Intel Multi-Core Briefing

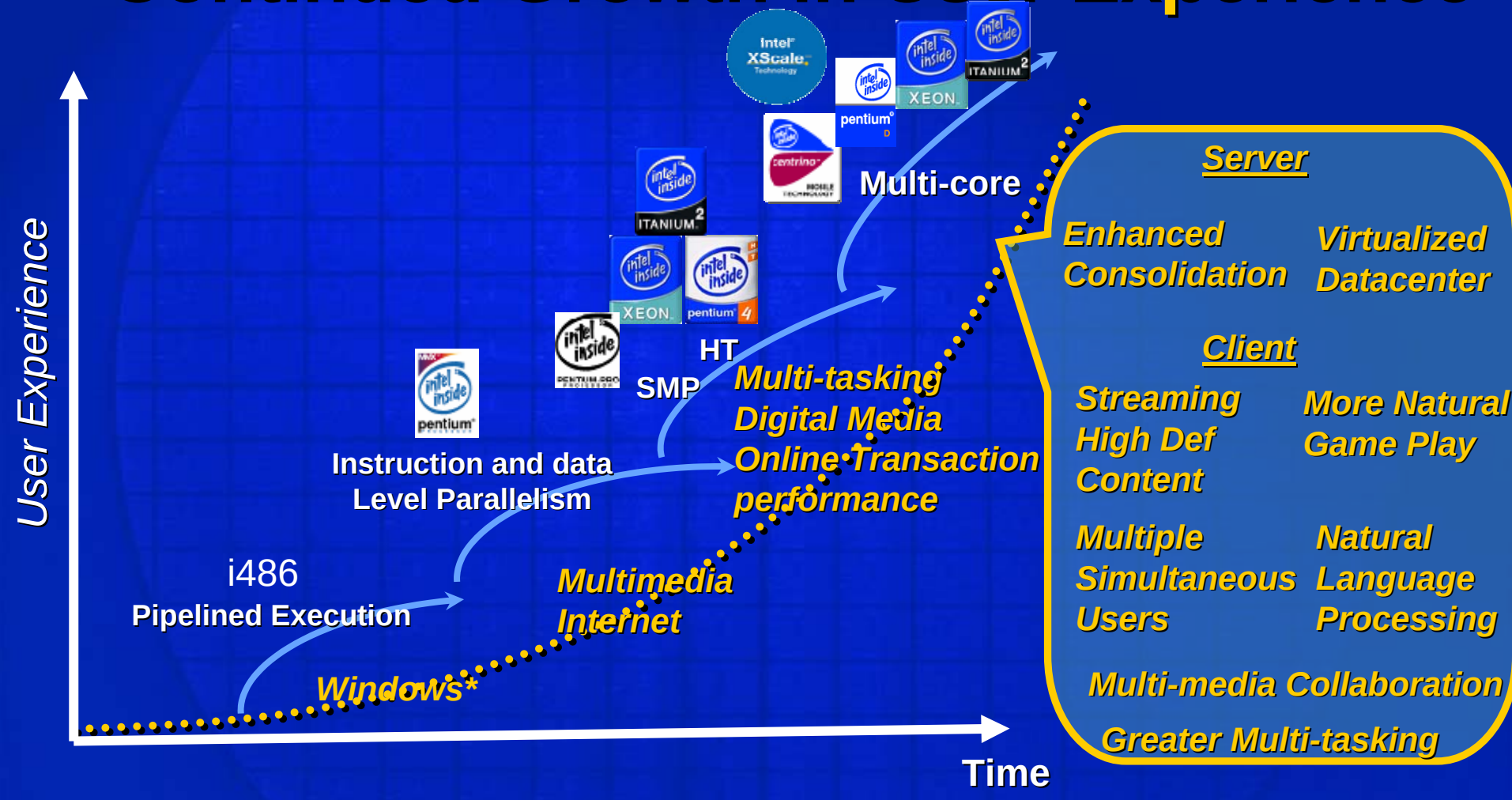
April, 2005

Intel Platform Strategy… and Multi-core

- **Intel continues to drive platform strategies across segments**
  - **Driven by expanding end user needs**
  - **Platform advancements: Wireless, Manageability, Security, Form Factor, Battery life, Compute Capability,…**
- **Intel Multi-core platforms are means to deliver tremendous growth in compute capability**
  - **Builds upon the success of Hyper-Threading Technology**
  - **Multi-threaded application performance and Responsiveness in Multi-tasking environments**

