IDF2011
INTEL DEVELOPER FORUM

Kirk Skaugen

Corporate Vice President, Intel Corporation

General Manager, Datacenter and Connected Systems Group

intel
Sponsors of Tomorrow.

Intel's Vision

This decade we will create and extend computing technology to connect and enrich the lives of every person on earth.



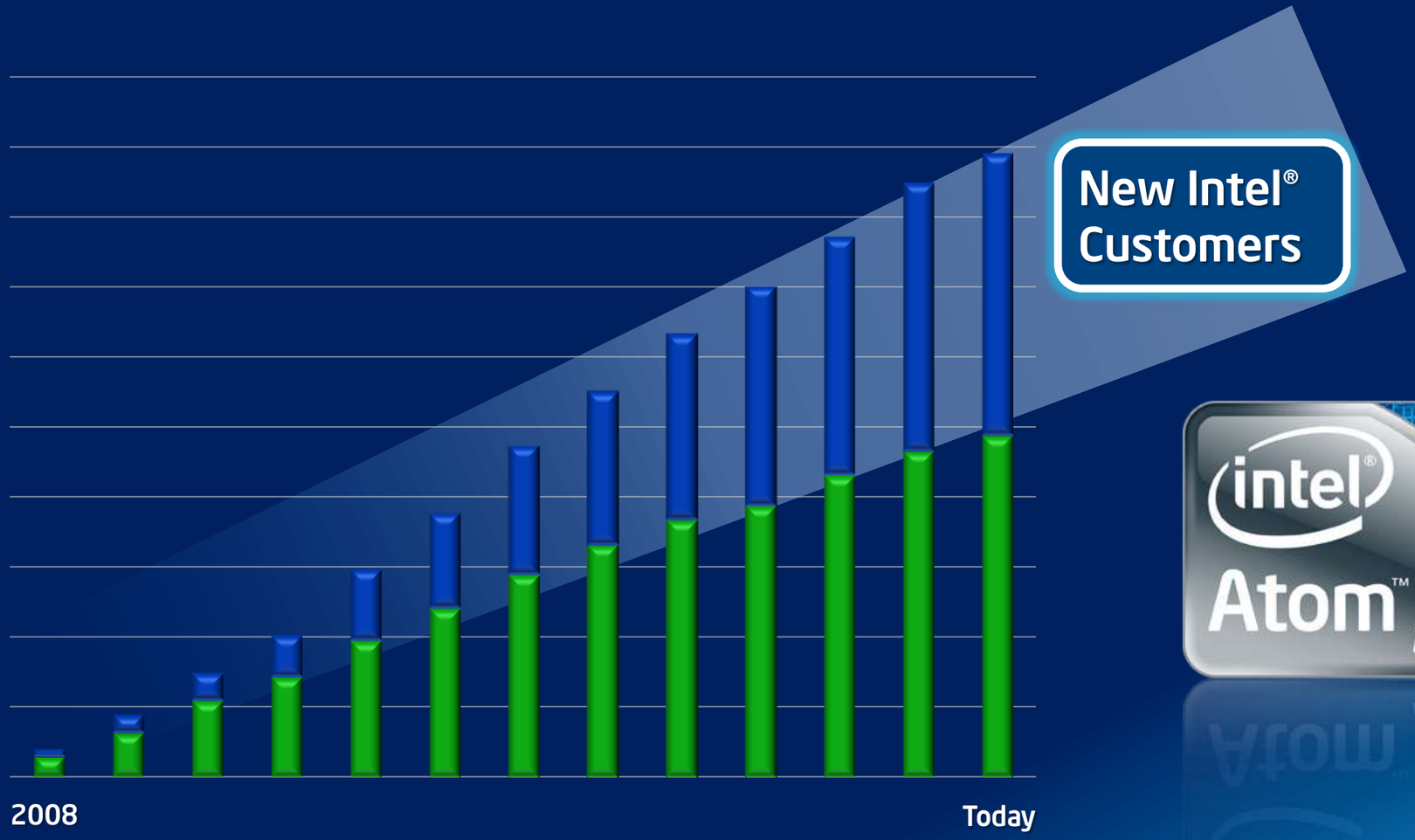




More Intelligent Connections Are Emerging


HEALTHCARE
MANUFACTURING
AEROSPACE AND MILITARY
TRANSPORTATION
COMMUNICATIONS
ENERGY
RETAIL

Intelligent Device Momentum



intel Atom™ inside™

Driving Datacenter Demand

By 2015…

More Users

>1 Billion More
Netizen's

More Devices

15 Billion
Connected Devices

More Data

>1,000 Exabytes
Internet Traffic

1. IDC "Server Workloads Forecast" 2009. 2.IDC "The Internet Reaches Late Adolescence" Dec 2009, extrapolation by Intel for 2015 2.ECG "Worldwide Device Estimates Year 2020 - Intel One Smart Network Work" forecast 3. Source: http://www.cisco.com/assets/cdc_content_elements/networking_solutions/service_provider/visual_networking_ip_traffic_chart.html extrapolated to 2015

