A Peek at the Future – Intel's Technology Roadmap

Jesse Treger – Datacenter Strategic Planning

October/November 2012

Intel's Vision

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

The Three Pillars of Computing

Energy Efficient Performance

Internet Connectivity

Wireless USB

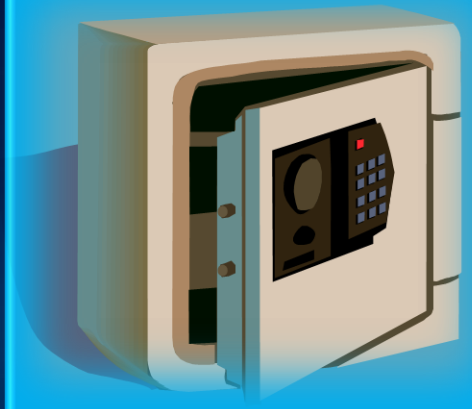
Wi Fi

Bluetooth

3GPP

wimax

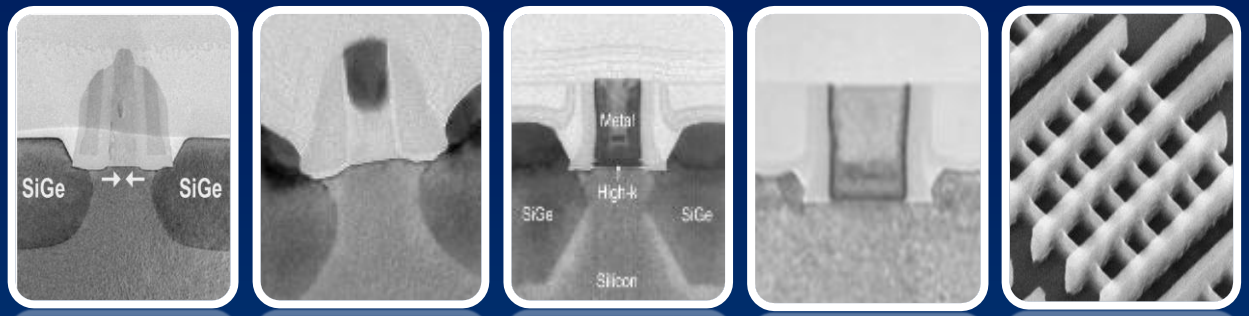
Security



intel

Relentless Pursuit of Moore's Law Opens the Door to Innovation…

2003	2005	2007	2009	2011
90 nm	65 nm	45 nm	32 nm	22 nm



Invented SiGe Strained Silicon	2nd Gen. SiGe Strained Silicon	Invented Gate-Last High-k Metal Gate	2nd Gen. Gate-Last High-k Metal Gate	First to Implement Tri-Gate

STRAINED SILICON

HIGH-k METAL GATE

TRI-GATE

The foundation for all computing

22nm

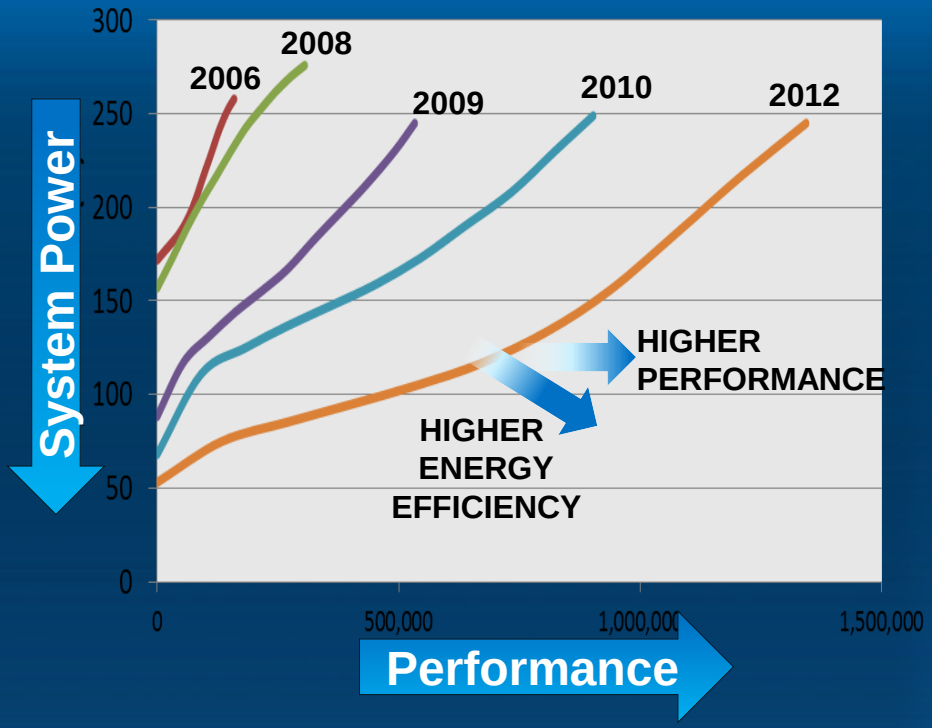
A Revolutionary Leap in Process Technology

