



IBM Flash Storage - brži od najbržih,

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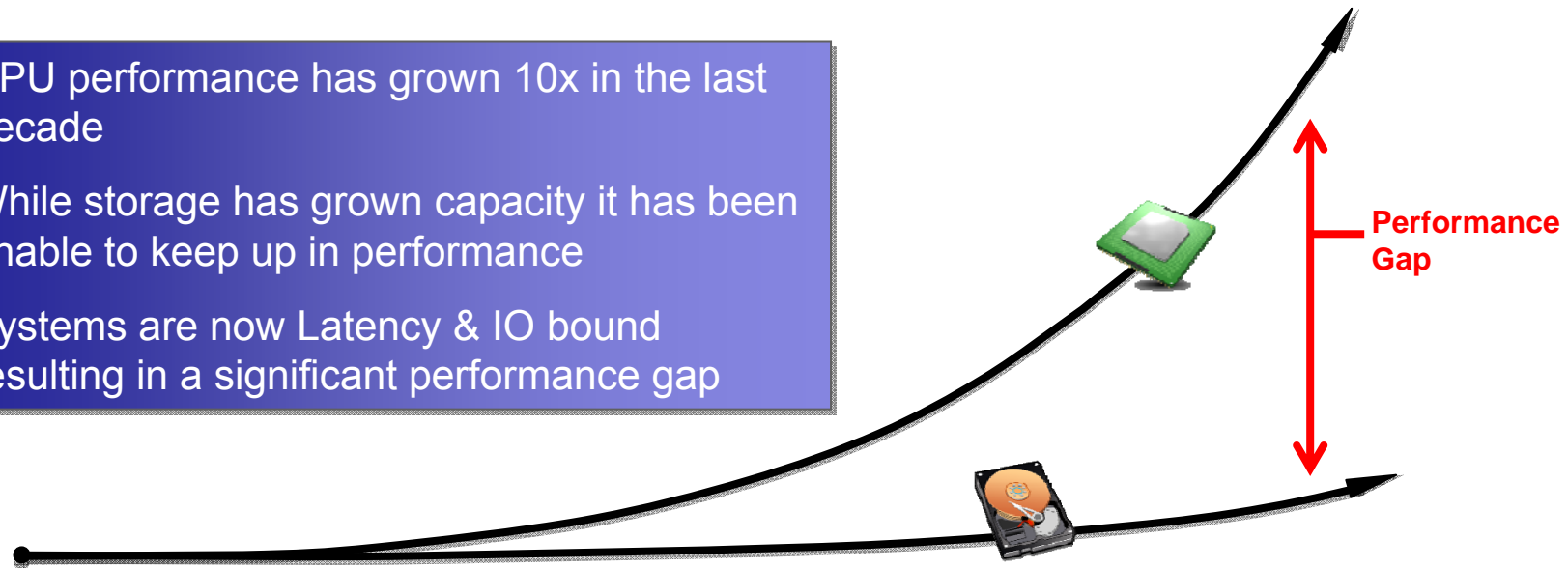
IT Infrastructure Challenges



