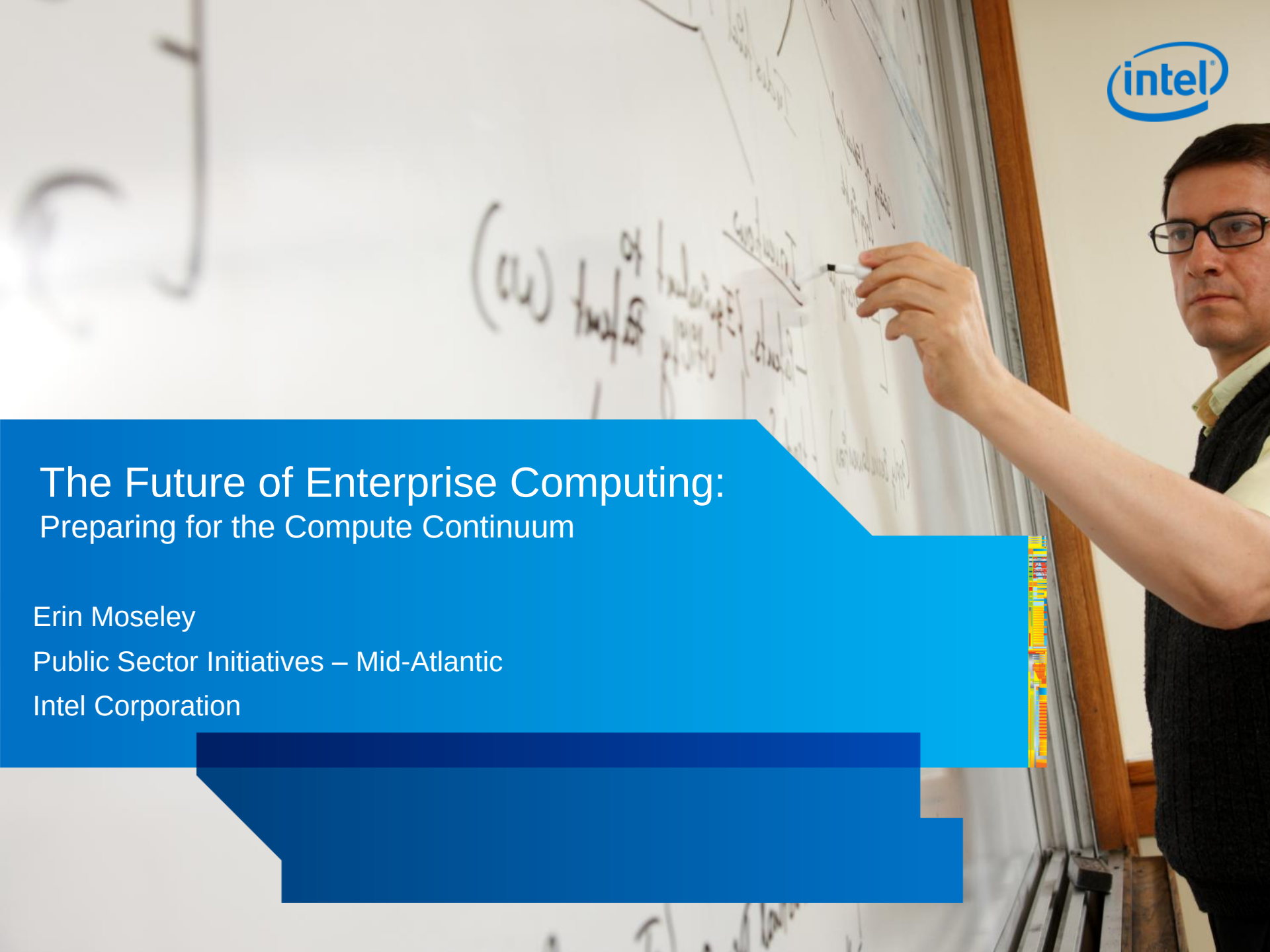

The Future of Enterprise Computing:
Preparing for the Compute Continuum

Erin Moseley

Public Sector Initiatives – Mid-Atlantic

Intel Corporation

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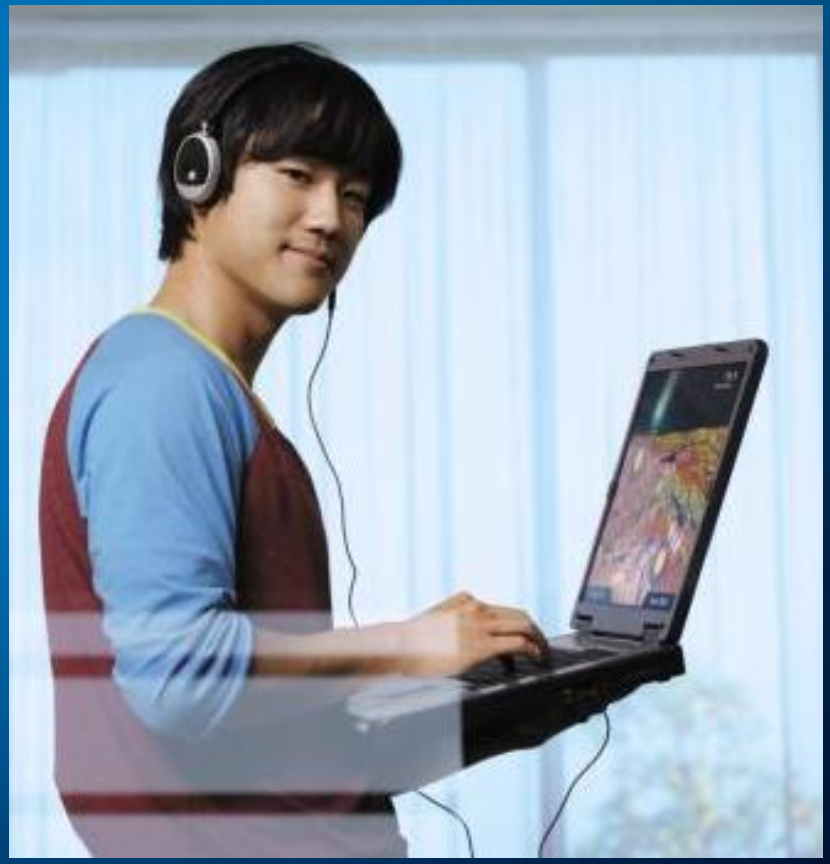
Agenda

Background

- What is the Compute Continuum?
- How is Intel preparing for the future and the Compute Continuum as an organization

Intel's Roadmap Mobile Devices

- Mobile Components
- Tablets
- The Ultrabook



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The Intel Reach

Established Architecture

Software Investments

and Compatibility

Manufacturing

and Process Leadership

Ecosystem Strategic Partners

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Intel's Vision: Create and Extend Computing Technology to Connect and Enrich the Lives of Every Person on Earth






The Compute Continuum Vision

Intel Envisions a Compute Continuum That Provides a Seamless, Consistent Experience Across Multiple Devices

Desktops | Laptops | Netbooks | Personal Devices | Smartphones | Smart TVs & Displays | Embedded