37%
Performance Gain at Low Voltage*

>50%
Active Power Reduction at Constant Performance*

Source: Intel
*Compared to Intel 32nm Technology

Technology Leadership Provides:



Servers Gain 60% Power Efficiency/yr

PCs get Ultra Thin and Light

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark* and MobileMark*, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. Configurations: Dual Socket Server. For full configuration information, please see backup. For more information go to

Advancing toward a worry free computing experience

Anti-Malware	Data	Identity	Recovery
Malware finds nowhere to run or hide	***Data stays where it belongs***	***Your identity is safe and trusted***	***Back in action even after attack by malware***

intel

Evolution of IT

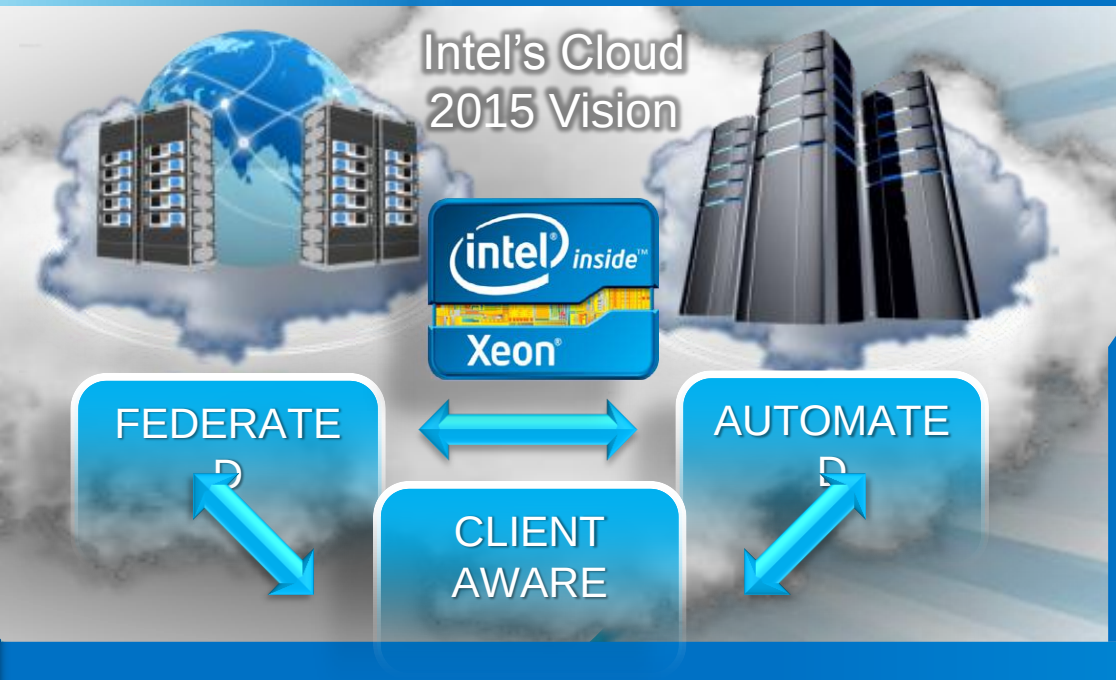
Cloud

Consumerization

Big Data

Cloud Computing – Rise of "as a Service"

Private Clouds, Public Clouds, Hybrid Clouds – delivering services to billions of connected devices



