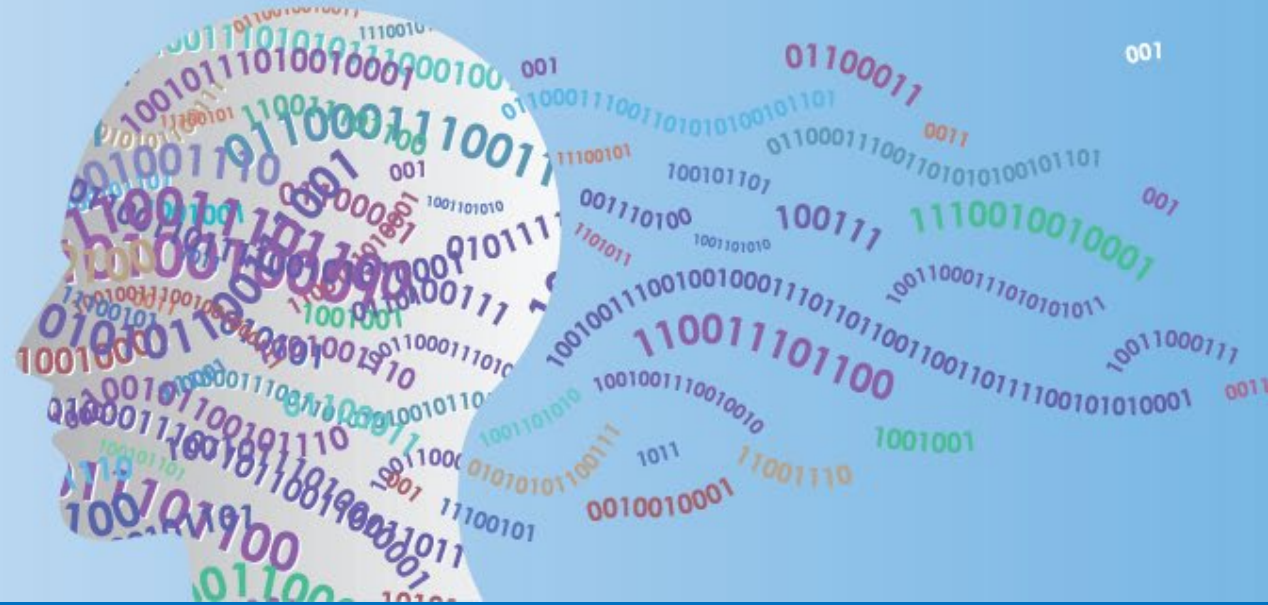




SNIA

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COMPUTATIONAL STORAGE

FROM DATACENTER TO EDGE : VIRTUAL EVENT
APRIL 21-22, 2021



How Computational Storage Can Become a New Standard for Cloud Architectures

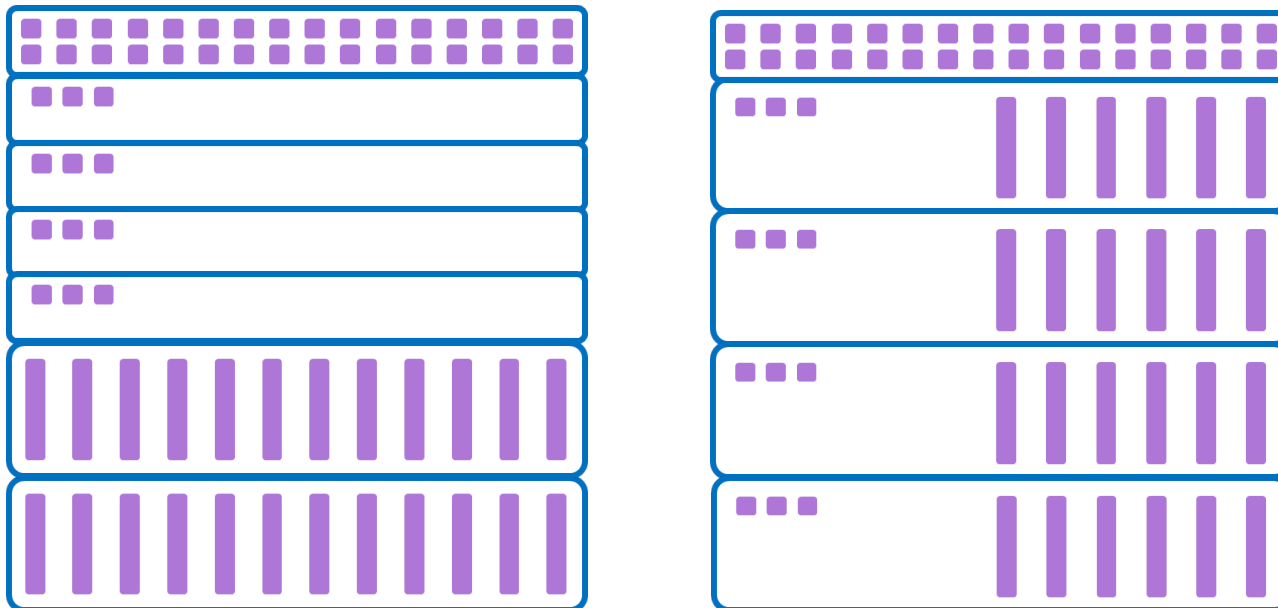
Jérôme Gaysse, Senior Technology and Market Analyst
Silinnov Consulting

