Building Secure and Efficient Clouds

ANDY NEHME
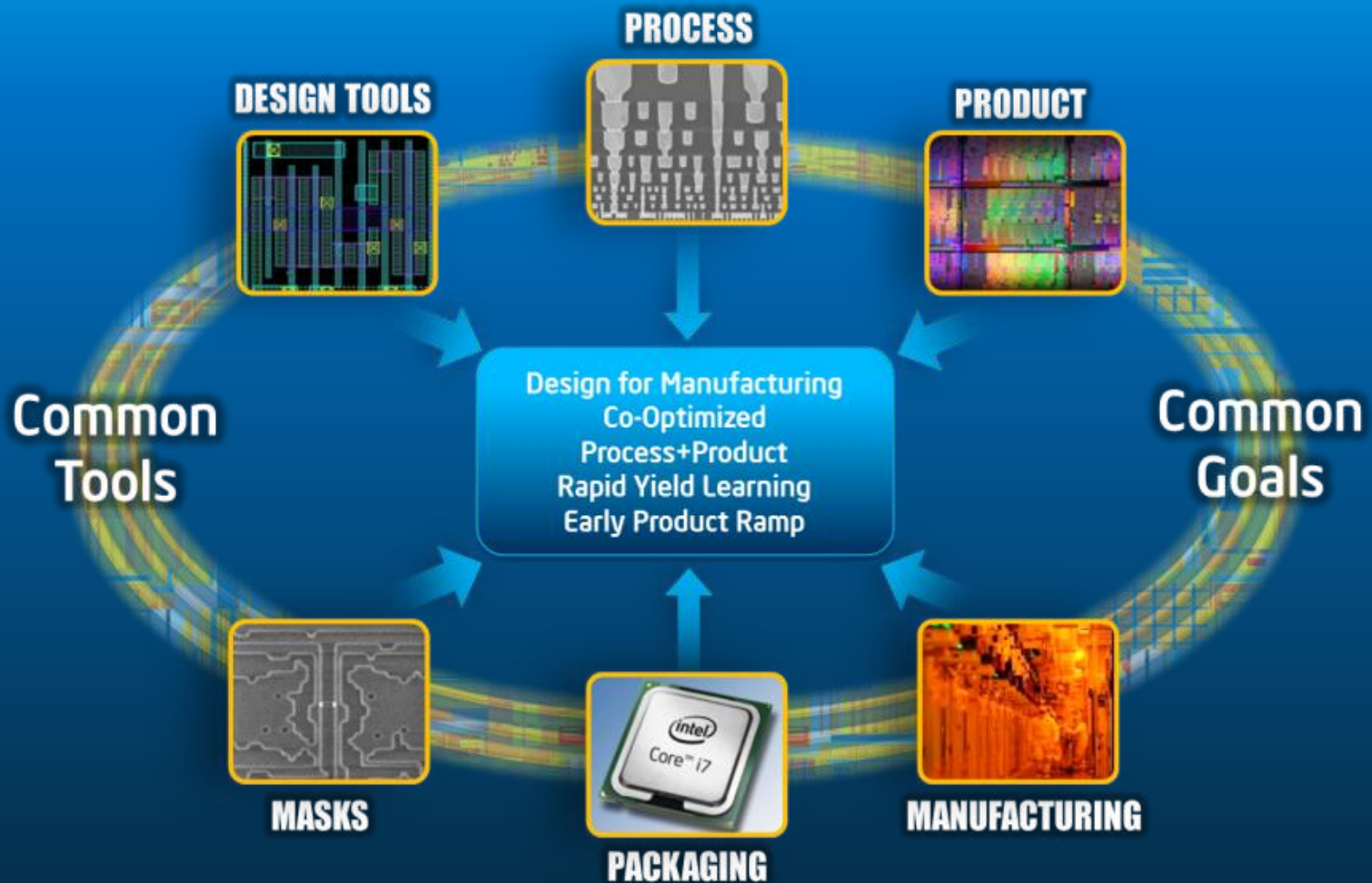
Business Development Director, MENA