The need to manage Internet growth

By 2015, we will need…

8X	**Network**
16X	**Storage**
20X	**Compute Capacity**

Agile, Flexible and Scalable Business Services

Consumerization

End Users Want
Freedom, Flexibility

IT Pros Need
Security, Manageability

Form Factor Innovation

Universal Collaboration

Blended Computing

Business Assistant

Comprehensive Security

Automated Manageability

Compute Model Flexibility

intel

Big Data

Volume, Velocity, Variety, Value

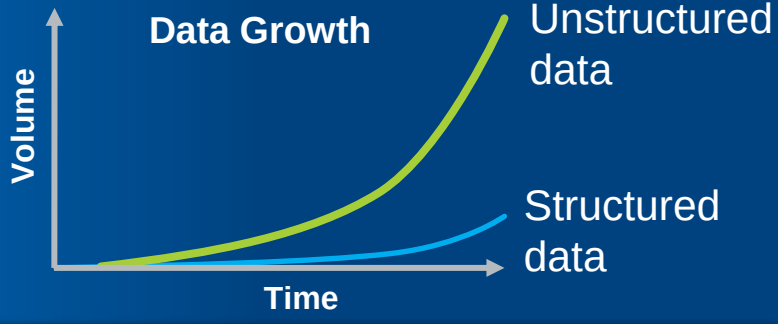
Big Corporate Data + Big Web Data + Big Sensor Data
provides a potential gold mine that can be mined for value

20 PB = HDD capacity manufactured in **1995**

39,000 PB = Unstructured data in **2011**

226,000 PB = Forecast unstructured data by **2015**

Companies will need to deal with 50x more data by 2020



Business Analytics will be a Competitive Differentiator

intel

Optimizing for Real Time Analytics

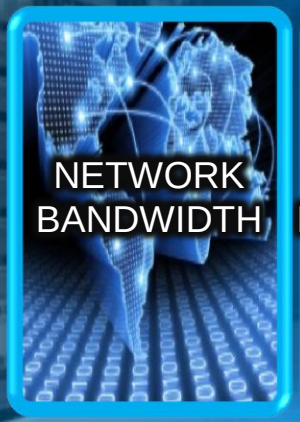
New Software Approaches

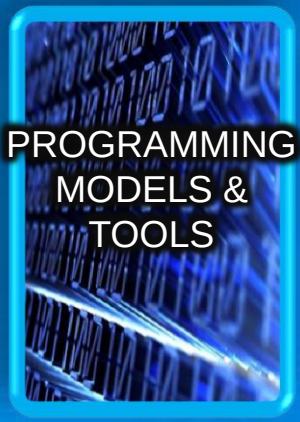
Distributed File Systems

hadoop

In-Memory Analytics

Advanced Hardware Capabilities





intel

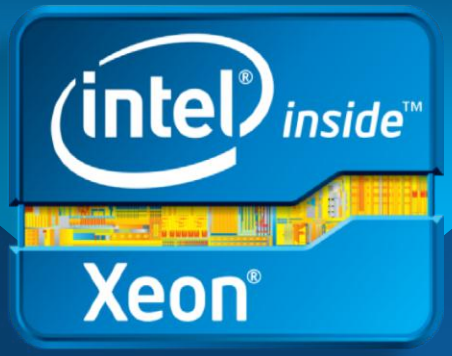
Datacenter Roadmap

Standard, flexible platform enables scale

Server

Storage

Network



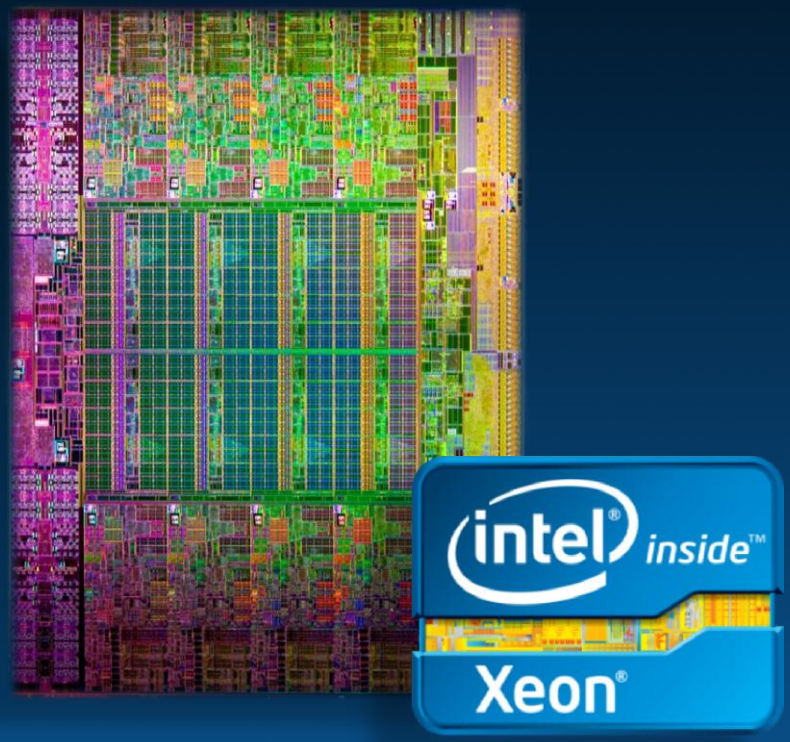
Introducing the Intel® Xeon® Processor E5 Family