Agenda

1. Cloud requirements and architectures
2. Computational storage technologies and architectures
3. Database use case simulation

Cloud Architectures

- Hyperconvergence
- Disaggregation



Cloud storage requirements

Security

⇒ Encryption

Availability

⇒ Replication, erasure coding

Performance

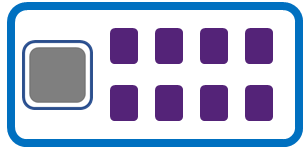
⇒ NVM, NVMe, NVMeoF

Flexibility

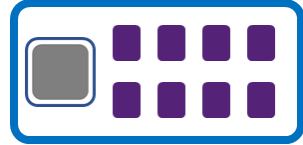
⇒ Software Defined Storage

CS Technologies

Computational Storage Drive (CSD)



ASIC + NVM

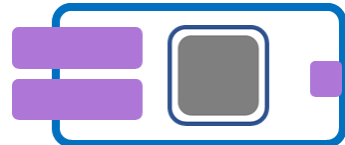


FPGA + NVM

Computational Storage Processor (CSP)



FPGA / GPU

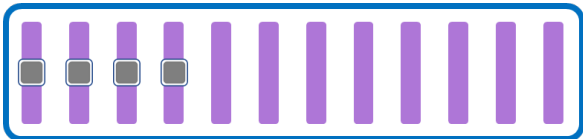


Smart NIC

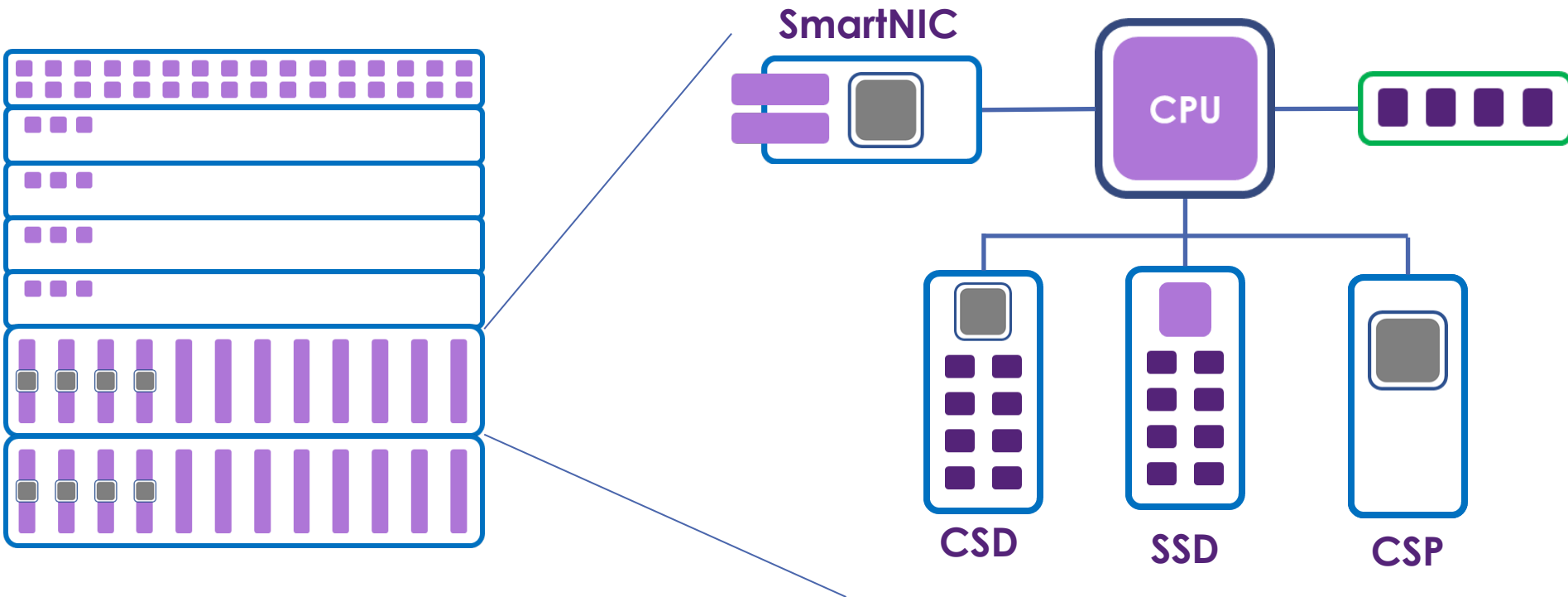


HBA

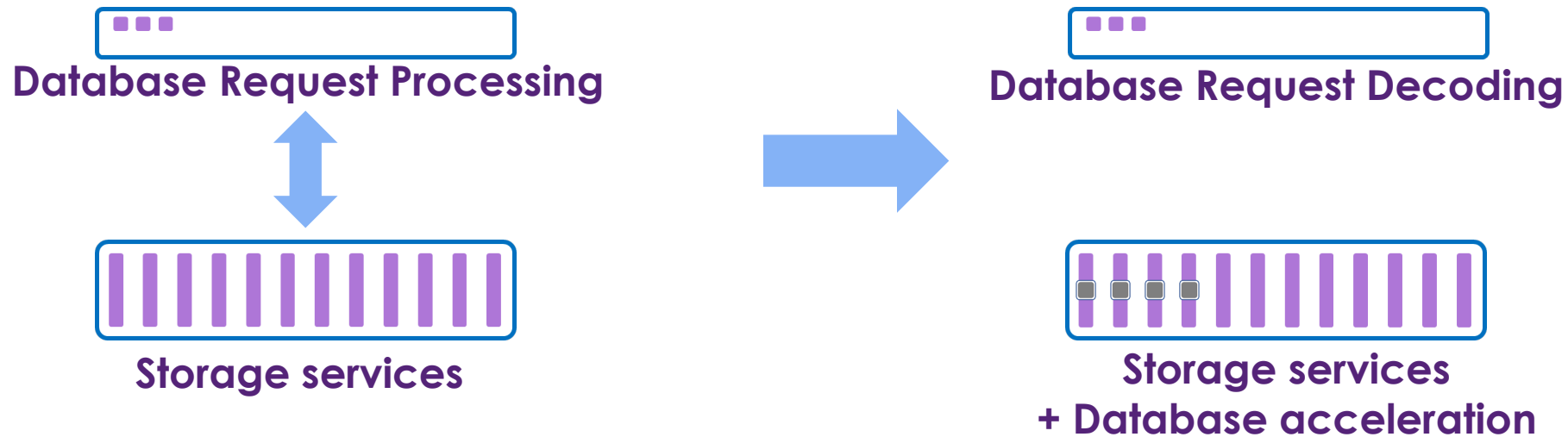
Computational Storage Array (CSA)



