

FLASH

REDEFINING THE POSSIBLE

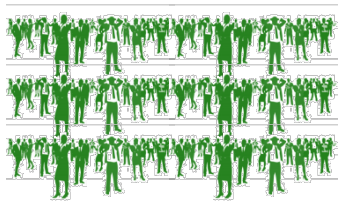
Zahid Hussain

General Manager/SVP

Flash Products Division, EMC



**BILLIONS
OF USERS**



**MILLIONS
OF APPS**



3RD PLATFORM

Mobile Cloud Big Data Social
Mobile Devices

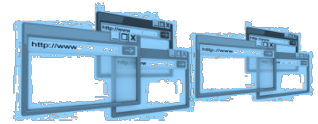
**HUNDREDS OF MILLIONS
OF USERS**



2ND PLATFORM

LAN/Internet Client/Server
PC

**TENS OF THOUSANDS
OF APPS**



**MILLIONS
OF USERS**



1ST PLATFORM

Mainframe, Mini Computer
Terminals

**THOUSANDS
OF APPS**



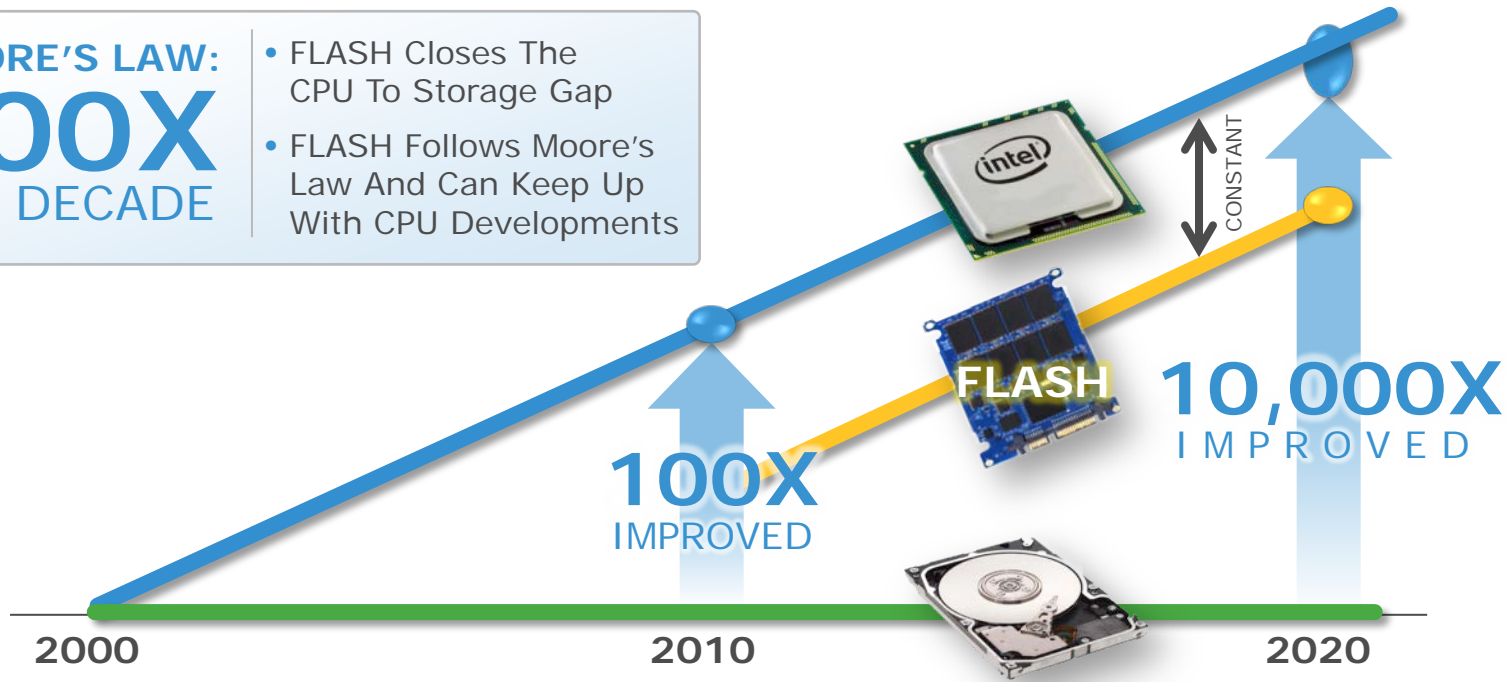
Source: IDC, 2012

New Workloads have created a performance Gap

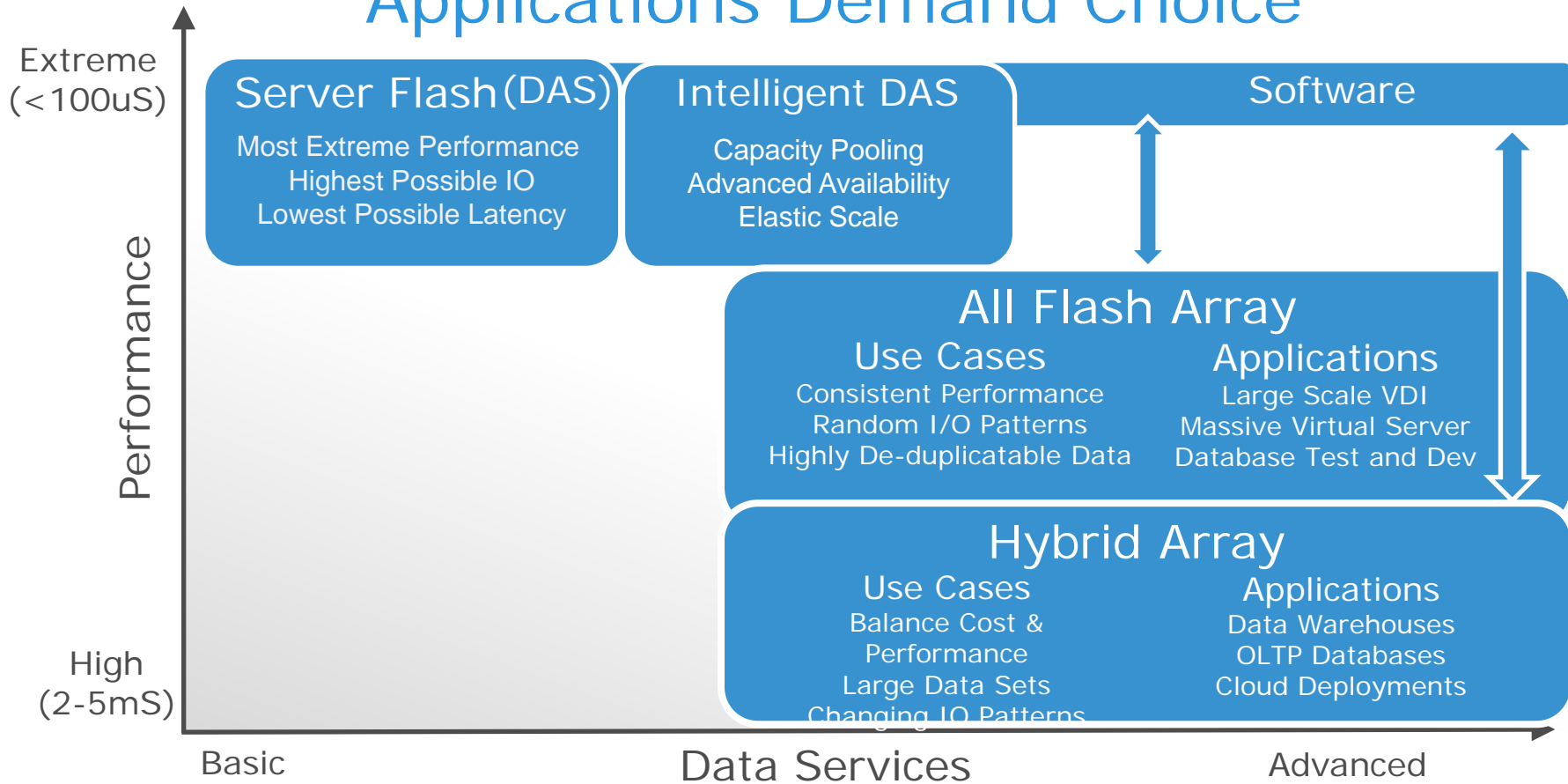
CPU Improves 100 Times Every Decade – Disk Speed Cannot

