



Intel®
Enterprise Solutions

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3. LS-DYNA FORUM 2004
14.-15. October 2004, BAMBERG



Intel's figures 2003/Q104

- Revenue 2003: \$ 31 billion
– first Quarter 2004: \$ 8.1 billion
- R&D Investments 2003: \$ 4.2 billion
- 22 Factories
- 82.100 Employees
– 17.000 working in the Intel Software Solution Group



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Beyond Processors

**Enterprise Competitiveness:
A Total Vertical Approach**

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Commitment to Enterprise

Robust Solution Ecosystem

Investing in all critical elements for the enterprise

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Intel® Enterprise Solutions Strategy 2004 and longterm



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2003: Milestone Year for Intel® in Enterprise

- Record shipments: Xeon & Itanium processors
- Record performance: Surpassing RISC on #1 TPC
- Significant RISC to IA migration – enterprise and HPC

RISC and IA Server System Revenue MSS
First time to pass RISC


Quarter	Intel	RISC
Q1 02	38	45
Q2 02	38	48
Q3 02	40	45
Q4 02	39	46
Q1 03	41	44
Q2 03	42	43
Q3 03	41	42
Q4 03	42	41

Source: IDC Server Tracker Q4 '03

Systems in HPC Top500 by Architecture
First time to pass top RISC arch

Year	IA	HP PA-RISC	IBM Power
2001	20	160	155
2002	60	115	105
2003	190	115	80

Source: www.top500.org, November lists from each year



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Complementary Intel Architecture solutions provide maximum flexibility for end to end solutions

Scale up (indicated by an upward arrow)

- ITANIUM²**: 2P, 4P, 8P-64P+ High-end Servers. EPIC technology delivers new levels of compute parallelism. Extends IA for the most demanding applications.
- XEON**: 4P, 8P, 8P+ rack optimized, pedestal servers. Intel® NetBurst™ micro-architecture and HyperThreading technology. 2P rack optimized, pedestal servers. Industry leading compute power and throughput for e-Business and enterprise server applications.

Scale out (indicated by a rightward arrow)

- pentium 4** and **XEON**: Dual processor Capable. UP, DP Low power server blades. Server density leadership for communication and web hosting servers. Value and flexibility for internet infrastructure and departmental/SMB server applications.

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Intel Enterprise Technologies Vision

Deliver features and value demanded by business today and tomorrow

- Cores & Threads**: Supports larger number of software threads for greater performance.
- Power Management**: Lower power consumed and improved data center utilization.
- Virtualization**: Robust, higher performance virtual partitions.
- I/O and Memory**: Higher bandwidth & reliability features; flexibility of industry standards.
- RAS**: Comprehensive data integrity & error recovery.
- System Management**: Common management standards for lower TCO.

Server advancements led by Intel

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Technologies Enhance All Platforms

<div style="text-align: center;"> </div>	<ul style="list-style-type: none"> • Demand Based Switching (ITP) • ACPI <ul style="list-style-type: none"> - Power safety mechanism that right sizes power & cooling • PCI-Express (ITP) • FB-DIMM <ul style="list-style-type: none"> - Adds memory scaling advantages • Silverdale Technology <ul style="list-style-type: none"> - More robust platform reliability & performance thru soft partitioning • Dual core <ul style="list-style-type: none"> - Two physical processors on a single die • Pellston Technology (ITP) <ul style="list-style-type: none"> - Capability to disable L3 cache lines that exhibit failures • Foxton Technology (ITP) <ul style="list-style-type: none"> - Dynamic performance boost • Multithreading (ITP) <ul style="list-style-type: none"> - Two threads running on one core when execution units are under utilized 	<ul style="list-style-type: none"> • Demand Based Switching (XPF) <ul style="list-style-type: none"> - Technology to reduce cost of power & cooling • PCI-Express (XPF) <ul style="list-style-type: none"> - Serial I/O for future headroom and balanced platforms • EM64T (XPF) <ul style="list-style-type: none"> - Extended memory addressing for select workloads • DDR2 (XPF) <ul style="list-style-type: none"> - Provides greater memory capacity, higher bandwidth and lower power than DDR
2003	2004	2005

Delivering the flexible real-time enterprise

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Intel® Xeon™ Processor Family Innovations

2003 & Prior Enhancements

- Hyper-Threading Technology
- Intel® Netburst™ micro-architecture
- SSE & SSE2 instructions

Future Enhancements

- Virtualization
- User defined power thresholds
- Dual core CPUs
- Fully buffered DIMMs

2004 Planned Enhancements

<ul style="list-style-type: none"> ■ New SSE3 instructions ■ PCI Express* ■ 800MHz FSB ■ 64-bit extension technology 	<ul style="list-style-type: none"> ■ Power management technology <ul style="list-style-type: none"> ✓ Demand Based Switching (DBS) ■ DDR2 memory <ul style="list-style-type: none"> ✓ Higher capacity & performance w/ lower power
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Intel focus on platform innovations that deliver performance, reliability and manageability to all enterprise segments

