Kirk Skaugen
Corporate Vice President, Intel Corporation
General Manager, Datacenter and Connected Systems Group
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
Intelligent Device Momentum

2008

Today

New Intel® Customers

Sponsors of Tomorrow: Intel
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
Datacenter Processor Growth

>2X in 10 YEARS

Datacenter Processor Growth

>2X in 5 YEARS


CPU Volume TAM

Networking* 10%
Storage 15%
High-Performance Computing 15%
Cloud 25%
Workstations 15%
Small & Medium Business 15%
Infrastructure & Mission Critical 35%

Forecast

Datacenter Processor Growth

* Reported in ECG
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

Adopter Members

Intel Serves as Technical Advisor to the Alliance
Industry Delivery to Usage Model Requirements
This Week’s Proof of Concept Solutions

Cloud On-Boarding: VM Interoperability

- **Citrix**
- **VMware**

Unified Fabric - Ethernet & FCoE: I/O Control

- **Dell**
- **Parallels**

Data Center Efficiency: Carbon Footprint

Trust VM Deployment: Security Compliance

- **EMC²**
- **Red Hat**

Secure Cloud on-Boarding: Security Compliance

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
Members from both orgs beginning engagement today

Early review of OCP products by ODCA members

Details to come in Q4 from both organizations

**Initial collaboration focus:**

- Rack scale infrastructure
- Scalable, open systems management
- Ultra efficient server and storage infrastructure
From Vision to Action

Define and Prioritize IT Requirements

Take Advantage of New Capabilities In Intel Platforms

Utilize Proven Reference Solutions to Ease Your Deployments
Intel® Cloud Builders

**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 Cloud Switch
- 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
- Nimbus* Cloud OS & Nimbus 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**

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

**Cloud Efficiency**

- 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*

**Cloud Storage/ Networking**

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

---

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

www.intel.com/cloudbuilders

**Solutions to Make it Easier to Build and Optimize Cloud Infrastructure**
Rapid Growth in Supercomputing

Top 100 CPU TAM growth

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
"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

All products, computer systems, dates, and figures specified are preliminary based on current expectations, and are subject to change without notice. Intel product plans in this presentation do not constitute Intel plan of record product roadmaps. Please contact your Intel representative to obtain Intel’s current plan of record product roadmaps.
RISC Migration Continues

RISC/Mainframe System Units

Thousands

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

~2X

Cloud and Supercomputing Drive Unprecedented Initial Demand

~20X
Significant Growth in **STORAGE**

**Storage System Growth Rate**

- **Entry**: 19% CAGR
- **Mid**: 21% CAGR
- **Performance**: 21% CAGR

**Enterprise Storage Market**

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
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
IDF2011
INTEL DEVELOPER FORUM