INTEL CORPORATION
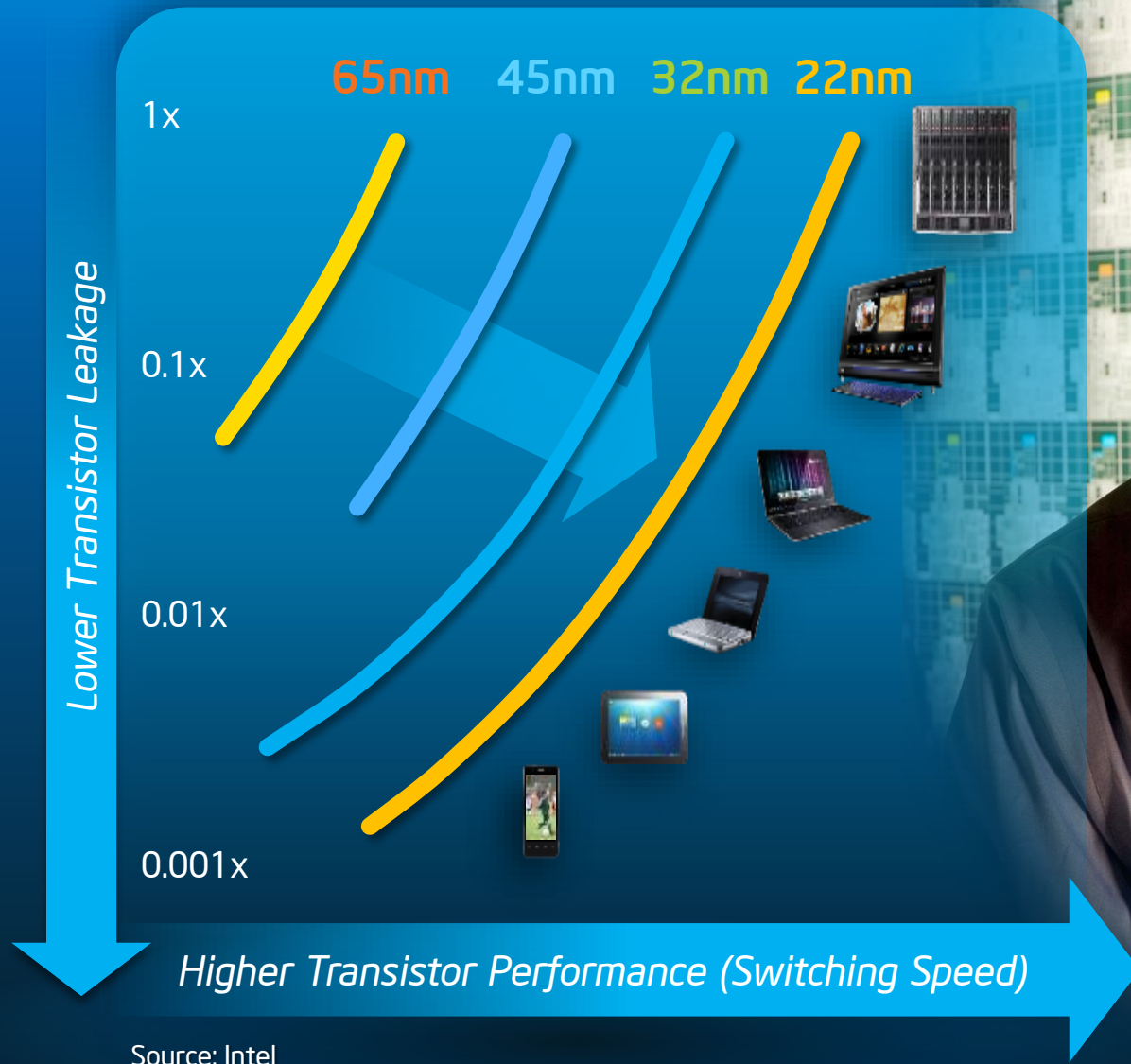
Legal Disclaimer

Intel's Integrated Device Manufacturer Advantage

PROCESS

DESIGN TOOLS

PRODUCT

Common Tools

Design for Manufacturing
Co-Optimized
Process+Product
Rapid Yield Learning
Early Product Ramp

Common Goals

MASKS

PACKAGING

MANUFACTURING

Leading-edge products and technologies

intel

CISCO

Leading Edge Process Technology

65nm **45nm** **32nm** **22nm**

Lower Transistor Leakage

1x

0.1x

0.01x

0.001x

Higher Transistor Performance (Switching Speed)

Source: Intel

4

The Journey to Computing Ubiquity

1960's
Scientists, Researchers

1980's
Business People

2000's
Mature Market, Wealthy Consumers

Today
Everyone

Intel Global Strategy

Use our unmatched employee talents, manufacturing, technology, and brand strength to:

Grow PC and data center business
enabling new users and usage models

Extend Intel solutions into
adjacent market segments

Create a continuum of secure
personal computing experiences

Care for our people and the planet and
inspire the next generation

Growth & IT Challenges Drive Need for Cloud Computing

Growth

IT Challenges

>3B
connected users by 2015[1]

2X growth
in information every two years[2]

15B
connected devices by 2015[3]

>11X
increase in mobile data traffic by 2015[4]

Up to 2X or $27B[5]
in additional data center power costs by 2015

Improve Agility
Reduce service delivery times, improve TCO

Greater Efficiencies
Reduce complexity & deploy new workloads

Gain Better Insights
Via intelligent analytics

Avoid Lock-In
Seek interoperable solutions & services

1 Cisco Global Cloud Index Nov 2011
2 IDC Extracting Value from Chaos June 2011
3 Intel ECG – One Smart Network device forecast
4 Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011–2016, Feb 2012
5 Datacenter Dynamics Global Datacenter Energy Demand 2012 forecast http://www.datacenterdynamics.com/research/energy-demand-2011-12; projected to 2015 by Intel; Assume $0.10/kWh

Cloud Adoption Growing & Delivers Benefits

IT Survey Results

Private Cloud

Today: 14%
2014:   42%
>40% of IT operations[1]

Hybrid Cloud

Private Cloud   Public Cloud

35% by 2015[2]

Public Cloud

Today: 7%
2014: 23%
>40% of IT operations[1]

Intel IT example[3]	Traditional IT – 2009	Private cloud - 2011
Resource provisioning	90 days	45 minutes
Virtualized Platforms	12%	65%
Asset Utilization	10-20%	>60%
Capacity	Silos	Shared globally
Cost Savings		$9M in savings in 2 years

1 ODCA global member survey, Oct 2011, N=63
2 Gartner, Dec 2010, N=55 The Road Map From Virtualization to Cloud Computing (G00210845)
3 Source: Intel IT- http://premierit.intel.com/docs

Progress Towards Vision of "Cloud 2015"

Private Cloud
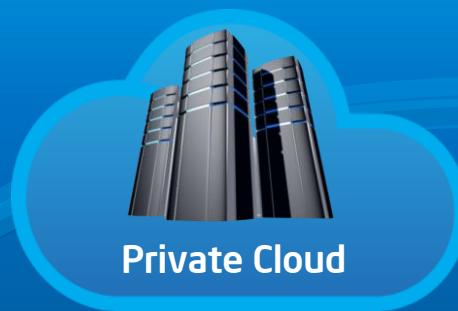
Public Cloud

Today
Silo'd Clouds

Federated
- ✅ Growing public and private cloud adoption
- 🚫 Security, management complexity, app migration