Intel Multi-core: Enabled by Intel Innovation and Moore's Law

Fueled By Moore's Law: Continued Growth in User Experience



Next Wave Driven via Intel Multi-core/Threading

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

The Move to IA Multi-core

Platform	Current	2005	2006+	Future
Itanium® processor MP	Itanium® 2 Processor	Montecito	Montvale	Tukwila Poulson
Itanium® processor DP	Itanium® 2 Processor - 3M (Fanwood)	Millington	DP Montvale	Dimona
MP Server	Intel® Xeon™ Processor MP	64-bit Intel® Xeon™ processor MP	Paxville Tulsa	Whitefield
DP Server / WS	64-bit Intel® Xeon™ Processor w/ 2MB cache		Dempsey	Future
Desktop Client	Pentium® 4 processor	Pentium® Processor Extreme Edition Smithfield	Presler	Future
		Pentium® 4 processor	Cedar Mill	
Mobile Client	Pentium® M processor	Yonah	Future	
		Yonah		
		Single core		Dual/Multi-core

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Mobile Client	Pentium® M processor		Yonah	Future
			Yonah	
		Single core		Dual/Multi-core

>15 Multi-Core Projects Spanning All Segments

	2005	2006**
Desktop*	Shipping	>70%
Server	Shipping	>85%
Mobile*	Shipping	>70%

*** Mobile & Desktop Pentium**

** data is projected run rate exiting the year.

Source: Intel

The IA Multi-core Platforms

Platform		2005	2006+	Future
Itanium® Processor Family	MP	Montecito / Montvale Intel® E8870 Chipset / Enabled		Richford / Future Platform Tukwila('07) / Poulson Future Chipset
	DP	Millington / DP Montvale Intel® E8870 Chipset / Enabled		Dimona Future Chipset
MP Servers			Truland Platform Paxville Intel® E8500 Chipset	Reidland Platform Whitefield ('07) Future Chipset
DP Servers			Bensley Platform Dempsey Blackford chipset	
DP Workstation			Glidewell Platform Dempsey Greencreek Chipset	
UP Server		Pentium® D Processor Mukilteo Chipset		
Desktop Client -Home		Anchor Creek Platform Pentium® Processor Extreme Edition Pentium® D Processor (Smithfield), Presler Intel® 945/955X Express Chipsets		Bridge Creek Platform
Desktop Client -Office		Lyndon Platform Pentium® D Processor (Smithfield), Presler Intel® 945/955X Express Chipsets		Averill Platform
Mobile Client			Napa Platform Yonah Processor Calistoga Chipset Golan Wireless LAN	

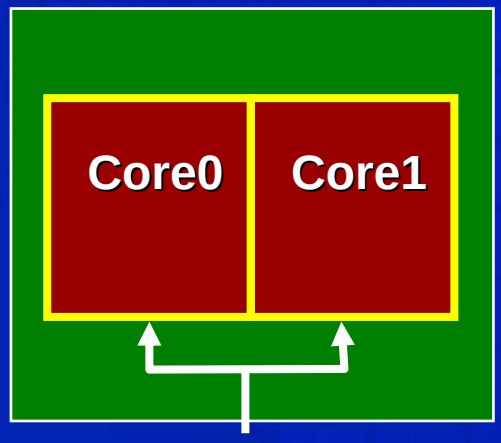
Note: only multi-core processors listed

What is Multi-Core?