CS Integration



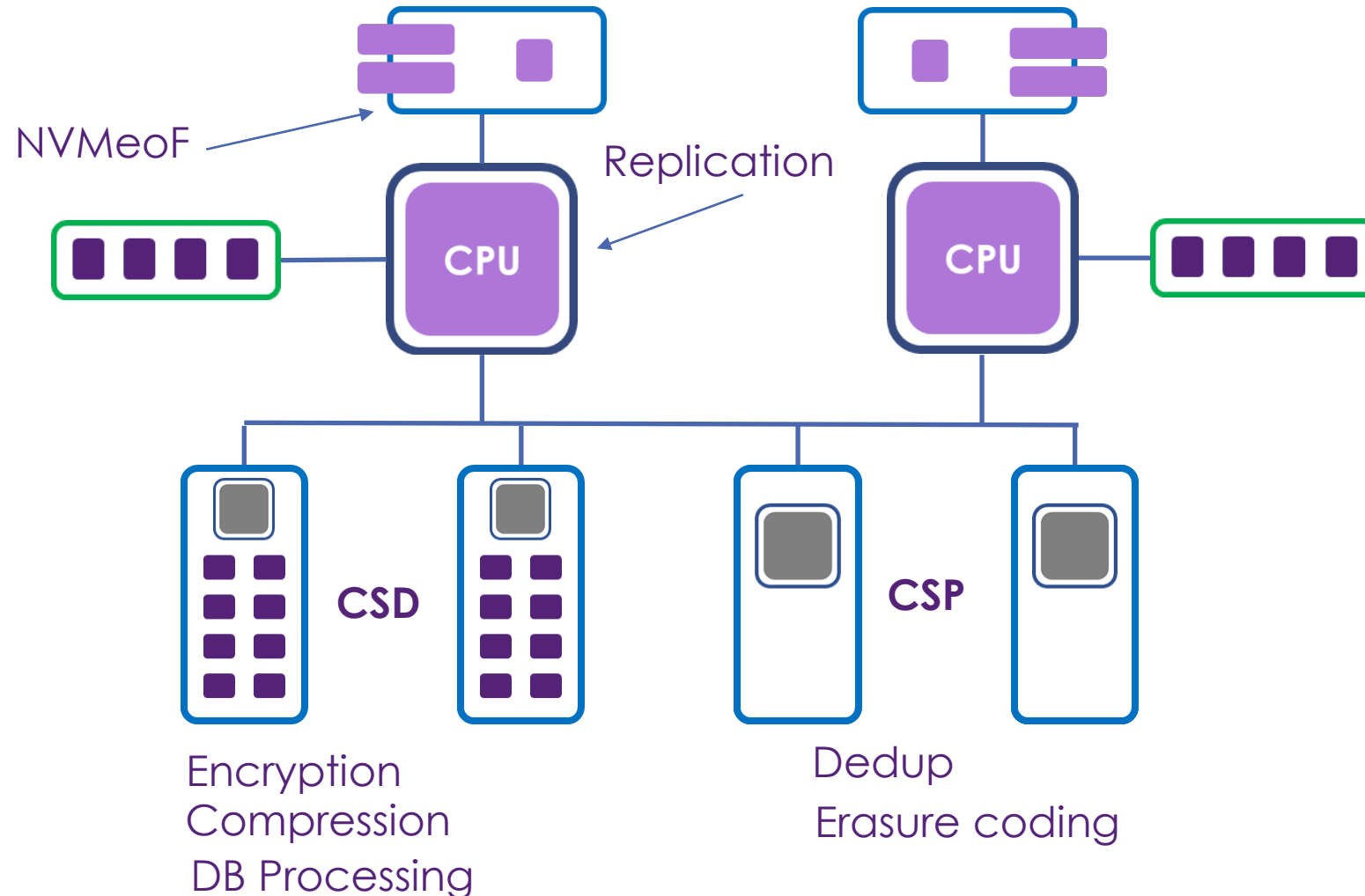
Simulation Environment



2 parameters

- ⇒ **Hardware configuration: CSD, CSP**
- ⇒ **Workload balance (host server vs CSA)**

