SATA Express: Where is SATA going?

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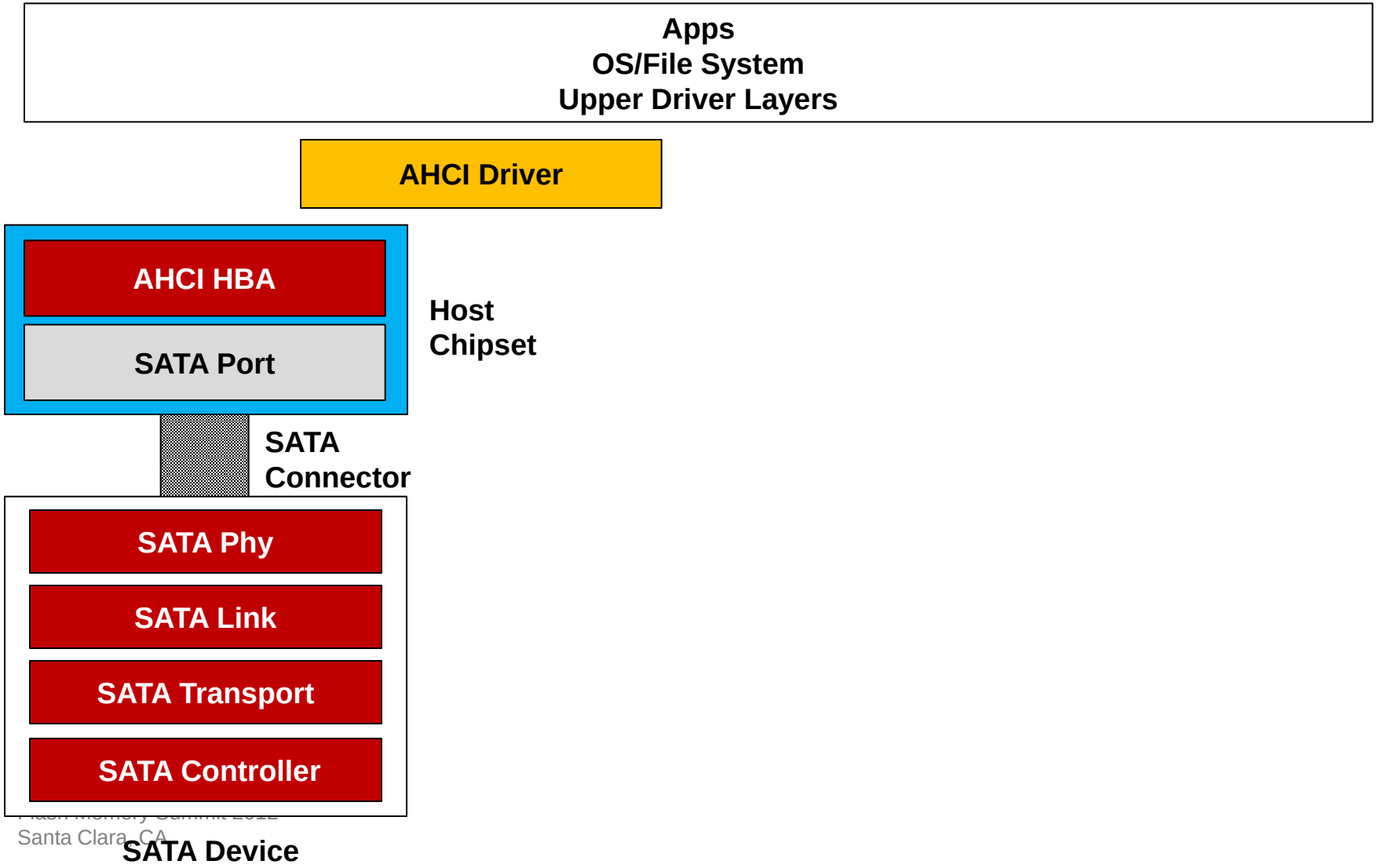
SATA beyond 6Gbps

- In client space, SSDs drive the need for interface speed beyond 6 Gbps
- No plans for SATA speed beyond 6 Gbps
- Instead, PCIe (Gen3) lanes
  - 8 GBps (1 GBps; no 8b/10b encoding) per single lane
  - Scalability – using multiple lanes