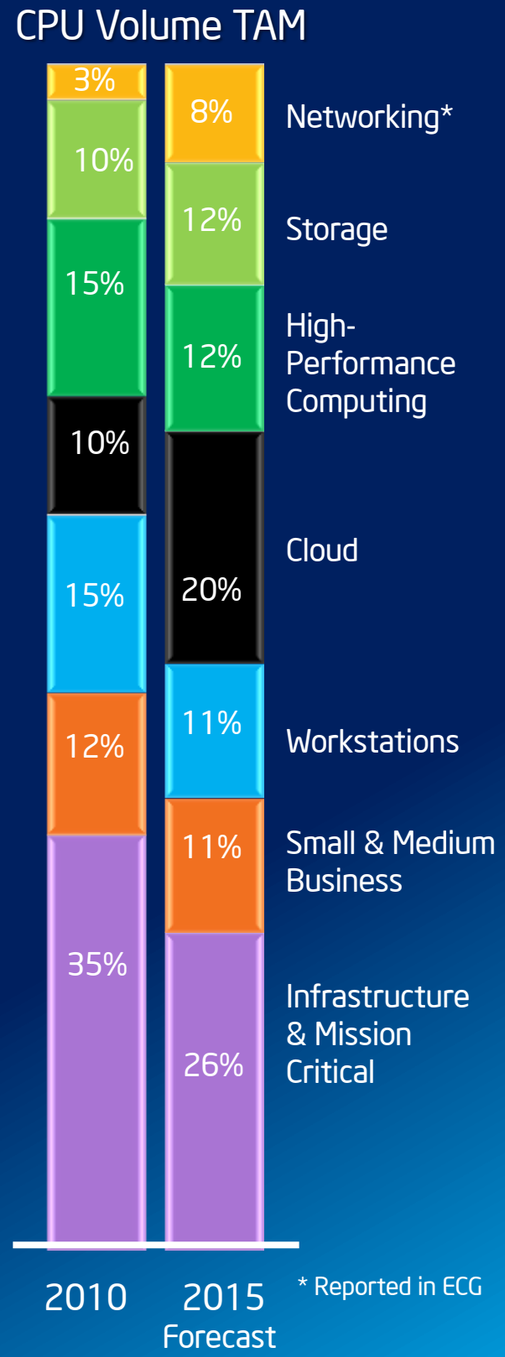
Datacenter Processor Growth

>2X in 10 YEARS

Source: IDC WW Server Tracker (1995-2004 systems data) & internal analysis;
2005-2010: Intel shipments
2011-2015: DCG Forecast

Datacenter Processor Growth

>2X in 5 YEARS



* Reported in ECG

Intel's Cloud 2015 Vision

FEDERATED
Share data securely across public and private clouds

AUTOMATED
IT can focus more on innovation and less on management

CLIENT AWARE
Optimizing services based on device capability

Desktops | Laptops | Netbooks | Tablets | Smartphones | Smart TVs | Embedded

Industry Standard Solutions

300+ *IT leaders representing*
$100B+ *in annual IT investment*

June, 2011: *1st IT Cloud Requirements*

Today: *Industry First POC Solutions*

>300 GLOBAL IT LEADERS

Steering Committee

Contributing Members

Solution Providers

Huawei

JouleX

Philips Technology Services

Adopter Members

AIMS Data Centre SDN BHD

Biznet Networks

Connectria Hosting

Getronics NL BV

JARING Communications Sdn Bhd

Scope Infotech, Inc.

Temperature Control

RampRate

Intel Serves as Technical Advisor to the Alliance

OPEN DATA CENTER ALLIANCE

Industry Delivery to Usage Model Requirements

This Week's Proof of Concept Solutions

Cloud On-Boarding: VM Interoperability	CITRIX	vmware	Unifed Fabric - Ethernet & FCoE: I/O Control
Data Center Efficiency: Carbon Footprint	DELL	Parallels	Trusted VM Deployment: Security Compliance
Secure Cloud on-Boarding: Security Compliance	EMC²	redhat	Cloud Interoperability: VM Interoperability

FRANK FRANKOVSKY

Founding Member, Open Compute Project

Director, Technical Operations, Facebook

OPEN COMPUTE PROJECT AND OPEN DATA CENTER ALLIANCE COLLABORATION

Collaboration Goals:

Accelerate efficient server, storage and data center infrastructure

Leverage complimentary organization charters

Collaborate on technical specifications and usage model requirements

INITIAL ENGAGEMENT

Initial collaboration focus:

- Rack scale infrastructure
- Scalable, open systems management
- Ultra efficient server and storage infrastructure

Members from both orgs beginning engagement today

Early review of OCP products by ODCA members

Details to come in Q4 from both organizations

From Vision to Action

Open Data Center Alliance

Define and Prioritize IT Requirements

Products & Technologies

Take Advantage of New Capabilities In Intel Platforms

Intel® Cloud Builders

Utilize Proven Reference Solutions to Ease Your Deployments

Intel® Cloud Builders

* Other names and brands may be claimed as the property of others.