CPU performance has grown 10x in the last decade

While storage has grown capacity it has been unable to keep up in performance

Systems are now Latency & IO bound resulting in a significant performance gap

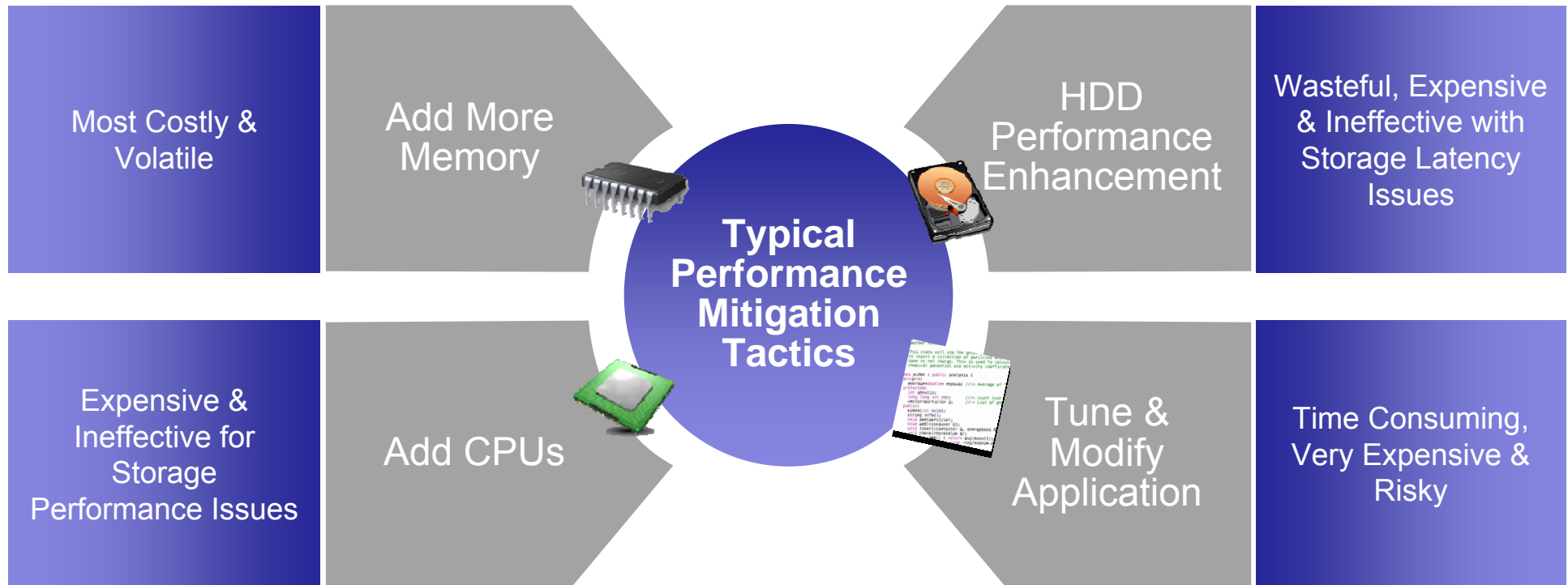


From 1980 to 2010, CPU performance has grown 60% per year*
...and yet, disk performance has grown ~5% per year during that same period**

* IBM study of CPU performance
** IBM study of disk performance



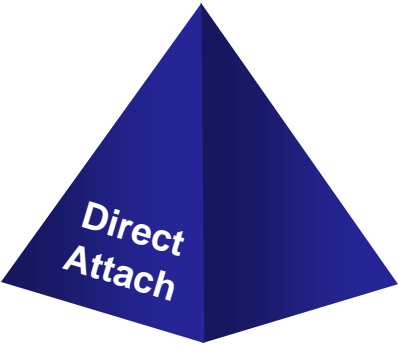
Client Responses to Performance Gap



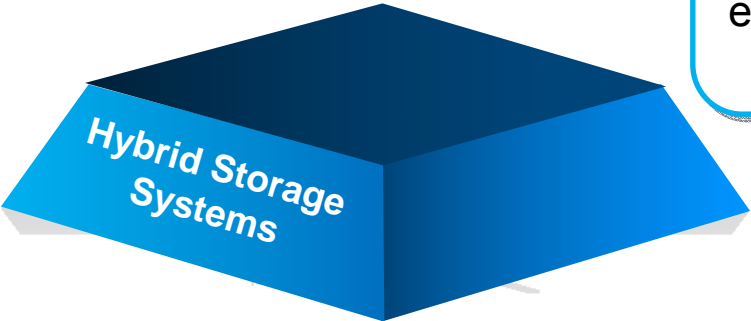
How Flash is Being Deployed in the Industry



Direct Attach Flash
(PCIe adapters, server SSDs)
provides low latency, high
performance storage for
in-server applications