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The Good Old Days

Enterprise Life

Consumer Life

Clear Delineation

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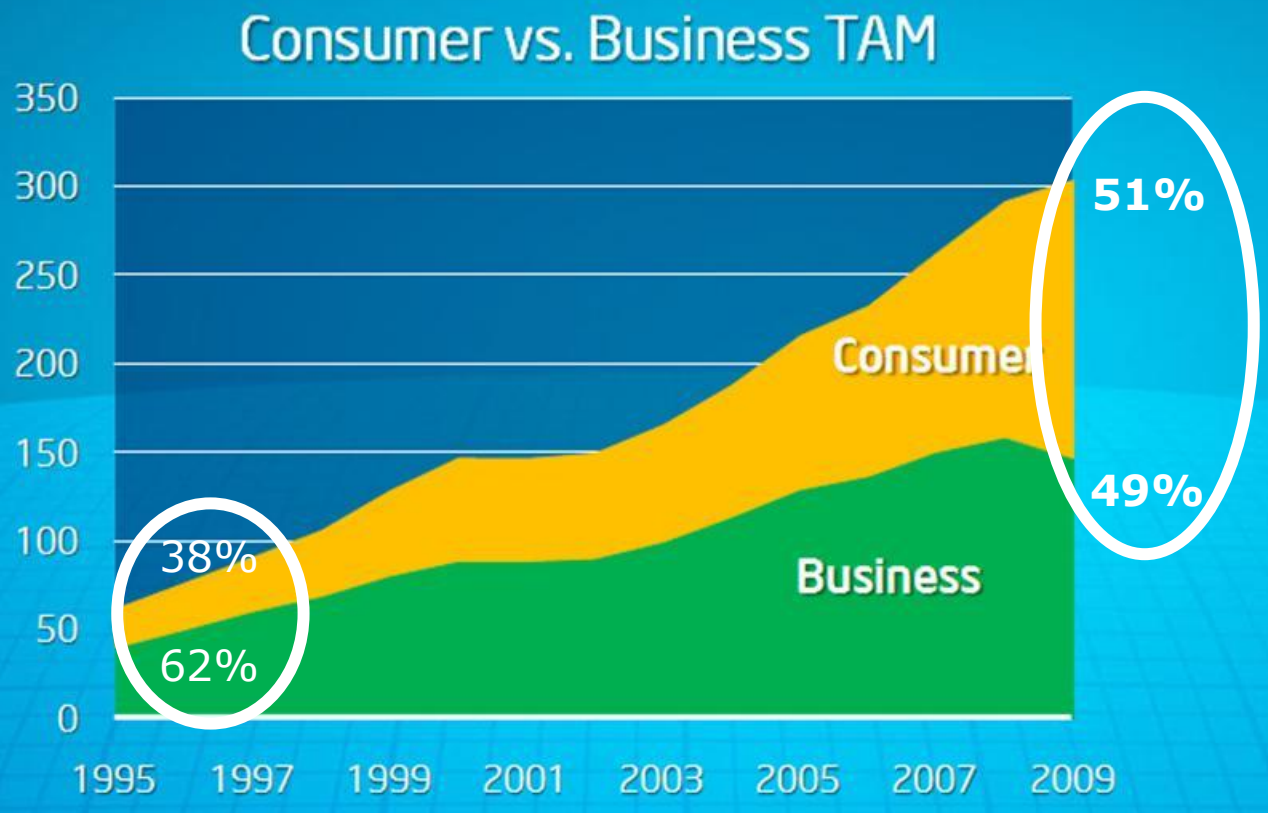
Now, Consumers are Shaping the Market



Consumer Overtakes Business in 2009

Source: Gartner April '10

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How Does Intel Define IT Consumerization

I want…

… to **bring my own** device

… **access from many** devices

… **to troubleshoot** my own device

… to **manage my own** services (example: Skype – video)

… **access to** new **collaboration** and **social media** solutions available to me outside work

THE INTEL IT DEFINITION

consumerization n. the increasing influence that our technology experiences in our personal lives, both hardware and applications, have on the technology that we expect to use at (school and at) work.

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But, is This a Passing Trend? … No

> In 2010, Consumerization crossed a threshold to become a broader business force.[1]

> Consumerization is an example of ongoing evolution of how people work together. As such, we need to learn as much about end users as we do about IT.[2]

> These end users expect greater access in more places and on more devices. They will either work with or against IT to make it happen.[2]

1 Source: Gartner
2 Source: Gartner Analyst

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Intel's Bring Your Own Device Program

Smart Phones & Handhelds

Personal Devices

Over 1 year of partnership, collaboration between Human Resources, Legal and Security to put safeguards in place to allow employee device choice

Program Status (started Jan 2010)

1 in 4 employees use handhelds (phone/tablet)

>50% personally owned today

Business Value

640k email/Qtr messages via personal handhelds

Avg. 51 minutes per day user productivity

Fewer unauthorized devices on our network

Employee Productivity Through Work Flexibility

Source: Intel IT Small Form Factor Team. Email support is with and without attachments

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As the Boundary Continues to Blur, Our Strategy Is To…