Infrastructure as a Service / Cloud Resource Mgmt

Acer eDC Cloud Smart Portal
Fujitsu PRIMERGY with VMware vCloud
Fujitsu PRIMERGY BX Blade Server
Cloud On-Boarding with CloudSwitch
Cloud On-Boarding with Citrix NetScaler*
Cisco* Virtualized Multi-Tenant DC
HP ProLiant SL* & Enomaly Elastic Computing Platform
Huawei SingleCLOUD*
IBM* CloudBurst
Inspur* IaaS
Joyent SmartDataCenter
Microsoft System Center VM Manager Self-Service Portal 2.0*
Neusoft Aclome* Cloud
Nimbula* Cloud OS & Nimbula Director*
Novell* Cloud Manager
NTT DATA BIZXAAS* Full OSS Cloud Solution
Oracle* Optimized Solution for Enterprise Cloud
Parallels* Elastic IT Solution Developer Cloud
Powerleader Power Rack Server* with Microsoft*
Red Hat* Cloud Foundations
StackIQ Rocks+ Management Software
Ubuntu Enterprise Cloud
Univa UD*
VMware vCloud* Director

Cloud Security

Cloud Gateway Security on Intel Expressway
Enhanced Cloud Security with HyTrust and VMware
Parallels* Trusted Compute Pools
Power Management & Security with Intel & OpenStack
Secure Cloud On-Boarding for Mission-Critical
VMware Enhanced Server Platform Security

Cloud Efficiency

Dell & VMware* Policy Based Power Management
JouleX Energy Management Solution
Manage Data Center Carbon Footprint with Dell, Intel, and JouleX

Cloud Storage/ Networking

EMC* Atmos* Scale-out Storage Usage Models
NetApp* Unified Storage and Networking
Storage I/O Control: 10Gb Intel® Ethernet with VMware* vSphere 5.0* SIOC
Unified Networking: 10GbE iSCSI and 10GbE FCoE on Linux*

Client-Aware

Client Aware Cloud with RES Virtual Desktop Extender
Balanced Compute Model with NetSuite & Gproxy Design

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www.intel.com/cloudbuilders

Solutions to Make it Easier to Build and Optimize Cloud Infrastructure

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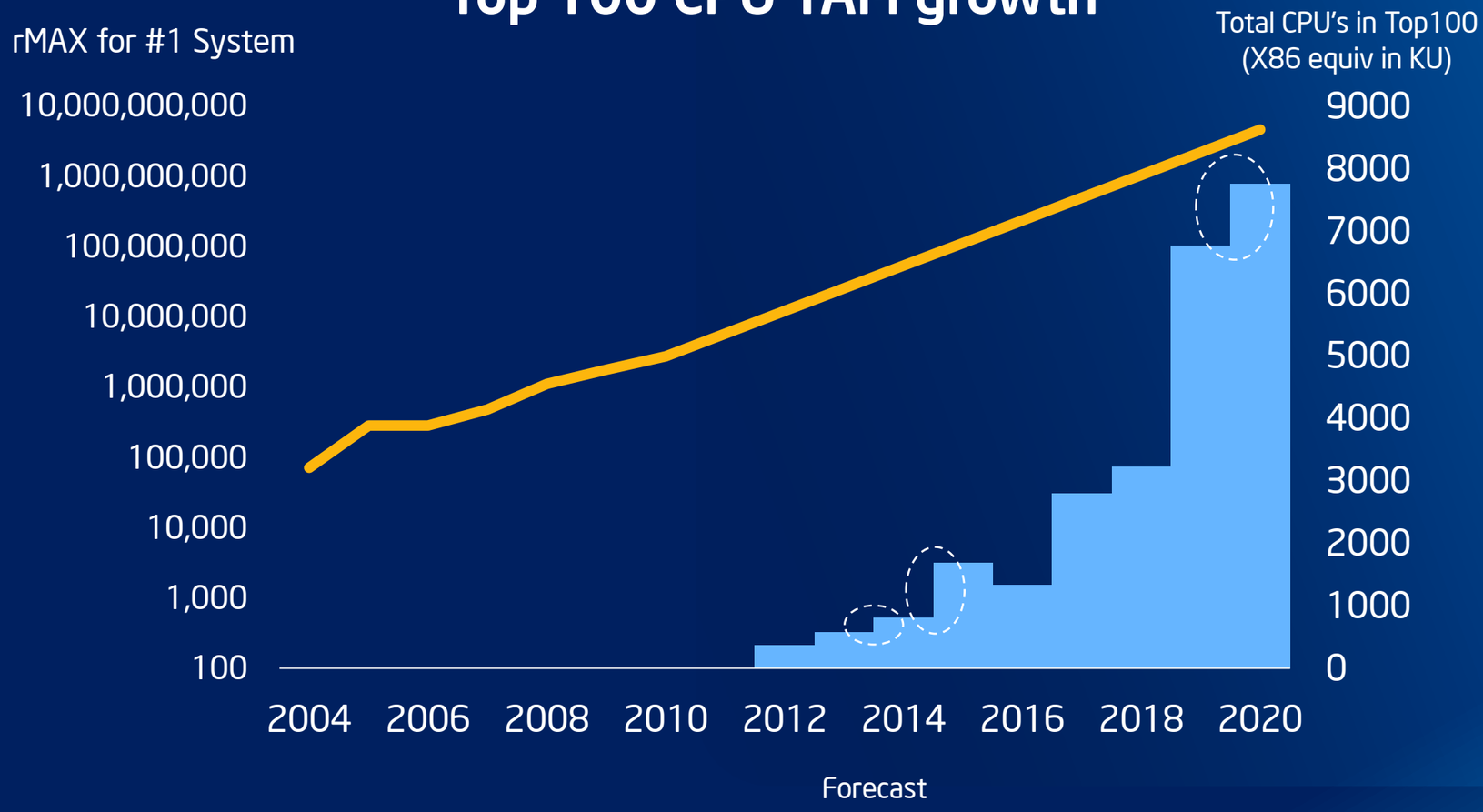
Rapid Growth in Supercomputing