Automated
- ✅ Resource Provisioning: Months => Minutes
- 🚫 Manual processes

Client Aware
- ✅ Context aware growing: screen size, location, identity
- 🚫 Lack client aware standards

ATM

2015 & Beyond: Open Cloud Vision

Private Cloud   Public Cloud

Federated   **Automated**

Client Aware

Open Clouds
Interoperable, Built on Open, Multi-Vendor Solutions & Industry Standards

2015

Private ⟷ Public

- Integrated hybrid clouds
- Easy to compare services
- Automated security and resource allocation
- Expanded context awareness

Future

- Services & resources adapt to environment
- Predictive, real-time analytics
- User experience adapts to patterns/behaviors

Barriers to Cloud Adoption

Risk Aversion

Compliance

Quality of Service

Lock In

Technology Maturity

Security

Scale & Automation

Standards

Cultural/ Organizational

Structure

New roles

Skills development

Scaling the Infrastructure

Cloud Security: Lack of control, manual auditing, identity theft

Resource Orchestration: Complex/management silos

Servers

Unpredictable demand
Space/power constrained

Storage

Massive data growth
Inflexible, hard to scale

Networking

Lack flexibility
Complex management

Intel Strategy to Realize Open Cloud Vision

IT Requirements & Open Standards

Define and Prioritize IT Requirements & Accelerate Industry Standards

Optimized Platforms

Deliver optimized products for more secure, efficient, automated platforms built on a common architecture

Intel® Cloud Builders & Cloud Finder

Enable proven solutions that ease cloud adoption & provide guidance on cloud service provider selection

Intel Competitive Advantage Leveraged by Cisco UCS

World Leading Semiconductor Technology
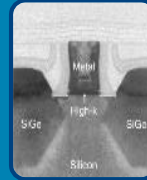
2007 45nm   2009 32nm   2011 22nm
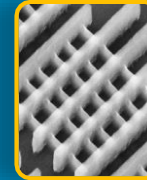
Huge Xeon Developer Base

14M+ Developers   **6M+** Applications

Cisco & Intel Jointly Drive Standards

THUNDERBOLT   Wi Fi   INFINIBAND   USB 3 UNIVERSAL SERIAL BUS   HDMI HIGH DEFINITION MULTIMEDIA INTERFACE   OPEN DATA CENTER ALLIANCE   JEDEC   3GPP A GLOBAL INITIATIVE   PCI EXPRESS   LTE   WiMAX FORUM

Multi-Platform Support & Open Source

intel   CISCO

Key Market Trends Addressed by Cisco UCS with Intel® Xeon® processors Inside

More users, devices, data, storage, traffic ...

More Users

More Devices

More Data

Changing Role of IT

Help **Lead** the Business

Support the Business

Growing Capability Gap

IT Arch Capability

What's Needed

gap

What's possible with traditional IT architecture capabilities

time
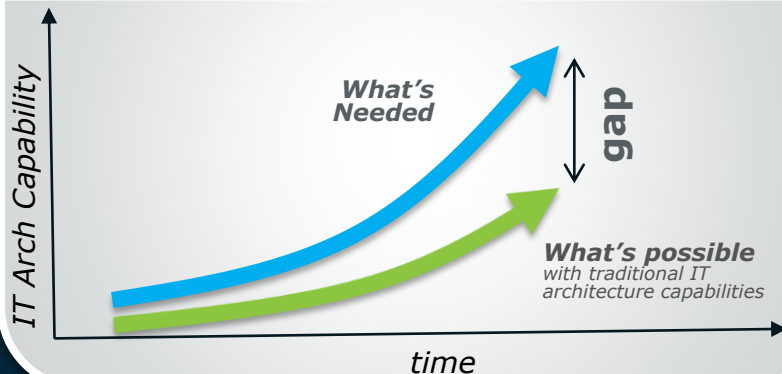
Maint. Costs Inhibit Innovation

Innovation (and new capabilities)

Maintenance
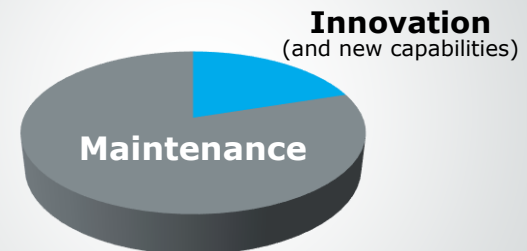
80/20 Split of the Typical IT Budget

Tick Tock Development Continues:
Innovate. Integrate. Innovate. Integrate.

TICK

2008	2010	2012	2014
45nm	**32nm**	**22nm**	**14nm**

Xeon® 5300 Xeon® 5100 — Xeon® 5400 Xeon® 5200 — Xeon® 5500 — Xeon® 5600 — Sandy Bridge-EP/EN — Ivy Bridge — Future — Future — Future

