DON’T FIGHT THE TRENDS
Development opportunities in a Virtual Storage World

Val Bercovici
CTO-at-Large
Office of the CTO
Consumers Driving Enterprise Trends
Industry Trends

- CPU Core Proliferation
  - Physical Concentration
  - Component Spillover
  - Infrastructure Convergence

- Data Center Ethernet (C. Ext. Eth.) (FCoE)

- Deduplication

- Flash
Processor Type Trends

CPU
- Evolving toward throughput computing
- Motivated by energy-efficient performance

GPU
- Evolving toward general-purpose computing
- Motivated by higher quality graphics and data-parallel programming

Throughput Performance

Multi-threading  Multi-core  Many Core

Larrabee

Fully Programmable
Partially Programmable
Fixed Function
Component Trends

- K.V.M. → Virtual
- NIC → Converged Network Adapter (CNA)
- HBA → NPIV Consolidation
- Memory Buses → Integrated
Ethernet’s Resurgence in the Data Center

Storage Developer Conference 2008
© 2008 NetApp. All Rights Reserved.
The Desire ... for One Wire

SAN
- Enterprise
- Departmental

NAS
- Enterprise
- Departmental

Fibre Channel

FCoE

iSCSI

Dedicated Ethernet

Ethernet

Data Center

Corporative LAN

NetApp Fabric Attached Storage

Storage Developer Conference
© 2008 NetApp. All Rights Reserved.
Deduplication on primary storage yields compound benefits down the line.
Reducing Physical Footprint via Software

Deduplication
50%
Saves up to 95% for full backups; 25% to 55% for most data sets.

Snapshot™ Backups
80%
Savings equal the portion of data set not changed since last copy was made.

RAID-DP™
46%
Saves up to 46% versus mirrored data or RAID 10.

Writable FlexClone® Copies
80%
Savings equal size of original data set minus blocks subsequently changed in clone.

FlexVol® Thin Provisioning
33%
20% to 33% typical savings.

Savings compound when using multiple features!
Solid State Storage (Flash) to cannibalize FC & SAS hi-rpm drives

Proven Enablers:
- NAND SLC / MLC

Emerging Enablers:
- NOR / FeFETs (ferroelectric gate field-effect transistors)
- MRAM (Magnetic RAM), STT-RAM (Spin Transfer Torque RAM) and PCM (Phase Change Memory)
VMware - Pulling it all Together

Provide Primary Storage

Provide Double Disk Data Protection

Deduplicate Primary Data (Add Flash / Converge Network)

Add VMware Disk Based Backup

Add VMware SRM

Storage Virtualization should drive cost reductions
Next-gen Virtual DataCenter Storage Management Opportunity
NetApp® Manageability Software Family

An Integrated Data Management Approach

Application Suite
- SnapManager® for Exchange
- SnapManager for SharePoint® Server
- SnapManager for SAP®

Database Suite
- SnapManager for SQL Server™
- SnapManager for Oracle®

Server Suite
- SnapManager for Virtual Infrastructure
- Virtual File Manager™
- SnapDrive® for Windows®/UNIX®/Linux®

Storage Suite
- Protection Manager
- Provisioning Manager
- Operations Manager
- File Storage Resource Manager
- CommandCentral™ Storage

Security and Access Control

Service Layer

Open Interfaces
Scalable Management Concepts and Terminology

Resource Groups

Datasets

Policies

Storage Developer Conference 2008
© 2008 NetApp. All Rights Reserved.
Scalable Management in Action

Increases Storage Utilization

Provisioning Manager: Resource pools scale transparently across multiple volumes

Protection Manager can redirect data from full volumes to empty ones

SnapVault

OSSV

SnapMirror

Resource Pool
All documentation resides in this directory. Most of the documents can be accessed through SDK help.

SDK developer utilities for Windows

Contains all header files

Contains source code for SDK utilities and sample codes

SNMP MIB files

Contains documentation for different versions of ONTAPI

Contains libraries for different platforms and languages

Contains all header files

Contains source code for SDK utilities and sample codes

Contains documentation for different versions of ONTAPI

Contains libraries for different platforms and languages
Thank You