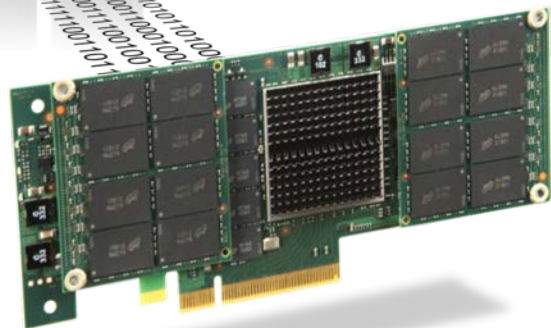# EMC CACHE STRATEGY

David Nicholson

Chief Strategist
EMC Flash Products Division
@DaveN007

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XtremSW Cache: Software Performance and Protection

Performance
Dramatic improvements in latency and throughput

Intelligence
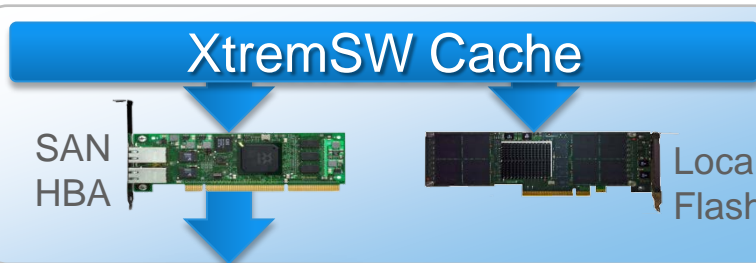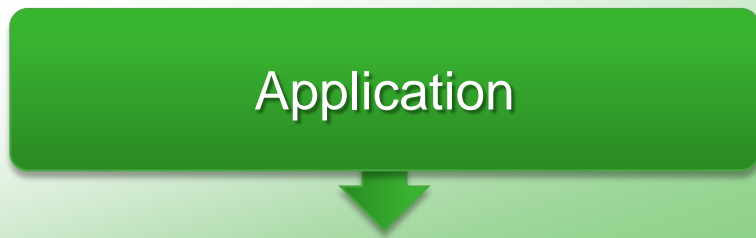Extends EMC FAST architecture into the server
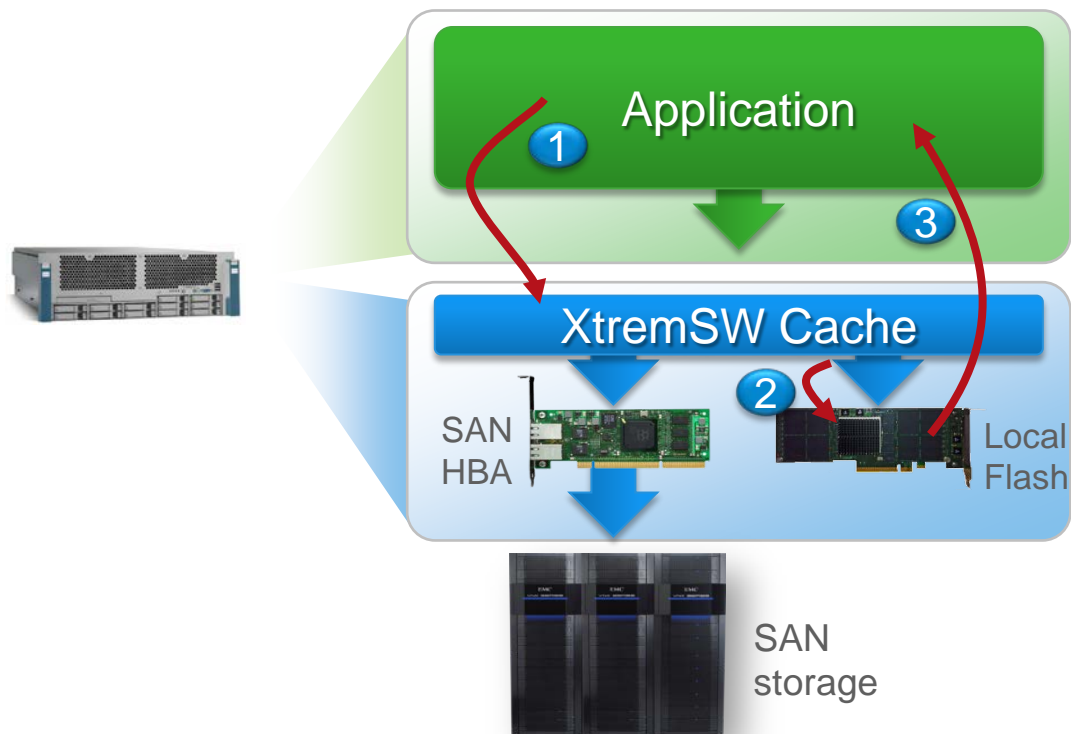
Protection
Backed by intelligent, resilient, highly available storage

