Mobility Has Evolved From Convenient to Cool
cool = the total mobile experience
Cool Users Want A “Total Mobile Experience”

“Sleek, Small and Fashionable”

“Secure”

“Fast Response Time”

“Good Media & Graphics”

“Long Lasting Battery”

“Every Application on Every Device”

“Connect Anywhere, to Anything”

“Within My Budget”
Obstacles to Cool

“Too Big and Heavy”
“Looks Boring”

“Battery Runs Out After a Couple of Hours”

“Slow Response Time”
“Reduced Quality Graphics and Media”

“Can’t Use SW on All Devices”,
“Can’t View Internet Content”

“Can’t Connect”,
“Devices Not Synched”

“Cost Too Much”

“Easily Hacked”
“Slow Boot”
The Different Priorities of Cool

- The Musician’s Netbook
- The Designer’s Laptop
- The Model’s Handheld
Intel Designs The Right Combination of Cool for Every User Experience

Netbook
Ultra-thin Laptop
Performance Laptop
Netbooks: The Right Device for the Right Priority
Elements to Deliver the Cool Mobile Experience
Elements to Deliver the Cool Mobile Experience

CONNECTIVITY

COMPATIBILITY

DEVICE

POWER

SECURITY & MANAGEABILITY

PERFORMANCE

SIZE
Intel Delivers Best-in-Class Mobile Device Technology

Increased Performance for Faster Computing & Better Graphics

Decreased Average Power for Longer Battery Life

Reduced Thermal Power for Thinner, Sleeker Form Factors

Performance

Battery Life

Thickness
New Usages Require High Performance Processors

- Voice
- Hi-def Media
- Visual Recognition
- Real-Time Language Translation
- Mixed Augmented Reality
- Mobile Server
- Laptops
- Handhelds

Performance (FLOPS)

- Tera
- Giga
- Mega

IDF 2009
INTEL DEVELOPER FORUM

Forecast
Intel Platform Architecture

Mainstream PC and Server

Tick

Tock

Tick

Tock

Tick

45nm

Penryn

Nehalem

32nm

Westmere

Sandybridge

22nm
Intel’s Second Platform Architecture
Internet Connected Devices

45nm
Bonell

32nm
Saltwell

22nm
New Core

15nm
New Core
Nehalem:
The Revolutionary Intel Micro-architecture
Comes to Mobile!
Introducing the Fastest Mobile Processor on the Planet

Intel® Core™ i7-920XM processor 2.0 GHz (Turbo up to 3.2 GHz*)
8M/8 threads**

The Fastest Notebook Processor On The Planet
(Overclocking Enabled For Incredible Performance)

Intel® Core™ i7-820QM Processor 1.73 GHz (Turbo up to 3.06 GHz*)
8M/8 threads**

Intel® Core™ i7-720QM Processor 1.6 GHz (Turbo up to 2.8 GHz*)
6M/8 threads**

The World's Best Family Of Laptop Processors

* Maximum single-core frequency that can be achieved with Intel® Turbo Boost Technology
** Total number of threads that can be supported with Intel® Hyper-threading Technology
Mooly Eden
General Manager, PC Client Group
Vice President, Intel Corporation
Revolutionary, Adaptable, Intelligent Performance

Intel® Core™ i7 Mobile Processors

- Intel® Turbo Boost Technology
- Intel® Hyper-Threading Technology
- Integrated Memory Controller Up to 8M Shared Cache
High-Performance in a Low Power Envelope

*Intel® Turbo Boost Technology*

**Previous Generation**  
*without Turbo*

**Clarksfield**  
*with Turbo*

- Power Gates
- Near Zero Power For Inactive Cores
High-Performance in a Low Power Envelope

*Intel® Turbo Boost Technology*

**Previous Generation**
*without Turbo*

**Clarksfield**
*with Turbo*

- **Power Gates**
  - Near Zero Power For Inactive Cores
High-Performance in a Low Power Envelope

Intel® Turbo Boost Technology

Previous Generation
*without Turbo*

Clarksfield
*with Turbo*

Power Gates
Near Zero Power For Inactive Cores
Incredible Performance for Demanding Apps

Intel® Core™ i7 Mobile Processors

Gaming Elite:
Stunning Realism

Multimedia Engine:
Rich Digital Content Creation

Mobile Workstations:
High Performance To Go
High-Performance for the Masses — Arrandale

