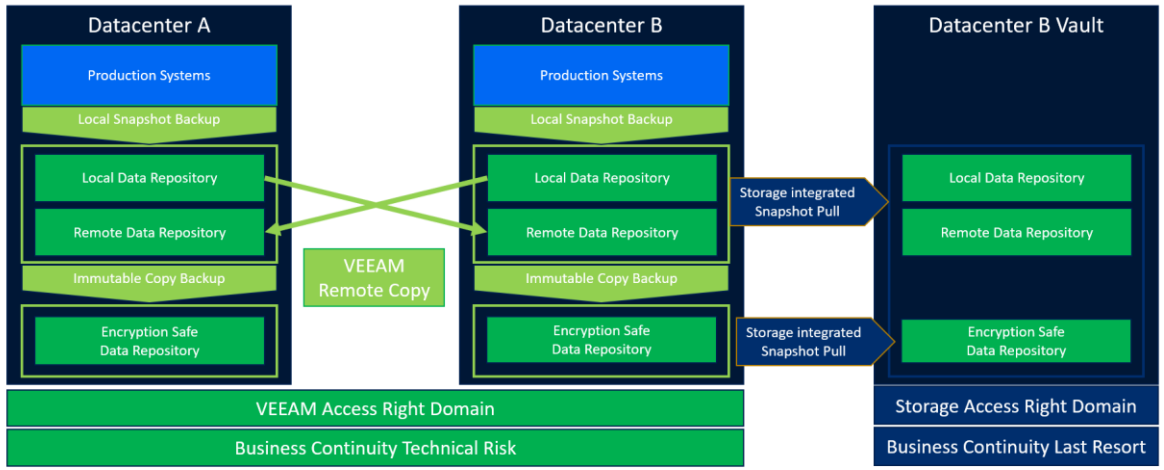
VIRTUALIZED BACKUP

REVIEW CONCEPT VS. BUILT



- Downsize to EXOS 84 – SAS compatibility
- Implement VEEAM with immutable backup
- Establish DR remote repositories
- Implement storage based snapshot exports
- Ransomware attack proved concept (!!!)
- Virtualize on different platform - Proxmox
- Implement data vault concept as last resort
- Break access right concepts
- Break architecture virtualization & storage
- Built as designed