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100 Percent Transparent Caching
XtremSW Cache Driver Extends The SAN

Application

XtremSW Cache
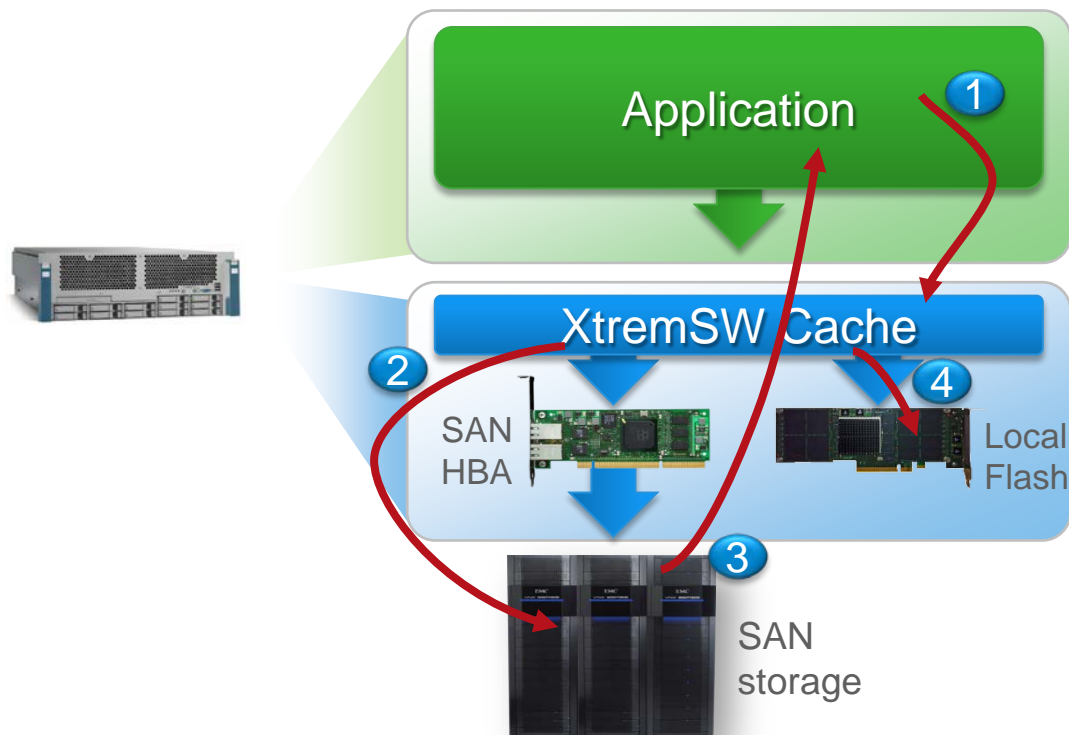
SAN HBA

Local Flash

SAN storage

Read Hit Example

1. Read request from application to an accelerated array LUN

2. XtremSW Cache determines a hit occurred and accesses data from Flash device

3. Data returned from the Flash device is forwarded to the application

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Read Miss Example

1. Read request from application to an accelerated array LUN

2. XtremSW Cache determines a miss occurred and accesses data from array LUN