Top 100 CPU TAM growth[1]



1 MILLION
Units in 2013

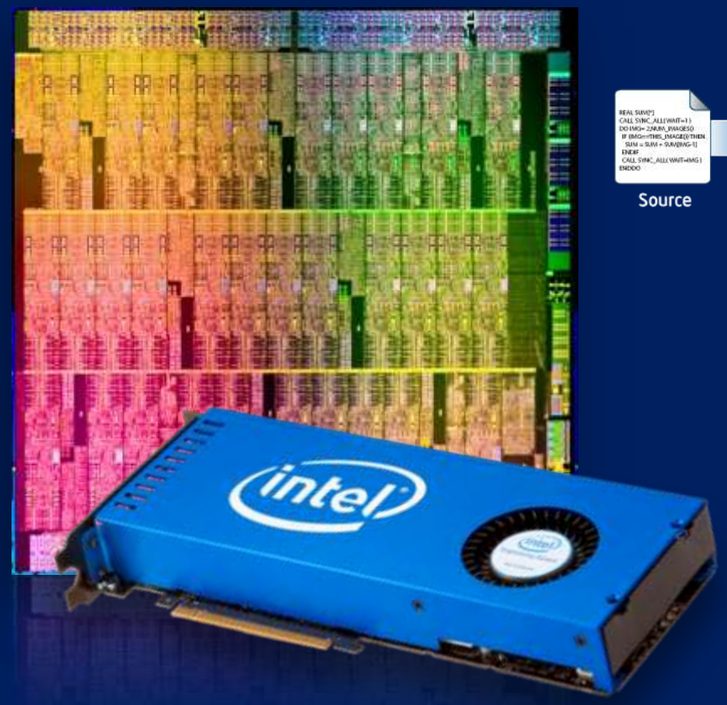
2 MILLION
Units in 2015

8 MILLION
Units in 2019

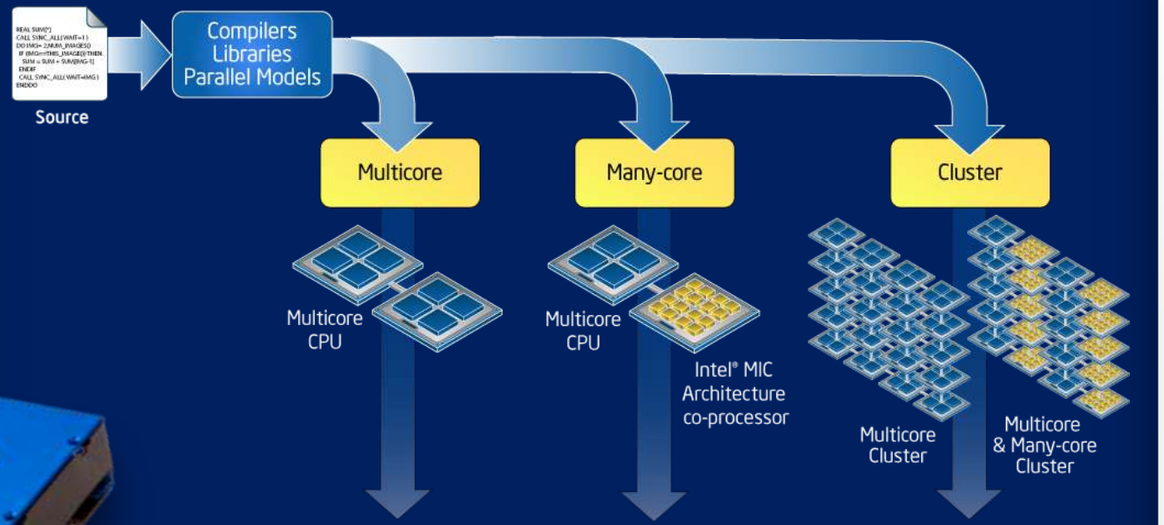
Source: Intel analysis and forecast list data from www.top500.org

Highly Parallel Performance

Intel® Many Integrated Core (Intel® MIC) Architecture



Intel® MIC Programming Model



"Unlike other approaches to an accelerator like GPGPU, I believe that **MIC is the most promising approach.** An x86-based server with MIC forms a single architecture for the most powerful next generation PC cluster. This **enables existing applications to easily migrate** to the new cluster and perform both data-intensive and numerical/scientific computing. To realize such a PC cluster, we have started to develop an operating system using MIC. "

Dr. Yutaka Ishikawa,
Director, Information Center University of Tokyo and Chairperson for PC Cluster Consortium
August 31, 2011