BACKUP DATA FLOW

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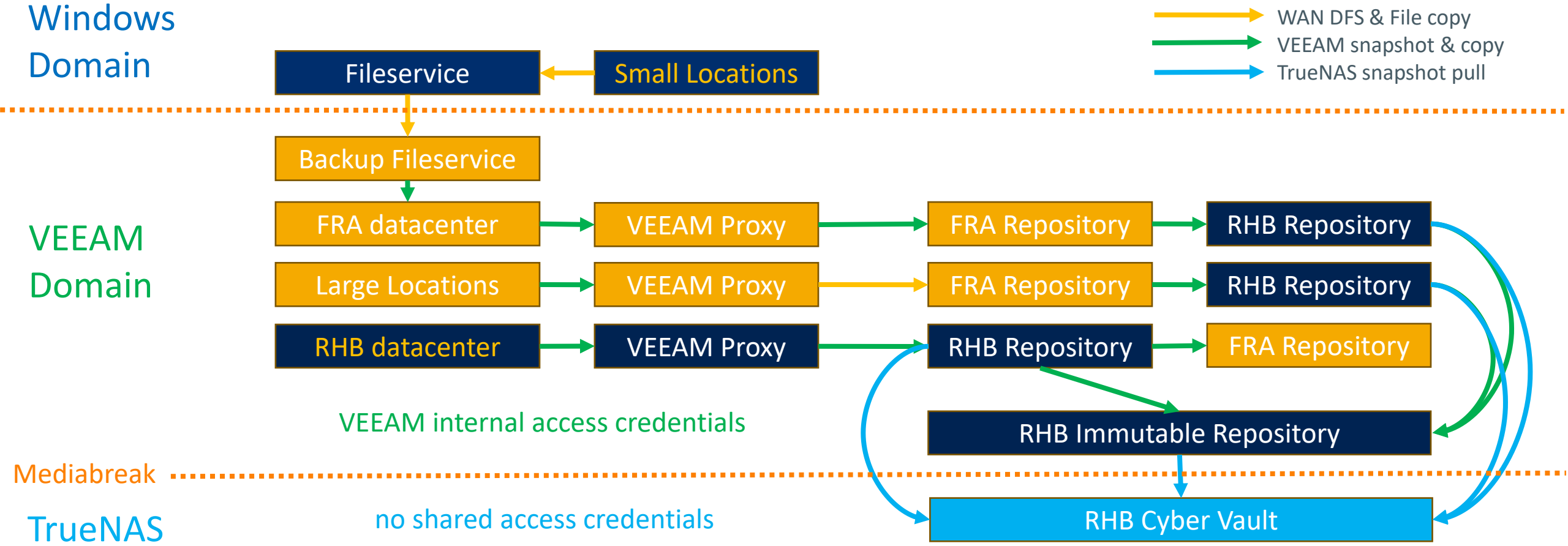
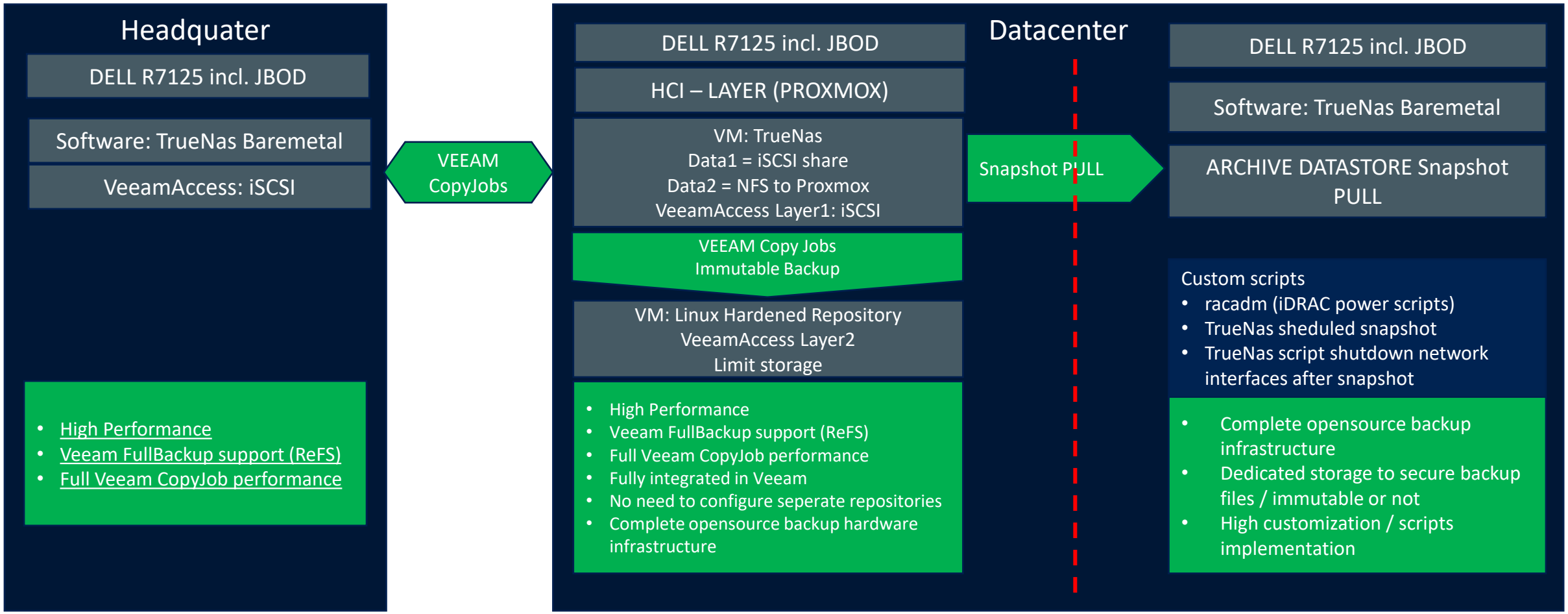