3. Data is read from the array and returned to the application

4. Read miss data is written to Flash device asynchronously

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Write Example
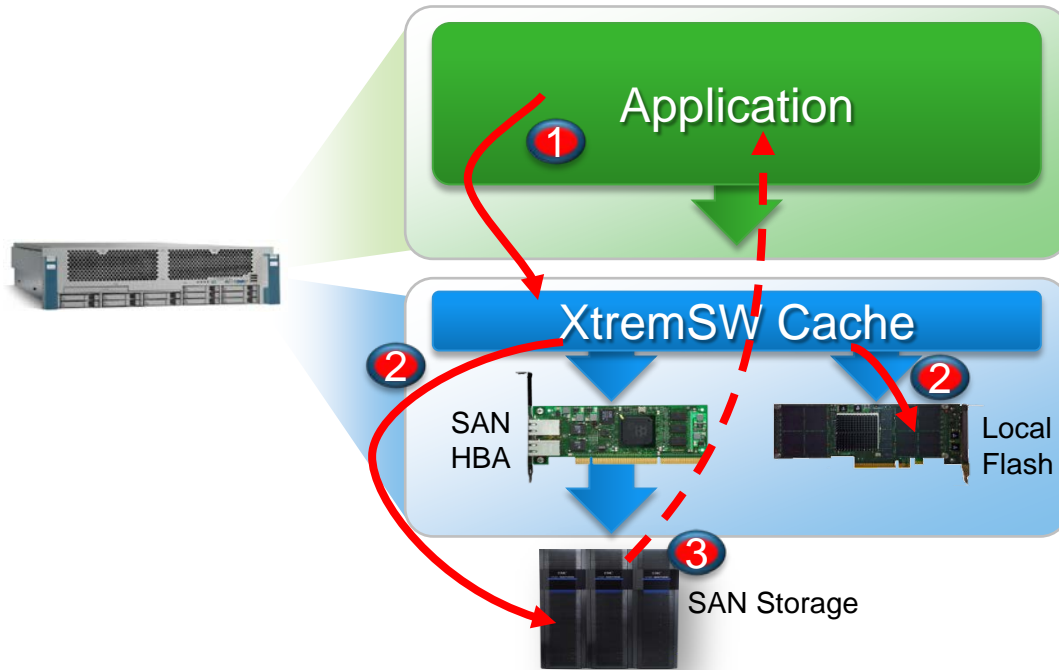
1. Write Request From Application To An Accelerated Array LUN

2. XtremSW Cache Writes Data To Array LUN and Flash Device

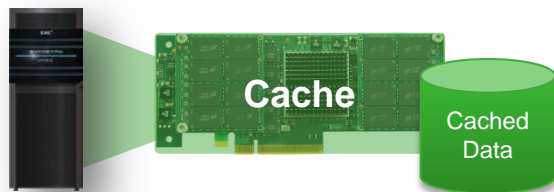3. Application Write Acknowledged Upon Array Completion

XtremSW Cache & XtremSF Split Card Mode

Cache

Local Storage

Microsoft SQL Server

Data 1

Data 2

Temp DB
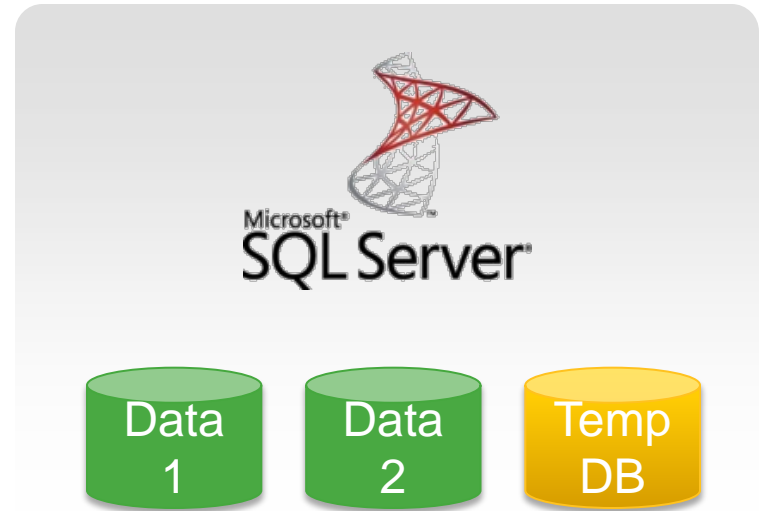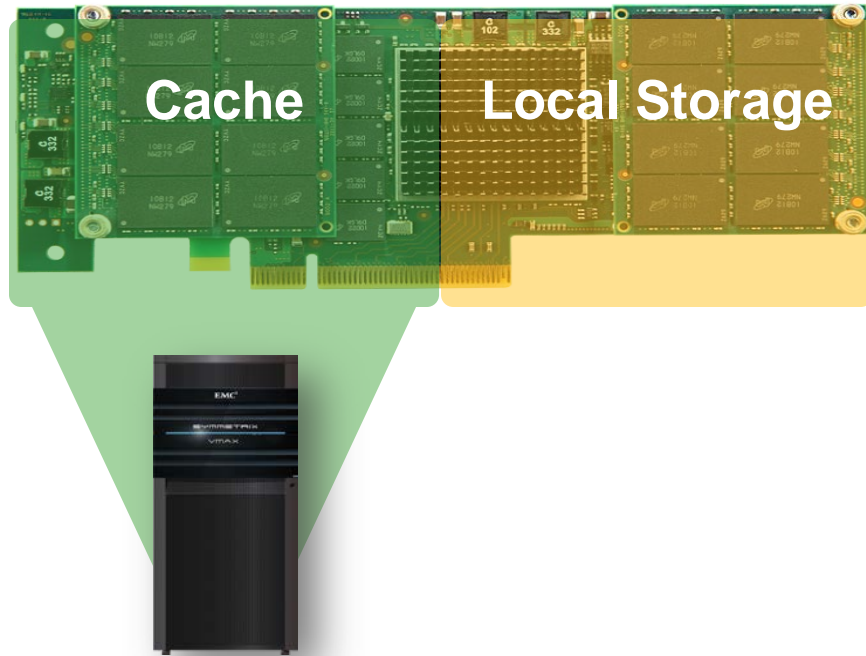
Server-Based Flash Deployments