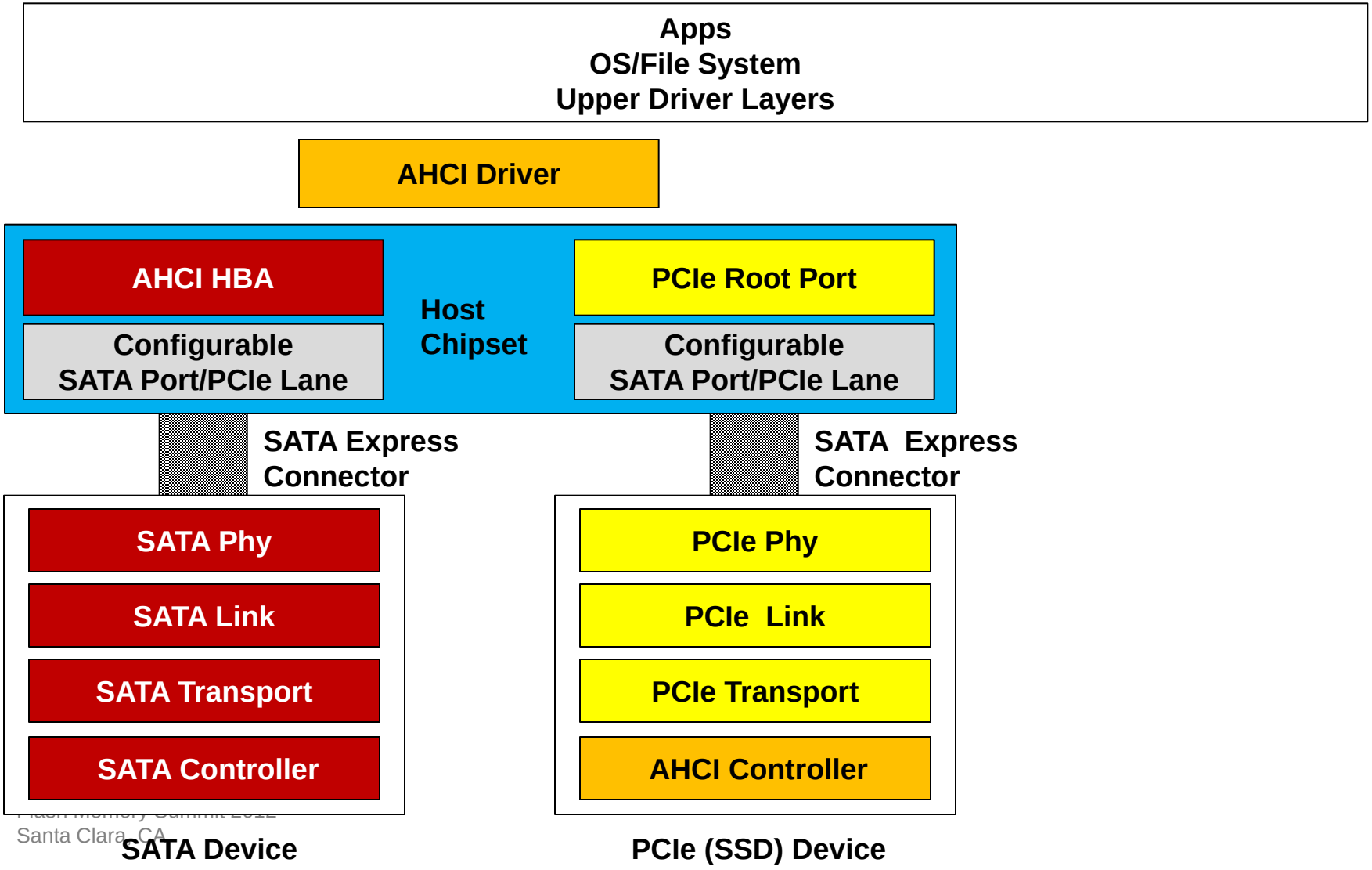
SATA Express

- SATA Express is the set of technologies that allow the transition from SATA to PCIe connectivity (in the client space)
- SATA Express is not a new interface in the sense of connectivity, protocol, transport, programming (SW) interface, command set
  - Connectivity: PCIe (two lanes)
  - Protocol, transport: PCIe
  - Programming interface: AHCI or NVMe
  - Command set: ATA or NVMe