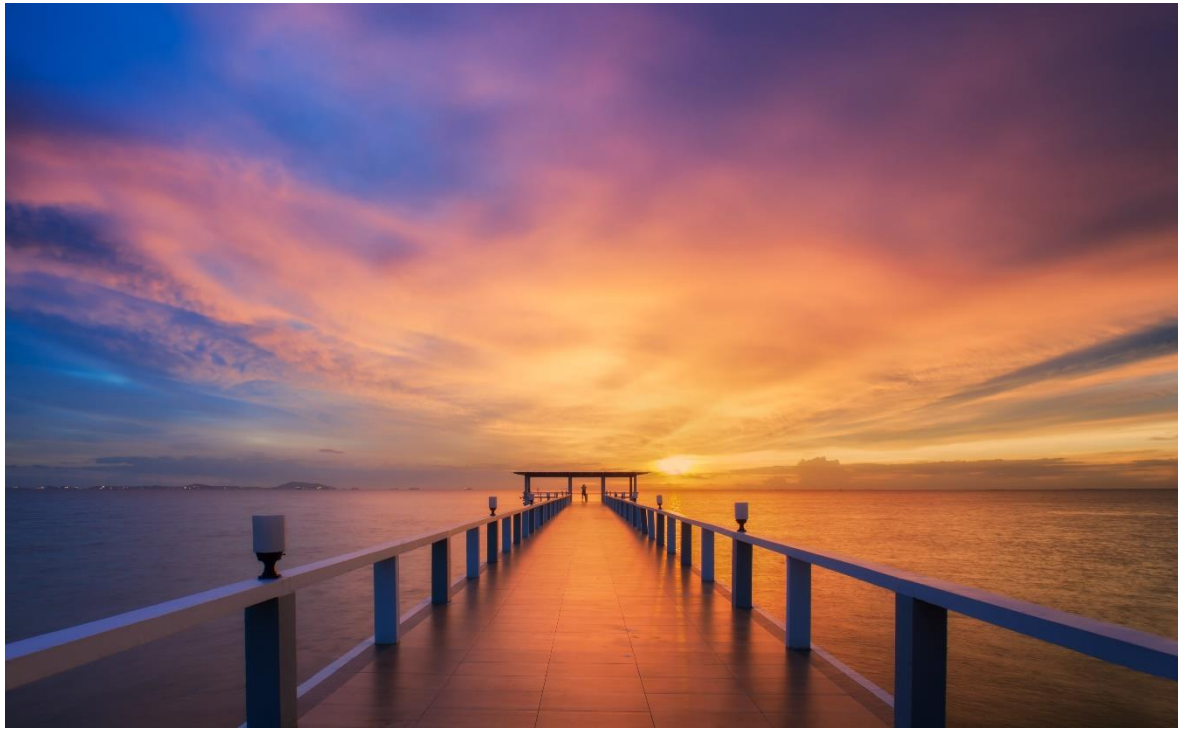
CURRENT BACKUP ARCHITECTURE



TAKE AWAYS

OUTLOOK

- Prepare for container workloads
- Shift in businessmodel *aaS
- Support increasing AI applications
- Support changes in engineering platforms
- Develop long distance data synchronization
- Break vendor lock ins
- Improve ransomware resiliency
- Broaden Proxmox usage
- Cover TrueNAS Scale
- Evaluate Ceph & Open Stack



KEY TAKE AWAYS

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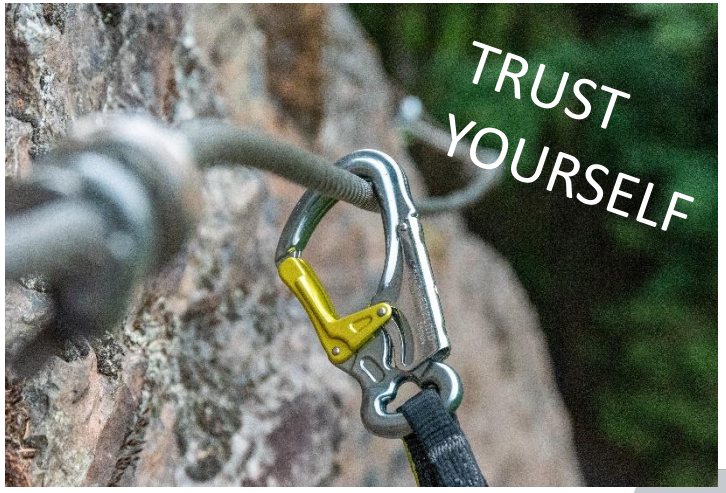

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