Next-gen Flash-based MySQL and NoSQL Solutions

Real World Case Studies of Extreme Performance, Scalability, and Availability

Darpan Dinker
Vice President, Database Technologies

SCHOONER INFORMATION TECHNOLOGY

Partnership Power >

IBM X-Architecture technology

A Smarter Planet

intel Xeon inside

Agenda

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- Datacenter trends and challenges
- Next-gen flash-based solutions
- MySQL case studies
- NoSQL case studies

Too Much Rack, Power, Pipe, and Complexity

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U.S. data-centers use more energy than the entire nation of Sweden.

- EE Times

Datacenter equipment is only utilized 6% to 10%

- William Forrest Forbes

The number of installed servers in the U.S. will increase from 2.2 million in 2007 to 6.8 million in 2010.

- Frost & Sullivan

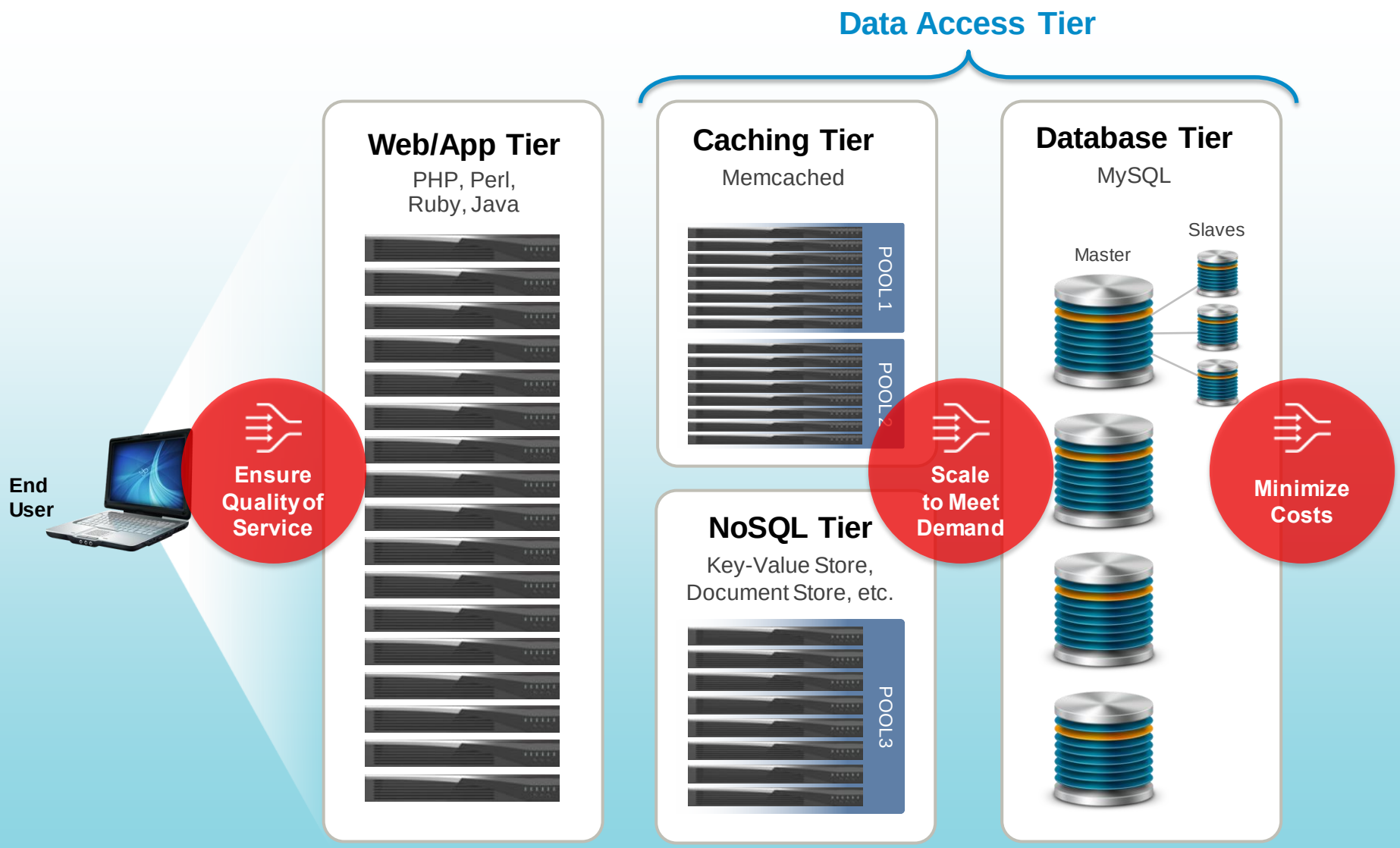
From 2003 to 2008 the data size of the average web page has more than tripled.

–websiteoptimization.com

For every 100 units of energy piped into a data center, only three are used for actual computing.