MOORE'S LAW:
100X
PER DECADE

- FLASH Closes The CPU To Storage Gap
- FLASH Follows Moore's Law And Can Keep Up With CPU Developments



Applications Demand Choice



EMC's Flash Everywhere Strategy Delivers Choice

Extreme
($< 100\mu\text{s}$)

Server Flash (DAS)



SLC & eMLC PCIe Flash

Intelligent DAS

EMC²

ScaleIO

Software



Performance

High
(2-5mS)



All Flash Array



Integration
&
Intelligence

Hybrid Array

VNXe, VNX, VMAX, Isilon



Basic

Data Services

Advanced

EMC²

The XtremSF Family

All Cards Are HDDL – Highest Density In The Industry



XtremSF 2200
2.2 TB



XtremSF 1400
1.4 TB



XtremSF 700
700 GB



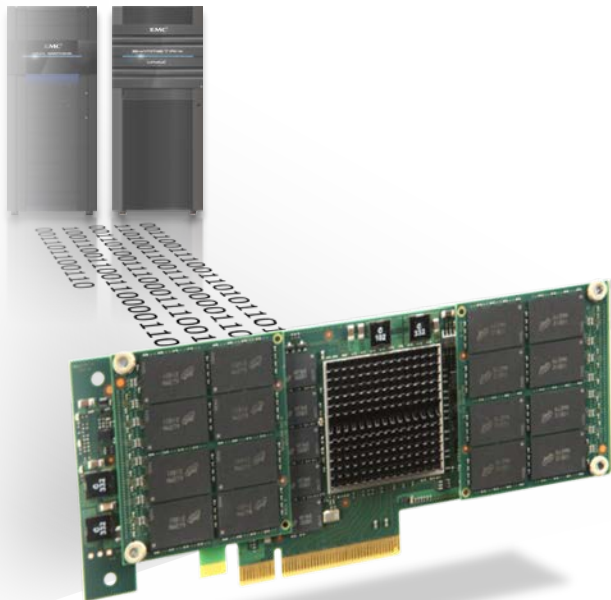
XtremSF 550
550 GB

EMC²
PROVEN

UP TO 1,130,000 IOPS

EMC XtremSW Cache

Server Flash DAS becomes Cache



Performance

Dramatic improvements in latency and throughput



Intelligence