Intel® Core™ Microarchitecture

Nehalem Microarchitecture

Sandy Bridge Microarchitecture

Haswell Microarchitecture

TOCK

2007   2009   2011   2013
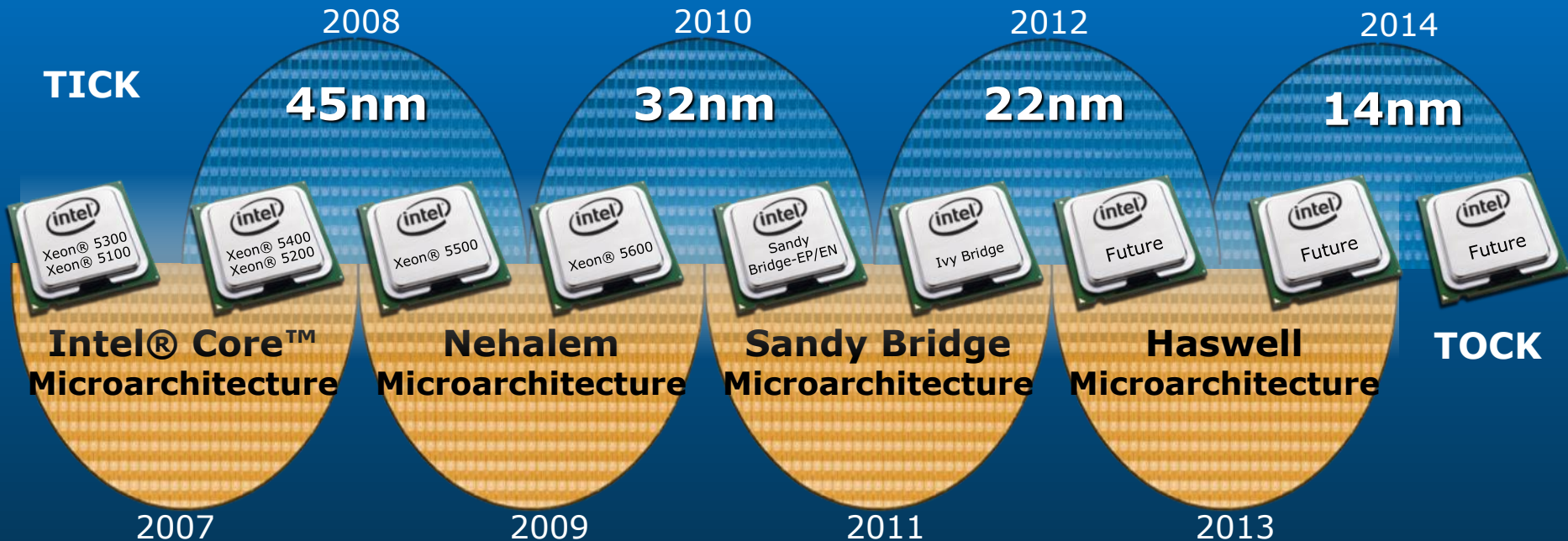
Predictable dependable cadence driving exponential growth in compute power and new business possibilities

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(intel) cisco

Intel® Xeon® Processor Historical Performance

Xeon E7-4800

Ten Core 32nm

Xeon 7500

Eight Core 45nm

Xeon 7400

Six Core 45nm

Xeon 7300

Quad Core 65nm

Xeon 7100

Dual Core 65nm

Xeon 7040

Dual Core 90nm

Xeon 3.66GHz

Single Core 90nm

2005 2005 2006 2007 2008 2010 2011+
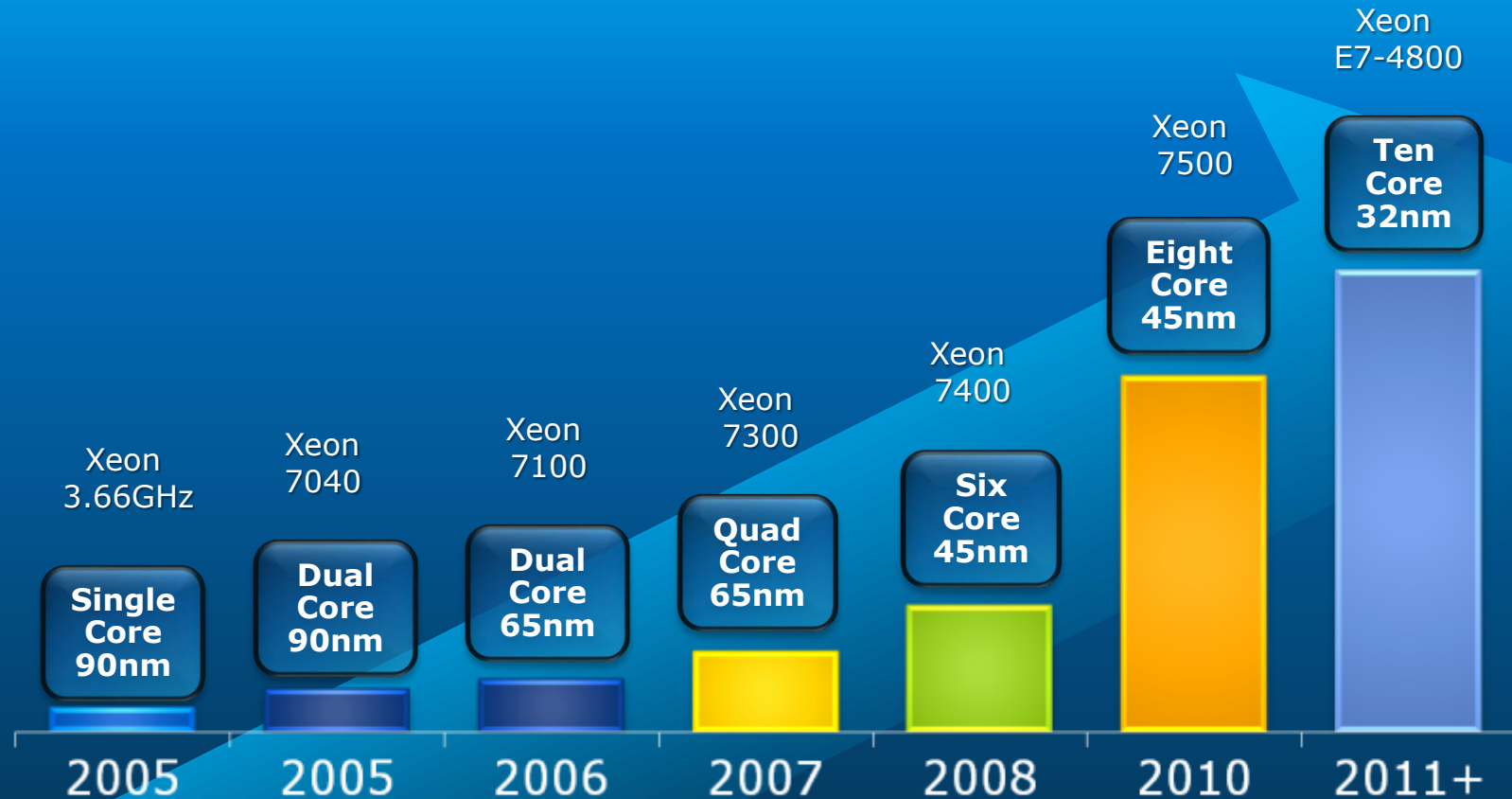
20x Increase in Database Performance since 2005