- U.S. Department of Energy

Typical Datacenter Deployment



Key Challenges

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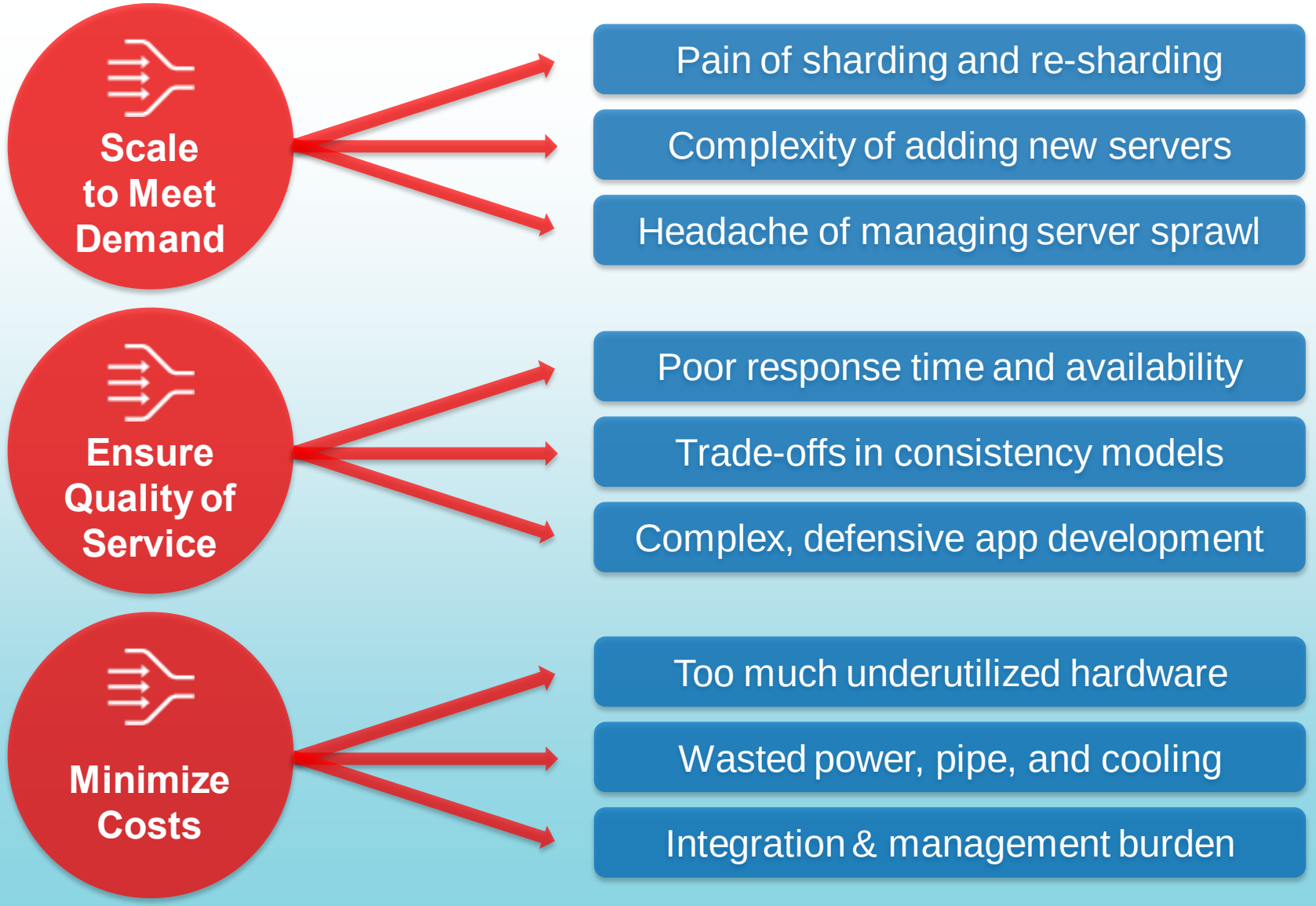

Vision: Tightly Coupled, Scalable MySQL and NoSQL Building Blocks

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Integrated, optimized, scalable MySQL & NoSQL solutions:

- Effectively leverage flash memory, multi-core processors, high-speed networking, scalable data access software
- Incorporate highly optimized, balanced hardware platform, operating environment, integrated MySQL and NoSQL
- Provide efficient, higher level scalable building blocks
- Eliminate complex integration projects and leverage out of the box performance, scalability and availability
- Deliver enterprise class reliability

Tightly Coupled Software Architecture

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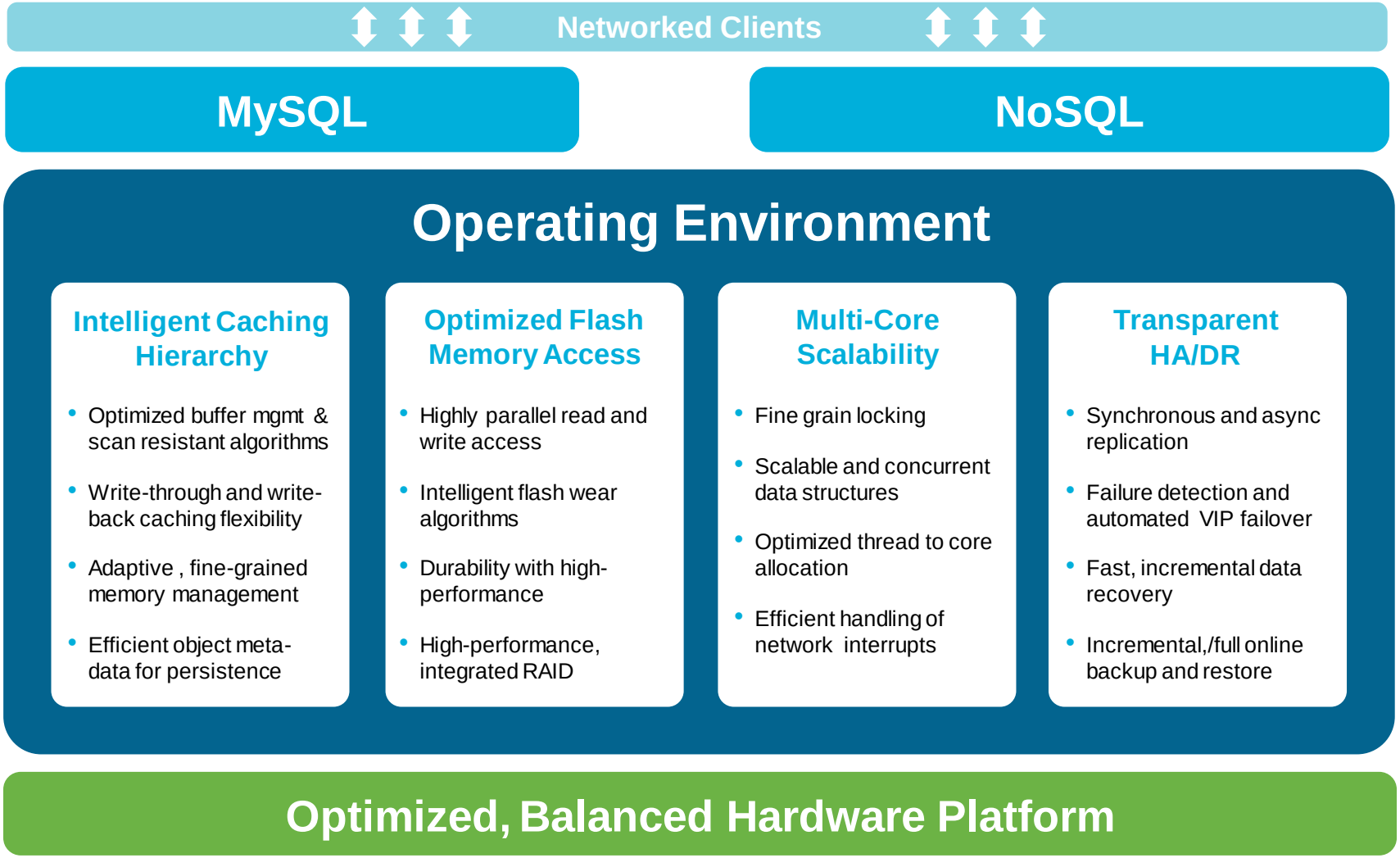

