Simplifying Desktop Virtualization with Flash

Todd Walls

Client Technical Manager

IBM Flash

Key stakeholders - everyone

Users
- Provide better-than-a-PC user experience

IT Organization
- Easy to deploy, operationalize, and manage at scale
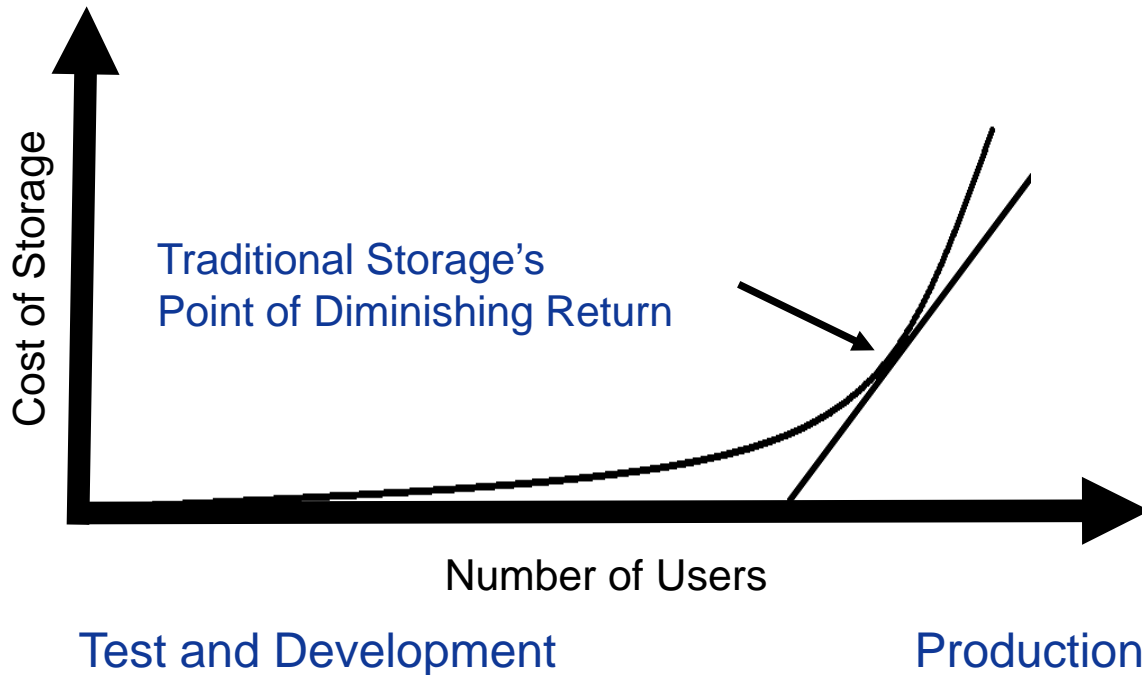- High Availability (HA) and disaster recovery (DR)

Chief Financial Officer
- CAPEX cost lower than a PC
- Tangible datacenter OPEX costs reduction
- Lower risk with no hidden costs

It worked great in the lab . . .

Many VDI implementations work well in small environments then fail to scale

Cost of Storage (y-axis)

Traditional Storage's
Point of Diminishing Return

Number of Users (x-axis)

Test and Development   Production

The Result:

Getting into production becomes a challenge

Cost of acquisition kills the momentum

Drives businesses back to laptops

The problem with VDI is storage

VDI Cost By Component
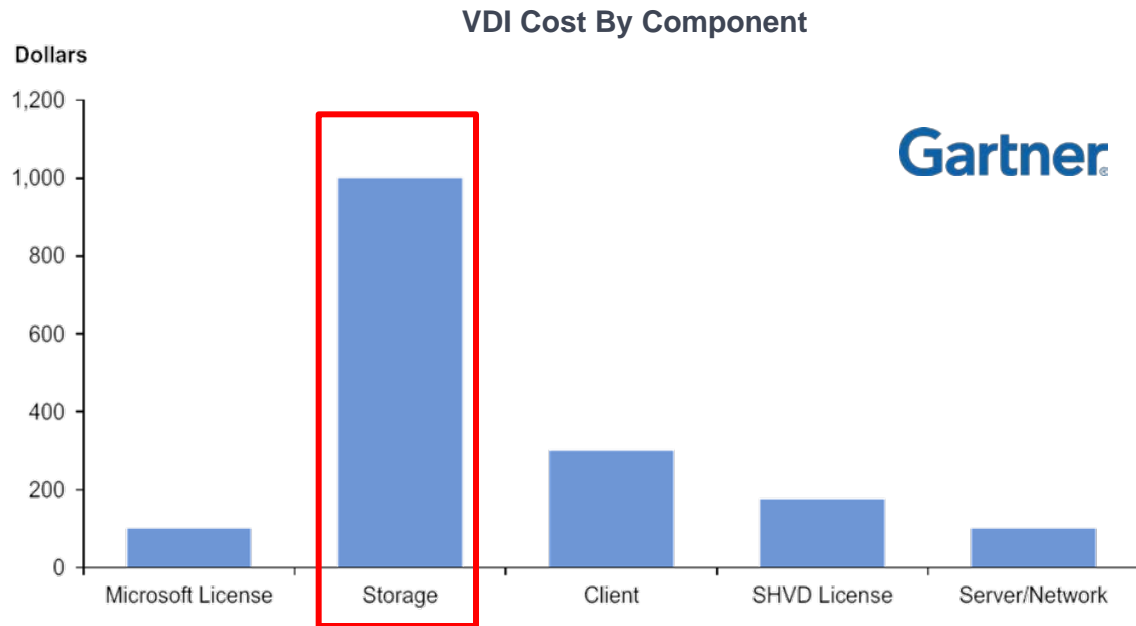
"The **No. 1 challenge** associated with any SHVD [VDI] project, is the lack of storage planning resulting in higher-than-expected **storage costs**."

Source: Attacking the High Cost of Desktop Virtualization (July 2013 Gartner ID: ID:G00250192)
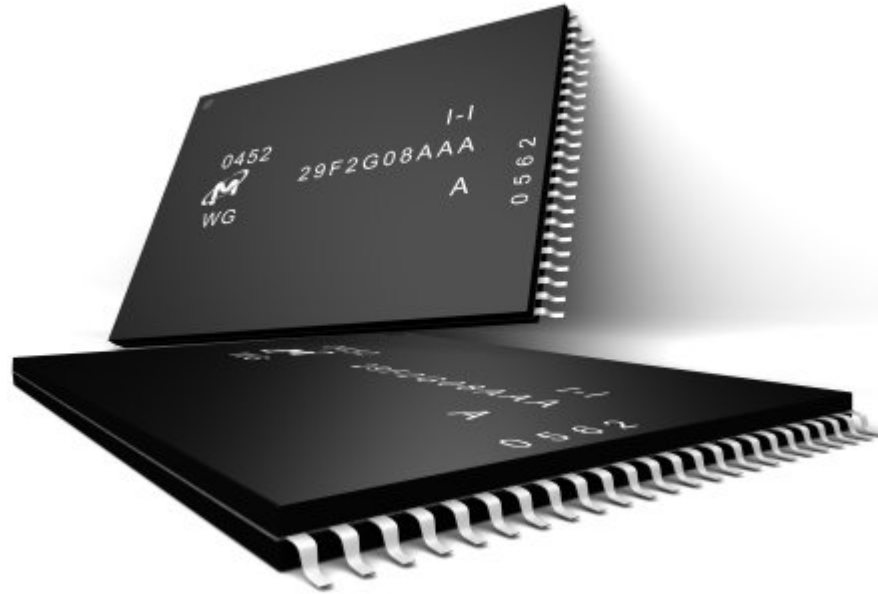
VDI workload poses challenges too

- Prone to bursty periods of intense activity

- Heavy on writes – 80% of IO writes

- Highly random data access patterns

- Generates large numbers of IO per user

How do we get VDI out of the lab and into production?