Source: Intel internal OLTP database workload performance estimates as of 8 May 2012. Results have been estimated based on internal Intel analysis and are provided for informational purposes only. Any difference in system hardware or software design or configuration may affect actual performance.
2005 Xeon 3.66GHz = 64-bit Intel® Xeon® Processor 3.66 GHz, 1M Cache, 667 MHz FSB
2005 Xeon 7041 = Intel® Xeon® Processor 7040 (4M Cache, 3.00 GHz, 667 MHz FSB)
2006 Xeon 7100 = Intel® Xeon® Processor 7140M (16M Cache, 3.40 GHz, 800 MHz FSB)
2007 Xeon 7300 = Intel® Xeon® Processor X7350 (8M Cache, 2.93 GHz, 1066 MHz FSB)
2008 Xeon 7400 = Intel® Xeon® Processor X7460 (16M Cache, 2.66 GHz, 1066 MHz FSB)
2010 Xeon 7500 = Intel® Xeon® Processor X7560 (24M Cache, 2.26 GHz, 6.40 GT/s Intel® QPI)
2011 Xeon E7-4800 = Intel® Xeon® Processor E7-4870 (30M Cache, 2.40 GHz, 6.40 GT/s Intel® QPI)

HANA Revolutionizes SAP Decision Making
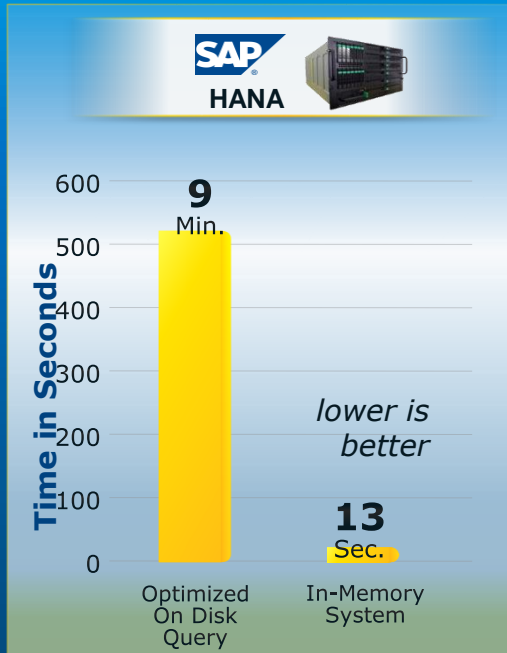
SAP HANA
- Appliance offered on Intel® Xeon® processor 7500 from key OEM's*
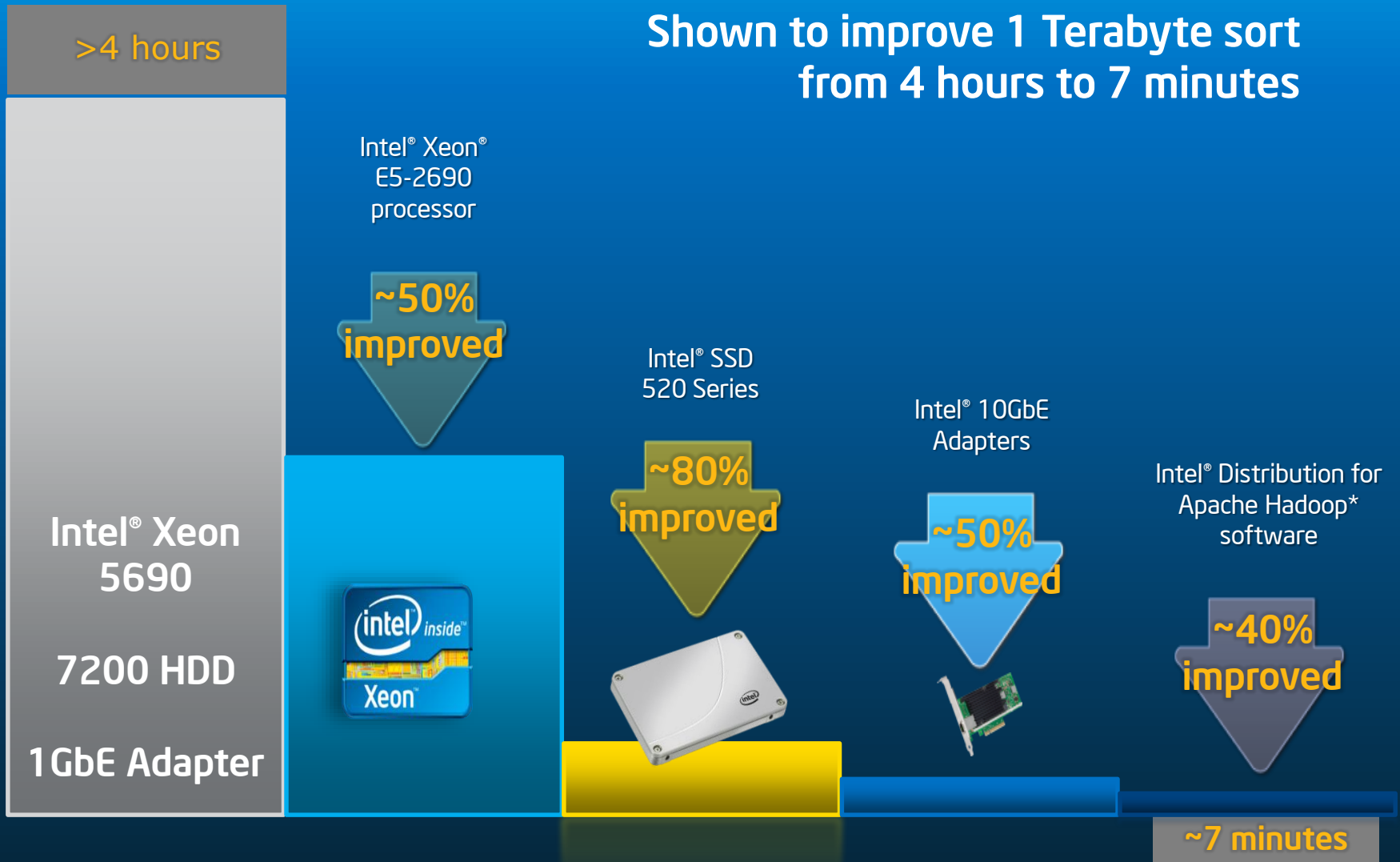- Instant response times to real-time events