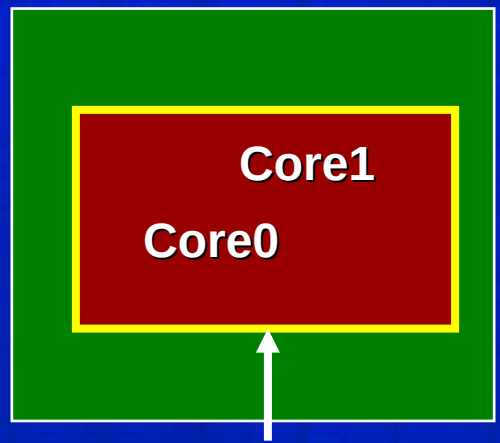
- Two or more independent execution cores in the same processor
- Specific implementations will vary over time - driven by manufacturing cost efficiencies
  - Best mix of product architecture and volume mfg capabilities
  - Designed to deliver performance, OEM and end user experience

Single die (Monolithic) based processor

Example: Smithfield

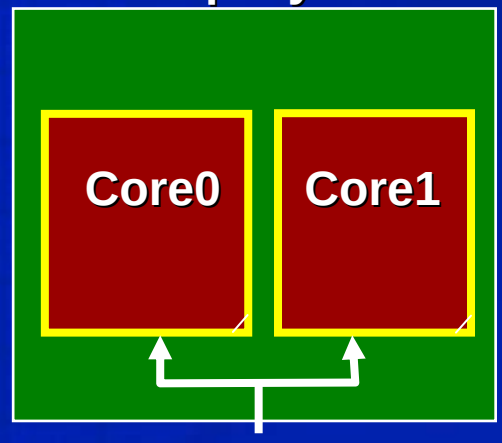


Example: Montecito



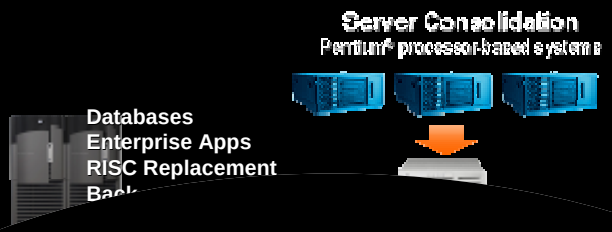
Multi-Chip Processor

Ex: 65nm "Presler" or "Dempsey"

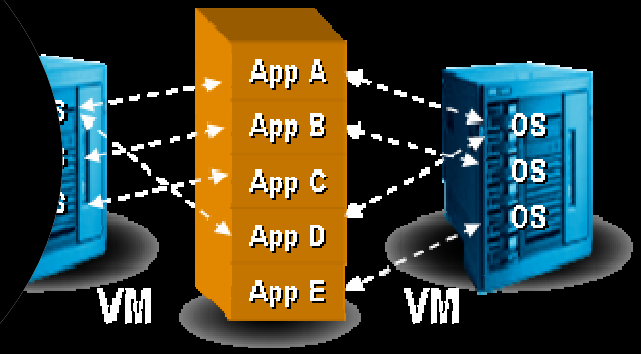


Multi-Core Enhances and Enables Key Server Platform Usage Trends

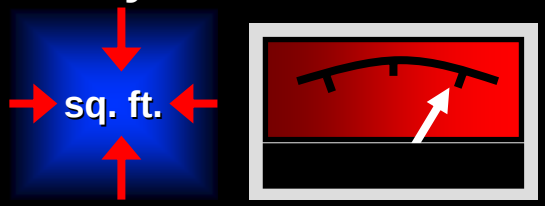
Scale-up headroom with more threads per platform



Optimal platform for virtualized environments



Improving compute density in the datacenter



Service Oriented Enterprise

Dual-core is a natural evolution of Hyper-Threading Technology

Napa: Technology to Benefit the End User

Performance

Yonah: 1st mobile 65nm DC,
Intel® Digital Media Boost
Calistoga: improved integrated graphics

Thinner Lighter

Golan: MiniCard
Small form factor GMCH
Intel® Advanced Thermal Manager

Wireless

Support latest IEEE 802.11 standards
Cisco* Compatible Extensions

Battery Life

Intel Integrated Graphics EBL techniques
Intel® Dynamic Power Coordination

Runs multi-threaded, multiple intense applications, and background tasks with greater responsiveness, delivering a better on-the-go experience for the digital home & digital office

*New feature information – more details in Mobility Keynote & Briefings

Parallelism in the Digital Home

Enhanced User Experience* 'Enjoy'

Multimedia

- Edit, create, share: music, videos, and photos

Multi-Task

- Enjoy multimedia, gaming, IM, browsing, ..