Extends EMC FAST architecture into the server



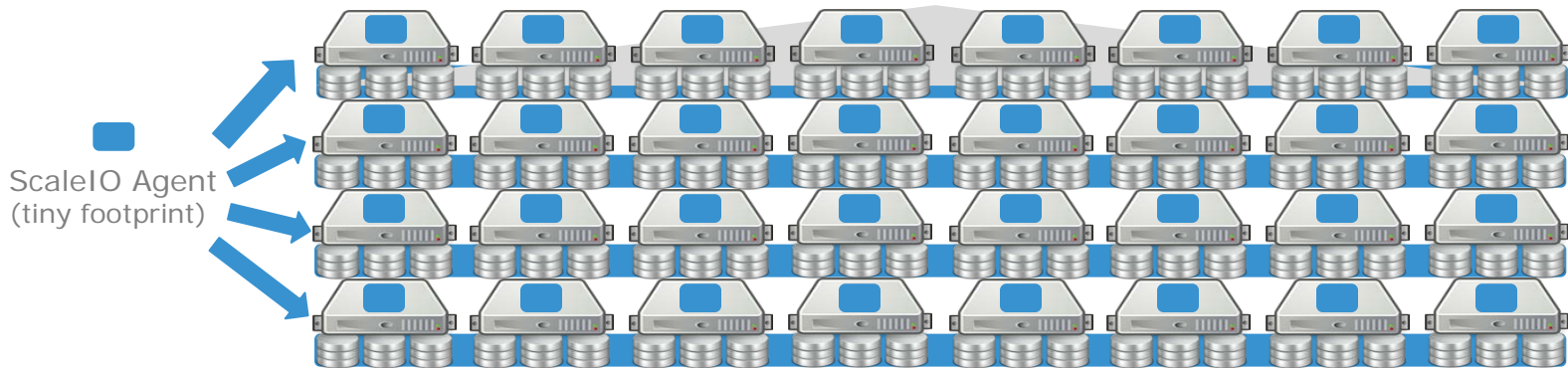
Protection

Backed by intelligent, resilient, highly available storage

ScaleIO

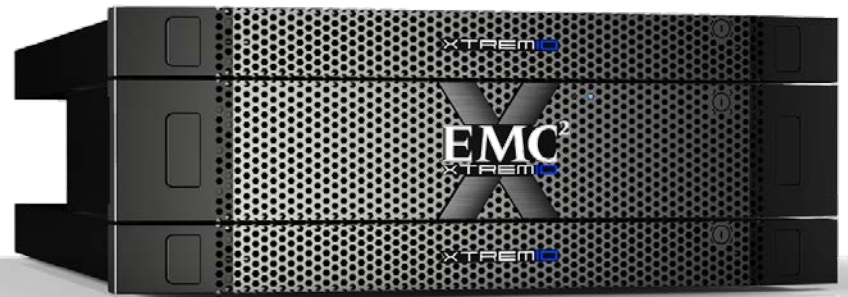
Creates Pools Of Server Flash

- 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



XtremIO

RETHINKING CORE DESIGN CRITERIA



Software-Defined

Commercial Off The Shelf Hardware

Inherently Balanced

Linear Scale-Out Architecture

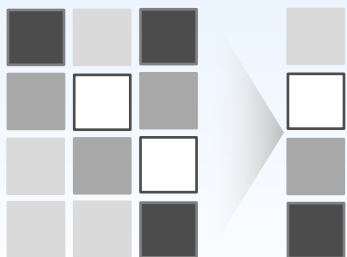
Flash-Optimized

"Always On" Data Services

XtremIO

Flash-Optimized Data Services

INLINE DATA REDUCTION



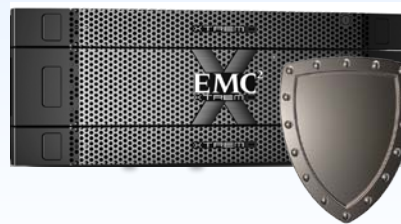
Never Write
Duplicate Data

THIN PROVISIONING



4KB Allocations
Optimal Utilization

DATA PROTECTION



Flash-Optimized
Zero Configuration

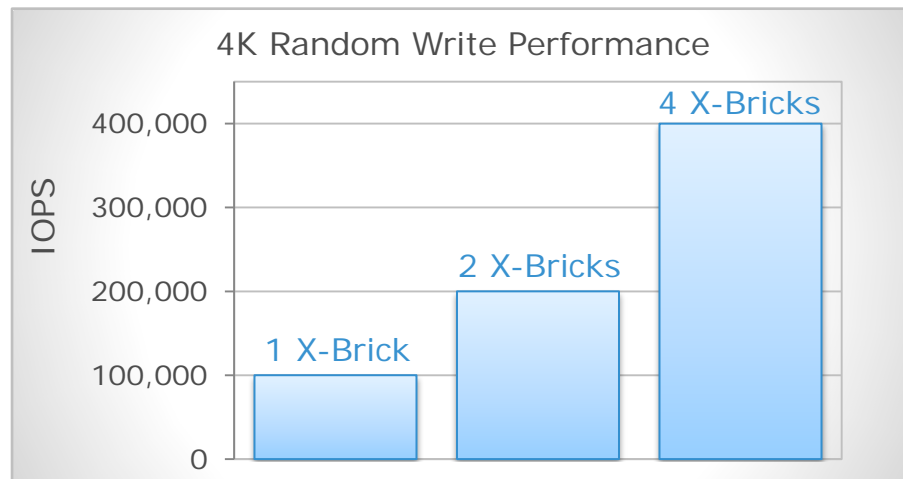
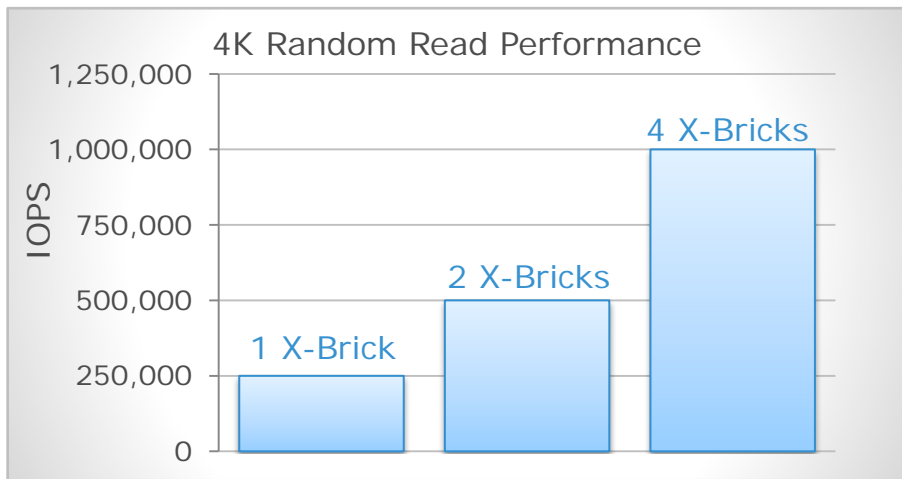
WRITABLE SNAPSHOTS