*"Intel and SAP, **through joint engineering**, have **optimized** SAP HANA...enabling greater business agility and innovative usage models that let customers respond to changing conditions in real time."*

- Press Announcement, December 2010

- SAP In-Memory Appliance (SAP HANA™) delivers SAP In-Memory Computing technology through an on going engineering collaboration between SAP and Intel.

- Optimized performance and reliability on Intel® Xeon® Processor E7 Family.

- Instant access to huge volumes of data

- Lets you model your business in a rapidly changing, competitive environment

- Certified on Cisco UCS Servers C 460 M2, C260 M2 and B440 M2

*Note: E7 family 1.37x faster

Intel® Xeon® Processor Historical Performance

Shown to improve 1 Terabyte sort from 4 hours to 7 minutes

>4 hours

Intel® Xeon
5690

7200 HDD

1GbE Adapter

Intel® Xeon®
E5-2690
processor

~50% improved

Intel® SSD
520 Series

~80% improved

Intel® 10GbE
Adapters

~50% improved

Intel® Distribution for
Apache Hadoop*
software

~40% improved

~7 minutes

intel CISCO.

Intel® Xeon® Processor Families in Cisco UCS

E5
Family

Top Performance / $,
Energy Efficiency, &
Flexibility
for Infrastructure Apps
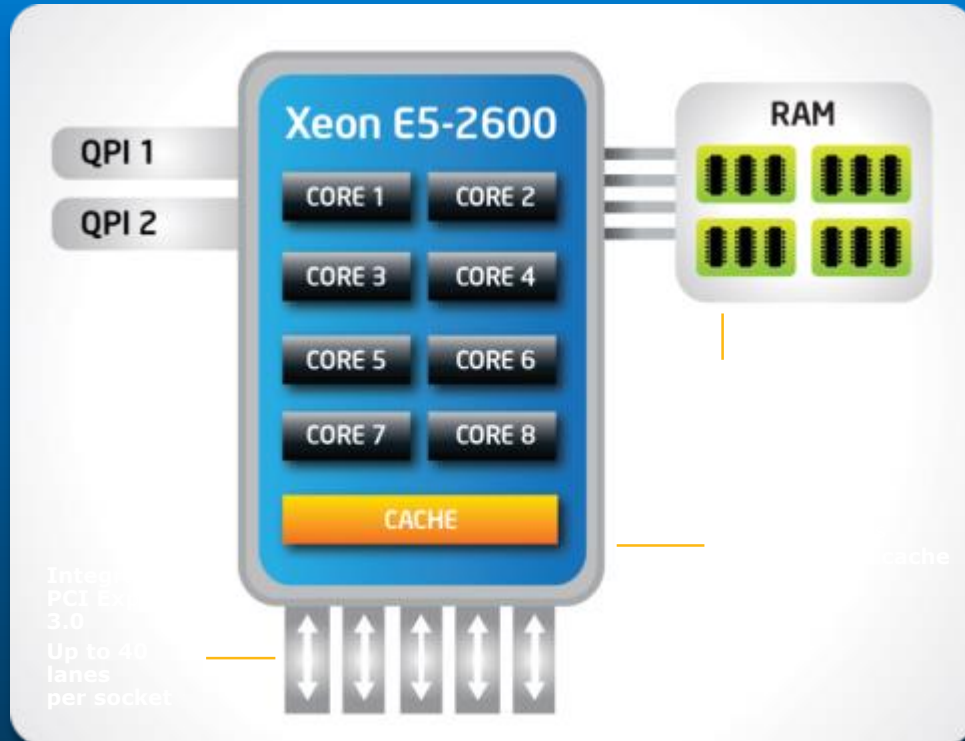
Xeon E5-2600 &
4600