Hybrid Storage Systems
(Storage with SSDs & HDDs)
provide a higher level of
enterprise capabilities with
superior capacity



However, there is a gap in the middle for all flash storage array that provides high performance, low latency, and enterprise-class attributes

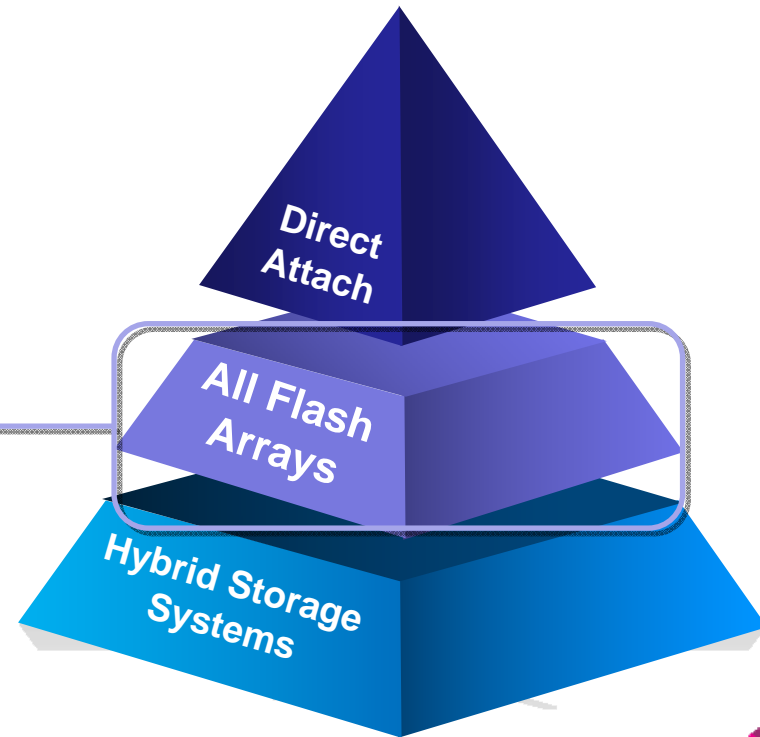


Completing the Flash Pyramid with All-Flash Arrays



Accelerate critical applications and unleash the power of performance

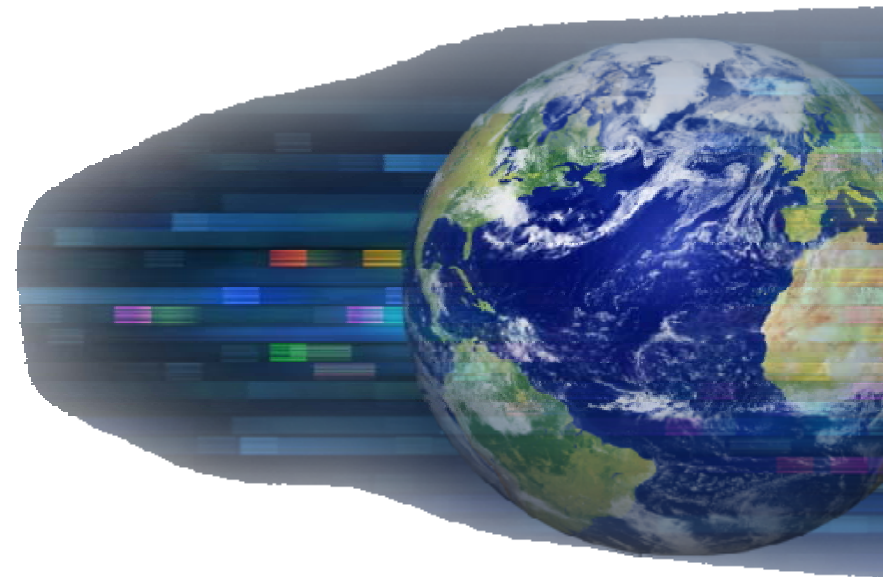
IBM FlashSystem
offers extreme performance, low latency
and enterprise attributes to handle fast
moving operational data in real time