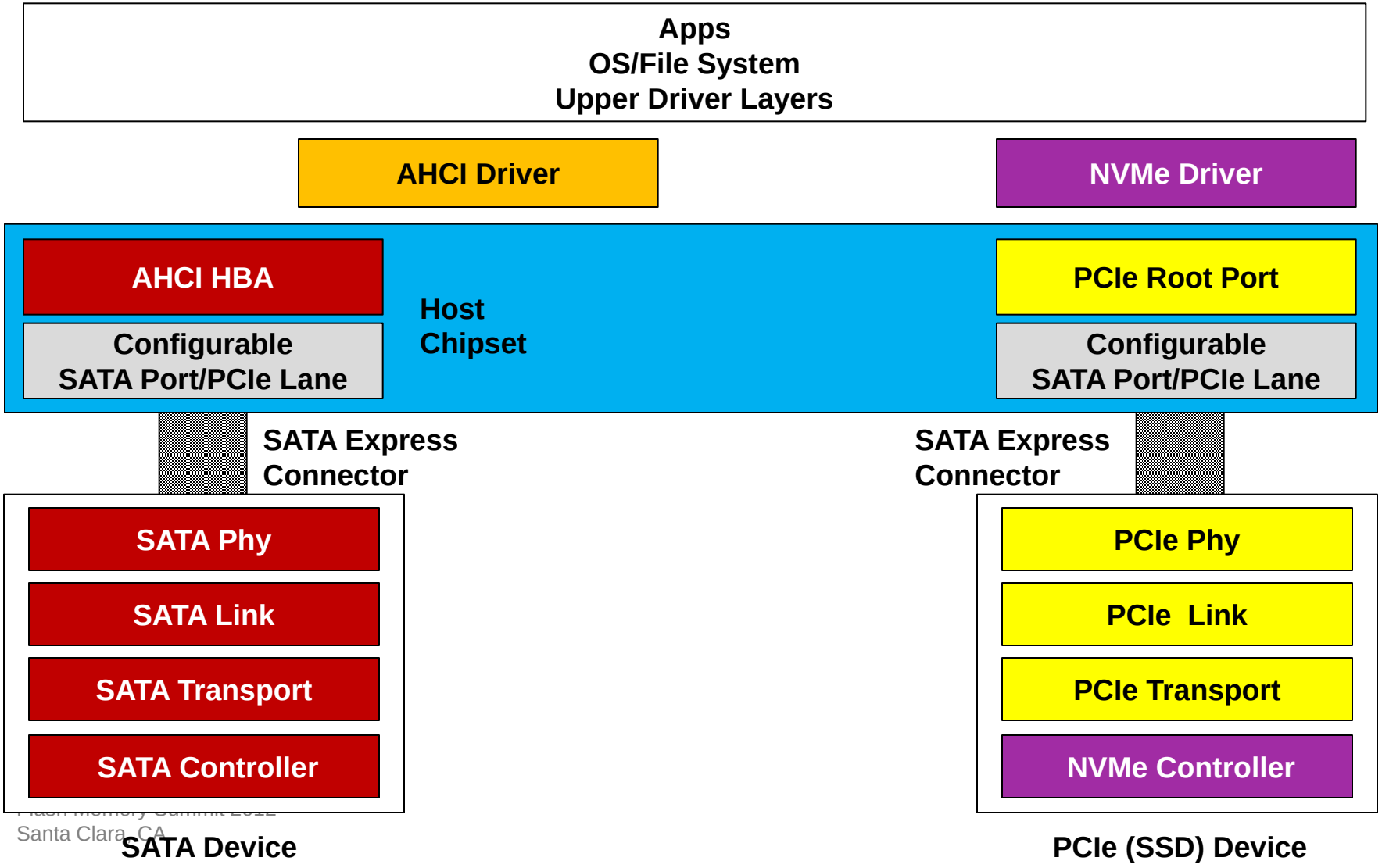
Legacy SATA


Apps
OS/File System
Upper Driver Layers
AHCI Driver
AHCI HBA
SATA Port
Host
Chipset
SATA
Connector
SATA Phy
SATA Link
SATA Transport
SATA Controller
SATA Device