Replace this

With this

Simple

Flash storage resolves latency issues

Flash delivers <u>deterministic</u> performance that easily addresses VDI IO Challenges:

- ☑ Prone to bursty periods of intense activity

- ☑ Heavy on writes – 80% of IO writes

- ☑ Highly random data access patterns

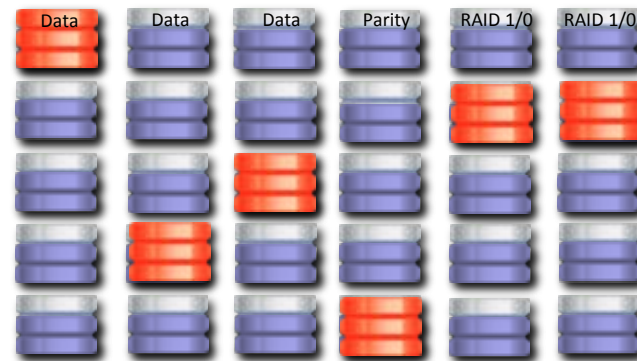- ☑ Generates large numbers of IO per user

Storage economics

Factors to consider with a solution using Disk Drives:
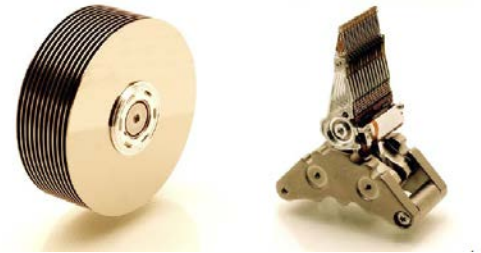
Architecting for Performance:

- Given - Limited to 200 IOPs per 15K rpm drive
- Spread the workload over large numbers of disks to account for IOPs
- Short-stroking drives
- Segregating the workload

- Despite the effort – still end
Up with performance problems

Results of using spinning disk

- A disk array with never-ending performance hotspots

- A very inefficient capacity utilization less than 50%

- Customers are forced to buy more storage than they need

- **Repeat the process again in 3-5 year refresh cycles**
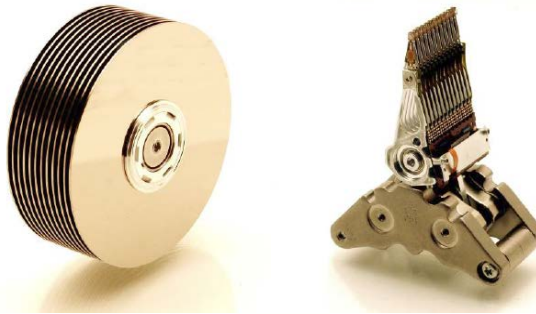
The advantage of flash

- With Flash response times are measured in microseconds – performance is a given.

- Deterministic response times – at scale (measured in hundreds of thousands of IOPS)

- Data is spread throughout the array automatically - ensuring no bottlenecks

- Architecting becomes a matter of capacity not performance.

- Due to the durability of flash as a solid state media, (no moving parts) longevity is also a factor in calculating storage cost.

- eMLC Flash can last 10 years in most workloads; twice as long as disk (without the tech refresh and associated data migration)!

Disk vs. Flash 7-10 year TCO

Spinning Disk   **Flash**

▪Initial cost is ~ $3K / TB   Initial Cost ~$10K / TB

    50% utilization - 2x the capacity needed

▪The effective cost is ~$6K / <u>Usable</u> TB

▪3-5 year refresh cycle doubles the cost

▪Additional risk of migrating the data

True cost is ~$12K / Usable TB   **~$10K / TB**

The performance of a disk solution can never approach that of flash.
Factor in vast reductions in power, cooling and space and the decision
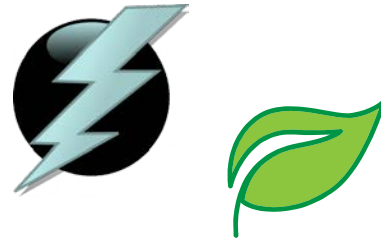to move to all-flash arrays becomes even easier.

Summary

Everyone benefits from a proper VDI installation

Traditional spinning disk technology is not the answer

The attributes of flash: fast and energy efficient make it the optimal storage media

Makes financial sense

Thank You