Instant Copies
Full Performance

XtremIO

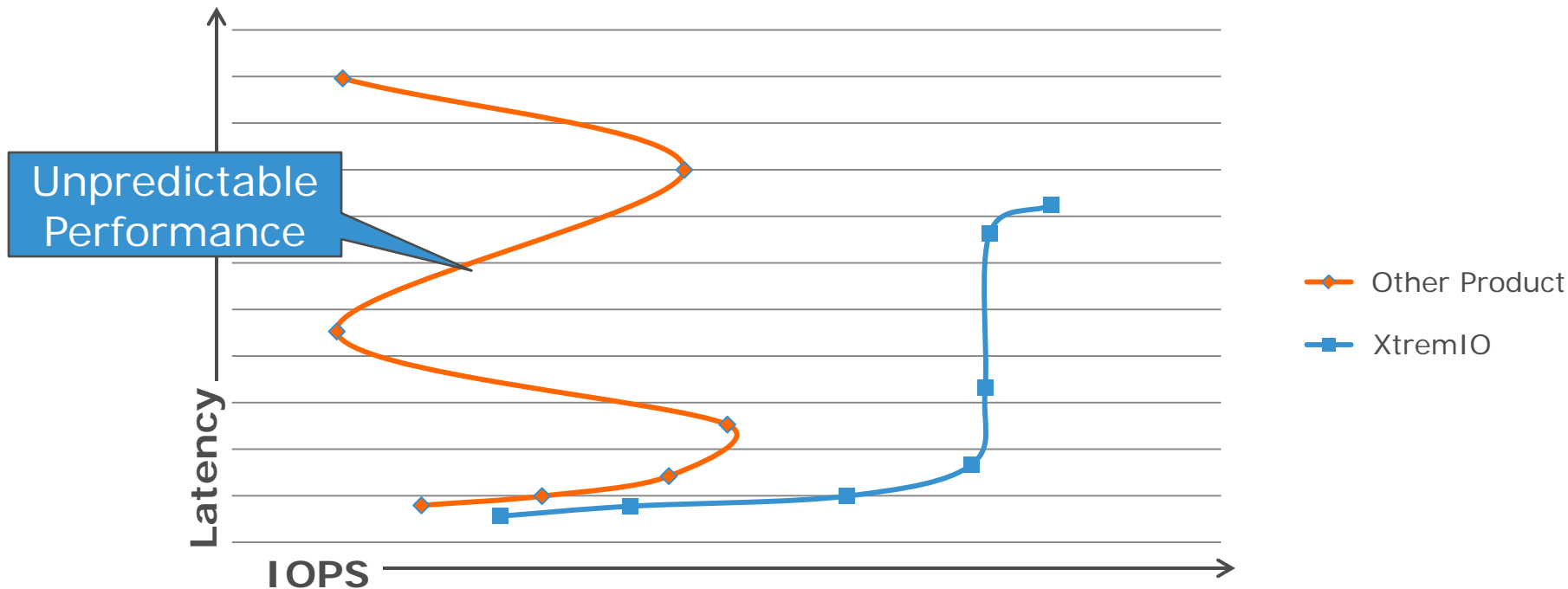
Scale-Out Architecture Delivers Unparalleled Functional IOPS