80% Performance Gain[1]

Breakthrough I/O Innovation

Trusted Security

Best Data Center Performance per Watt[2]



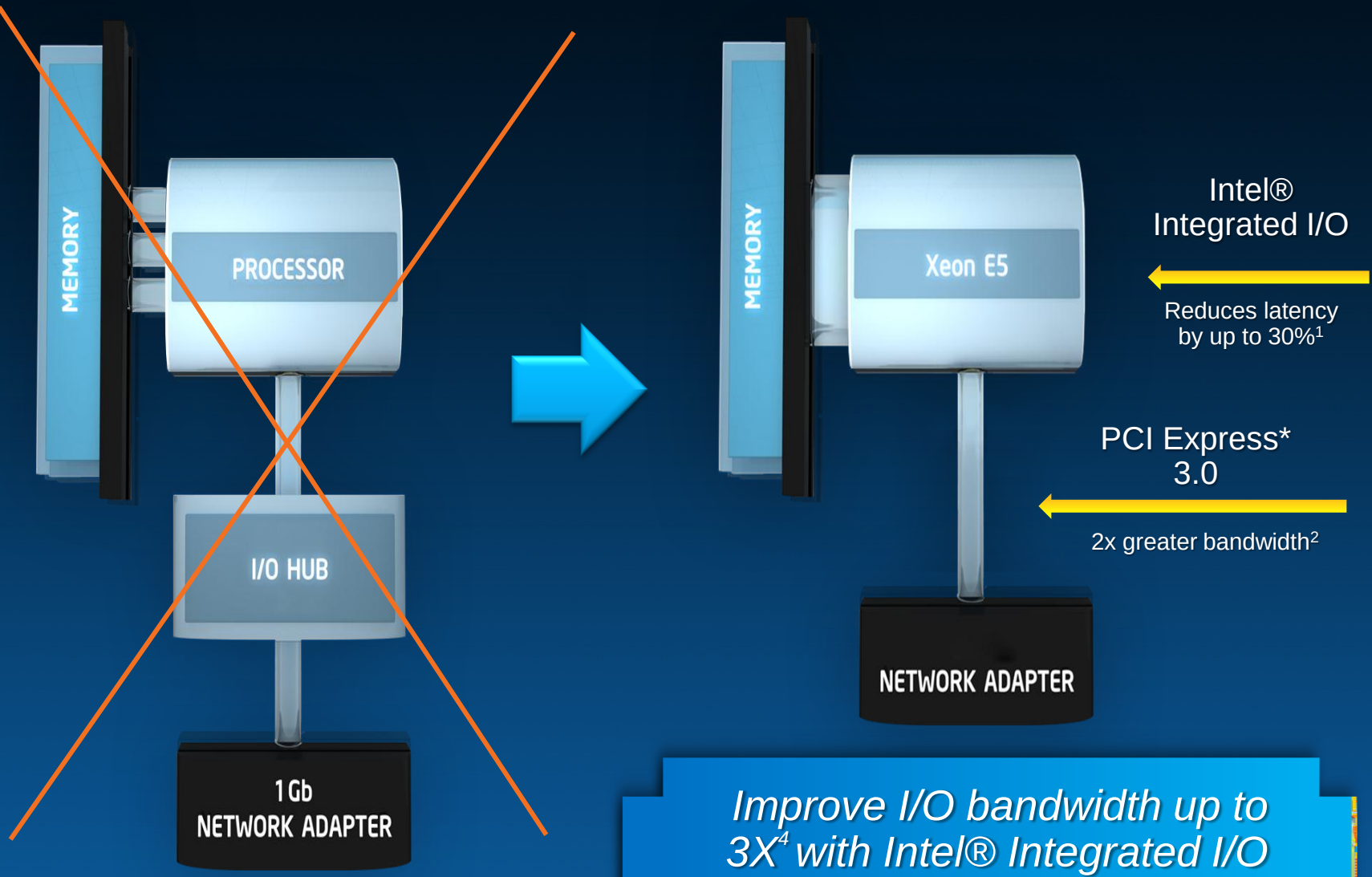
The Heart of a Flexible, Efficient Data Center Built to Scale

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

1: Performance comparison using best submitted/published 2-socket server results on the SPECfp*_rate_base2006 benchmark as of 6 March 2012. Configuration details in backup

