Evaluator Group

IOmark Suite

Benchmarking Storage with Application Workloads

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What is IOmark Suite?

- A storage specific benchmark for application workloads
  - Tests storage only
  - Supports VDI and Virtual Machine application Workloads
  - Additional workloads to be added in the future
- Storage Agnostic
  - Supports any storage that application supports
- Based on a set of standard set of application workloads
  - Uses "I/O replay" to simulate storage I/O patterns
  - Benchmark drivers use real-world workloads
  - VDI uses same workload as VMware View Planner
  - VM uses same workloads as VMmark benchmark
- Reduces server hardware requirements by 10X
  - Lower capital requirements by 10x
  - Reduced test time 10x less setup
  - One physical server can generate workload equivalent to 1,000 VM's

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Why an Application Workload Specific Benchmark?

- Existing tools have issues
  - Storage focused tools do not have valid workloads for VDI or VM environments
  - Tools with accurate workloads don't test storage
  - No standard metrics, or ways to apply existing tools
  - Time and expense of environment setup may be costly
- No storage focused tools
  - Most existing VM tools and benchmarks are server focused
  - Tools focus on testing CPU, Memory and Hypervisor, not Storage

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VM Storage Performance Testing Comparison

	IOmark-VM	VM-Mark	IOmeter	SPC
What it tests	Storage	Entire System Focus on CPU	Storage	Storage
Workload	VM Server Workloads	VM Server Workloads	Synthetic	Generic Application
Standardized	Yes	Yes	No	Yes
Server Equipment Required	Low	Very High	Low	Low
Setup Time	Low	High	Low	Low

Popular, but unrealistic results

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VDI Performance Benchmark Options

	IOmark-VDI	Login VSI	View Planner	SPC
Component Measurement	Storage	Entire System	Entire System	Storage
Workload	100% real VDI	100% real VDI	100% real VDI	Non VDI
Cost of tool	Cost to license & publish	Cost to license	VMware partners only	Cost to license & publish
Equipment Required	Low	High	High	Low
Setup Time	Low	High	High	Low

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IOmark-VDI Workload

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Running IOmark-VDI

- Results directly comparable to actual use cases
  - Real workloads, able to dial in Heavy , Standard or Light workloads
- Set up and run in 1 day
  - Plan for two weeks of tuning to maximize results
- Equipment needed for typical 5000 User benchmark
  - Server equipment - 12 cores, 96GB, multiple I/O ports
  - Storage and connectivity (most likely FC)

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Benchmark Specifications

- The workloads run coincide with the user profiles outlined in the View best practices guide
- The workloads simulate typical usage, including:
  - View booting (for provisioned and non-provisioned users)
  - View steady state operation
    - Workload = Heavy user - office worker (avg. 12 IOPS)
- Successful Benchmark Criteria:
  - Maximum write response time for steady state must not exceed 50ms
  - All storage utilized must reside on/within the storage system under test
  - Report must include the amount of time to boot all users

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IOmark-VM Workload

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Details

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IOmark-VM Methodology

- Benchmark creation
  - Real world VM workload used for data capture
  - Actual I/O captured based on application interactions
- Benchmark run
  - Utilize driver to replay workloads (I/O replay)
  - Benchmark driver (the test harness) does not require applications
  - Benchmark driver runs under multiple guest OS
    - Linux supported initially, Windows TBD
- Result reporting
  - Results indicate number of VM's supported by storage system
  - Benchmark runs and results audited by Evaluator Group for consistency
  - Storage configuration options are included in report

