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Next Generation Storage Solution Using NVMeoF & NF1 Form Factor SSDs

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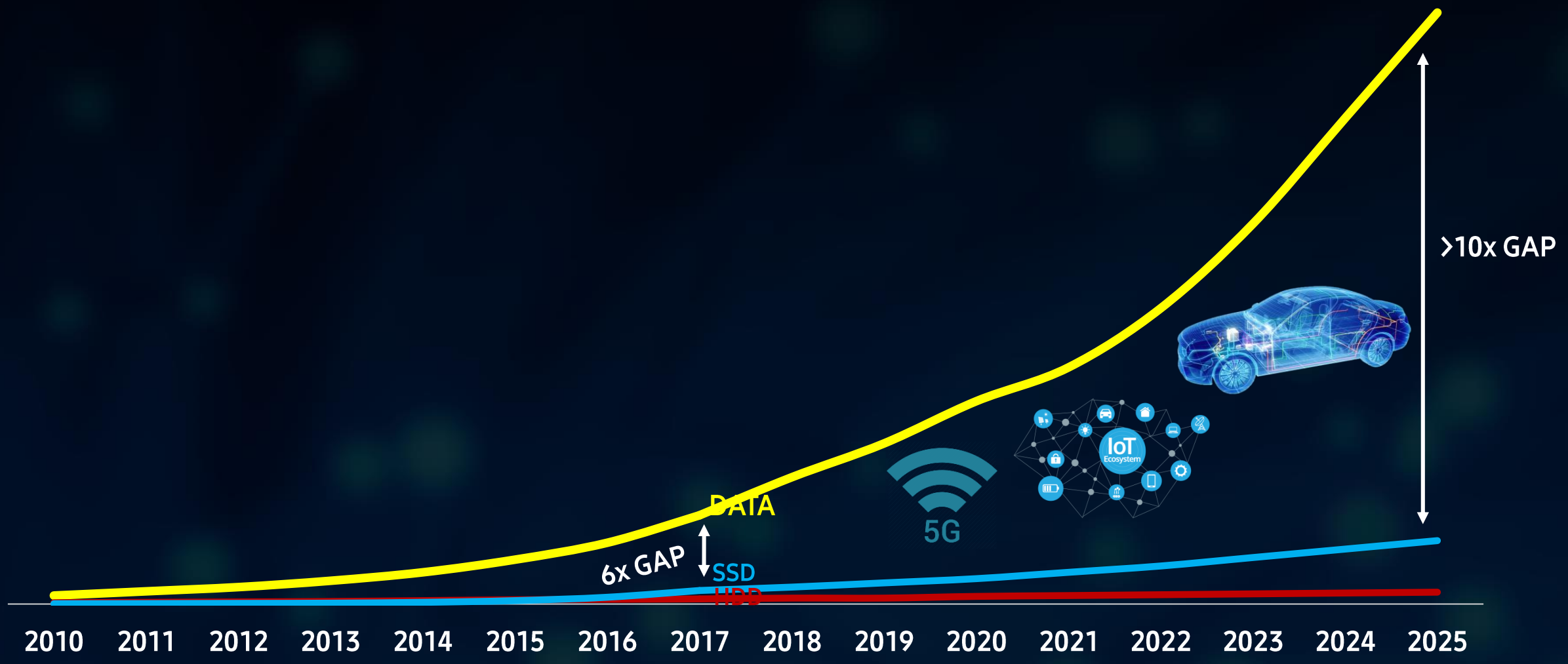
Data Growth versus Storage Media



Source: IDC, Samsung estimate

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To manage data overload, IT Industry needs...