Schooner MySQL and NoSQL Solutions

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- **Integrated, turnkey appliance**
  - Integrated hardware and software
  - Enterprise-class support
  - 100% compatibility, fully certified
- **High performance**
  - 8x performance improvement
  - 1/8x the power and rack space
  - 50% lower TCO over 3 years
- **High availability**
  - Complete data & service availability
  - Transparent and fully integrated
  - 90% higher availability

1

The Schooner Appliance for MySQL Enterprise™ with InnoDB

MySQL Enterprise + INNODB

2

The Schooner Appliance for Memcached / NoSQL

High Capacity Cache + **Persistent Key-Value Store** + **100% Memcapable**

Schooner Powered Datacenter

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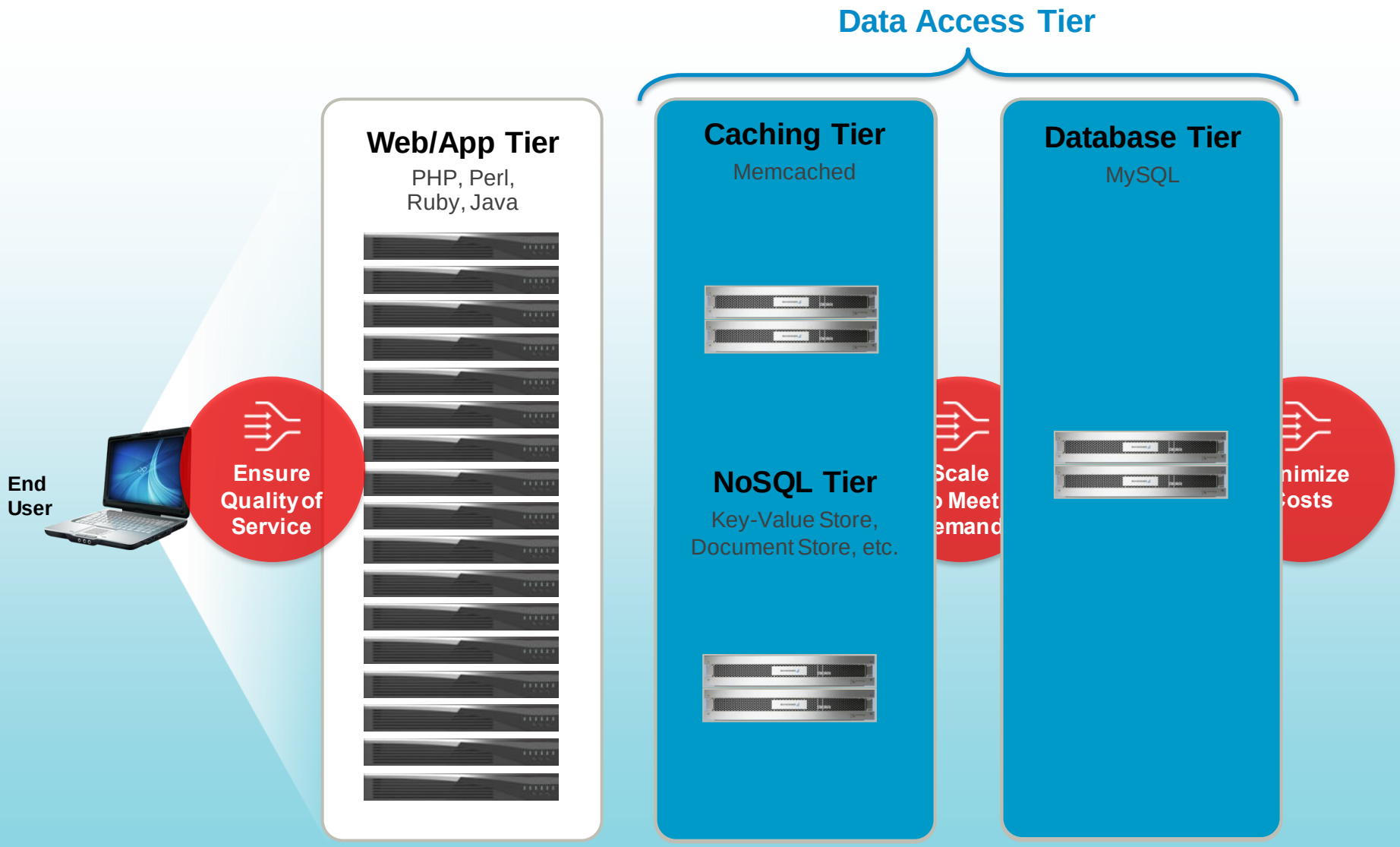