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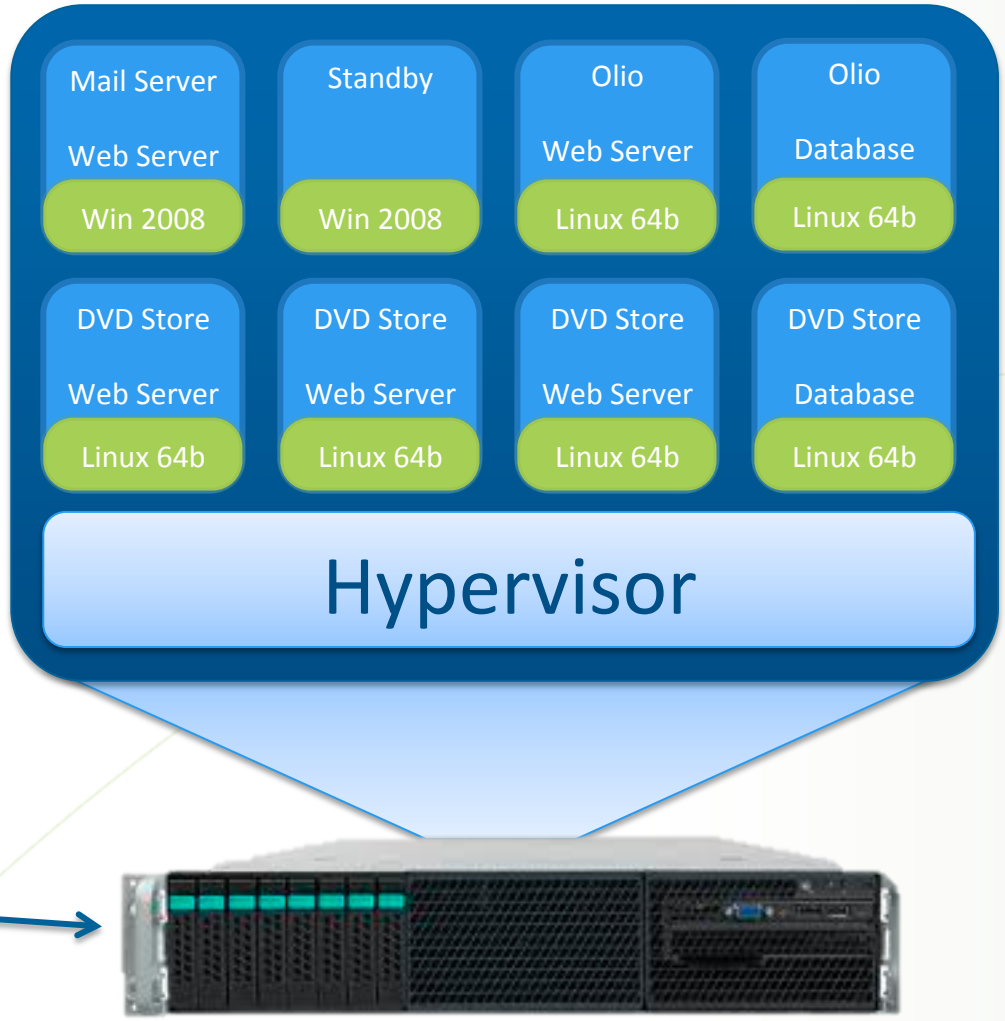
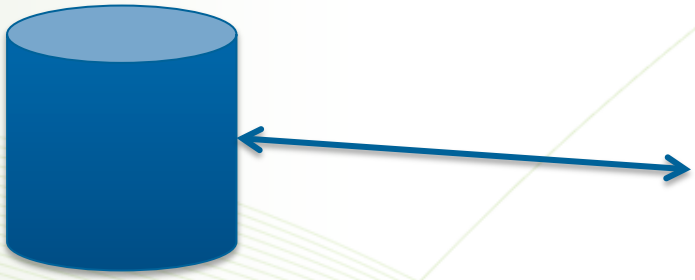
Example VM Workload Set



Storage System
(System Under Test)



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Benchmark Specifications

- IOmark-VM workloads match hypervisor workload guidelines
- Workloads simulate typical virtual machines, including:
  - Steady state operation
    - MB/s and IO/s are TBD
- Successful Benchmark Criteria:
  - Maximum response time must not exceed _xx_ ms (TBD)
  - All workloads must reside on the storage system under test
- Published Results:
  - All published results will be audited, reviewed and approved prior to publication

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