

STORAGE INDUSTRY SUMMIT

The Future of Computing:
The Convergence of Memory
and Storage through
Non-Volatile Memory (NVM)

JANUARY 28, 2014, SAN JOSE, CA



Adrian Proctor
Viking Technology
VP Marketing
Memory Bus Devices

Competing Technologies for the same Real Estate



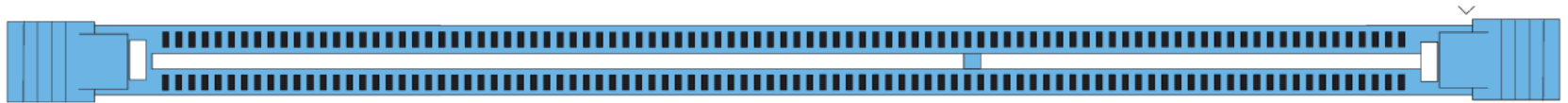
DIMM SOCKETS: NO LONGER “1” HORSE RACE

IN THE PAST

The Std DRAM module was the only option

A Typical system ~60% populated

i.e = NON-OPTIMIZED SYSTEMS

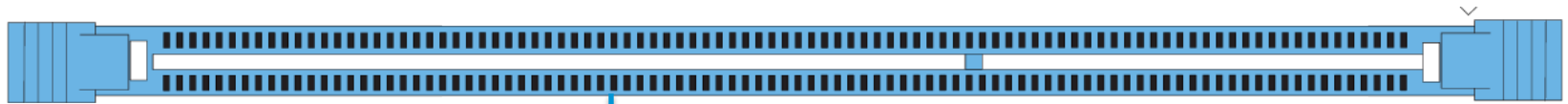


MEMORY BUS DEVICE OPTIONS

Memory Innovation – New Alternatives for DIMM Socket Real Estate

TODAY

Many new options:



Find the right tool for the job!



- DRAM Modules
- NVDIMM
- MCS (ULLtraDIMM)
- SATADIMM
- HDIMM (Hybrid DIMM)
- SCM (MRAM, ReRAM etc)

OPTIONS - FLEXIBILITY

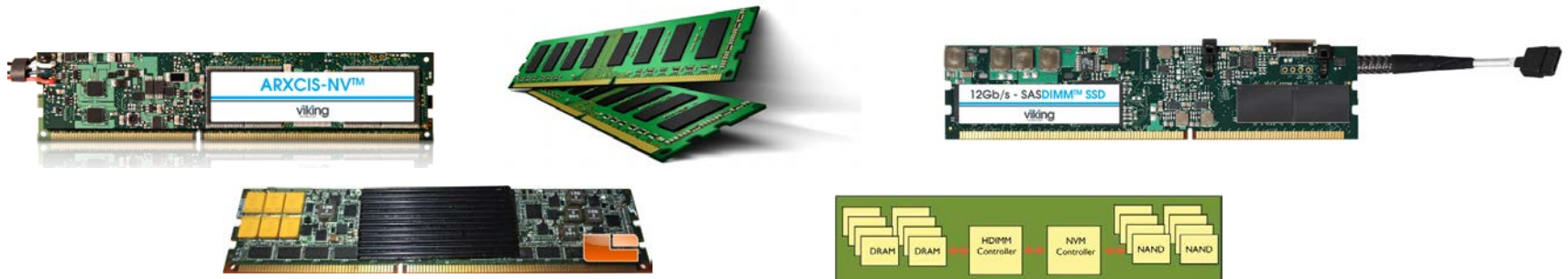
4 x CPU socket server
48 x "memory sockets"