MySQL Conference & Expo, 2010

Schooner Appliance for MySQL Enterprise™ with InnoDB

SCHOONER INFORMATION TECHNOLOGY

High Performance

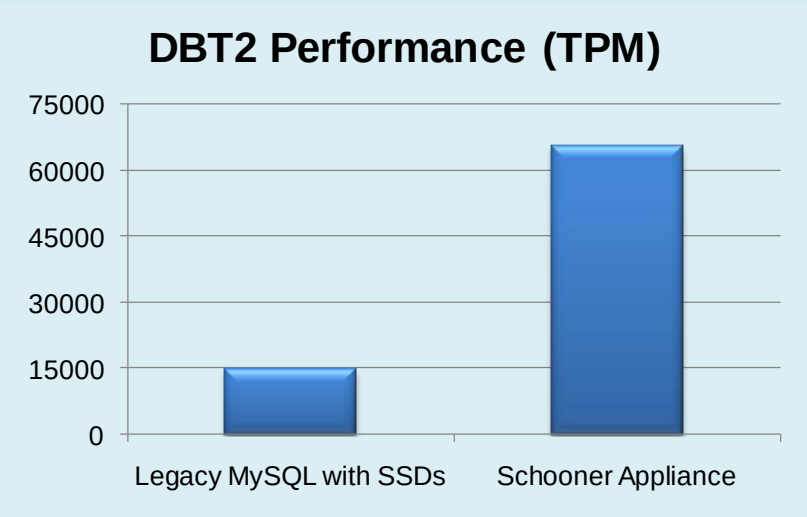
- Highly parallel, optimized flash memory access
- Advanced buffer pool caching algorithms
- Multi-core scalability with fine grained locking
- Delivered on proven IBM server with up to 1TB of flash

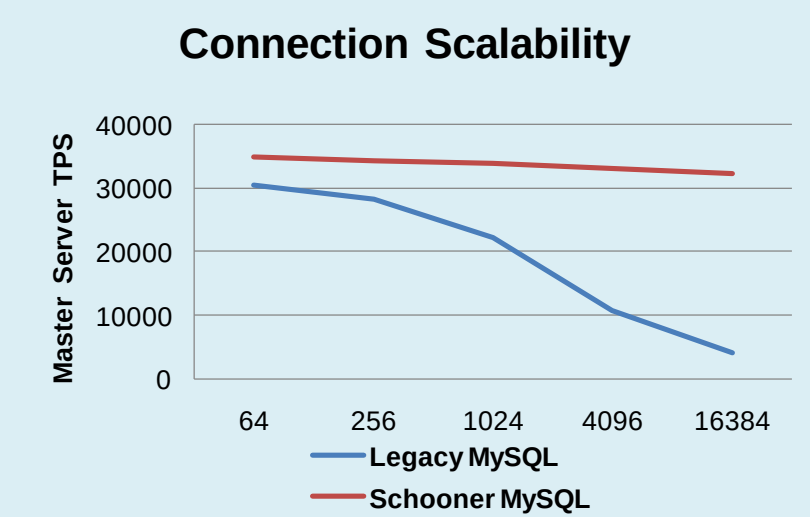
High Availability

- Fully ACID-compliant with data durability
- Integrated replication and automated failover
- Integrated, high-performance backup and restore
- RAID across SSDs and HDDs

Turnkey Appliance

- Multi-instance consolidation on single appliance
- Web-based GUI/CLI for centralized management
- Integration with 3rd party mgmt & monitoring tools
- 100% compatible and fully certified by Sun/MySQL





Measured DBT2 throughput at 1000 warehouses,32 connections, 8 SSDs/HDDS with RAID 5. All databases configured for durability and consistency. Legacy results were on MySQL version 5.1.44 (most commonly used today). Schooner MySQL Appliance results were on Schooner-optimized 5.1.44

