Intel’s New Category of SoC Designs, Products

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Today’s News

✓ Emerging category of smarter, purpose-built SoC Designs. New levels of performance, power efficiency and complexity vs. traditional SoCs

✓ Intel’s Smart SoC strategy: Intel architecture, advanced process technology, high performance computing, low power, high complexity expertise & R&D investment

✓ >15 projects underway; Future SoCs based on Intel® Atom™ processor core; target growth areas

✓ Perfectly timed with emerging need for persistently connected Internet devices

✓ Introducing our first 8 new products; targeting a broad range of embedded, voice and security applications
Designing Smart SoCs

What is the emerging category that requires Smart SoCs?

How is Intel poised to lead in this category?

How is Intel internally structured for optimal development?
Technology drivers

Internet

Connectivity

Moore's law
**New Medium**

> 1.2 B Mobile Internet Users in 2012

100M TV households watching internet video on their TV by 2011

Billions of embedded internet connected devices

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**New Users**

Explosive emerging market growth

Tech-savvy & Internet generation

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**New Uses**

Location based services: 100X growth

OTG Interactive Entertainment

Connected in-car infotainment

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Sources: eMarketeer, The Diffusion Group, In-Stat

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Connectivity

**High bandwidth**

100 Mbps wireless by 2013

Gigabit Ethernet

**Rich Content**

Hi-Def

Encryption

Multi-comms

Uplink + Downlink

**Broad Reach**

> 1.4B subscribers for 3G/4G/WiMAX in 2012

> 33% annual growth in Asia/Pacific

Persistent connectivity

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* Source: Intel, ABI Research, 3GPP RAN1, In-Stat

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Moore’s Law

Economics of Moore’s Law

Enabling

- Supporting unprecedented complexity
- 45nm -> 32nm -> 22nm
- 100s of millions of transistor SoCs

Continue the pace of dimension reduction and feature improvement

Source: WSTS/Dataquest/Intel

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Emergence of Smart SoCs

Smart and Flexible (PCs)

Light and Simple (CE, Embedded)

Smart, Flexible, Light & Simple
Intel Smart SoC

Characteristics of Smart SoC Design

High performance, Low power: *Fast CPU; Dynamic range; Performance per watt*

Multiple sophisticated sub-systems; Workload acceleration. Examples: Hi-def video, Security

High complexity & integration on die: >100M transistors

Support of full operating systems and multi-source complex software

Simplified platform implementation
“Exceptional user experience”-on-chip

- Enhanced Visual Computing
- Higher Security & Manageability
- New IOs
- Complex accelerators
- Low power
- Sensors
- Higher CPU performance
- DFM, DFT

Next 5 years

1B Transistors On-The-Go

1B Transistors Embedded
Intel advantage

Intel Architecture
High performance computing leadership
Process technology & high volume manufacturing
High HW & SW complexity handling expertise

Extensive R&D investment
SoCs For Multiple Market Segments, Growth

Multiple markets

MID

Embedded

CE

IA Core + SoC Collateral + IP blocks

Process technology & manufacturing capability

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• Ground-up new IA architecture design for low-power operation
• 10X lower power
• **2008**: Powering Silverthorne, Diamondville
• **Future**: Powering next-generation of Intel’s Smart SoCs
SoC technology layer benefits

- Fast Turn-Around-Time
- Flexibility & Customization
- Cost/Power/Size optimization
- High Performance
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Today: Billions of Connected Devices

Common Element: The Internet
The Next Billions of Connected Devices

Common Element: The Embedded Internet
Intel Architecture for Embedded
Delivering Applied Computing Beyond
the PC & Server

> 3500 customers serving 30 segments for 30 years

intel
Intel Architecture Processors for Embedded

**Traditional Intel Architecture for Embedded**
- Desktop
- Mobile
- Server

**Low Power Intel Architecture**
- Fan-less
- Ultra Low Power
- Small Footprint
- Launched Q2’08

**Smart SoCs for Embedded**
- 45% Smaller Footprint with 34% Lower Power*
- Full Feature SoC
- Embedded Requirements
- Integrated Accelerators support with Intel® QuickAssist Technology