“All Flash” Systems from IBM Redefine the Economics of Computing to Meet the Demands of a Smarter Planet *IBM intensifies storage system investments...*

IBM announces new investments to help clients benefit from the value of flash

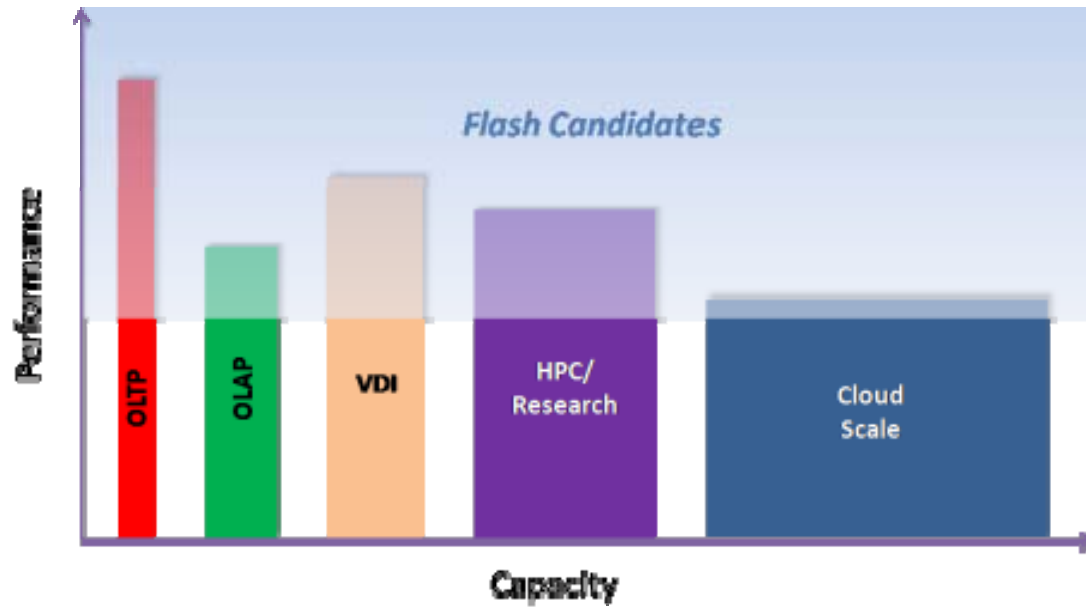
- Investing ~\$1B in flash system research & development*
- 12 IBM Flash Centers of Competency around the world to help clients transform their systems*
- IBM releases the IBM FlashSystem™, new all-flash storage offerings*



Where Do You Best Use Flash Today



Typical Use Cases



IBM Flash Storage Impact on *Systems Economics*



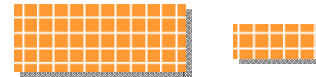
Better Economics Without Re-architecting Applications



85% Reduction
in batch
processing times



50% Reduction
in Software
Licenses



75% Reduction
in footprint; 1 Petabyte
on 1 floor tile.



80% Reduction
Energy
Usage



100 μ s Latency
No more
bottlenecks



Enterprise Reliability
High Availability, 2D Flash RAID &
IBM Variable Stripe RAID™