2: Performance comparison using SPEC Power results published as of March 6th, 2012. See back up for configuration details. For more information go to intel.com/performance

Intel® Integrated I/O



Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

1 Source: Intel internal measurements of average time for an I/O device read to local system memory under idle conditions comparing Intel® Xeon® processor E5-2600 product family (230 ns) vs. Intel® Xeon® processor 5500 series (340 ns). See notes in backup for configuration details

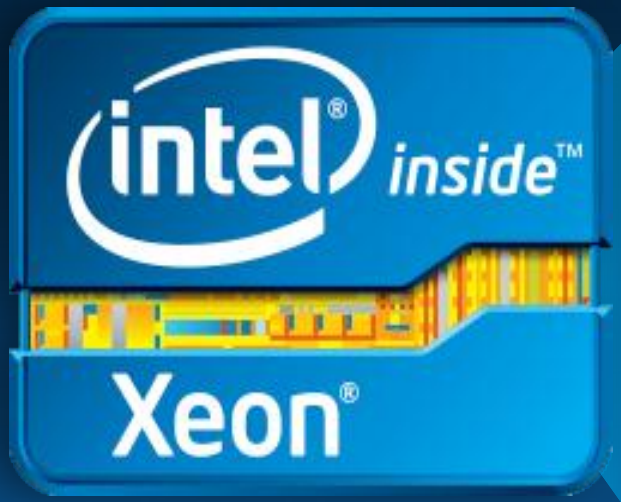
2 Source: www.Pcisig.Com/news_room/november_18_2010_press_release

3 Up to 2.3x I/O performance is 1S with a Xeon processor 5600 series vs. 1S Xeon Processor E5-2600 data for L2 forwarding test using 8x10GbE ports .See notes in backup for configuration details

4 Intel internal measurements of maximum achievable I/O R/W bandwidth (512B transactions, 50% reads, 50% writes) comparing Intel® Xeon® processor E5-2680 based platform with 64 lanes of PCIe* 3.0 (66 GB/s) vs. Intel® Xeon® processor X5670 based platform with 32 lanes of PCIe* 2.0 (18 GB/s).

Continuing Processor Advancement

Next Generation Intel® Xeon® Processor E7 & E5 Families



22nm Processors Expected To Offer:

- Best-in-class performance
- Exceptional energy efficiency
- Robust hardware enhanced security
- Improved virtualization with APICv
- New advanced reliability features for the Intel Xeon® processor E7 Family
- In Production: 2013

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.

For more information go to intel.com/performance

Business Clients

The Evolution of vPro

Now Available on Intel® Xeon® processor

Gaming Machines

Point of Sale

Signage

Servers

Workstations

2006 — Enterprise Remote Management

2007 — Enhanced Security Wireless

2008 — Reach Beyond Firewall

2010 — Data & Asset Security, HW-KVM Remote Control

2011 — Host-Based Configuration AT 3.0**

2012 — Identity Protection – PKI SCS 8.0

vPro 1.0

vPro 2.0

3rd Gen Intel® Core™ vPro™ Processors

Built for Business

Engineered for Security

Intel® Anti-Theft Technology[13]
Securing data and assets through Intel Anti-Theft technology

Intel® AMT Technology[10]
Recovery and enhanced patching

Intel® OS Guard[19]
Prevents malware exploiting elevation of privilege (EoP) vulnerabilities from executing

Intel® Identity Protection Technology[8] with One Time Password or PKI
Identity protection and fraud deterrence

Intel® VT & TXT[9] Technologies
Prevention of malware

Intel® Secure Key[20]
High quality security key generator

Remote Encryption Management
Deploys security patches across PCs faster

AES-NI[4]
Accelerates AES encryption

Ultrabook™

A new category that meets the emerging needs of the business user

Sleek, Cool, Super Responsive, and a Full PC

- Instant on, always on, always connected
- High performance, visual, and media experience
- Extended battery life, multi-week standby
- Sleek design – 1-2 external connectors + wireless
- Full keyboard + convertible to full touch
- Sensors – accelerometer, GPS, compass, gyro
- IA compute continuum, security, and perceptual computing experiences

**"It's a tablet when I want it.
It's a PC when I need it.
All day. Every day."**

Summary

Technology leadership provides tremendous gains in:

- Energy efficient performance
- Internet connectivity
- Security

…and drops deployment barriers to cloud and big data

Intel Architecture across compute, storage and networking enables flexible scaling of IT infrastructure

vPro enables secure management of consumer devices and intelligent systems in the enterprise