Tick/Tock Predictability Continues

Tick-tock Model

Tick	Tock	Tick	Tock	Tick	Tock
45nm		32nm		22nm	
Penryn	Nehalem	Westmere	Sandybridge	Ivybridge	Haswell

Tock	Tock	Tock
65nm	32nm	22nm
Tukwila	Poulson	Kittson

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Mission Critical

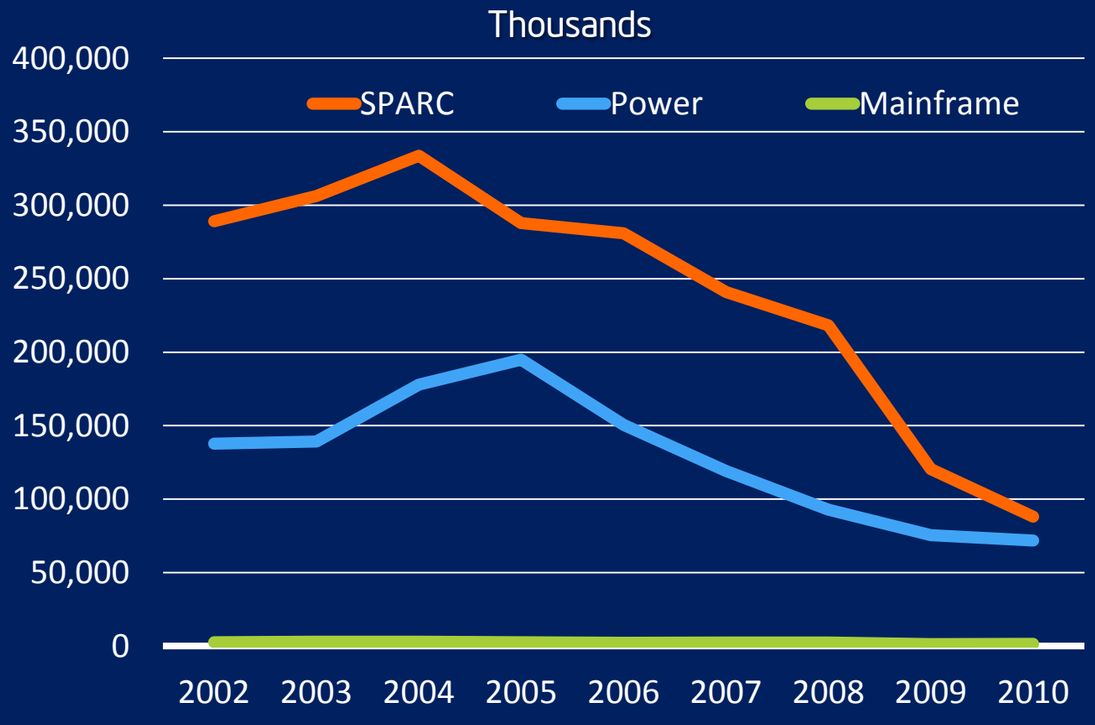
Performance

Energy Efficiency

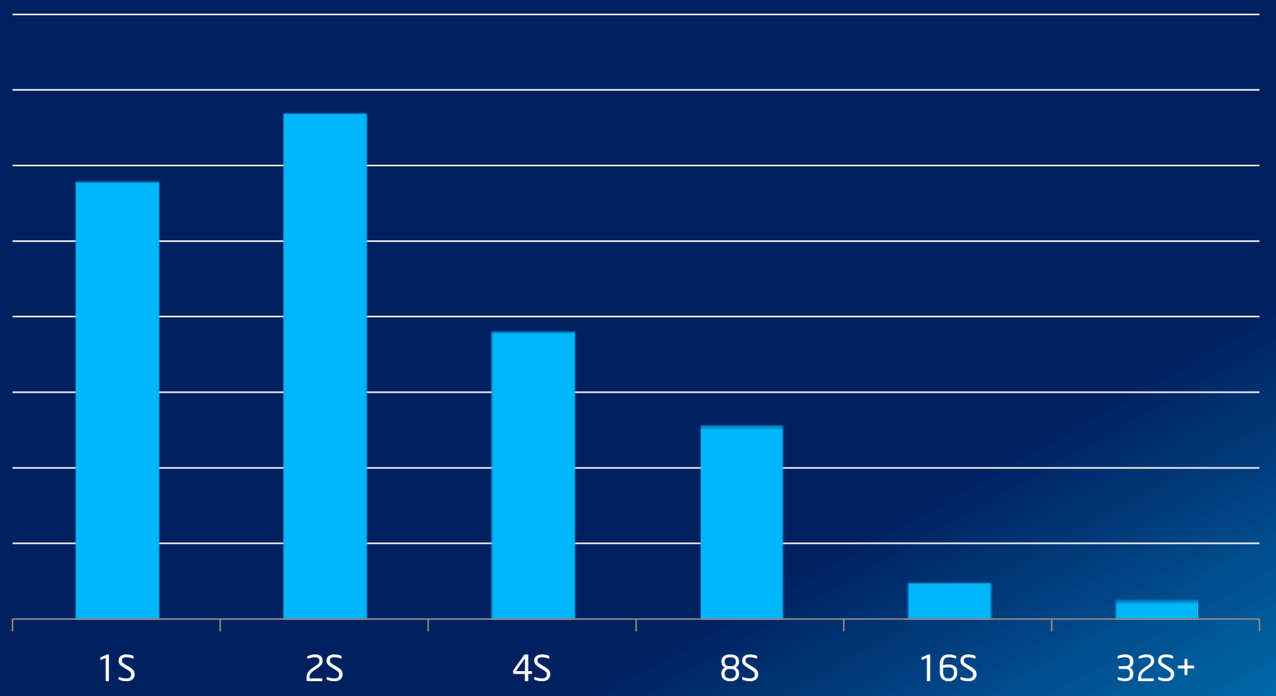
RAS

RISC Migration Continues

RISC/Mainframe System Units