*Assumptions: Compares Intel® Pentium® M processor platform with external PCI crypto accelerator to EP80579
256 byte packets with 2048 IPsec VPN tunnels
Intel® EP80579 Integrated Processor Product Line
Smart IA System-On-a-Chip

45% Smaller Footprint with 34% Lower Power*
- 4 chips to 1 for smaller form factors
- 11 to 21 watts
- 600MHz to 1.2GHz

Full-Feature SoC
- Integrated memory controller
- Flexible integrated I/O
- TDM & analog voice connectivity

Embedded Requirements
- 7 year extended life cycle support
- Industrial temp
- Intel Architecture compatible
- Multiple operating systems

Intel® QuickAssist Technology
- Integrated accelerators
- Software for security & VoIP
> 1Gbps security processing

*Compared to previous platform containing the Intel® Pentium® M processor, Intel® 915GME GMCH, Intel® ICH6-M and Intel® IXP465 network processor
Intel’s First Integrated x86 SoC with QuickAssist Technology

Intel EP80579 Integrated Processor Product Line

- Lower Power
- Smaller Footprint
- Comprehensive I/O
- Integrated Acceleration
Intel® EP80579 with Intel® QuickAssist
Example - IPSec VPN Appliance

45% Footprint Reduction

Solution Area

EP80579 1-chip Solution

Traditional IA 4-chip Solution
(CPU + MCH + ICH + PCI Crypto Accelerator)

34% Power Savings

Power

32 in² (206 cm²) 17 in² (110 cm²)

31W 21W

Assumptions: Compares Intel® Pentium® M processor platform with external PCI crypto accelerator to EP80579 256 byte packets with 2048 IPsec VPN tunnels.
Rich SoC Ecosystem for Embedded and Communications

Software and Tools
- American Megatrends
- phoenix
- redhat
- insyde
- WIND RIVER
- GENERAL SOFTWARE
- XGI
- intoto
- American Arizm
- SafeNet
- FONALITY

Hardware
- Nortel
- Alcatel-Lucent
- kontron
- ADI
- Advantech
- Lanner
- ADI Engineering
- Portwell
- Advantech Inc.
- dotHILL
- EMERSON
- WIN enterprises
- ARBOR
- Axiomtek
- iBASE
- QNAP
- ARASTRA
- xyco technologies AG
- FORTINET
- PROMISE Technology Inc.
- PERFORMANCE TECHNOLOGIES
- RIO
- NexCOM

Building The Digital Infrastructure
SoC Development Continues

*Increased Performance and Performance per Watt*

**Embedded**
- Smart SoCs for embedded
- Future Roadmap of increased data and control plane performance

**CE**
- Bringing the Internet to TV
- IA performance, with CE features
- Optimized for CE Internet content compatibility

**MIDs**
- Projected >10X Reduction In Idle Power Compared to 2008 Platform
- First Entry Into Phone Form Factors
- First SoC for MIDs Intel Atom Architecture

Source: Intel Roadmap. All products, computer systems, dates, and figures specified are preliminary based on current expectations, and are subject to change without notice.
Summary

Intel is creating a new category of smarter, purpose-built SoC designs and products based on Intel architecture.

Intel unveiled 8 chips for embedded.

Intel chip design, factory, manufacturing and R&D expertise and investment enables SoC development.

Over 15 SoC designs planned.
Most will be based on the Intel Atom® processor.
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Block Diagram for the Intel EP80579 Integrated Processor and Intel EP80579 Integrated Processor with Intel® QuickAssist Technology
Intel® QuickAssist Technology
Comprehensive Approach to Acceleration

- Multiple accelerator and attach options with software and ecosystem support
- Performance and scalability based on customer needs and priorities
- More news at IDF

Comprehensive Initiative to simplify the use and deployment of accelerators on Intel® architecture platforms.