…while

…While Transparently Running Multiple Background Applications

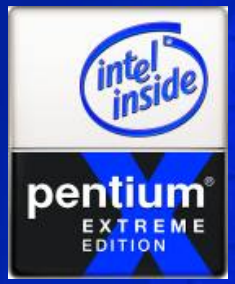
Protection:
Virus Scan
Firewall
Data backup
Data encryption

Platform Health/Operation:
Automatic Downloads
OS Updates and services
Compression

Content Management:
Transcode to different formats
Delivering multiple streams
Record content to the hard drive (PVR)

**Performance improvements relative to single threaded CPUs in similar market segment*

Intel Desktop Dual-core Platforms



Intel® Pentium® Processor Extreme Edition with Intel® 955X Express Chipset

Intel® Pentium® D Processor (Smithfield) with Intel® 945 Express Chipset Family

Coming in Q2'05

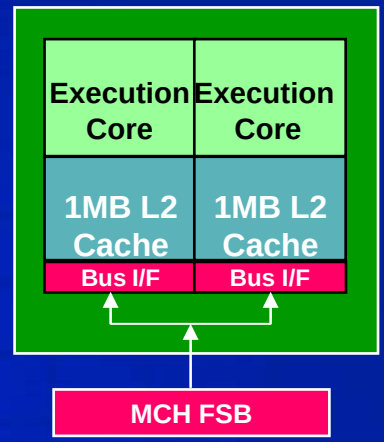
intel

Pentium® Processor Extreme Edition 840

Intel Dual-core with Hyper-Threading Technology

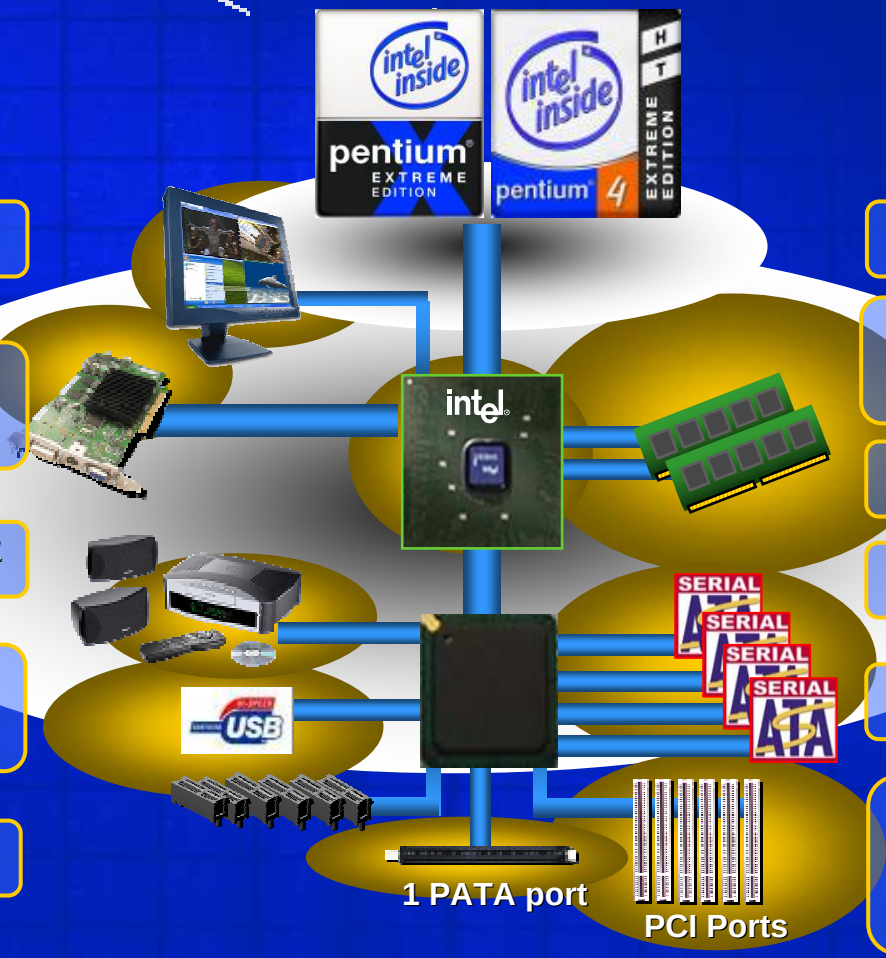
Summary:

- 3.2 GHz dual-core processor
- 2MB L2 Cache (1MB each core)
- 800 MHz FSB
- Intel® EM64T
- Execute Disable Bit
- Built on 90 nm process technology
- LGA775 package
- Die size: approx. 206 mm²
- Transistor count: approx. 230M
- Introduction Q2'05



Rich New Features Boosting Platform Experience

The Balanced Performance Platform
Intel® 955X Express Chipset Family



- 800/1066MHz FSB
- PCI-E* x16 Gfx Dual x16 with Bridge
- 6-PCI-E* x1 Expansion[1]
- Intel® High-Definition Audio
- 8-Hi-Speed USB2.0

- 2-Channel DDR2-667
- Performance Memory Optimizations
- 8GB Memory Support
- ECC Memory Support
- 4-SATA ports
- Intel® Matrix Storage Technology (RAID 0,1,5,10 and AHCI)[1]

Innovation for High End Performance & Advanced Usages

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[1] Features only available in value-add ICH7 SKUs

Performance for an Extreme Experience

Don't delay your departure: Convert digital movies for content on the go

High Definition Video Encoding with Adobe Premiere * using Microsoft* Windows* Media Encoder Advanced Profile*

50% Faster[1]

Quickly enhance your music mix: Enjoy custom music with superior sound quality

MP3 encoding (Razor Lame) + Sound Normalization (MP3 Gain*)*

65% Faster[1]

Create digital content faster: Develop and render images with ease

*Rendering 3D images with 3D Studio Max**

52% Faster[1]

Do more while gaming: Play a game while recording multiple TV shows

Gaming with Need for Speed 2 and dual TV tuner using Snapstream* PVR*

124% More Frames[1]

intel inside

pentium EXTREME EDITION

EXTREME EDITION

Configurations and Disclaimers

Source: Intel® Configuration: **Intel® Pentium® Processor Extreme Edition 840 (2x1MB L2 Cache, 3.20 GHz, 800 MHz FSB) –** Intel® pre-production Lakeport Chipset, 1GB DDR2 667 (2x512MB); **Intel® Pentium® 4 Processor with HT Technology Extreme Edition 3.73 GHz (2MB L2 Cache, 1066 MHz FSB)–** Intel® i925XE Chipset, Intel D925XECV2 Desktop Board. **All Platforms –**Intel® Chipset Software Installation Utility 6.10.1002, Intel Application Accelerator RAID Edition 4.5 with RAID ready; Memory: 1GB DDR2 533 (2x512MB); ATI* Radeon* X800 XT Platinum Edition PCIe, ATI Catalyst 4.11 Driver Suite: Display driver version: 6.14.10.6490, Seagate ST3160023AS Serial ATA 160GB 7200RPM, DirectX 9.0c, Operating System : Windows XP Professional Build 2600 SP2 NTFS, *Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance.*