Sub-Millisecond Response Time With All Data Services Operating

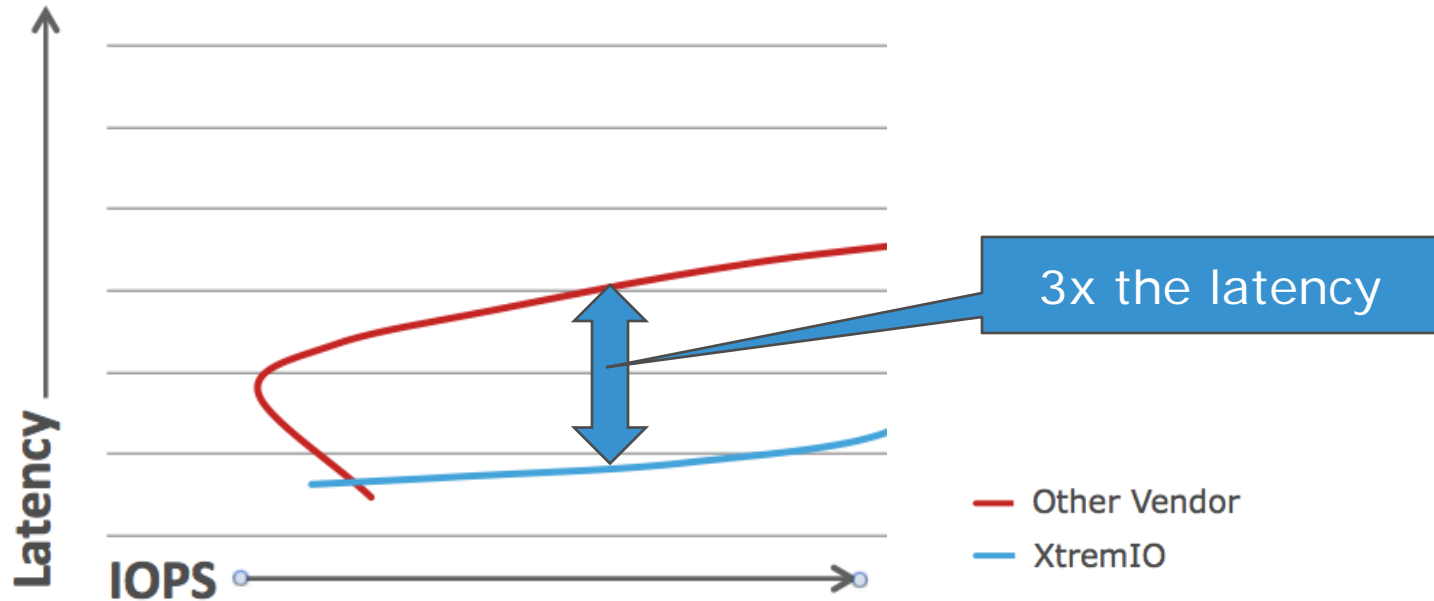
The Silver Bullet - Garbage Collection

8KB Random Writes



Flash Locking Effects

8KB 50% Writes / 50% Reads



XtremIO

Configure In Minutes – Zero Planning, Zero Tuning

The screenshot displays the XtremIO Storage Management Application (alpha) interface. The main window is titled "LUN Mapping Configuration" and is divided into three main sections:

- Volumes:** A table listing volumes with columns for Name and LUN. The table contains the following data:

Name	LUN
targetVolume1 (DGB)	0
targetVolume2 (DGB)	1
targetVolume3 (DGB)	2
targetVolume4 (DGB)	3
targetVolume5 (DGB)	4
targetVolume6 (DGB)	5
targetVolume7 (DGB)	6
targetVolume8 (DGB)	7
targetVolume9 (DGB)	8
targetVolume10 (DGB)	9
- Initiator Groups:** A table listing initiator groups with columns for Name, FC, and IP. The table contains the following data:

Name	FC	IP
LG04-Initiator1 (I)	FC1	50:01:43:80:09:af
LG04-Initiator2 (I)	FC2	50:01:43:80:09:af
- Central Mapping Area:** A large empty table for mapping volumes to initiator groups.

Three large circular callouts are overlaid on the interface, indicating the steps:

- 1 CREATE VOLUMES**
- 2 CREATE INITIATOR GROUPS**
- 3 MAP VOLUMES**

Redefining the Possible



COMPLETE

FLASH PORTFOLIO

SET OF TOOLS

DEPLOYMENT

EXPERTISE

EMC²®