- **Proactively and securely enable consumer devices and services**
- **Develop the capability to isolate corporate data, enabling coexistence**
- **Abstract data & apps from devices so they can function in diverse environments**
- **Use cloud computing as foundation for flexible service delivery**

Proactive Approach …
Otherwise Users Will Work Around

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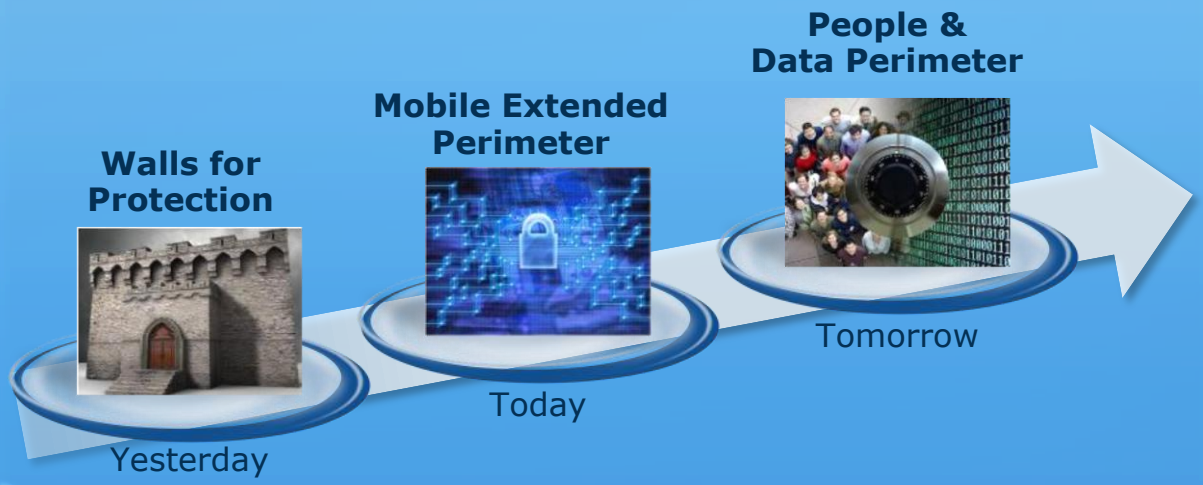
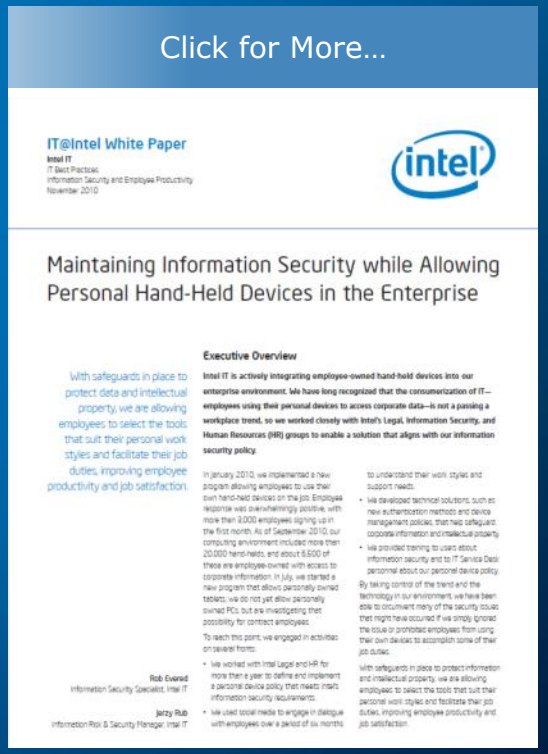
Enabling Consumerization Securely

- New policies + partnerships between HR, legal, IT and security
- View employees as both partners and customers
- Establish training to nurture aware users
- Radical 5 year shift in security model



Click for More…



IT@Intel White Paper

Intel IT
IT Best Practices
Information Security and Employee Productivity
November 2010

Maintaining Information Security while Allowing Personal Hand-Held Devices in the Enterprise

Executive Overview

With safeguards in place to protect data and intellectual property, we are allowing employees to select the tools that suit their personal work styles and facilitate their job duties, improving employee productivity and job satisfaction.