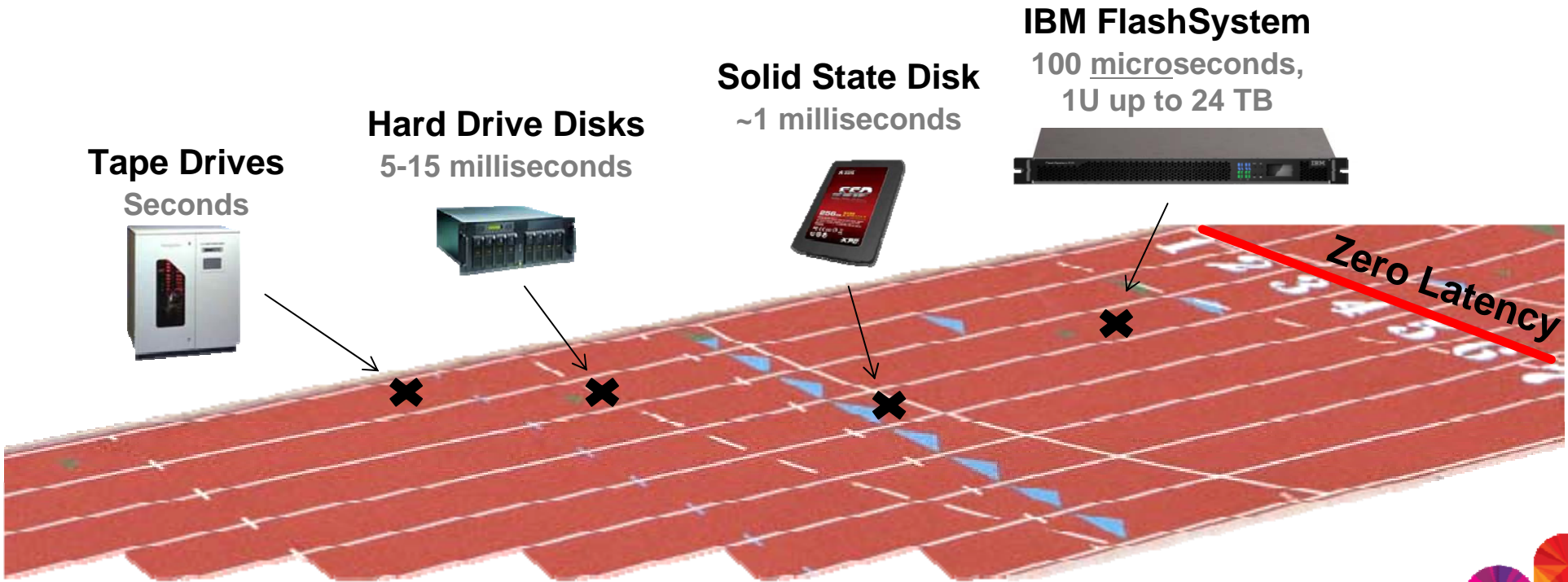
The data below are based on average operating conditions that may or may not be representative of a particular customer's operating environment. The use case measurements are from TMS customers using the flash technology that has been integrated into IBM's systems



Race to Zero Latency



With each new gen. of storage, comes performance gains in order of magnitude

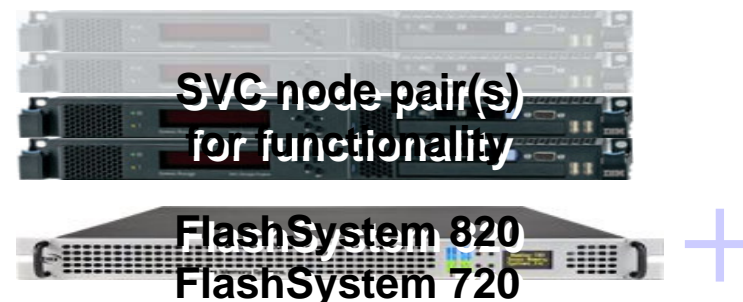


Masterchef – dekonstrukcija jela



Adding SVC functions to FlashSystem *RamSan*

- SVC adds all the functions missing in a standalone FlashSystem
- SVC is **fast** (+100µs max)
- SVC+RamSan is **functionally superior** to any other Flash product!
- Process high IOPS with fullsize SVC, or just good latency with small SVC



1 Petabyte, 1 rack. What it means



- 1 Petabyte: 1 Floor Tile
- 100 microsecond latency
- 22 Million IOPS
- 210 GB/s
- 12.6 KW power

Less power than the average 200TB array



1 Rack

22 Million IOPS Alternative

315 Racks Performance
Optimized Disk