E7
Family

Scalable Performance,
Flexibility, & Advanced
RAS for Demanding Apps /
Consolidation

Xeon E7-4800 &
2800

The Heart of a Next-Generation Data Center

intel inside™
Xeon®

QPI 1

QPI 2

Xeon E5-2600

CORE 1	CORE 2
CORE 3	CORE 4
CORE 5	CORE 6
CORE 7	CORE 8

CACHE

RAM

Integrated
PCI Ex...
3.0
Up to 40
lanes
per socket

cache

Up to **80% performance boost** vs. prior gen[1]

Dramatically reduce compute time with Intel® Advanced Vector Extensions

Performance when you need it with Intel® Turbo Boost Technology 2.0

Intel® Integrated I/O with Intel® Data Direct I/O **cuts latency**[2] while adding capacity & bandwidth

UCS C240 M3
Storage-Optimized

UCS C220 M3
Dense

UCS B200 M3
Performance-Optimized

intel **CISCO**

Intel® Xeon® Processor E7 Family
Delivers More Performance, Expandability and RAS

Xeon E7

CORE 1	CORE 2
CORE 3	CORE 4
CORE 5	CORE 6
CORE 7	CORE 8
CORE 9	CORE 10

CACHE

RAM
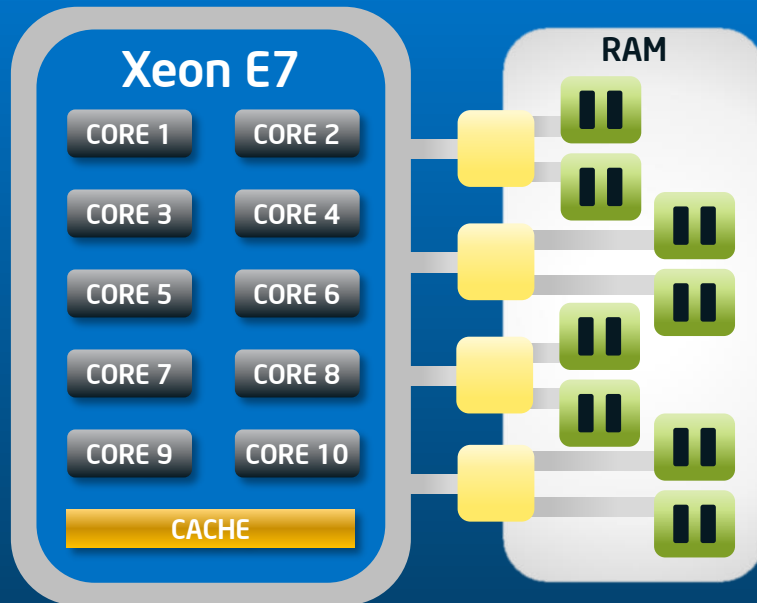
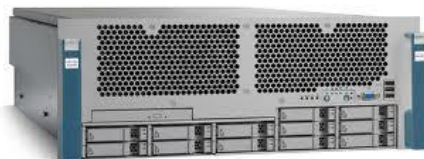**Performance** to handle any workload

Expandable & **Scalable** across processor, memory & I/O

Increased **Efficiency** through processor & memory energy saving technologies

Data Protection & Reliability to support mission critical applications
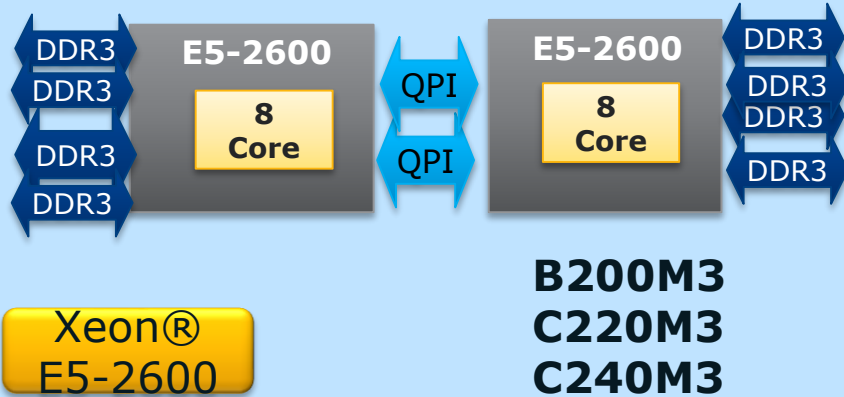
UCS C260 M2

UCS C460 M2

UCS B230 M2

UCS B440 M2

2-Socket Platform Comparison

Efficient Performance Class

DDR3
DDR3

E5-2600
8 Core

QPI
QPI

E5-2600
8 Core

DDR3
DDR3
DDR3
DDR3

DDR3
DDR3

B200M3
C220M3
C240M3

Xeon®
E5-2600

Expandable Class

intel E7-2800   intel E7-2800

intel IO HUB

B230M2
C260M2

Xeon®
E7-2800
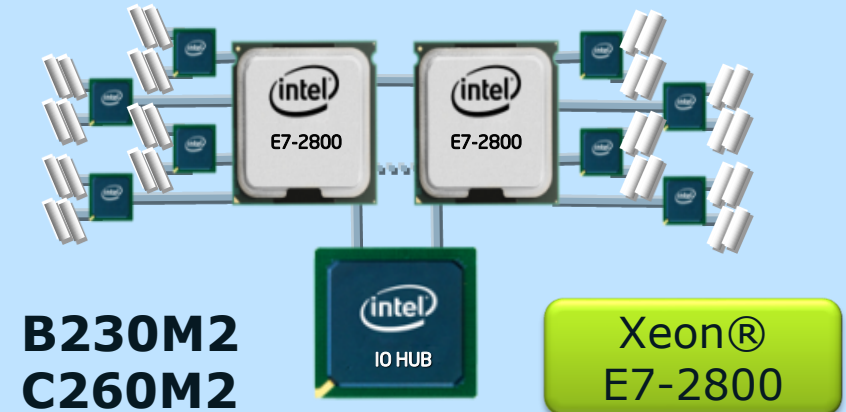
Performance
Frequency Sensitive   Thread Sensitive