Intel IT is actively integrating employee-owned hand-held devices into our enterprise environment. We have long recognized that the consumerization of IT—employees using their personal devices to access corporate data—is not a passing a workplace trend, so we worked closely with Intel's Legal, Information Security, and Human Resources (HR) groups to enable a solution that aligns with our information security policy.

In January 2010, we implemented a new program allowing employees to use their own hand-held devices on the job. Employee response was overwhelmingly positive, with more than 8,000 employees signing up in the first month. As of September 2010, our computing environment included more than 20,000 hand-helds, and about 6,500 of these are employee-owned with access to corporate information. In July, we started a new program that allows personally owned tablets; we do not yet allow personally owned PCs, but are investigating that possibility for contract employees.

To reach this point, we engaged in activities on several fronts:

- We worked with Intel Legal and HR for more than a year to define and implement a personal device policy that meets Intel's information security requirements.
- We used social media to engage in dialogue with employees over a period of six months to understand their work styles and support needs.
- We developed technical solutions, such as new authentication methods and device management policies, that help safeguard corporate information and intellectual property.
- We provided training to users about information security and to IT Service Desk personnel about our personal device policy.

By taking control of the trend and the technology in our environment, we have been able to circumvent many of the security issues that might have occurred if we simply ignored the issue or prohibited employees from using their own devices to accomplish some of their job duties.

With safeguards in place to protect information and intellectual property, we are allowing employees to select the tools that suit their personal work styles and facilitate their job duties, improving employee productivity and job satisfaction.

Rob Evered
Information Security Specialist, Intel IT

Jerzy Rub
Information Risk & Security Manager, Intel IT

Intel IT Has Adopted a New Four-tier Security Model That Incorporates the Person, Device, Data and Location

Source: Intel IT whitepaper. http://www.intel.com/content/dam/doc/white-paper/intel-it-enterprise-security-maintaining-information-security-while-allowing-personal-handheld-devices-paper.pdf

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Preparing for the Compute Continuum

In 2010, Intel IT established a program to begin evaluating our holistic client strategy and environment

Expanding Consumerization

- *More devices supported by BYO*
- *More services on more devices*

Delivering IT as a Service

- *Embrace both server and client virtualization*
- *Utilize cloud computing for flexibility, agility*

Realizing the Compute Continuum

- *Client-aware application and data delivery*
- *Refining the enterprise client security & trust model*

IT@Intel White Paper

Intel IT

IT Best Practices

IT Consumerization / Compute Continuum

May 2011

The Future of Enterprise Computing: Preparing for the Compute Continuum

Executive Overview

Our goal is to provide greater productivity and flexibility for Intel employees by enabling them to access information and IT services from multiple devices, whether personal or corporate-owned.

Enterprise client computing is at an inflection point. A number of trends and pressures—including the explosion of connected devices in the marketplace—are driving a transition from the traditional client computing model toward a future in which employees will use a variety of devices to access information anywhere, at any time. Intel envisions a Compute Continuum that provides a seamless, consistent experience across devices.

Intel IT's goal is to provide greater productivity and flexibility for Intel employees by enabling them to access information and IT services from multiple devices, whether personal or corporate-owned, while maintaining enterprise security.

We are shifting focus to deliver certain services to any device—and to multiple devices for any employee. By taking advantage of a combination of technologies and trends—such as ubiquitous Internet connectivity, virtualization, and cloud computing—we have an opportunity to meet changing user requirements and redefine the way we provide services.

To deliver these capabilities, Intel IT established a program in late 2010 to chart a path from today's traditional client computing model. Our strategy includes three overlapping phases:

- **Supporting IT consumerization.** In response to employee productivity needs and technology expectations, Intel IT has begun to provide access to e-mail, calendar, and other business applications from personally owned devices. Our focus in 2010 was on smart phones, and we also plan to deliver services on larger personal devices.
- **Delivering IT as a service.** We are developing and testing capabilities that let us deliver our IT applications and environment as services that run on a variety of personal and corporate devices, rather than as a single integrated hardware and software platform.
- **Delivering the Compute Continuum for the enterprise.** Our goal is that users will be able to securely access services anywhere, at any time, from a growing variety of personal and corporate devices. An increasing number of these services will be delivered from our private cloud and from public clouds.