32nm Westmere Processor

45nm Integrated Graphics & Integrated Memory Controller

Not all features are available on every processor line item
The Next Generation of Cool Processors

Sandybridge

- On die integrated graphics on leading edge 32nm process
- Significantly better performance
- More sophisticated power management between CPU, Graphics and Chipset
- Better media and processor intensive software performance with Intel’s AVX instructions
Cool is Sleek and Fashionable
Cool Cooling Technology
Intel® Core™ i7: The Performance to Innovate

HPC Benchmark Average* for Ansys Fluent® CFD
(higher is better)

- Single Process Performance
- 4 Core Parallel Performance

- Clarksfield 1.7 GHz (45 W TDP)
- Xeon X5482 3.2 GHz (150 W TDP)

* Average includes all benchmark cases up to 4 Million cells
Sleek, Stylish Ultra-thin Laptops Are Here

58% Smaller
60% Lower Power

From 3342 mm² to = 1415 mm²
The World's Thinnest Notebook

If it catches on, Intel's sleek laptop could be a game changer for PCs

by Olga Khazova

When Intel asked designers to build a better laptop, its instructions were simple, really. The machine has to be fashionable, able to connect to all manner of wireless networks, and full of the latest, fastest computing capabilities. Oh yes, and make it as thin as Motorola's RAZR. Its own engineers in conjunction with Ziba Design in Portland, Ore., rose to the challenge.

The result, code-named Intel mobile Metro notebook, is less than 1.7 inches thick—about one-quarter of an inch thicker than Motorola's (MDT) iconic cell phone, making it the...
The Value of Long Battery Life for Laptops

Willingness To Pay For An Incremental Hour Of Battery Life

% likely to purchase

US

China

Source: Extended Battery Life Working Group, 2008
Integrated Power Gate
Enabling Energy Efficient Integration

VCC

Core0  Core1  Core2  Core3

Memory System, Cache, I/O

VTT
Data Protection For Missing Laptops

Intel® Anti-Theft Technology v.2.0
With Enhanced Data Encryption Solutions

Absolute® Software
phoenix
WINMAGIC
PGP

Other brands and names are the property of their respective owners.
Anti-theft Protection for Consumers

Coming Soon

Other brands and names are the property of their respective owners.
Dell customers want an effective way to deter laptop theft, minimize business risk and protect their digital life. Intel’s Anti-Theft Technology provides an added layer of hardware security to existing anti-theft software programs that will give our customers more peace of mind. We are excited to introduce Intel AT capabilities to Dell’s notebook lineup.”

Bill Curtis, CTO, Dell Corporation

“Intel & Panasonic have a joint history of outstanding technology innovations around notebooks & we are very excited today to announce the introduction of Intel® Anti-Theft Technology built into the latest generation of CF-19, CF-30 Toughbook laptops from Panasonic”

Mr. Shigeo Okuda, Director, ITPD, Panasonic Corp.
Fast Response Time With Solid State

Ultra Responsive
Highly Rugged
More Battery Life
Lower TCO

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INTEL DEVELOPER FORUM
A New Era of Cool Handhelds
The Evolution of Cool Handhelds

- 2008: MENLOW (45nm)
- 2010: MOORESTOWN (45nm)
- 2011: MEDFIELD (32nm)
Dramatic Power Reductions On Handhelds

- Distributed Power Gating
- Dedicated Mixed Signal IC (MSIC)
- Next Gen OS Power Management (OSPM)
- Low Power Handheld I/O

LINCROFT (45nm)
- 2D / 3D Graphics
- CPU core
- Hardware Video Acceleration
- Display Controller
- Memory Controller

LANGWELL (65nm)
- SDIO Ports
- Audio Codec
- MIPI CSI Interface
- USB Controller
- NAND Controller

BRIERTOWN
- Integrated PMIC

EVANS PEAK
- WiFi
- BT
- WiMAX
- GPS
- 3G

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Example: Power Gating Technology
Major Power Reductions Across Platform Usages

Up to 50X Improvement in Moorestown Over Menlow

Standby Video 720p Audio Playback
Menlow Moorestown

Platform Power Progression

Power (mW)