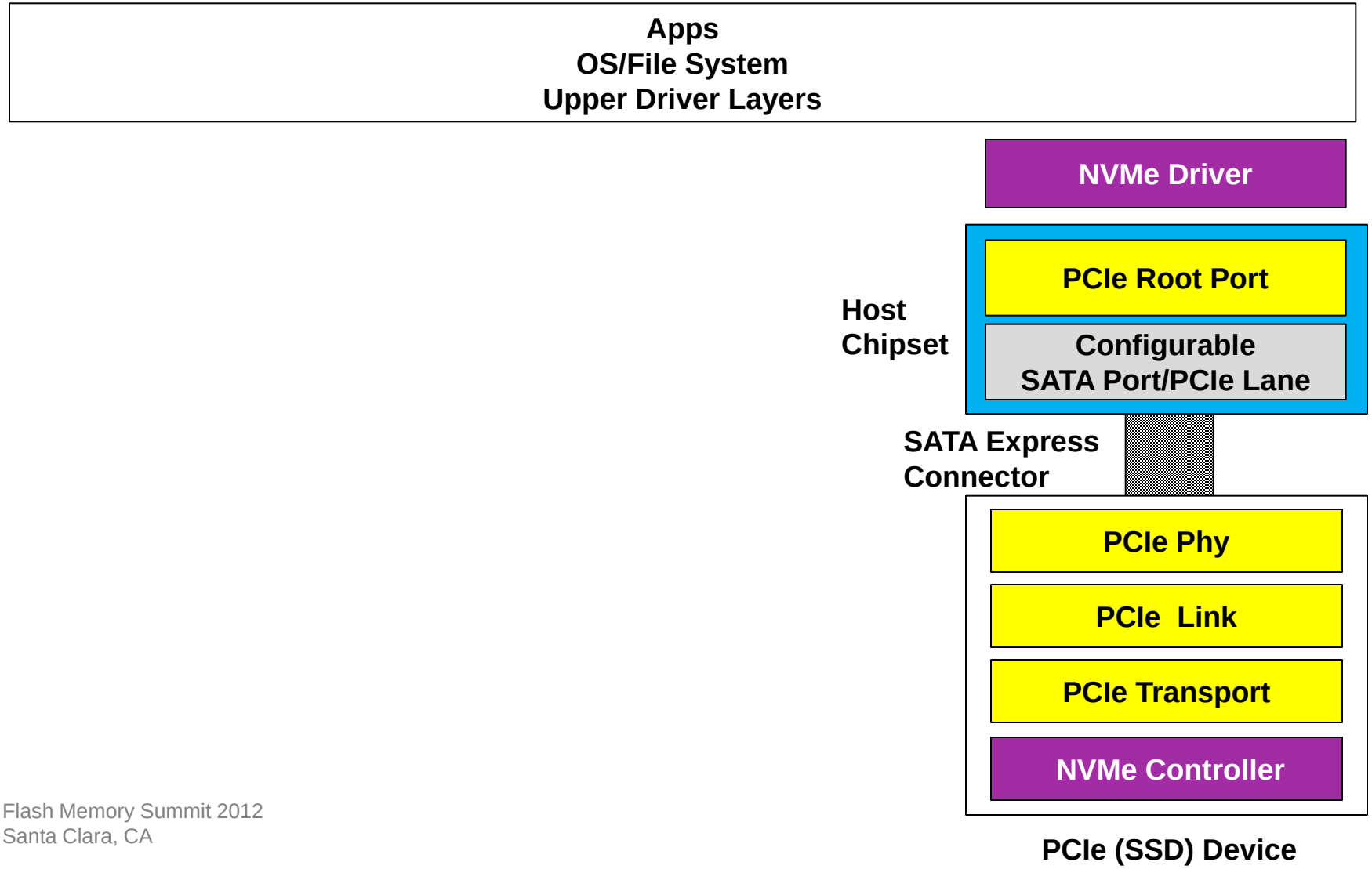
SATA Express/AHCI



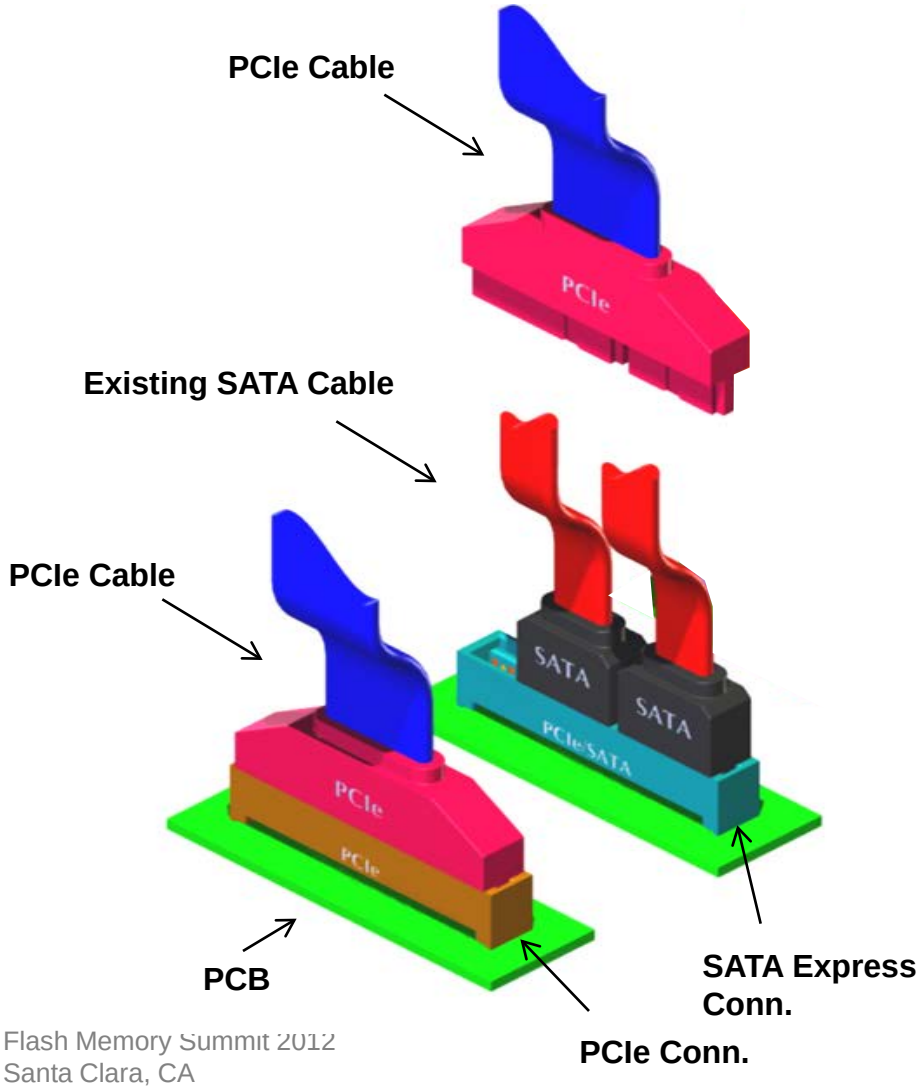
SATA Express/NVMe



SATA Express/NVMe: The likely end



2.5” SATA Express connectors



- Enables the transition form SATA to PCIe
- Two lanes muxed between SATA and PCI on the host
- The host chipset can dynamically or statically select SATA or PCIe
- If SATA is selected, it enables two cabled SATA devices to be attached
- If PCIe is selected, it enables one x2 PCIe device to be attached

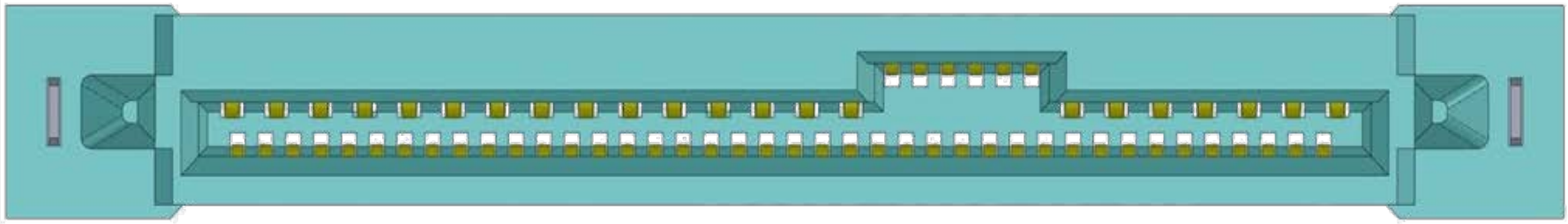
PCIe client devices in enterprise space

- The SATA Express device connector is (mechanically) compatible with the SFF-8639, enabling client PCIe devices to be used in enterprise backplane
- Part of the ongoing SATA Express development

Power,
SATA Express sideband
P15-P1 (15 Pins)

PCI Sideband
E6-E1
(6 Pins)

SAS/SATA/SATA Express
1st Port
S7-S1 (7 Pins)



PCIe Lanes 3-1, Sideband
E25-E17, S25-15
(23 Pins)

SAS/SATA Express
2nd Port
S14-S8 (7 Pins)

PCIe Lane 0, RefClk
E16-E7
(10 Pins)

Is SATA dead?

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Not for a while...