We are currently developing use cases in several of the areas that are most important to our users. These include blended use models—such as corporate and personal environments on the same device, and bring-your-own computer—as well as enhanced enterprise collaboration.

By building on our existing support for IT consumerization and exploration of device-independent service delivery models, and taking advantage of new trends and technologies, we anticipate that our Compute Continuum program will result in significant benefits for our users and for Intel.

Dave Buchholz
Principal Engineer, Intel IT

John Dunlop
Client Architect, Intel IT

Source: Intel IT whitepaper "The Future of Enterprise Computing: Prepare for Compute Continuum", May 2011
http://www.intel.com/content/www/us/en/it-management/intel-it-the-future-of-enterprise-computing-preparing-for-the-compute-continuum-paper.html

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Realizing the Compute Continuum

Six Strategic Focus Areas for Intel IT

Platforms & Applications

Client Awareness
Desire Apps that can discover capabilities of hardware to deliver best user experience

Common Development Framework
Goal is to quickly develop applications across a spectrum of OSs and Devices

Dynamic Application Delivery
Decide if internal software distribution or application stores are best for each device

Consumer Device Security

IT Security Policies
Evolve policies to comprehend management of more non-IT supported devices

Multi-level Trust Model
Dynamically adjust user's data access privileges as location and device changes

Streaming Device Security
Need mechanisms to secure data through less cumbersome authentication procedures

Represents Progressive Exploration & Delivery of New Capabilities

Source: Intel IT whitepaper "The Future of Enterprise Computing: Prepare for Compute Continuum", May 2011
http://www.intel.com/content/www/us/en/it-management/intel-it-the-future-of-enterprise-computing-preparing-for-the-compute-continuum-paper.html

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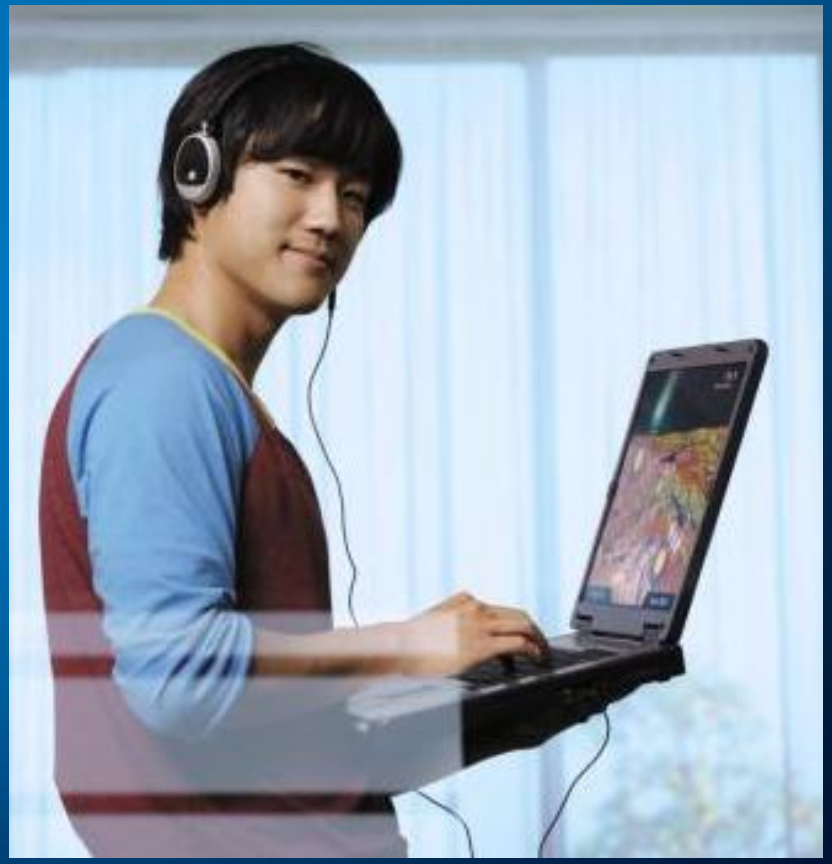

