Deployment and Bottlenecks of Flash and Virtualization:

Flash and VDI Considerations

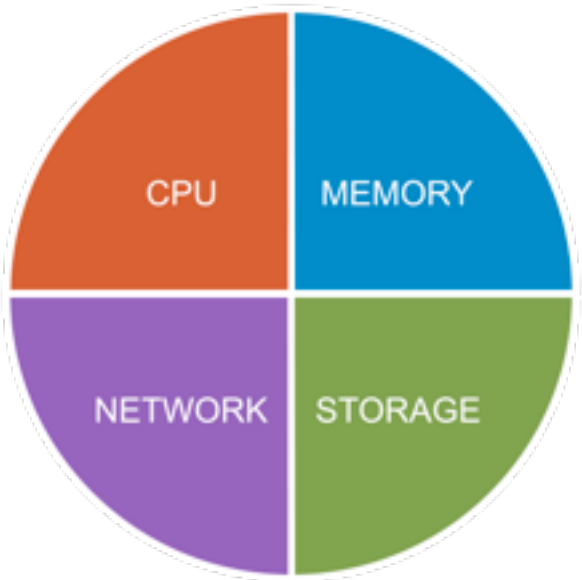
Dr. Alex Danilychev
Citrix Systems, Inc.

VDI Examples

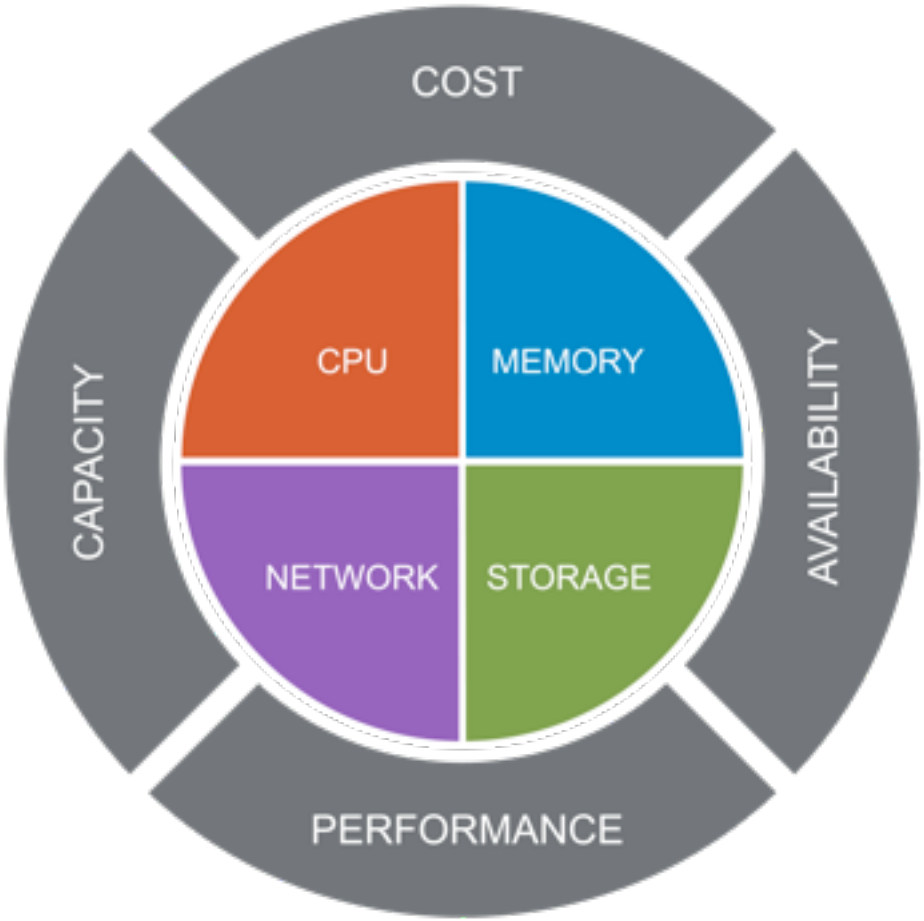
- **Single-tenant VDI - *Citrix XenDesktop***
- **Multi-tenant VDI - *Citrix XenApp***

Keeping it in perspective…

Keeping it in perspective…



Keeping it in perspective…



VDI Storage Characteristics

VDI Storage Characteristics

- Cost per virtual user workload:
  - ~$1,000 for single-tenant
  - ~$300 for multi-tenant
  - As high as 80% dependent on storage

VDI Storage Characteristics

- Cost per virtual user workload:
  - ~$1,000 for single-tenant
  - ~$300 for multi-tenant
  - As high as 80% dependent on storage
- Predominant 4-8k block size

VDI Storage Characteristics

- Cost per virtual user workload:
  - ~$1,000 for single-tenant
  - ~$300 for multi-tenant
  - As high as 80% dependent on storage
- Predominant 4-8k block size
- 80% random writes vs. 20% reads

VDI Storage Characteristics

- Cost per virtual user workload:
  - ~$1,000 for single-tenant
  - ~$300 for multi-tenant
  - As high as 80% dependent on storage
- Predominant 4-8k block size
- 80% random writes vs. 20% reads
- Sizing per 100 users:
  - 600-800Gb for single-tenant
  - 200-300Gb for multi-tenant
  - 2,000 IOPS, can be as high as 5,000

IO Optimization Techniques

IO Optimization Techniques

- Tune OS Image

IO Optimization Techniques

- Tune OS Image
- Favor multi-tenant VDI and achieve 3 to 5 times reduction of IO

IO Optimization Techniques

- Tune OS Image
- Favor multi-tenant VDI and achieve 3 to 5 times reduction of IO
- “Derandomize” IO

IO Optimization Techniques

- Tune OS Image
- Favor multi-tenant VDI and achieve 3 to 5 times reduction of IO
- “Derandomize” IO
- Consider caching and tiering

Flash vs. Mechanical Disks

- 8 SAS 15k disks
  - ~ 1,000Gb
  - ~ 3,000 IOPS

Flash vs. Mechanical Disks

- 8 SAS 15k disks
  - ~ 1,000Gb
  - ~ 3,000 IOPS

- Single SSD
  - ~ 200Gb
  - ~ 20,000 IOPS

Flash Considerations with VDI

Flash Considerations with VDI

Advantages:

Flash Considerations with VDI

Advantages:

- Unmatched IO for 4-8k random writes

Flash Considerations with VDI

Advantages:

- Unmatched IO for 4-8k random writes
- Supports emerging GPU virtualization applications, demanding high IO per user

Flash Considerations with VDI

Advantages:

- Unmatched IO for 4-8k random writes
- Supports emerging GPU virtualization applications, demanding high IO per user

Challenges:

Flash Considerations with VDI

Advantages:

- Unmatched IO for 4-8k random writes
- Supports emerging GPU virtualization applications, demanding high IO per user

Challenges:

- Capacity

Flash Considerations with VDI

Advantages:

- Unmatched IO for 4-8k random writes
- Supports emerging GPU virtualization applications, demanding high IO per user

Challenges:

- Capacity
- Cost

Flash Considerations with VDI

Advantages:

- Unmatched IO for 4-8k random writes
- Supports emerging GPU virtualization applications, demanding high IO per user

Challenges:

- Capacity
- Cost
- Predictable longevity

Flash Considerations with VDI

Advantages:

- Unmatched IO for 4-8k random writes
- Supports emerging GPU virtualization applications, demanding high IO per user

Challenges:

- Capacity
- Cost
- Predictable longevity
- Garbage collection

Q&A