Use XtremSW Cache:

- For mission-critical data
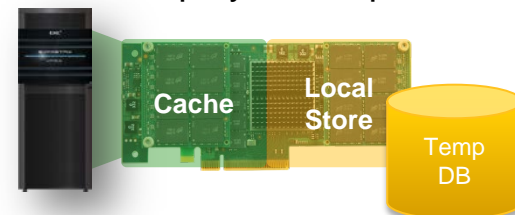- Read Acceleration
- For data protection

Use XtremSF (Local Storage):

- Larger Temporary data
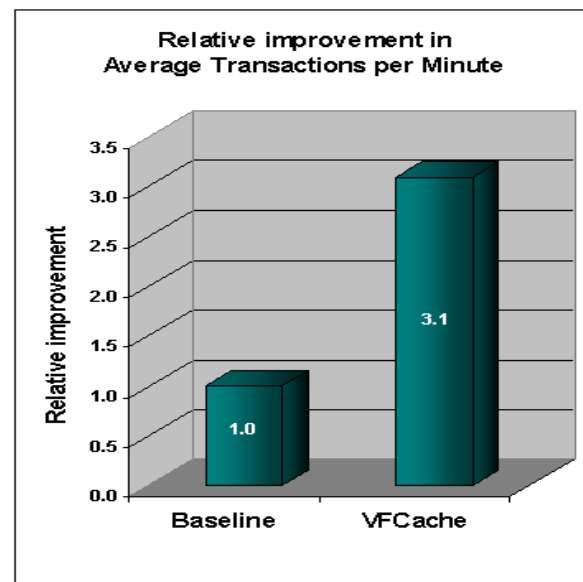- To accelerate Reads & Writes
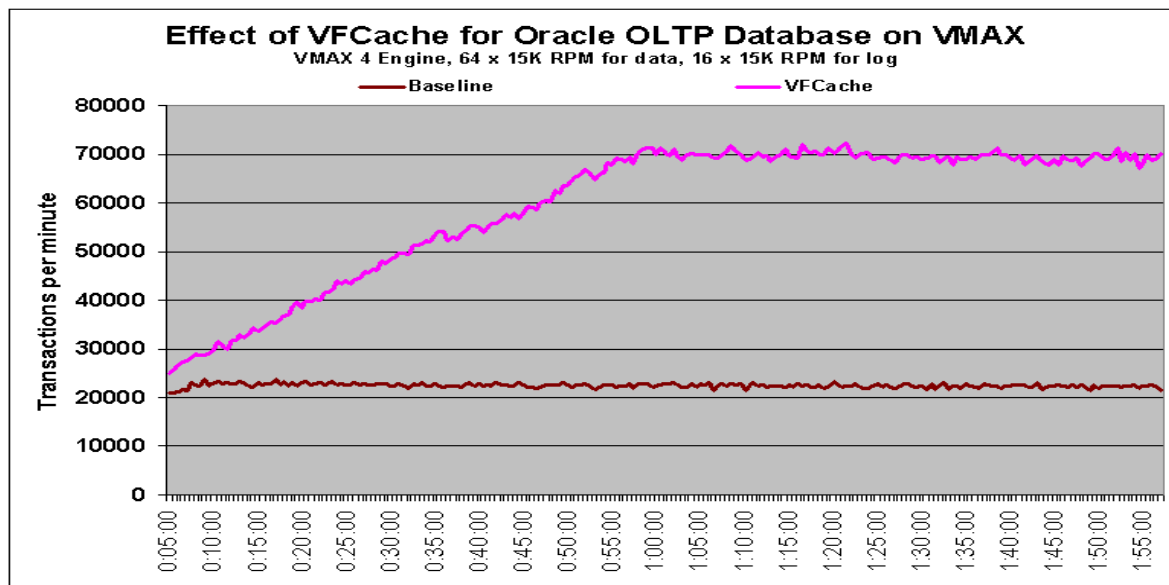- For large working sets