RISC/Mainframe Installed Base



*Source – IDC Installed Base & MC Forecast, April 2011

The Future Intel® Xeon® processor E5

Codenamed Sandy Bridge-EP

Growing Performance

- Up to 8 cores per socket
- Up to 2X FLOPS with Intel® Advanced Vector Extensions

Efficient I/O

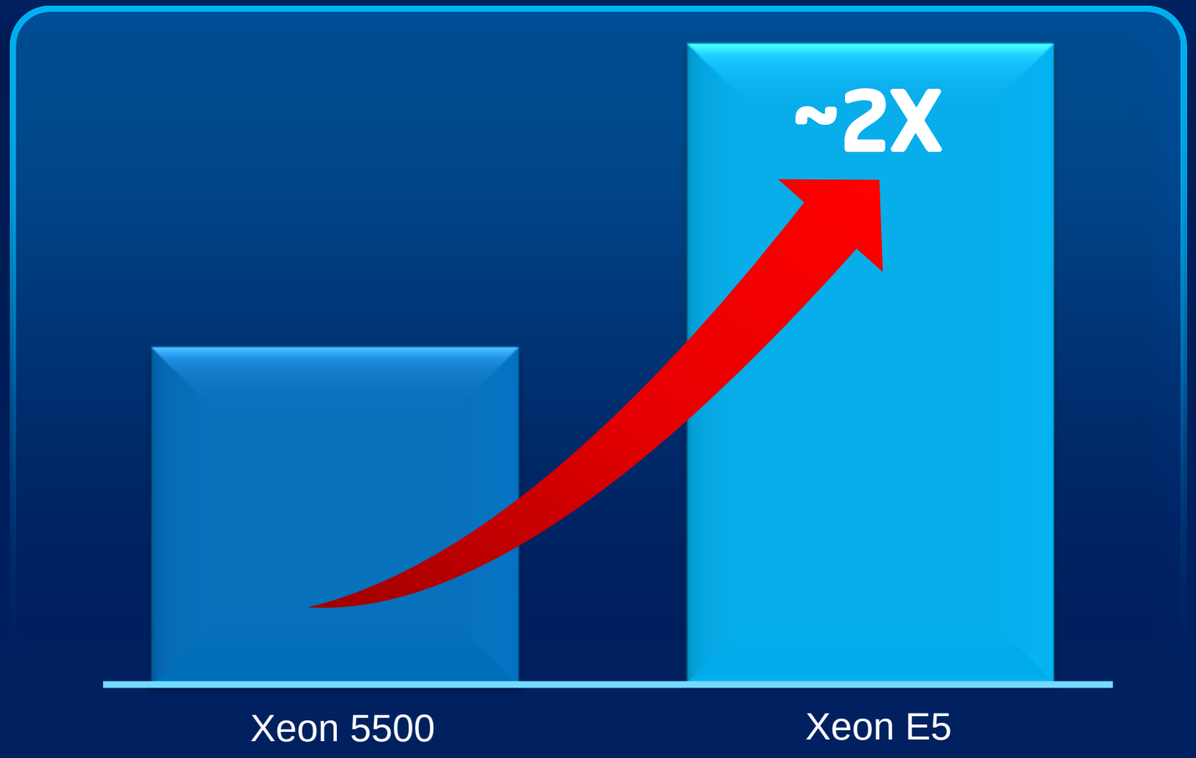
- Integrated PCIe reduces latency and power
- Platform includes integrated 6Gb SAS for high performance local memory