...But storage infra relies on obsolete standards

Since 1983

Since 1988

SERIAL ATA 6 Gb/s

Since 2003

Serial Attached SCSI

Since 2004

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nvm EXPRESS over Fabrics

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SATA

- One lane
- 30km/h speed limit
- Red light after 32 cars

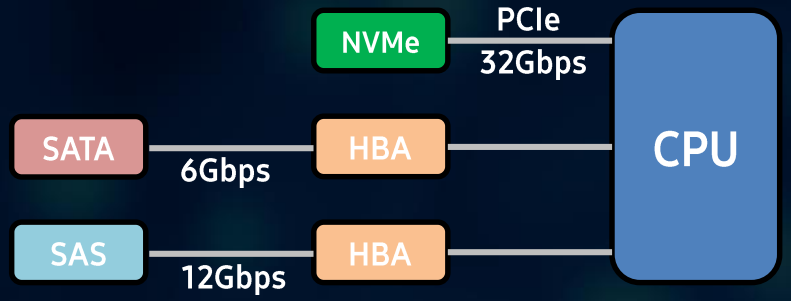
SAS

- One lane
- 60km/h speed limit
- Red light after 254 cars

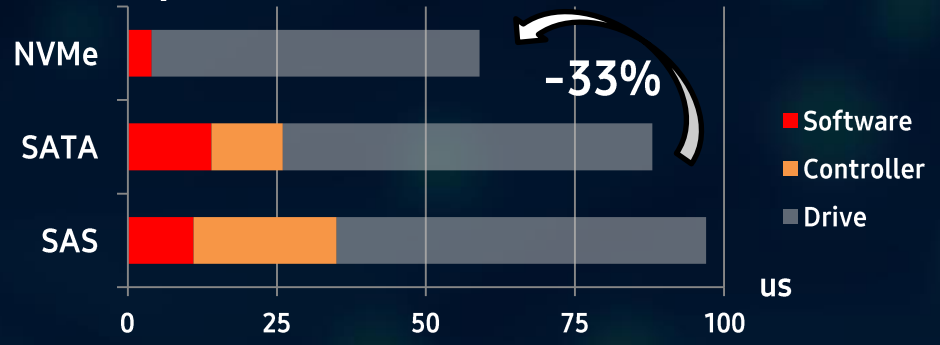
NVMe

- 65,536 lanes
- 120km/h speed limit
- Red light after 64K cars

Direct CPU Connection



Optimized Software Stack



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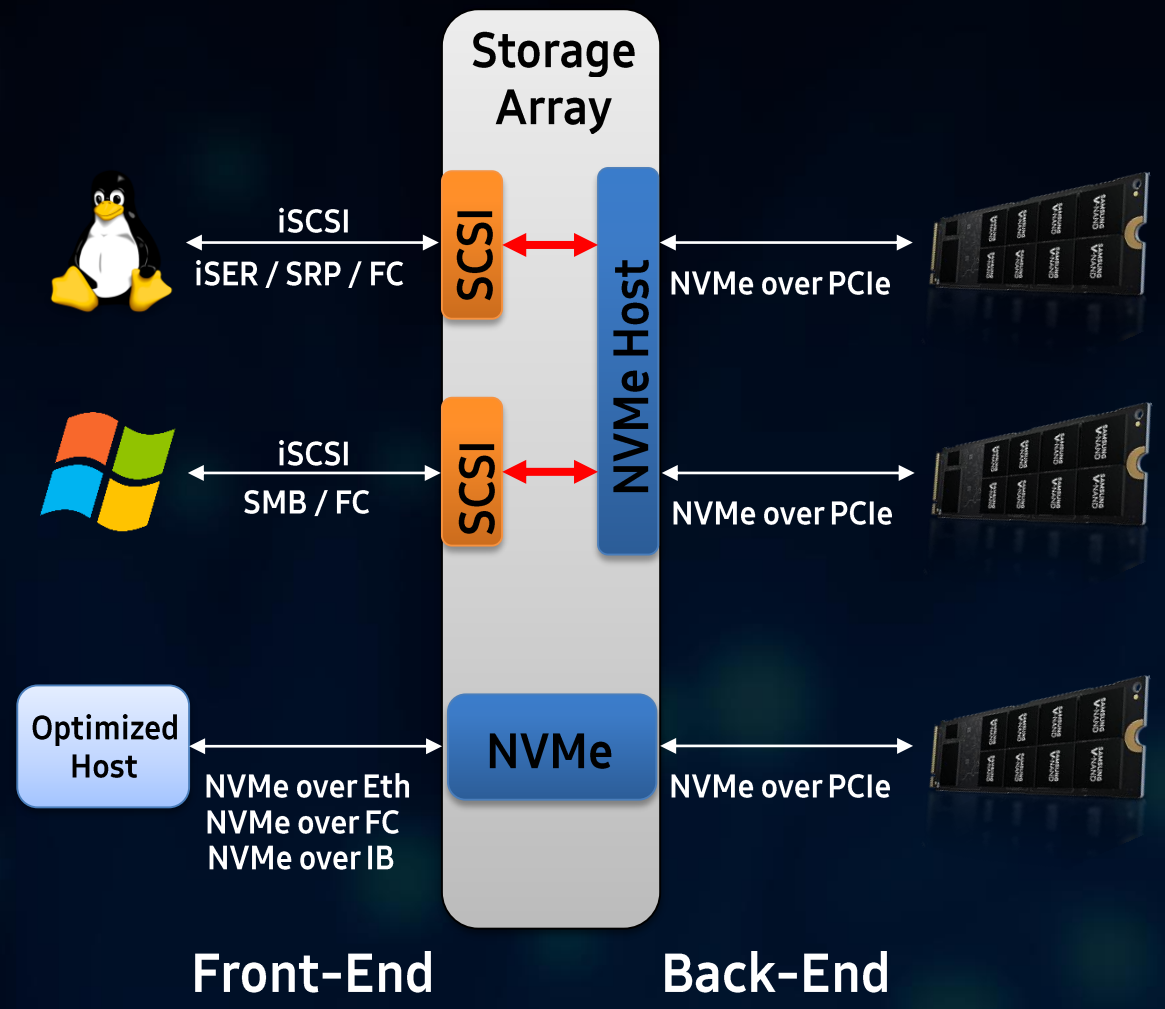
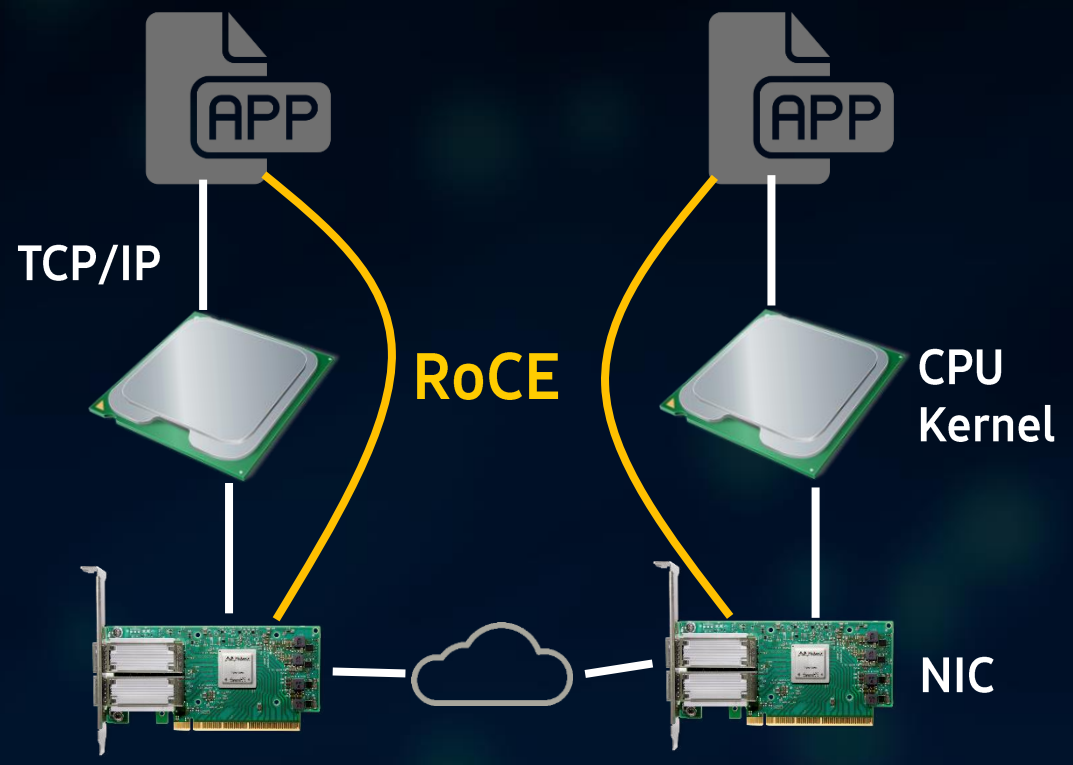
End-to-End NVMe over Fabrics