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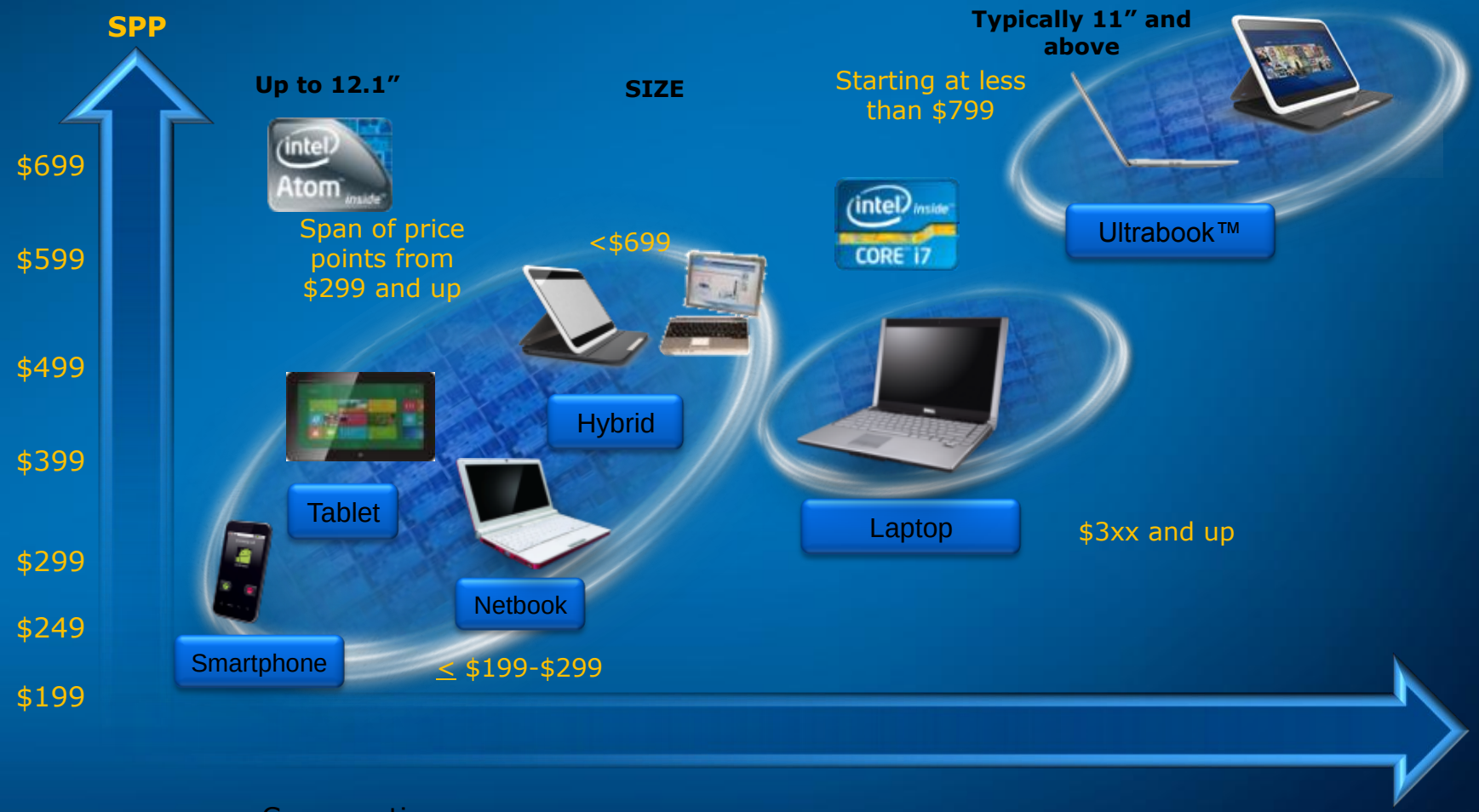
Mobile Landscape in 2012