MySQL Consolidation and Cost Savings

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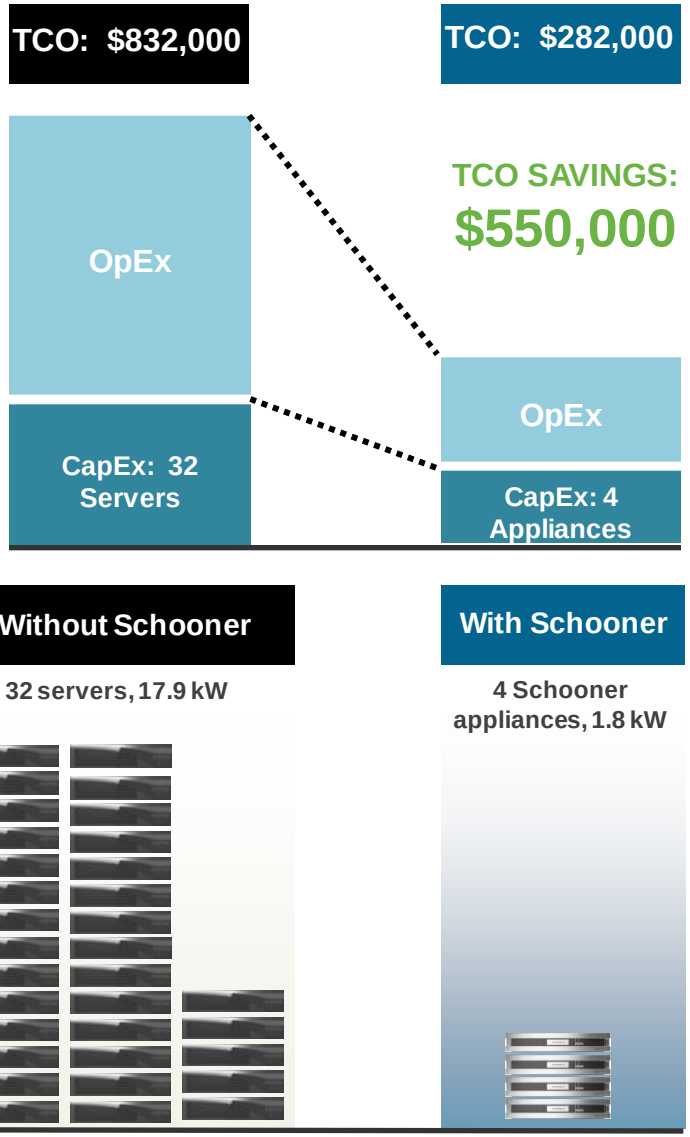
3 Year TCO (2 TB MySQL)



THE BOTTOM LINE

- Immediate capex savings
- 66 % TCO savings ($550,000) over 3 years
- Power & space reductions enable green datacenter

What Can I Do With It?

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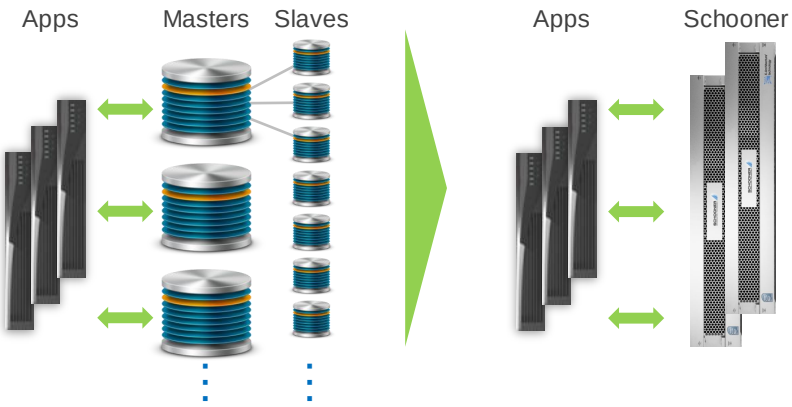
Reduce sharding and consolidate slaves



Scale performance and process queries faster

70K TPM (DBT2)
20K Connections

½ TB or
1TB Flash

Reduce planned and unplanned downtime

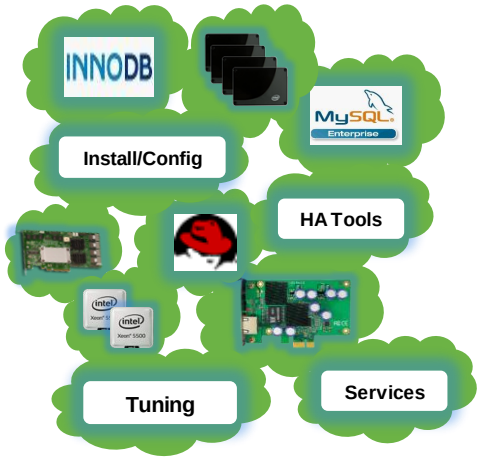
MySQL Replication + MMM Failover

SSD RAID & Data Durability

SSD RAID & Data Durability

SSD RAID & Data Durability

Eliminate integration and optimization headaches



- Software
- Hardware
- Support
- Certified
- Complete

Case Study: Financial Services

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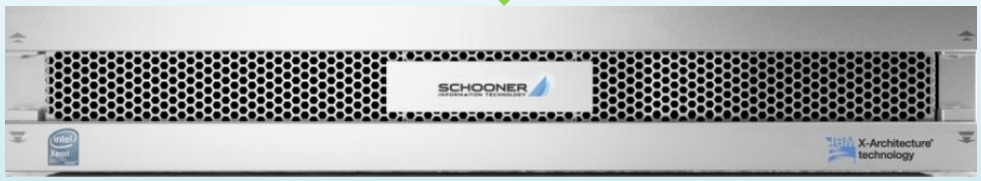
Scale Performance and Process Queries Faster

High-performance, out-of-the-box
100% compatible



"**Our ad-hoc MySQL queries run at least five times faster** after installing the Schooner Appliances. They deliver a huge performance benefit and are a breeze to install and manage."

– Darryl Weatherspoon, VP of Eng at Xoom.