- Eliminates protocol translation overhead



RDMA: Ultra-Low Latency

- Eliminates CPU/kernel overhead



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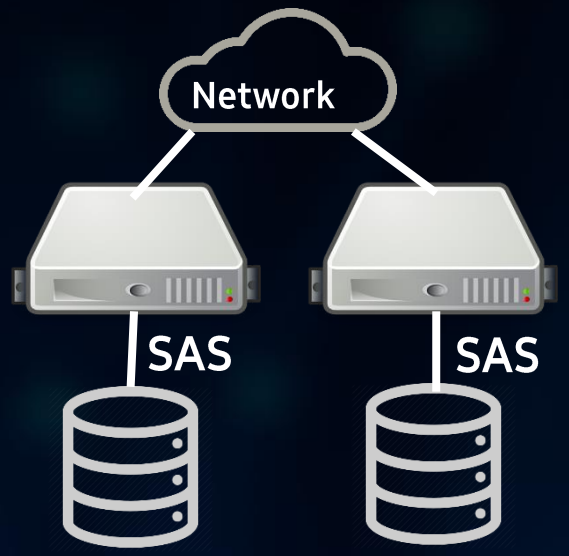
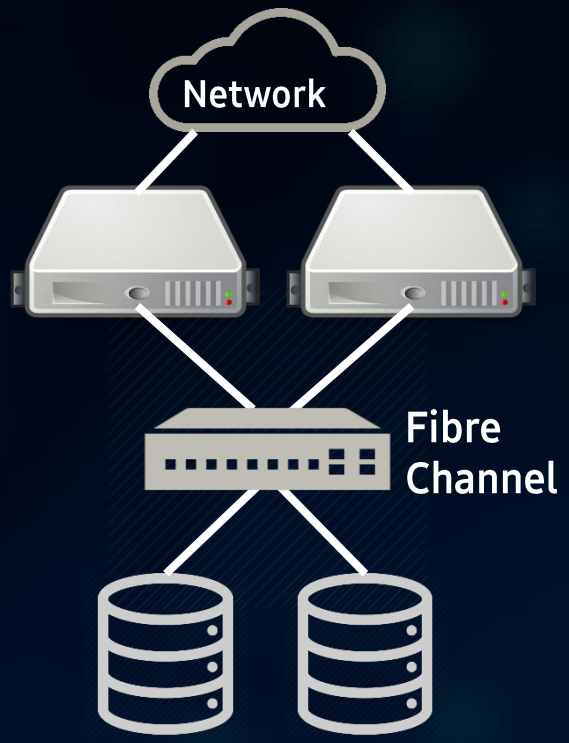
DAS