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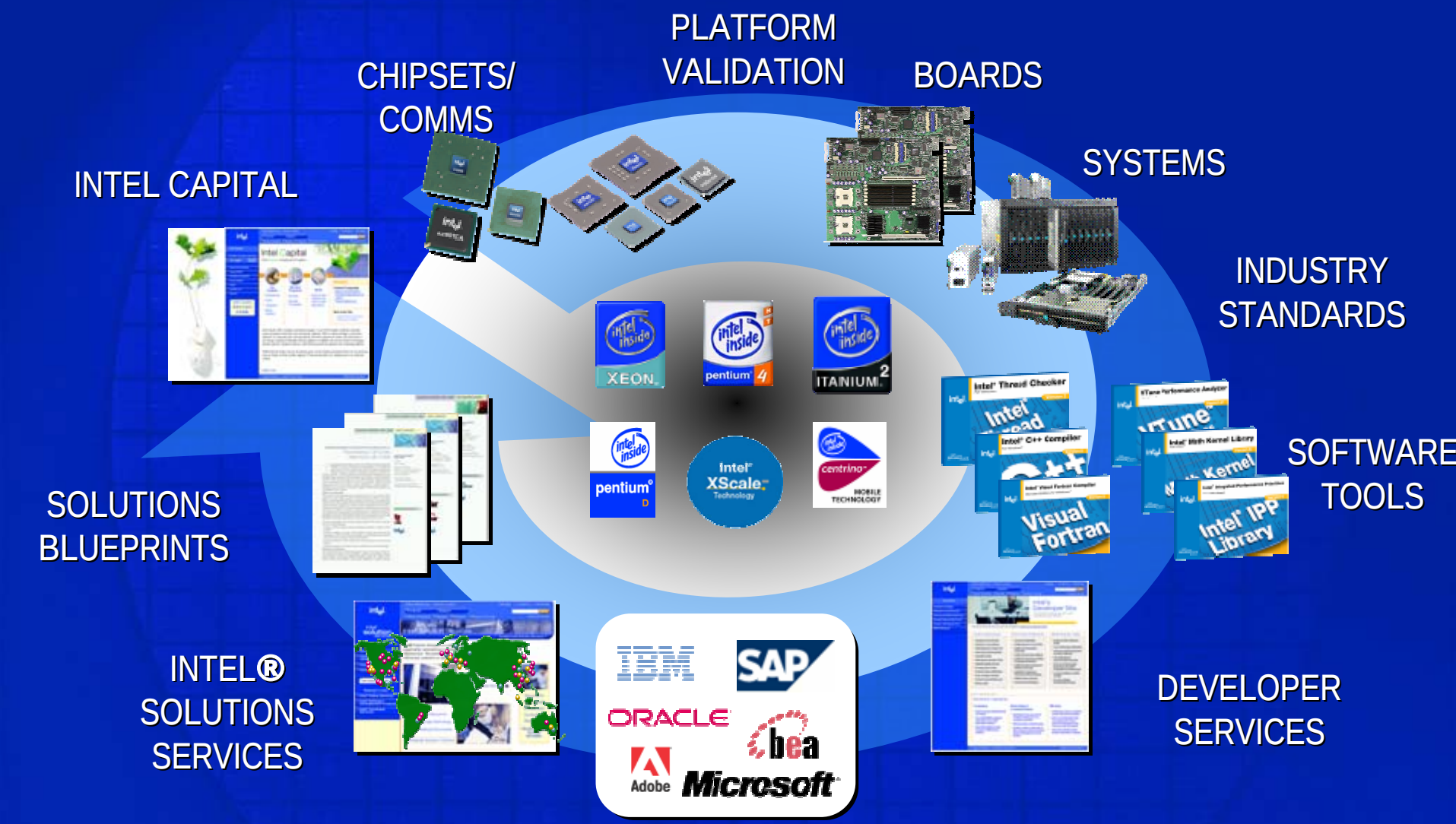
[1] When comparing a Intel® Pentium® Processor Extreme Edition 840 to an Intel Pentium 4 Processor with HT Technology Extreme Edition 3.73 GHz