Both

- Split Database and Temp Space
- Best utilization of PCIe Slot
- Flexible Deployment Options

Deployment Choice!!!

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Improvements from XtremSW Cache To VMAX Oracle 11gR2 OLTP Database
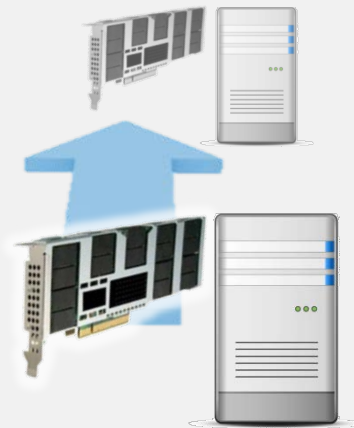
XtremSW Suite

Data Services For Flash As Cache, DAS Or Memory
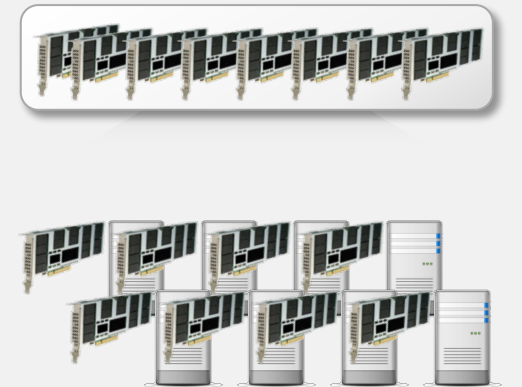
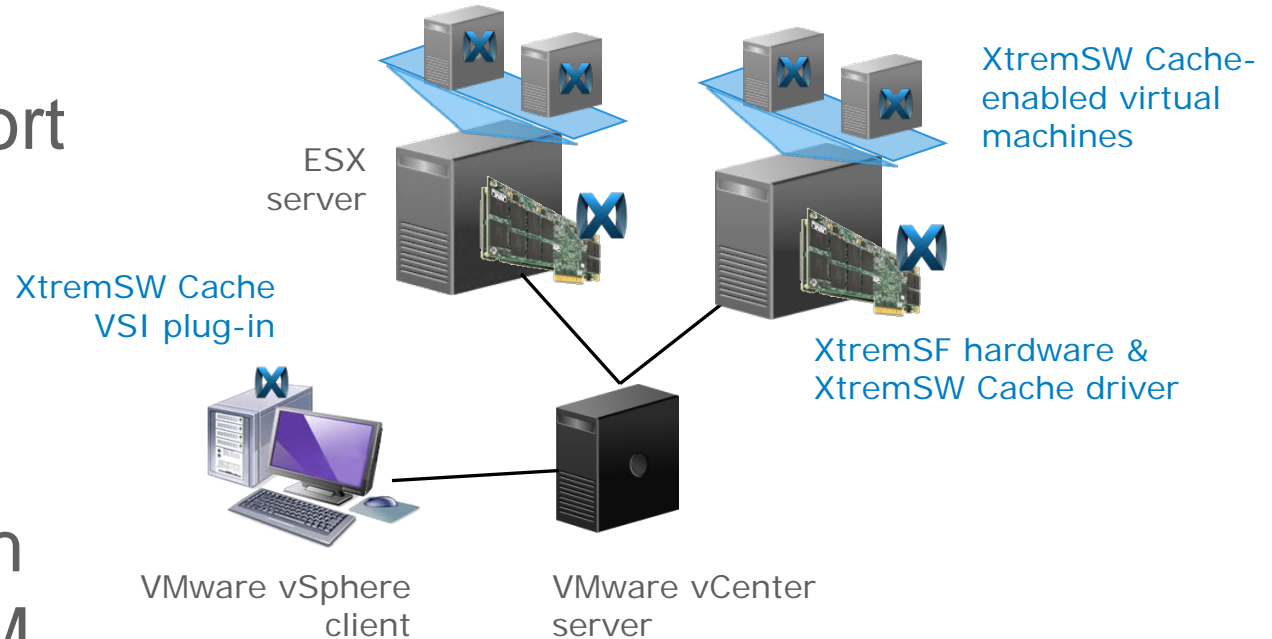| Caching	Direct Attached Storage (DAS)