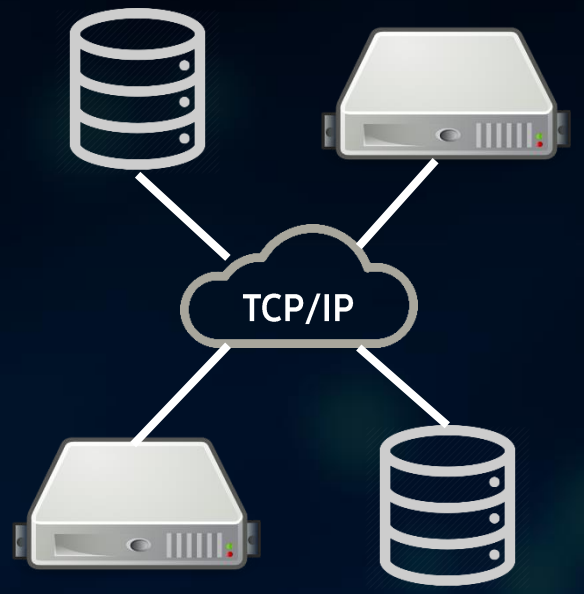
Limited Scalability

SAN



Expensive & Complex

NAS



Limited Performance

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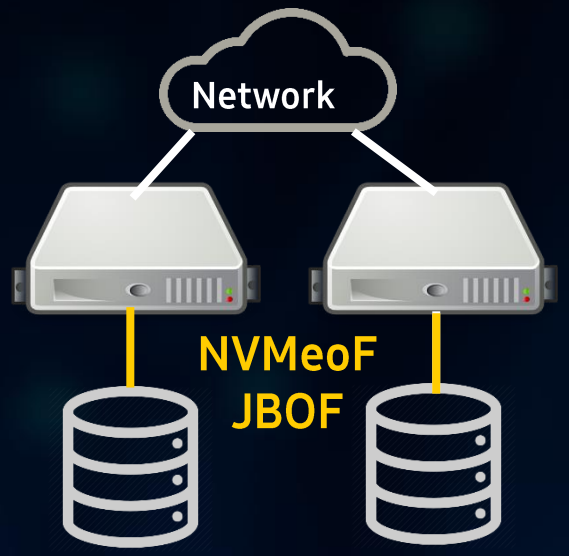
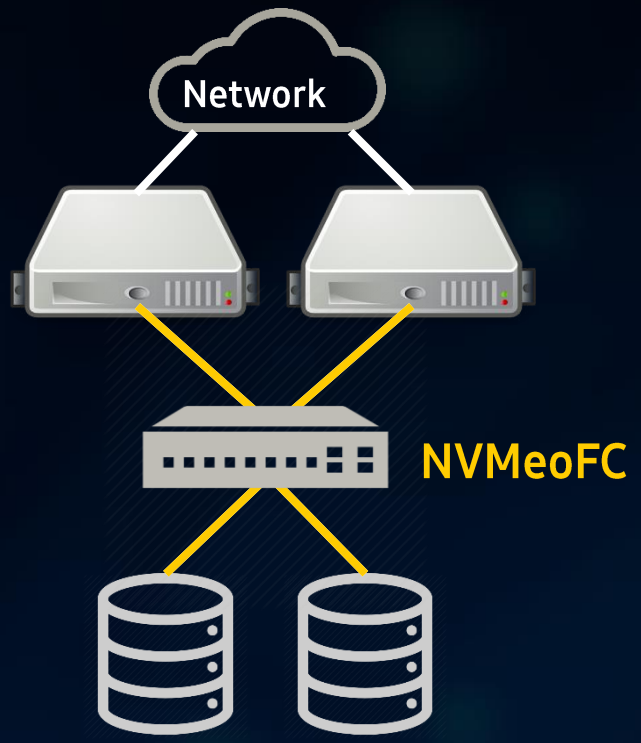
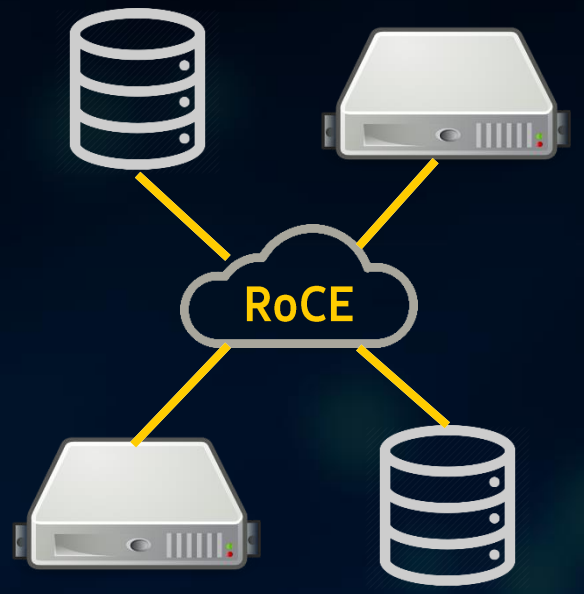
DAS