System Description



Cloud storage requirements

Security: YES

⇒ Encryption

Availability : YES

⇒ Replication, erasure coding

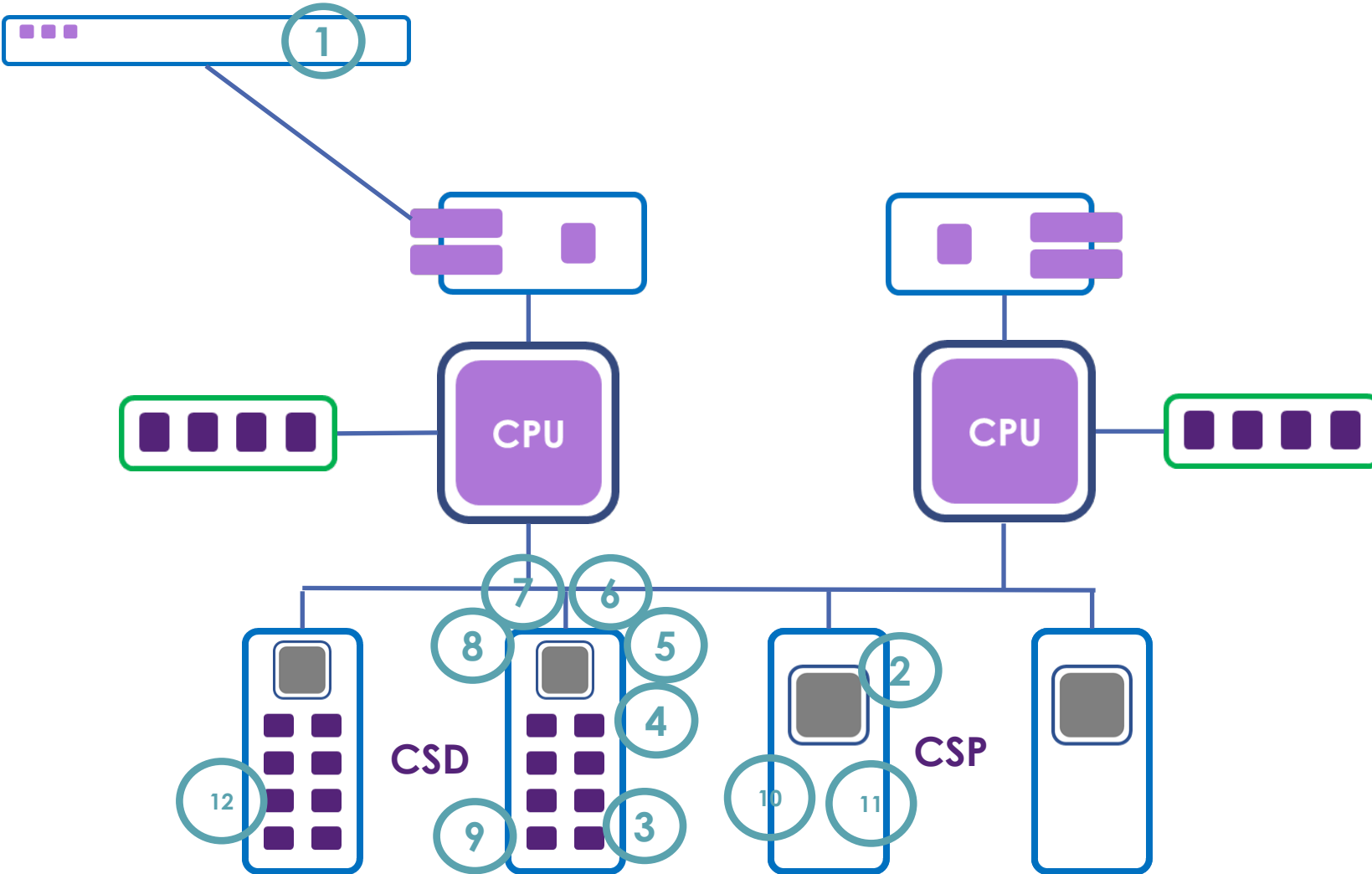
Performance : YES

⇒ NVM, NVMe, NVMe-oF

Flexibility : YES

⇒ Software Defined Storage

Theory of Operation



“Update” request processing

1. Host server: IO and list of operations
2. Dedup function by Dedup
3. Data read
4. Data Decryption
5. Data decompression
6. DB request processing
7. Data compression
8. Data encryption
9. Data write
10. Dedup index update
11. Erasure coding engine
12. Data write

Simulation Results

	100% SSD	50%CSD + 50%CSP
Density	50U	29U
Power	25kW	17kW
TCO	\$1.5M	\$1M

Configuration: 1000 VM hosting a database server

Conclusion

- Cloud requirements
 - Computational storage compliant with cloud requirements : Security, High Availability, Performance and Flexibility
- CSaaS
 - For PaaS model: CS included in the offer: better performance
 - For IaaS model: additional VM configuration
 - CSDaaS, CSPaaS, CSSaaS
- Call to action
 - Need bigger ecosystem
 - Need more software support

Thank you

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