High Availability

Pooling

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XtremSW Cache 2.0 Features

- ✅ Integration with EMC arrays
- ✅ Interoperability with:
  - VMware vCenter features
  - IBM AIX
  - Any server flash hardware
 - Oracle RAC*
- ✅ Control and efficiency via XtremSW Management Center

VMware vCenter Features Support

- Transparent vMotion Support

- Automatic failovers

- Seamless integration with DRS, HA, SRM

XtremSW Cache-enabled virtual machines

ESX server

XtremSW Cache VSI plug-in

XtremSF hardware & XtremSW Cache driver

VMware vSphere client

VMware vCenter server

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Support With Any Server Flash Hardware

- Enables use of XtremSW Cache in blade servers

- All form factors
  - SSDs: All SATA or SAS devices
  - PCIe Cards:
    - HHHL and HHFL
    - Devices with SATA, ATA, or SCSI bus

- VMware: SCSI devices only
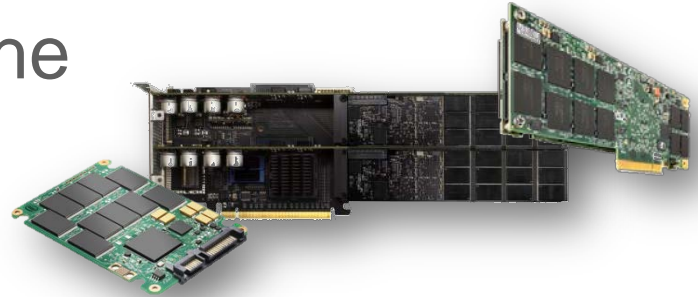
IBM AIX Support

- IBM Power 7 servers with AIX 6.1 and 7.1

- Standard edition of PowerVM

- Native clustering (PowerHA active/passive)

- Certified AIX SSDs supported as underlying HW

Oracle RAC Support*

Active-active Shared Storage via Distributed Cache Coherency

- Oracle Database 11g on Windows, RHEL or OEL running Oracle Clusterware 11g with ethernet interconnect
- Up to 8 nodes per cluster
- Uses SCSI-3 Persistent Reservations to block joining node from accessing storage until XtremSW Cache approves it

EMC Array Integration

VMAX

- Manage XtremSW Cache directly from Unisphere
  - LUN selection based on VMAX trending analysis
  - Integrated performance statistics reporting

- Gain unmatched performance boost
  - Prefetching (read full track) increases IOPS by 25%
  - Cache coordination (optimized read miss) increases IOPS by up to 2.5X