SAN

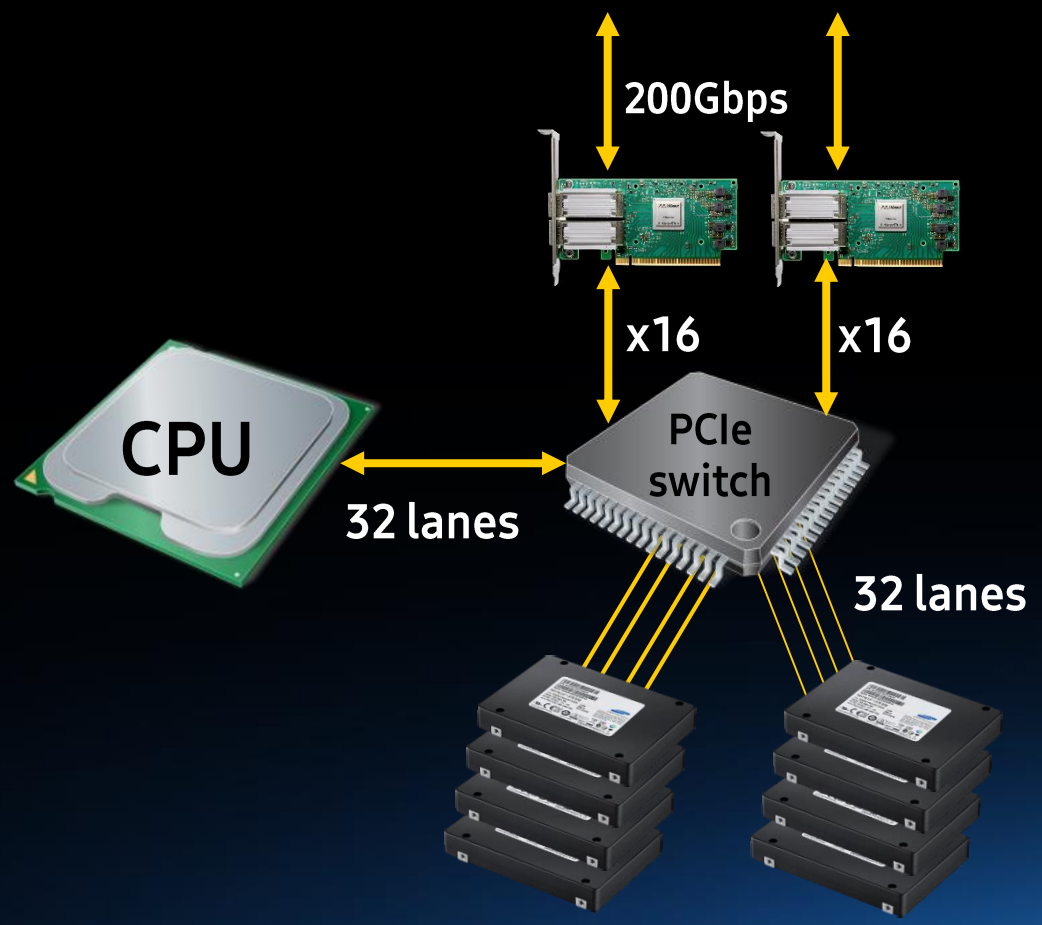


NAS



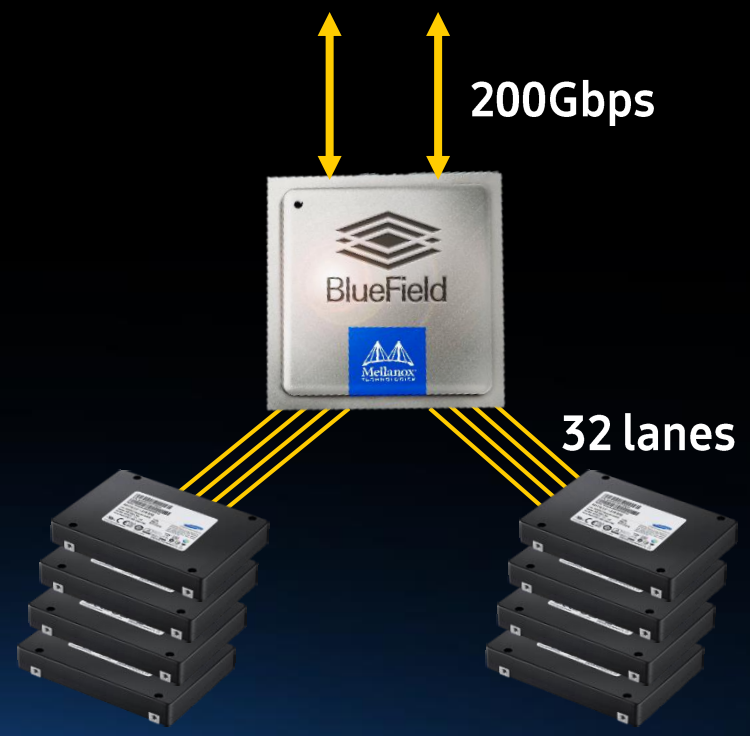
NVMe over Fabrics can be everywhere

Legacy Storage Server Architecture is Ineffcient



Conventional NVMe-oF Server

High BOM from non-storage components



Tomorrow's NVMe-oF Solution

JBOF architecture with storage array features

Painpoints of Existing Storage Form Factors

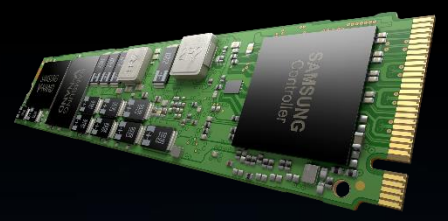
2.5”

+ Compatible with HDD infra

- Low storage density

- Thermals not optimal

M.2

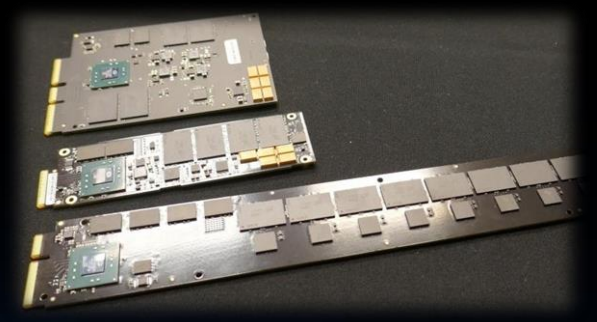


+ More space efficient vs 2.5”

- Limited capacity points

- No dual-port & hot-plug

EDSFF



+ Increased storage density

- Complexity: 3 form factors

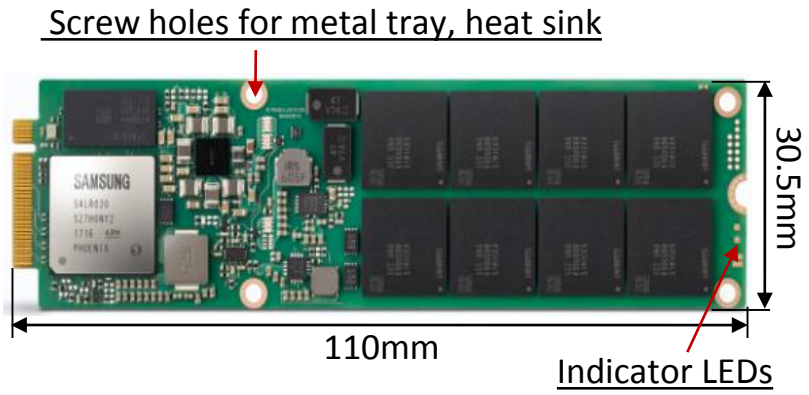
- No SATA & SAS support

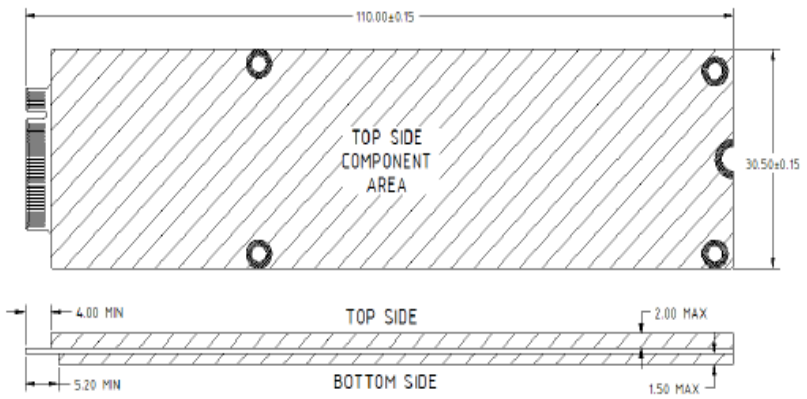
Introducing NF1 Form Factor

- High capacity & small form factor SSD for Data Center & Enterprise Servers

Samsung SSD activated

SAMSUNG V-NAND Gen4





Slim Form Factor

- 30.5 x 110mm, max. 4.38mm T
- M.2 connector for easy migration

Maximum Capacity

- 16 NAND packages, same as U.2 7mm
- 16TB available today, 32TB in the future

Future-Proof Design

- Supports all 3 interfaces (PCIe, SAS & SATA)
- Max 16W power (12V) – ready for PCIe Gen4

Key Features

- Dual-port support for mission critical use
- Hot-plug & front-loading supported