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Mobile Solutions

Form Factor and Battery Life to be Mobile and Connected

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Key Intel Tablet and Hybrid Designs in 2011

HP Slate 2
- Enterprise focus, Win7
- 10.1 inch
- Fingerprint reader

ViewSonic ViewPad 10Pro
- Dual OS Experience
- 10.1 inch

Motion CL900
- Rugged design, Win7
- 10.1 inch
- 802.11 a/b/g/n

Fujitsu Stylistic Q550
- Enterprise focus, Win7
- 10.1 inch
- Fingerprint reader

Fujitsu TH40D
- Slider
- 10.1 inch
- Win7

Cisco Cius
- Enterprise Android Tablet
- 7 inch
- AppHQ Enterprise App Store

Dell Latitude ST
- Enterprise focus, Win7
- 10.1 inch
- 5MP rear camera and 720p HD front camera

Evolve III Maestro C
- Convertible with stand, opt. keyboard
- 10.1 inch
- Multiple OS

Toshiba WT110
- Larger slate form factor
- 11.6 inch
- Win7

Lenovo Ideapad
- Focus on vertical markets
- 10.1 inch
- Win7

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

Intel Mobility Experience

Oak Trail Experience

<15 mm Thick Slates*	≤1.5 Pounds	~6 Hours Battery Life	1 Week Stand By*

Medfield and Clover Trail Experience

<8.5 mm Thick Slates*	≤1.5 Pounds	~9 Hours Battery Life	30 Days Stand By*

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Enterprise Ultrabook™

Ultrabook™ for Enterprise extends current content creation capabilities with optimized mobile experiences without compromising security and manageability

Ultra-Light. Ultra-Sleek. Ultra-Powerful.

Business User Requirements

Responsiveness **User Interface(s)**

Mobility **Form Factor**

Device Like Experience

IT Decision Maker Requirements

Reliability **Stability**

Security **Manageability**

Business-Level Performance

Ultrabook™ for Enterprise

Full PC functionality and enterprise-class security in an Ultra-mobile package – only from Intel®

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Why We're Talking About Change

- **End User Expectations of PCs Rising**
  - Aesthetics, Long battery life
  - Instant on, Always connected
  - Touch, Ease of SW delivery

- **Ultrabooks™ for Enterprise will:**

– Address security and manageability that IT managers **require**

AND…

– Address growing user needs for:
  – Innovative thin & light designs with Full PC productivity
  – Instant on, AOAC (Always on & Connected) experiences + High performance
  – Extended battery life and multi-week standby

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2012 Ultrabook™ Specs for 2012

Categories	Chief River (2012)
CPU	*Baseline:* Ivy Bridge 17W (Core™, Core™ vPro)
Z-Height	*Baseline:* ≤21.0mm for ≥14.0" systems ≤18.0mm for <14.0" systems (2.0mm allowance for convertible designs)
Battery Life	*Baseline:* > 5 hours MobileMark* 2007 *Recommended:* > 8 hours
Responsiveness	Baseline: Awaken S4 to KBD: < 7 sec, AND Baseline: A storage solution that achieves a PCMark Vantage HDD Sub Score Overall ≥16,000** and a PCMark Vantage HDD Sub Score Video Editing Score of 80 MB/s. A minimum capacity of 16GB of solid state storage is required. The storage solution shall transparently present a single drive to the user."*** Recommended: SSD
Connectivity	*Baseline:* Wi-Fi *Recommended:* Programmable Pull Updating
I/O	*Baseline:* USB 3.0 and/or TBT (thunderbolt)
Security	Baseline: BIOS/Firmware Enabled to expose HW features for Intel® Anti-Theft and Intel® Identity Protection Technology services (OTP and True Cove). AT and IPT SW pre-installed and service/deal ready for OOBE *Recommended:* + vPro for Enterprise, Intel® Small Business Advantage
Sensors	*Recommended:* Touch, GPS, Accelerometer, Proximity, ALS
SW/OS	Windows* / Mac OS* *Recommended:* App store

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Thank you and enjoy the day!

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