VNX

- Manage XtremSW Cache directly from Unisphere Remote
  - LUN selection based on VNX trending analysis
  - Performance and Health Monitoring
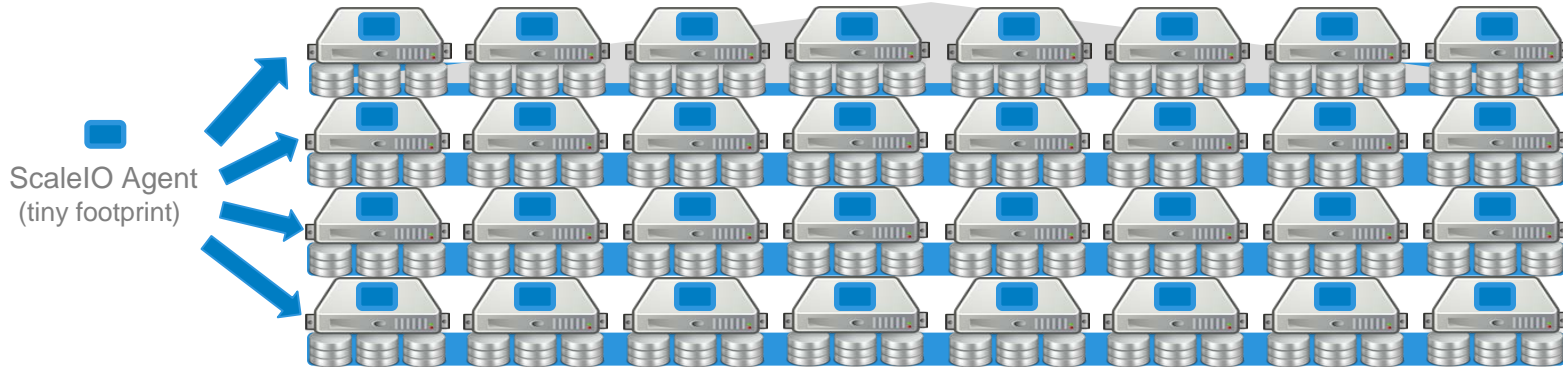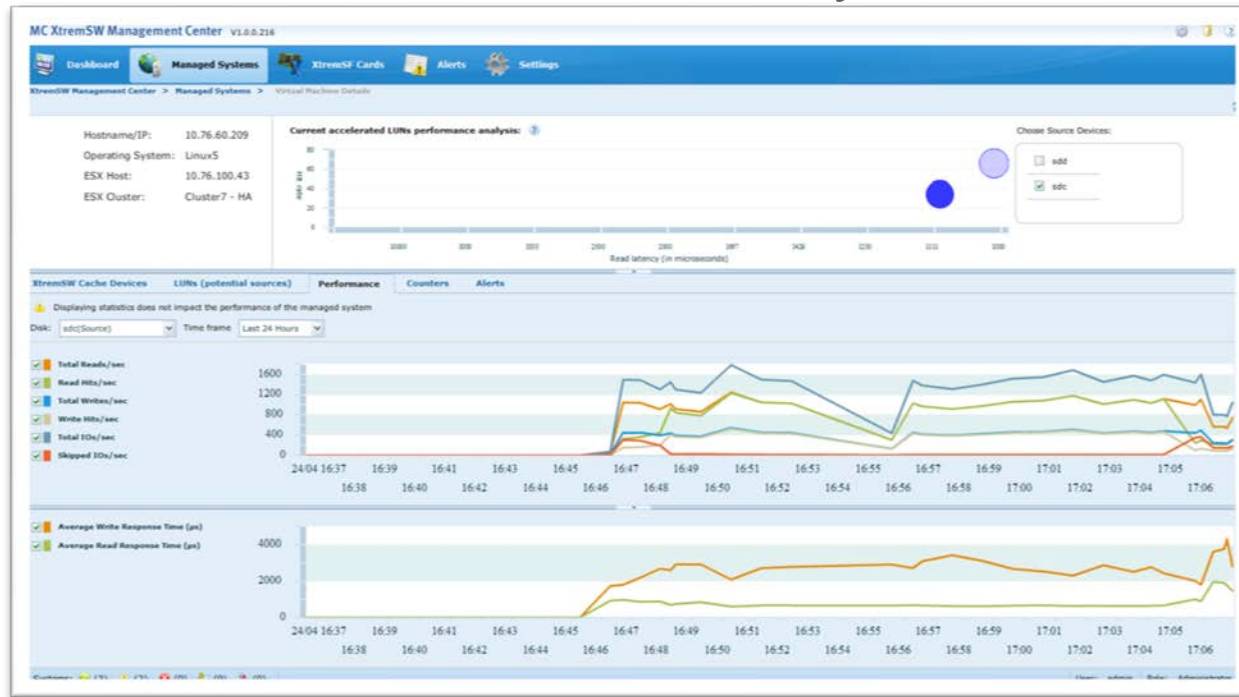 - Discovery and Configuration

ScaleIO

Creates Pools Of Server Flash

- Leverage application servers with local storage

    - Physical or Hypervisor Servers

- Aggregate total DC server capacity and I/O performance

- Add (and remove) storage and compute dynamically

ScaleIO Agent
(tiny footprint)

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XtremSW Management Center
Greater Control and Efficiency

- Manage multiple server flash devices

- Access environment health & performance dashboards

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THANK YOU