Why NF1 is an Ideal Fit for OCP

OPEN Compute Project

Efficiency

Reduce W/TB
All-in-one spec

Scale

Front-loading
LED indicator

Openness

Submitted to
JEDEC process for
Standardization

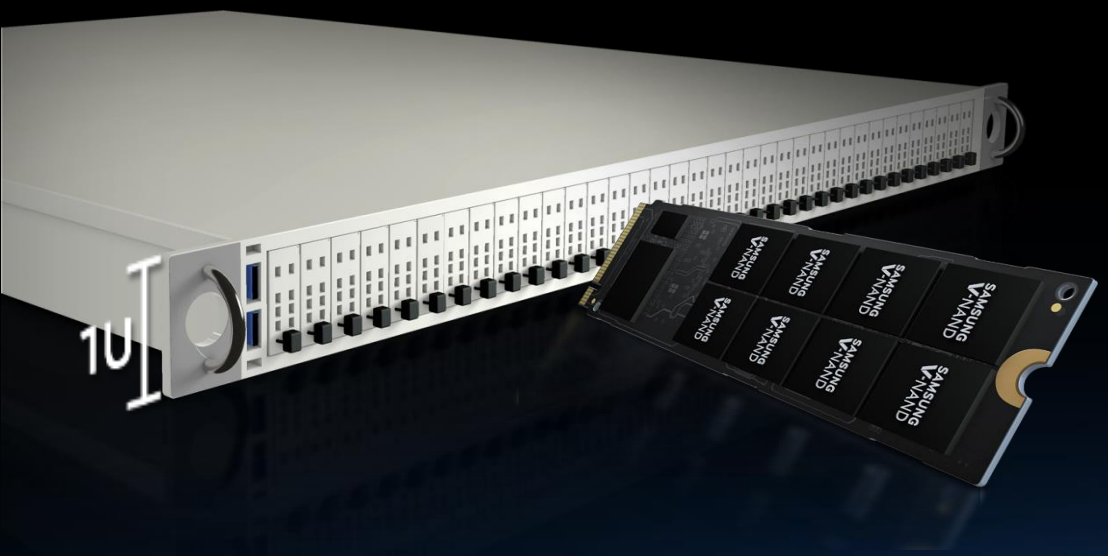
Impact

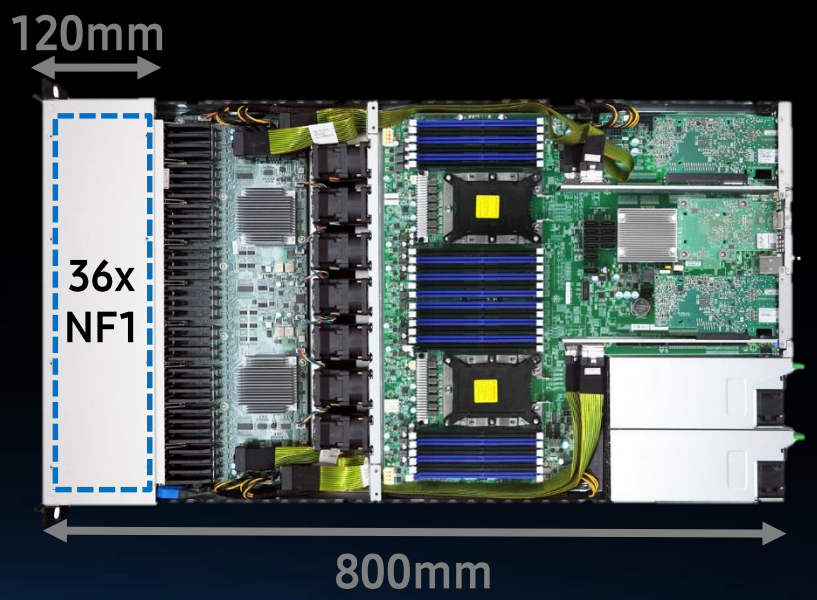
Improves TCO

“Mission Peak“ – NF1 NVMe Storage Server

- NF1 NVMe SSD reference design developed in partnership with AIC

Samsung SSD activated

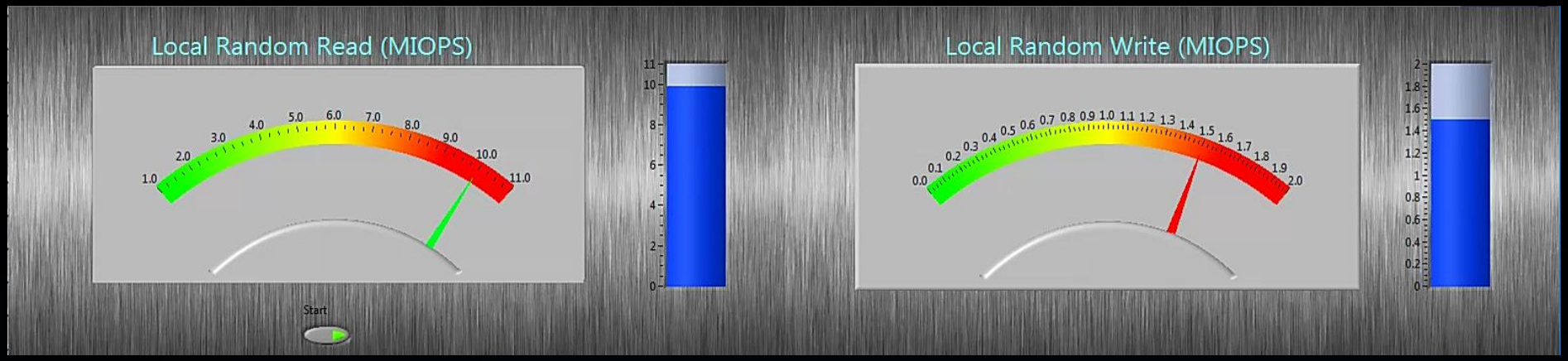




Key Features

- 1U EIA-310D (19”), 800mm deep
- 24x DIMM slots (DDR4)
- Dual Intel™ Xeon™ / Skylake
- Advanced Thermal Solution
- 2x redundant hot plug power supplies
- 36x NF1 drives (capacity up to 550TB usable)
- 3x 100GbE network connectivity
- Power 1200W
- 2x PEX9797 switches connected to drives