XOOM

Case Study: Social Networking

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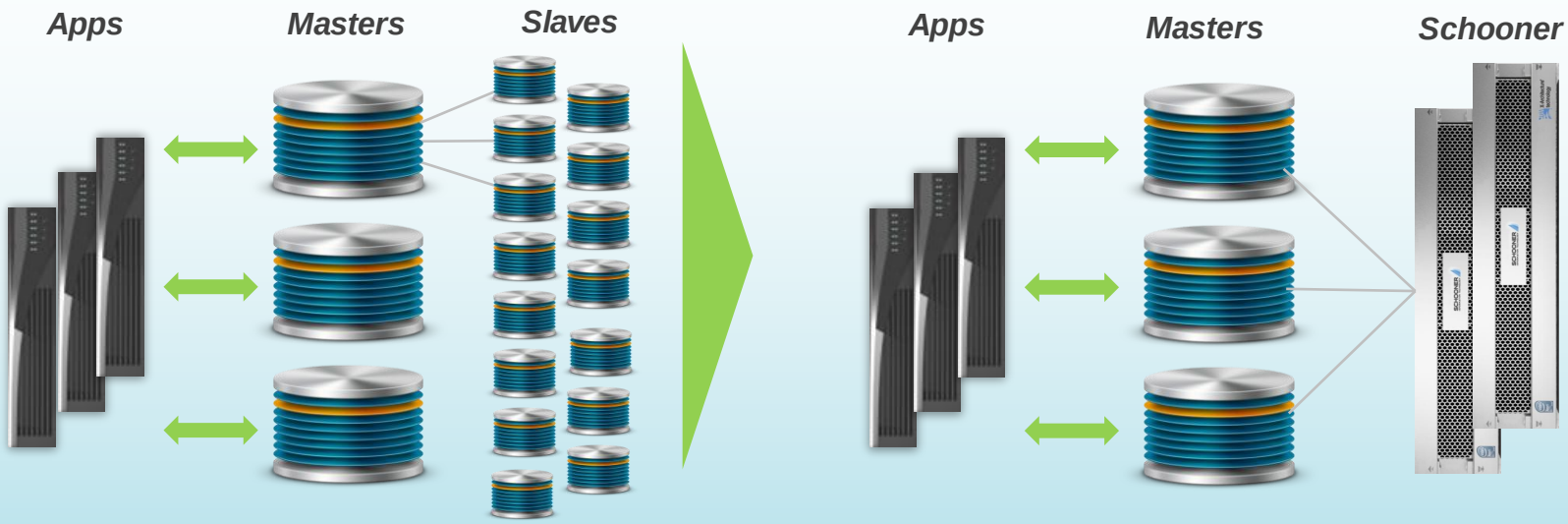
Consolidate Slaves



"In our business, website performance and efficiency is key to the success of our web properties. The Schooner MySQL Appliances have significantly helped GuteFrage **improve their overall website response time** while at the same time allowing them to **consolidate their database slaves onto a single Schooner appliance**, dramatically reducing the time necessary for database administration."

– Frank Penning, CTO of Holzbrinck Digital

HOLTZBRINCK DIGITAL

Schooner Appliance for Memcached / NoSQL

SCHOONER INFORMATION TECHNOLOGY

High Performance

- Highly parallel, optimized flash memory access
- Fast, efficient DRAM-to-Flash caching algorithms
- Multi-core scalability with parallel thread allocation
- Delivered on a proven IBM server with a ½ TB of flash

High Availability

- Persistent key-value store mode and cache mode
- Transparent replication and automated failover
- Non-disruptive, rolling upgrades
- RAID & high-performance backup and restore

Easy Appliance

- Dynamic containers for consolidation & multi-tenancy
- Web-based GUI/CLI for centralized management
- Integration with 3rd party mgmt & monitoring tools
- 100% compatible and fully memcapable compliant

Memcached Caching Service
- 150GB capacity, 250K TPS
- Replication & Failover
- 100% Memcapable

Key-Value Store Service
- 350GB capacity, 150K TPS
- Replication & Failover
- Persistence, RAID, and Backup
- Memcached-based key-value API

Schooner Memcached / NoSQL: Capacity and Availability

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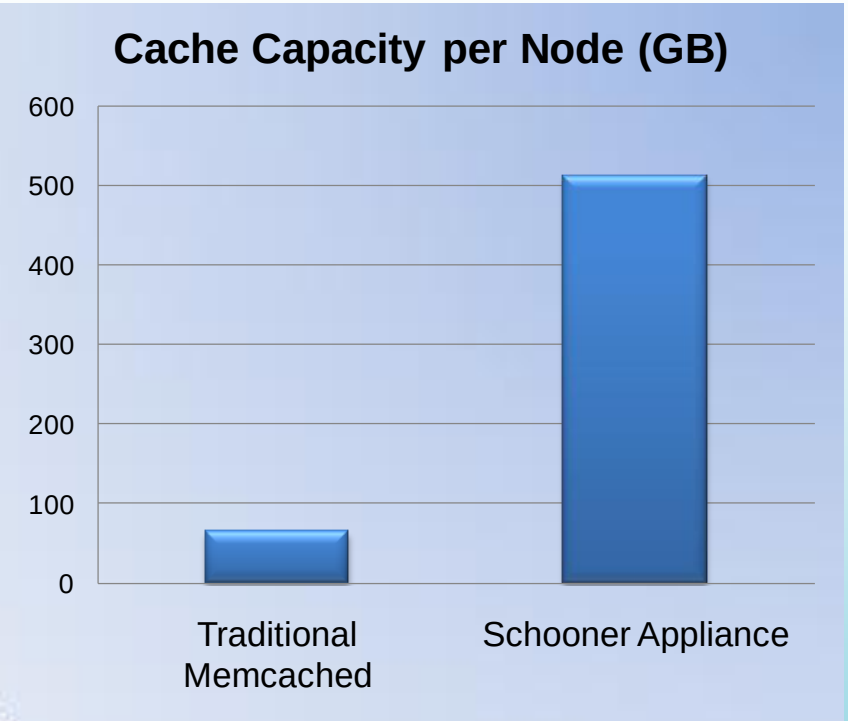