Advanced Security

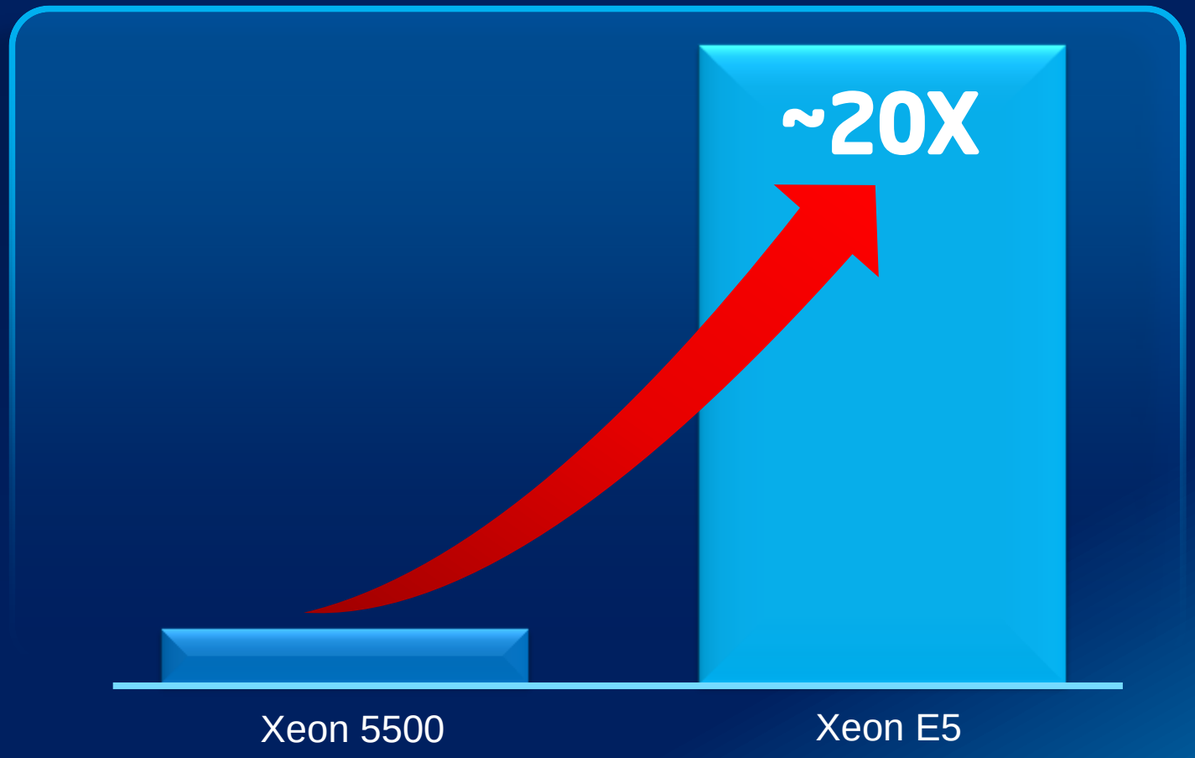
- Support for the latest Intel security features like Intel® Trusted Execution Technology and Intel® AES New instructions

The Foundation of the Next Generation Datacenter

Intel® Xeon® E5: Broadest Xeon Product Line



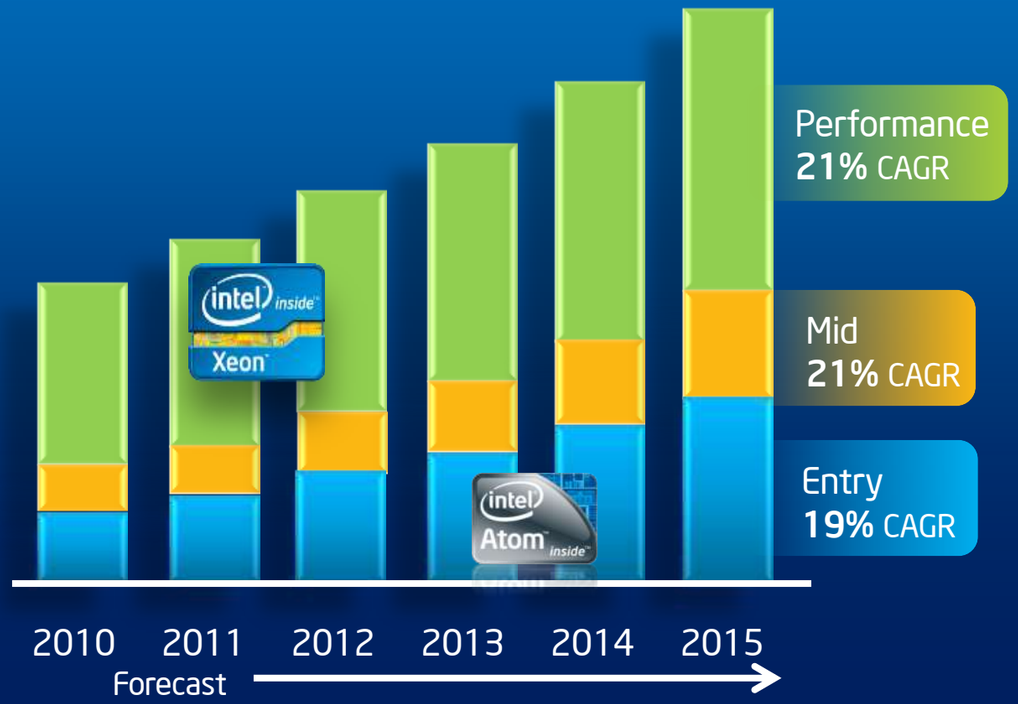
Expect to Launch
Almost 2X the Designs of
Xeon 5500/5600