Possible config's
1.5TB DRAM or 96TB* Flash

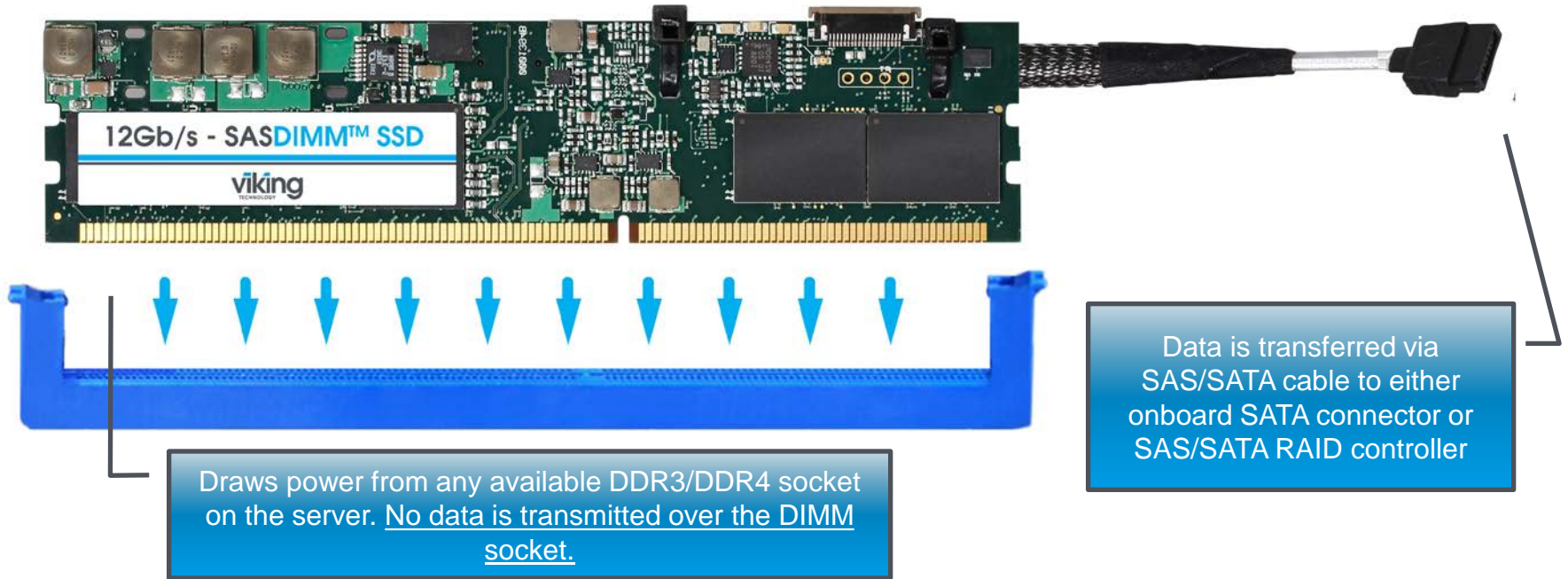
**Without use of HDD-bay*



The NEW Memory / Storage Options for these memory sockets:
Storage Capacity vs. IOPS vs. Latency vs. Increased Endurance vs. \$/GB vs...



ENTERPRISE SSD OPTION: SAS / SATADIMM



FEATURES & BENEFITS

- » SSD in a DIMM form factor – Cost Effective Solution
- » Adds high-performance SSD storage into unused DIMM sockets
- » Up to 2TB Per DIMM: Same Performance / Capacity / Latency as Std SSD
- » DIMM Socket: for Power & Retention ONLY (No I/O via memory channel)

THE ANSWER – OF COURSE...IS..



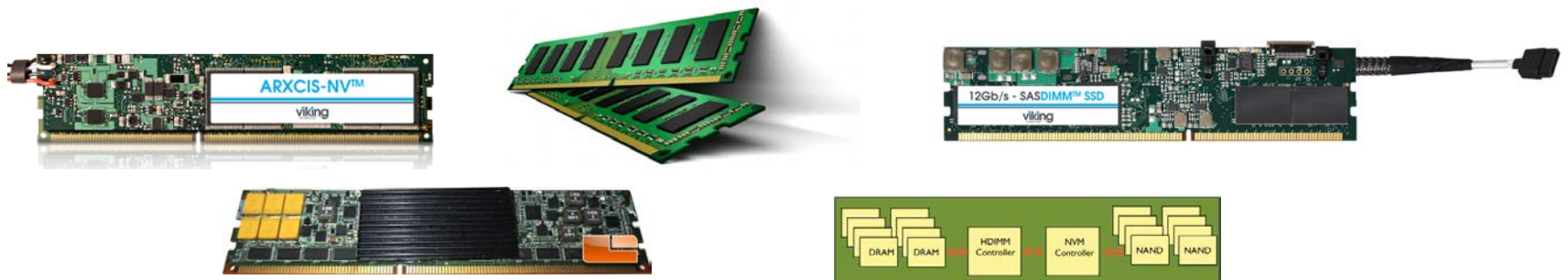
Standard Servers become Highly Flexible

There is a Solution for whatever the Application Demands

- Persistent DRAM - NVDIMM
- High Capacity Flash – SAS/SATADIMM
- Lower Latency SSD – ULLtraDIMM
- NAND used as local swap space for DRAM - HDIMM

OPTIONS – FLEXIBILITY – PRO’S & CON’S

- Flash is cheaper than DRAM \$/GB
- NVDIMM has 1000x lower latency than Flash
- DRAM has practically infinite endurance
- Hyperscale want “Dense & Cheap” (WORM)
- Financial want low & predictable latency
- Storage wants higher I/O performance & increased data security
- No individual “BEST” choice – There are OPTIONS....



MEMORY BUS DEVICE OPTION....

Further detail from the panelists...