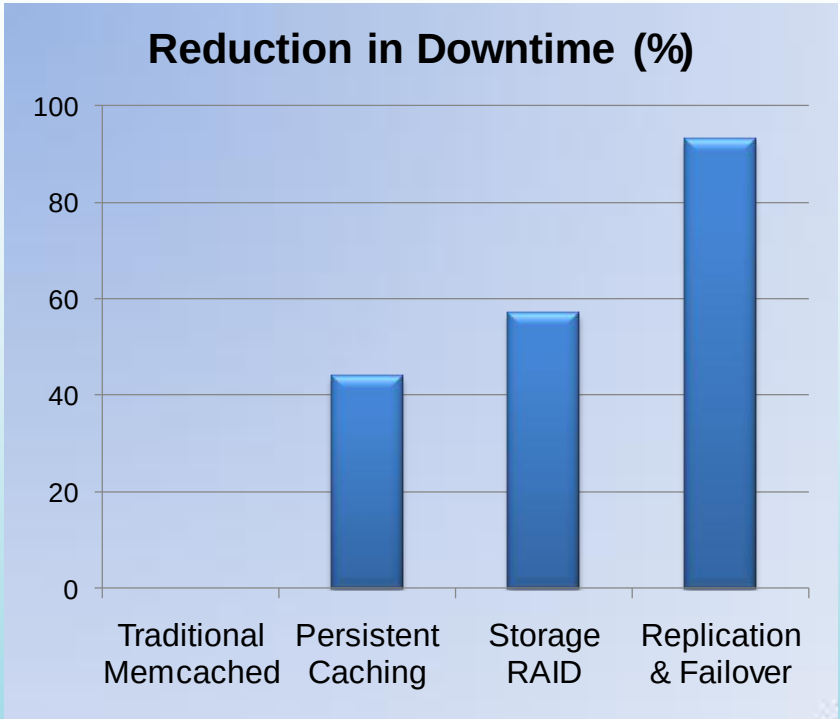

Memcached / NoSQL Consolidation and Cost Savings

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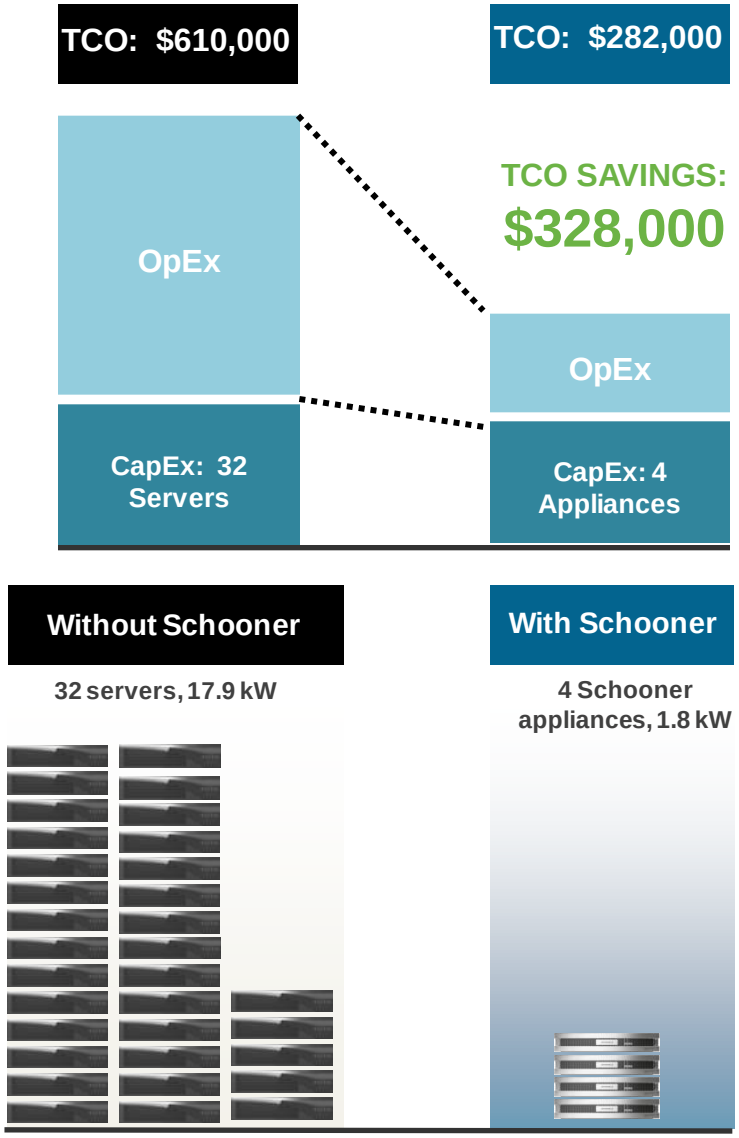
3 Year TCO (2 TB Memcached)



THE BOTTOM LINE

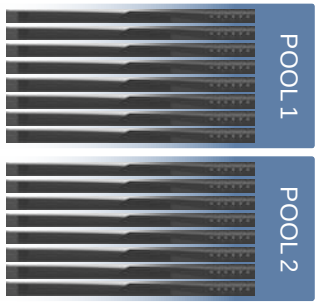
- Immediate capex savings
- 54% TCO savings ($328,000) over 3 years
- Power & space reductions enable green datacenter

What Can I Do With It?