Power Efficiency
Low   High

Memory Capacity
Low   High

Reliability
Good   Best

intel CISCO

Remove Your Storage Bottlenecks
Intel® SSDs Give Applications Full Access to Your Storage

Keeps up with Virtualized Apps Growth

Supports Increased Demand for Content

App

App

App

App

DATA

DATA

DATA

DATA

Intel® SSD 710

App

App

App

App

DATA

DATA

DATA

DATA

Cisco PID : UCS-SD300G0KA2-E

Scales with growth of Volume and Variety of Data

Meets Increased Demand for Real-Time Data Access
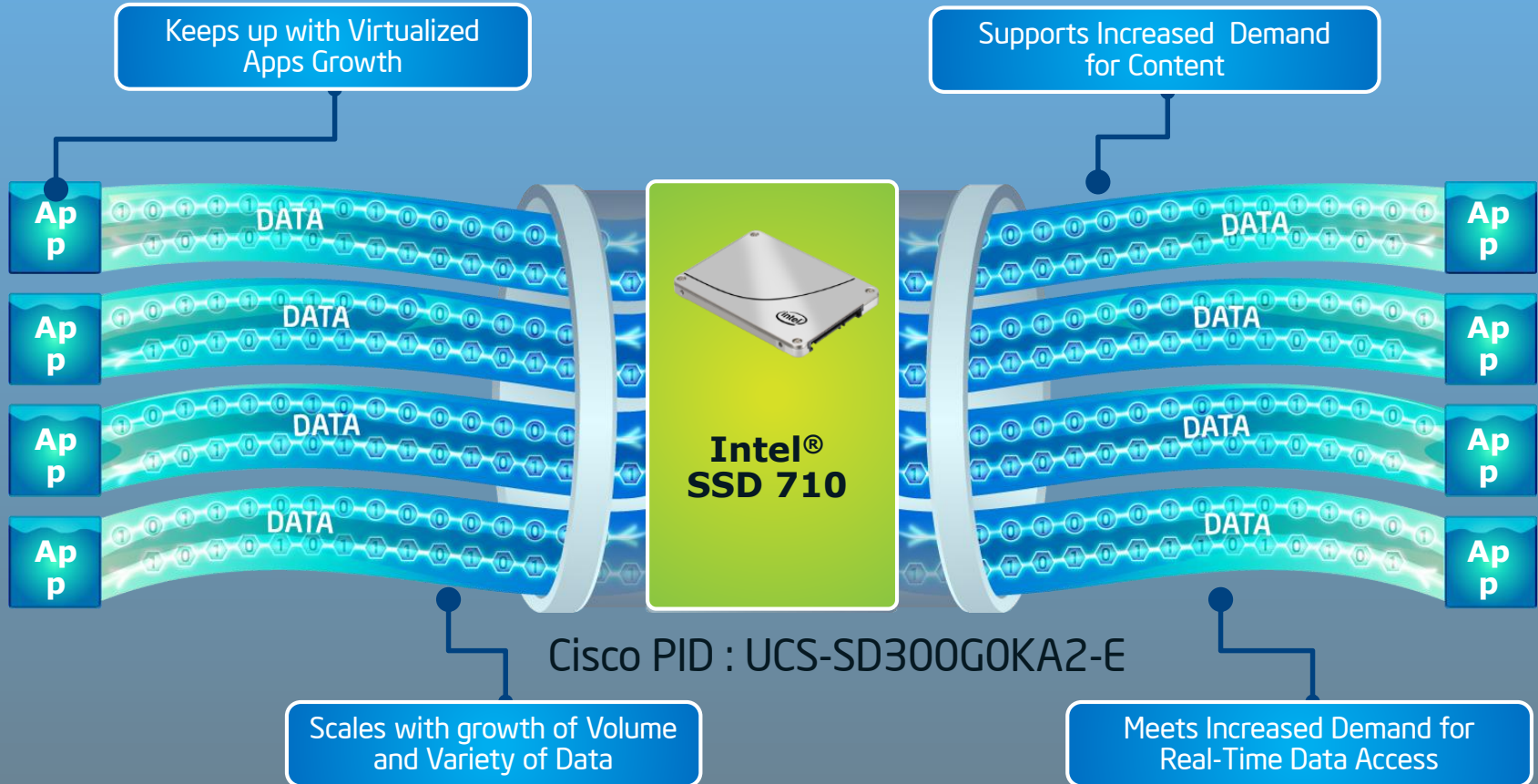
Fast & Consistent Performance

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(intel)   CISCO

Intel® Ethernet Converged Network Adapters

- Industry-first FCoE over 10GBASE-T
- Backwards-compatible with GbE networks

- SFP+ DAC for Top-of-Rack
- Intel® Ethernet SFP+ optics for SR and LR distances

- One adapter for LAN, iSCSI, FCoE

- Support for 10GBASE-T, SFP+ DAC/SR/LR

- Advanced virtualization optimizations (VMDq, SR-IOV, VXLAN)

- Custom models available for OEM servers – including Cisco UCS

- Up to 50%[1] less than competing CNAs

[1] Based on November 2012 price listings

Intel® Ethernet – It Just Works

intel® CISCO.