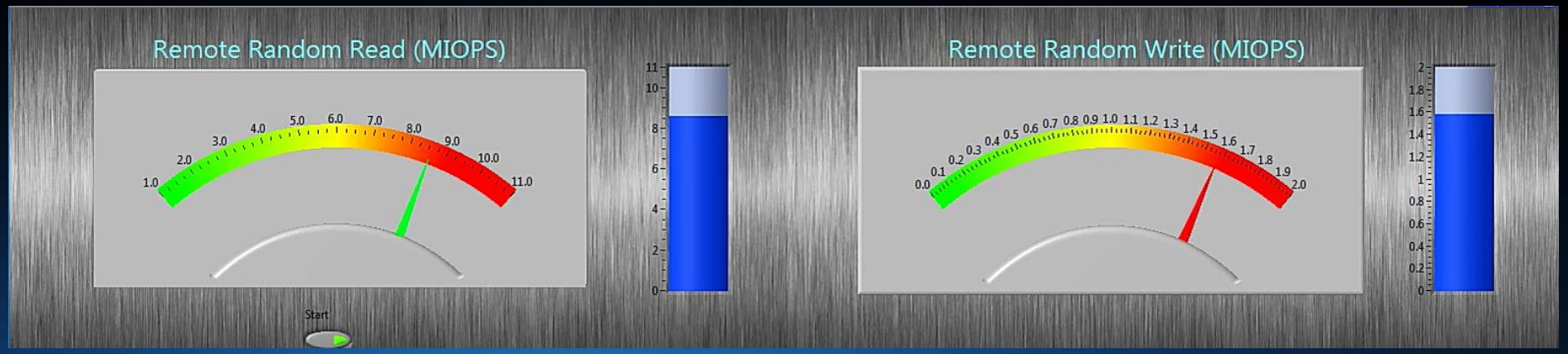
“Mission Peak“ – NF1 NVMe Storage Server



Samsung SSD activated

10M Random Read IOPS delivered inbox

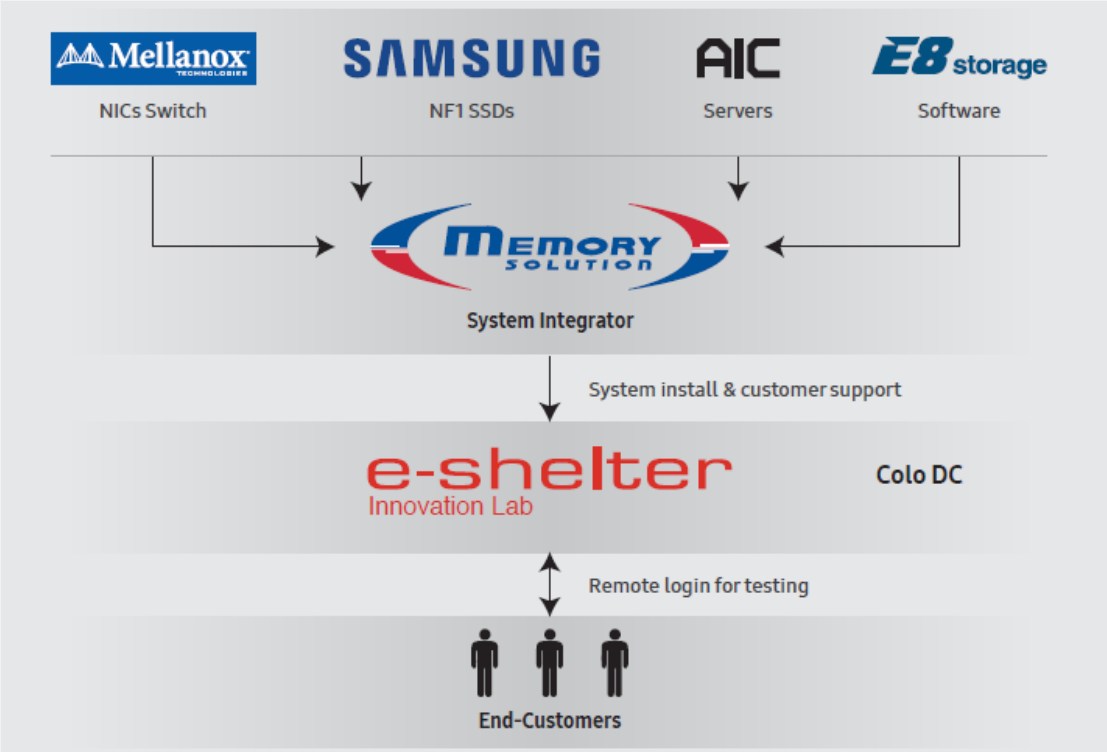
8.5M Random Read IOPS over NVMe-oF



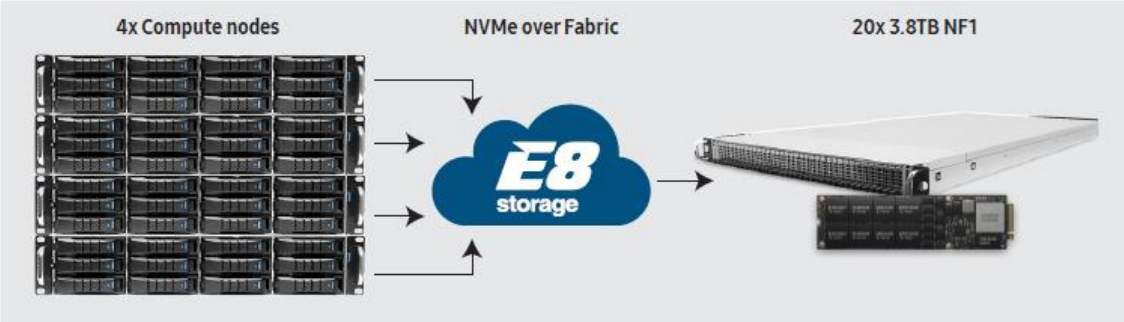
Mission Peak with NVMe-oF enables near-DAS Performance at Scale