SCHOONER INFORMATION TECHNOLOGY

Consolidate and reduce server sprawl

Traditional Memcached



Schooner

Reduce planned and unplanned downtime

Application Transparent

Synchronous Replication + Automated Failover

SSD RAID & Persistence

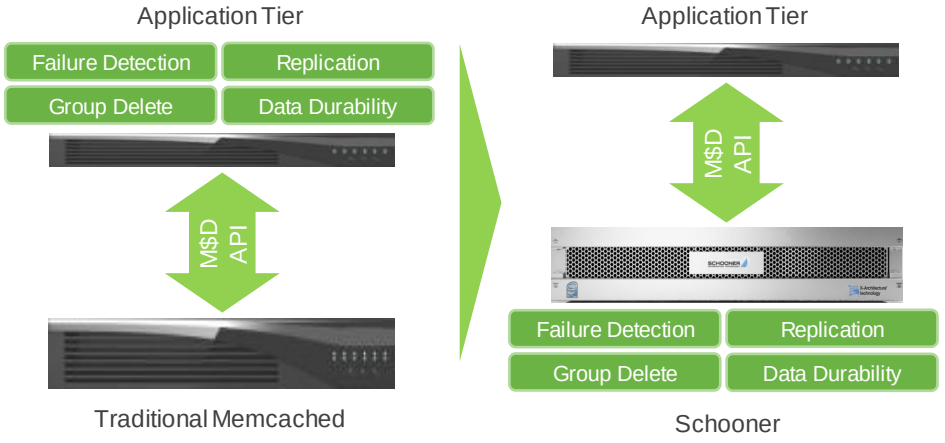
SSD RAID & Persistence

Scale cache capacity and process requests faster

250K TPS

½ TB Flash

Reduce application development complexity



Case Study: Social Networking

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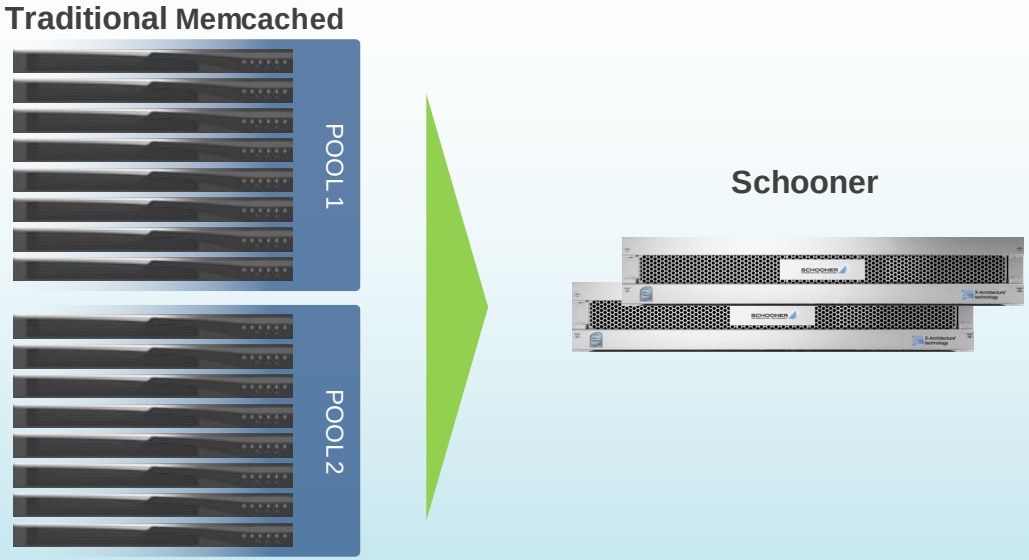
Consolidate and Reduce Server Sprawl



Scaling with 12:1 Consolidation using Persistence, Multi-Get, Replication and Recovery

Scaling the data tier is a common challenge, and Schooner is helping us do just that. Power is the big constraint right now, so anything we can do to reduce that footprint right now is helpful. From an administrative perspective, fewer machines is always better, from a monitoring and scripting standpoint, and it also means reductions in potential failures due to fewer boxes."

– Saran Chari, CTO and Founder at Flixster

Flixster
Watch movies. Tell friends.

Case Study: Media

SCHOONER INFORMATION TECHNOLOGY

Reduce Planned and Unplanned Downtime

Application Transparent

Synchronous Replication + **Automated Failover**

SSD RAID & Persistence | ***SSD RAID & Persistence***

40 Million Users Address Books in Key Value Store with 8:1 Consolidation

In the wonderful Schooner world, failovers go away. Schooner replication means that you're sure that what you have on one node will also be on the other. Our developers don't have to worry about cache coherency. They can plan on the data being available so they don't have to program defensively.

– Ethan Erchinger, Director of Ops at Plaxo

plaxo

Market Segments

- Social Networking
- Business Analytics
- Gaming
- Cloud
- Media
- Telco
- Finance

The Schooner Advantage

- **Vastly Higher Performance and Scalability:** 8x compared to traditional servers
- **Significantly Lower TCO:** Replacing 8 traditional servers with 1 reduces TCO by more than 50%
- **Quick Deployment:** Easy plug-and-play installation and configuration
- **Seamless Operation:** 100% compatible with existing client applications and management tools
- **Higher Reliability**: Delivers enterprise-class reliability by leveraging persistence, replication, and recovery software
- **Easy Management:** Simple but powerful centralized management and reporting with integrated CLI and GUI
- **More Revenue**: Powers new revenue-producing applications enabled by fast access to terabyte-scale data
- **World-Class Support:** IBM provides 24/7/365, single-point-of-contact service and support for every Schooner appliance, worldwide

Q&A

Abstract

Scale out data centers are realizing order of magnitude improvements in performance, scalability, and availability while reducing TCO with innovative MySQL and NoSQL solutions. These architectures tightly couple MySQL and NoSQL with flash memory, multi-core processors and high performance networking into balanced, highly available, scalable solutions .

In this presentation, Darpan Dinker, Vice President of Database Technologies, Schooner Information Technology, will discuss:

- business and technology challenges
- tightly coupled MySQL and NoSQL scale out architectures
- case studies of large scale web site deployments in premier web 2.0, enterprise, and cloud companies, discussing their realized order of magnitude improvements in performance, scalability, downtime and TCO.