- Menlow
- Moorestown

Standby: Assuming S0i3, 38mW with S0i1

MRST Projection: Workloads were emulated on McCaslin (GreenCanyon CRB-XP-600Mhz, DTN-512MB memory, 32GB SSD) and cross checked on some data points with Menlow (Crownbeach CRB, SLT-1GHz, 512MB memory, 32GB SSD). CPU, Memory and CS power data was analyzed with C-state, P-state residencies, Memory Bandwidth and power data points were studied and scaled where appropriate to MRST architecture. Assuming Native MIPI display and LPDDR1 memory (32b, 400MT/s)
With Great Handheld Performance

Moorestown Platform

Highly Integrated Lincroft SoC

High Performance Techniques

Industry Leading 45nm Process Technology

LINCROFT (45nm)

- 2D / 3D Graphics
- CPU core
- Hardware Video Acceleration
- Display Controller
- Memory Controller

LANGWELL (65nm)

- SDIO Ports
- Audio Codec
- MIPI CSI Interface
- USB Controller
- NAND Controller

EVANS PEAK

- Wi-Fi
- BT
- WiMAX
- GPS
- 3G

BRIERTOWN

- Integrated PMIC

IDF2009

INTEL DEVELOPER FORUM
Performance at Ultra-low Power
Small & Sleek Handhelds

Enabled by Moorestown

- **Compact Handheld**
  - 3”
  - Candybar
  - Full Internet with Telephony

- **EB MID Reference**
  - 4”
  - Sleek, Media Centric
  - 3D & Haptic Touchscreen

- **Inventec X3 MID**
  - 5”
  - Cutting Edge UI
  - Media-Rich
  - Navigation Focused

- **Quanta M1**
  - 4.3”
  - Slider Keyboard
  - Navigation & Entertainment

- **Aava Mobile Smartphone**
  - 4”
  - 3G
  - Telephony
  - Messaging Services

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Ultra-low Power Gets Even Smaller

Medfield On 32nm Enables Even Smaller, Sleeker Devices
IA Software Compatibility

Compatibility at Multiple Levels
- IA Instruction set
- CPU implementations
- Apps binary compatibility

Robust IA Ecosystem
- First platform for development
- Extensive set of tools, compilers, ...

Easy Path to Broad Deployment
- Write on one PC, run on any PC
- Large installed base

Robust ISV Community

Apps
- Windows
- Moblin

OS
- Windows
- Moblin

CPU
- Core™, Atom™

I/S
- IA Instruction Set

Other brands and names are the property of their respective owners.
The Same OS Experience Across Any Device
The Same Rich, Visually-Compelling Internet Across Any Device
Cool Connectivity
Mobile Internet Requires Broadband Connectivity

Traffic Equivalents*

1 Laptop= 15 Smartphones = 450 Voice Handsets

A Network Optimized for Mobile Voice Cannot Handle High Numbers of Mobile Internet Users

Customers Angered as iPhones Overload AT&T

“It’s so slow, it feels like I’m on a dial-up modem”

“It’s not exactly rocket science here. It’s pretty standard stuff to be able to make a phone call.”

Customers reactions quoted by New York Times, 9/2/09

* Source: Cisco, 2009
Commercial Mobile WiMAX is Here
WiMAX Services & Devices Deployed in Major Markets Around the Globe

Source: Computer Industry Almanac, Jan '09
Devices Connected to All Wireless Access Types

Connected on every device, anywhere ... using many wireless access types

- WiFi
- WiMAX
- LTE
- 4G
- 3G
- EVDO
- EDGE
- WAP
Multi-Comm Products To Connect Anywhere

2009
- Puma Peak: WiFi

2010
- Kilmer Peak: Integrated WiFi, WiMAX

2011
- Evans Peak: Integrated WiFi, WiMAX, BT, GPS
- Future Product: Fully Integrated Comms
Bringing Optical Connections to the Mainstream

Light Peak High-Speed Interconnect Technology

- Fewer, Smaller Connectors
- Longer, Thinner Cables
- Higher Bandwidth
- Multiple I/O Protocols On Single Cable
“Sony is excited about the potential for Light Peak technology that Intel has been developing, and believe it could enable a new generation of high-speed device connectivity.”

Ryosuke Akahane
Vice President of VAIO business Group, NPSG, Sony
Elements of the Total Mobile Experience

- CONNECTIVITY
- COMPATIBILITY
- DEVICE
  - POWER
  - FEATURES
  - PERFORMANCE
  - SIZE
The Cool Mobile Experience DELIVERED