“Mission Peak“ – PoC as a Service

Efficient Provisioning



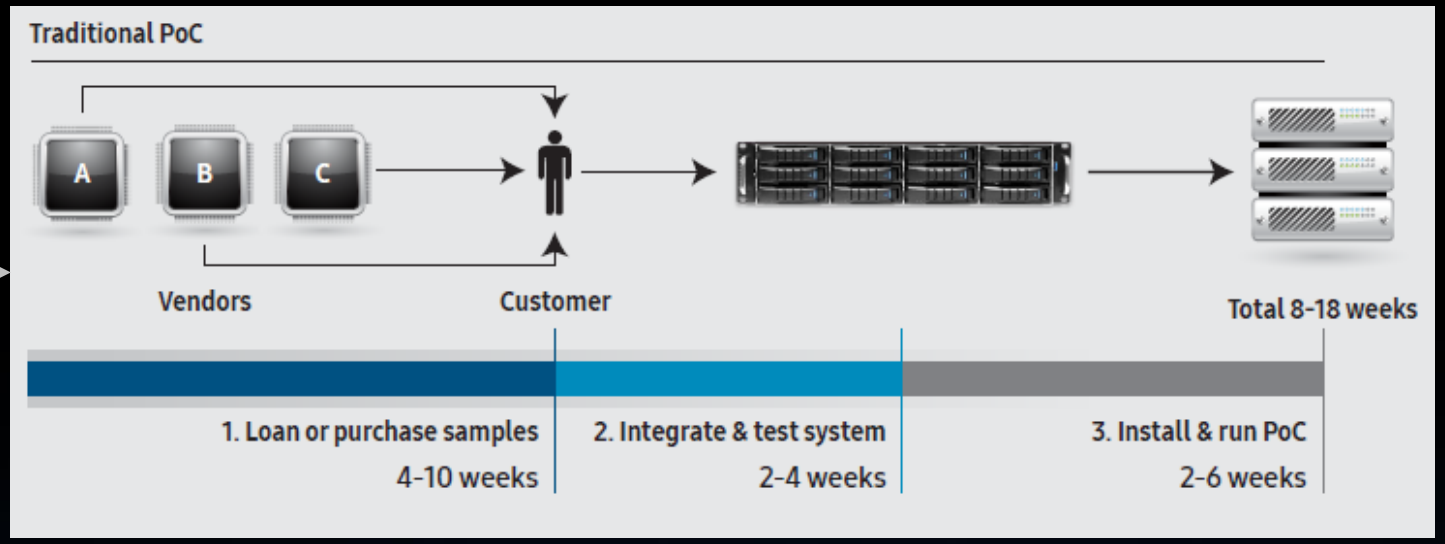
Fully Functional



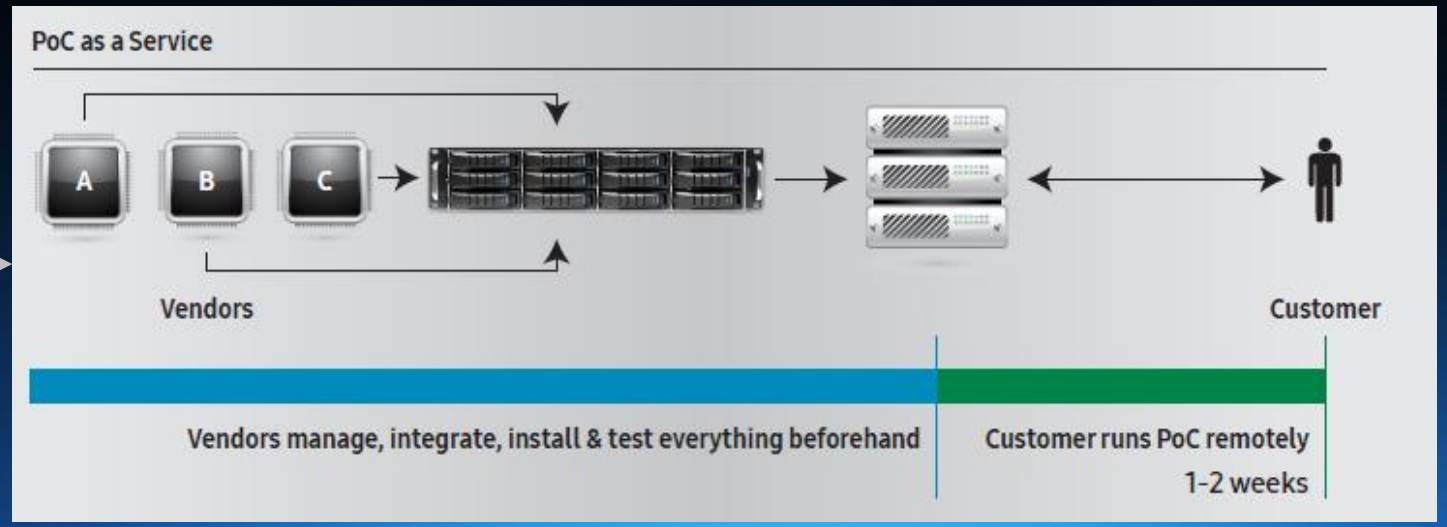
Mission Peak PoC Performance

4KB random read	2M IOPS
4KB random write	260K IOPS
64KB sequential read	18GB/s
64KB sequential write	13GB/s
Read latency (QD1)	70µs
Write latency (QD1)	36µs

The Shortcut to your PoC



4 ~ 6 months



Only ~ 2 weeks

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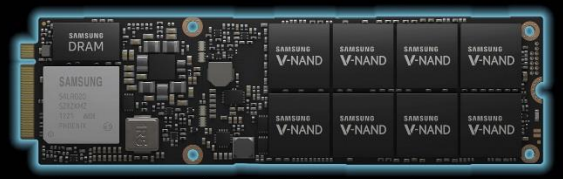
Rethink Storage

Small shape, huge capacity

Despite its tiny size, our new PM983 NVMe SSD allows you to pack more storage capacity in your servers than ever before.



Available in capacities ranging from **4TB to 16TB** for up to 0.5PB in slim 1U server designs. PM983 is depicted in its real NGSFF form factor size (110mm x 30.5mm).

www.samsung.com/semiconductor

PM983 NVMe SSD

Samsung
NF1 & Mission Peak

The Next Generation of
compact All NVMe Flash Storage

Visit us at A22 to see live demo...
...and sign up for remote PoC!