Cloud and Supercomputing
Drive Unprecedented
Initial Demand

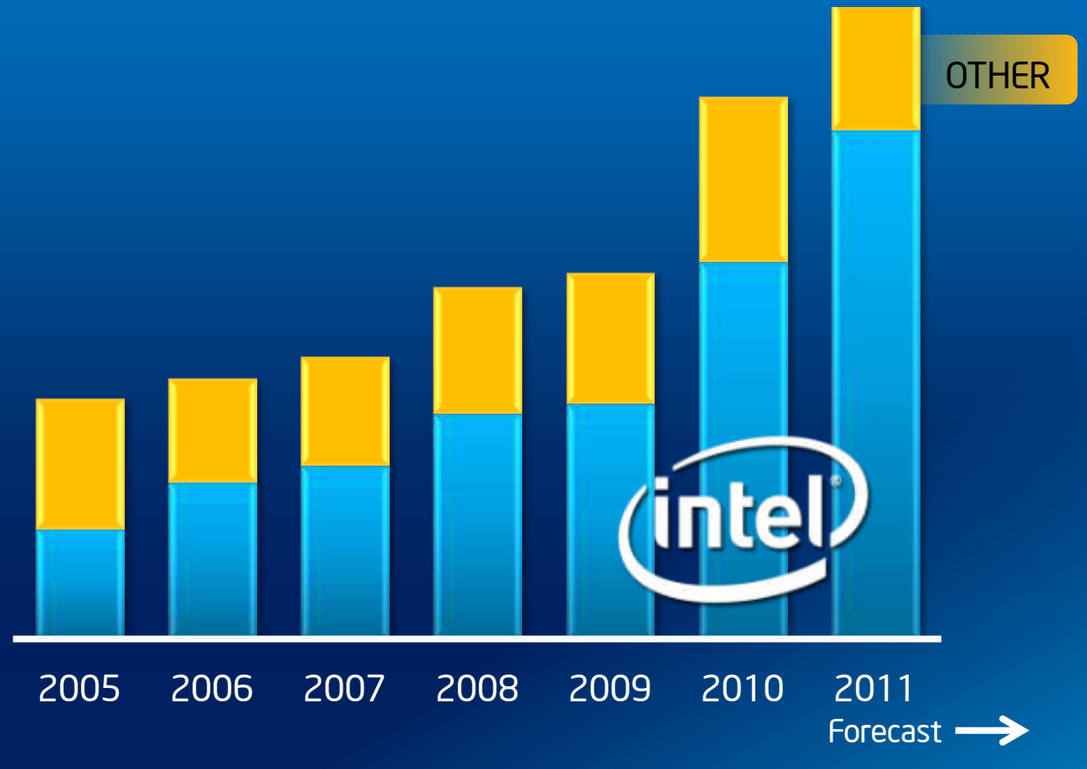
Significant Growth in **STORAGE**

Storage System Growth Rate



Source: IDC Worldwide Enterprise Storage Systems 2011-2015 forcast (May 2011)

Enterprise Storage Market



Source: Intel Market Model derived from internal data
And IDC Worldwide Enterprise Storage Systems 2011-2015 forcast (May'2011)

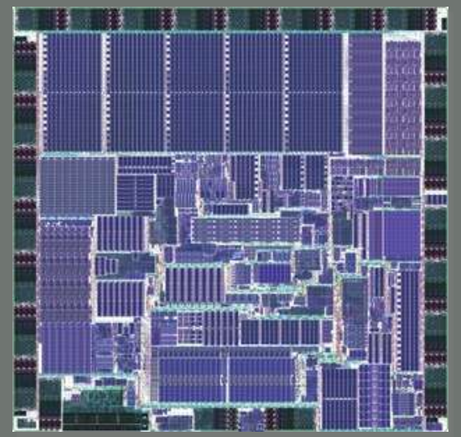
Intel® Ethernet - Switch & Router Operation

Intel 10G/40GbE Switching Silicon

- Acquisition of Fulcrum Micro Systems complete
- Fulcrum established on technical excellence and brings a proven track record
- Complements Intel's leading processors and Ethernet products
- Ground breaking Alta switch silicon sampling in Q4

Alta *Sampling Q4'11*

- *72-port 10G/40G router*
- *1 Billion packets per second*
- *300ns latency*
- *Programmable packet*



Communications

Four Workloads on Intel® Architecture

Access Networks

Edge/Core Networks

Enterprise Networks

Base Stations

Radio Network Controllers

VoD / Content Distribution

IPTV/IMS CDN

Wan Acceleration

Routers & Switches

Gateways

Firewall & VPN Appliances

Application Processing

Control Processing

Packet Processing

Signal Processing

Summary

- 15 Billion connected devices by 2015
  - Embedded systems becoming intelligent connected systems
  - 464 new Atom® customers
- More users, more devices & more data are driving datacenter growth
  - 2x datacenter volume 2010 to 2015
- Intel® is working with the industry to deliver an open cloud
  - Xeon® growth in storage, networking and RISC server migration accelerating
  - Open Data Center Alliance and Open Compute collaboration announced
- Tick/Tock model and product execution discipline remains:
  - Intel® Xeon® Processor E5: In production & 20x ramp vs previous TOCK on Nehalem
  - Poulson: On track for 2012 production and 2x performance vs current Itanium®
  - MIC & Knights Platform: 100 supercomputing customers developing s/w by end of year
  - Fulcrum brings leading 10GbE & 40GbE switch capabilities to Intel®

Q&A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