Intel: A Total Platform Approach



Intel Threading Enabling

Developer Platforms

HT/ Dual-core platforms

Remote Access

SW Tools and Expertise

Intel Compilers

Intel Threading Toolkit,

Performance Libraries, Whitepapers

SW Engineers

Extensive Support Services

Early Access Program

Threading Immersion Program

Application Tuning Centers

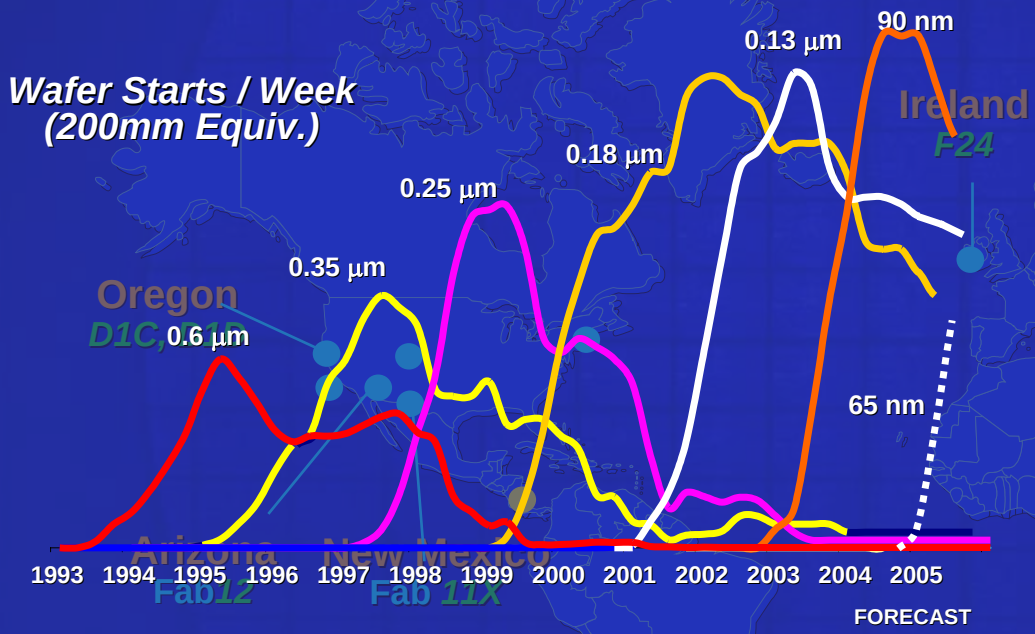
Intel Solution Services

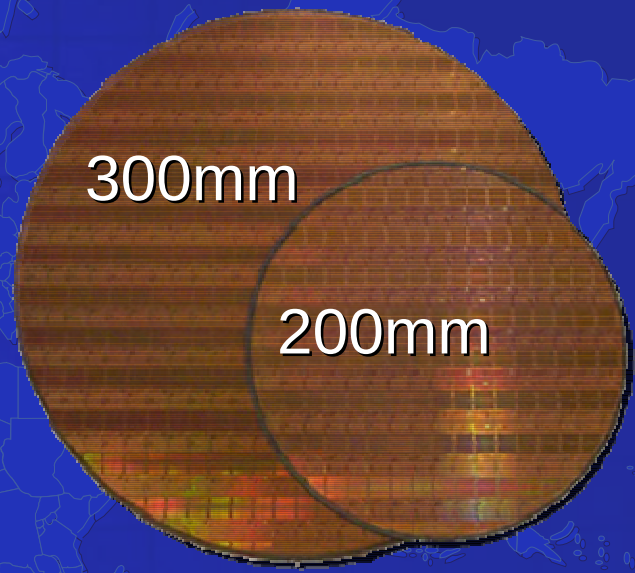
Intel Software College

Comprehensive Enabling: Accelerating the Ecosystem

Threading: Intel Working With ISVs

Intel 300mm Ramp Capability





Worldwide Manufacturing and Sales Channels

Summary

- Intel is addressing expanding end user needs with advancements to the platform
  - Broad array of multi-core products
- Intel Multi-core: Enabled by Intel Innovation and Moore's Law
- Intel accelerating value and deployment via a powerful enabling strategy