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2004 Platform Enhancements

	2003	2004
Processor	Intel® Xeon™ processor with 533MHz system bus Intel® NetBurst™ microarchitecture	Intel® Xeon™ processor with 800MHz system bus Intel® NetBurst™ microarchitecture Intel® EM64T Intel® Extended Speed Step Technology
Frequency	3.2 GHz	3.60 GHz
Chipset	Intel® E7501, E7505	Intel® E7520, E7525, E7320
System Bus Frequency	533MHz	800MHz
System Bus B/W	4.3 GB/s	6.4 GB/s
Memory	DDR 266	DDR2 400
Mem B/W	4.3 GB/s	6.4 GB/s
I/O	PCI-X 64/100MHz	PCIe* x8
I/O B/W	3.2 GB/s	12.0 GB/s
Graphics	AGP 8X	PCIe* x16
Graphics B/W	2.0 GB/s	4.0 GB/s
IOP	Intel® IOP321: 600MHz, DDR200, PCI-X	Intel® IOP332: 800MHz, DDR2 400, PCIe*


1.5X
1.5X
4.0X
2.0X
2.0X

Significant platform performance enhancements make NOW the optimal time to upgrade from older systems

Intel® Xeon™ Processor Technologies Extensions

2003	2004	2005+
 <ul style="list-style-type: none"> Hyper-Threading SSE2 Instructions NetBurst™ Architecture FSB533 DDR Memory PCI-X AGP-8x 	<ul style="list-style-type: none"> Better Hyper-Threading New SSE3 Instructions Improved NetBurst Architecture EM64T Extension FSB800 DDR2 Memory PCI-Express I/O PCI-Express GFX Demand Based Switching 	<ul style="list-style-type: none"> Dual-Core CPUs (Socket) Improved Hyper-Threading Additional Instructions Enhanced Micro-Architecture EM64T Extension FSB1066 Fully-Buffered DIMMs Memory PCI-Express I/O PCI-Express GFX Demand Based Switching Rack-based Power Mgmt. Virtualization Technology Security Technologies

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Intel® Itanium® 2 Processor

Performance

Targeted for up to 2X higher performance than Xeon

Cost

Lowering TCO with scalable platforms
Expanded DP and low voltage offerings
Cost parity with Xeon based platforms (via common infrastructure by '07)



Technology

Dual Core / Multi-core
Multi-thread
Foxton, Pellston, Silverdale
Power Management

Volume

>100,000 CPU's in '03
On track to exceed RISC competitors in next 3-4 years


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Intel® Itanium® Processor Family Innovations

2004 & Prior Enhancements

- EPIC architecture
- Enhanced Machine Check Architecture
- FMAC for floating-point leadership
- Largest on-die resources for demanding workloads



Future Enhancements

- Multi-core
- Virtualization
- I/O and memory
- Enhanced RAS
- Cost parity with Xeon processor based platforms (via common platform infrastructure)
- Up to 2X higher performance than Xeon based platforms

Next Planned Enhancements

- Dual-core
- Multi-threading
- Power management technology
 - ✓ Demand Based Switching (DBS)
 - ✓ Automatic Control Power Consumption (ACPC)
- Enhanced system bus Bandwidth

- Foxton Technology (performance feature)
- Pellston Technology (cache reliability)
- PCI Express*
- Fully-buffered DIMMS (FBD) , DDR2

Targeted platform innovations deliver Intel's highest performance, reliability and manageability leadership solutions for the enterprise

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Momentum – New Advances

Examples of recent product releases, wins, etc.

ISVs Releasing Software

- Abaqus
- Accelrys
- Adina
- Autodesk
- BMC
- Borland
- CA
- Fujitsu
- EMC
- Hyperion
- i2
- IBM
- Microsoft
- NetIQ
- NAG
- Oracle
- SAP
- Symantec
- Sybase
- Veritas

End Users

Application Ramp¹

2000 1000 2000

'03 '04

>2X growth over '03

>2000 applications now available

>30% of Global 100 now deployed, including 9 of top 10

Hardware

- Unisys adds Linux support for ES7000 line
- 4P Dell PowerEdge 7250
- 2P Fujitsu Siemens Primergy RXI300
- 32P Bull NovaScale 6000

Performance

- 61 Itanium® 2-based systems on Top500 Supercomputer list, including #2 spot
- New records with Unisys, SGI, and NEC

Itanium® processor family success continues to build

RISC / UNIX Migration to Intel® Itanium® 2 Processor

8 of 9 RISC vendors delivering Itanium platforms...and many others, totaling over 50 vendors

IDC Forecast (Q1 04)

RISC & Itanium-based Server Volumes (ku)

500 400 300 200 100 0

2002 2003 2004 2005 2006 2007 2008

IPF Alpha PA-RISC Power SPARC

All dates and features are preliminary and subject to change without notice

Customers migrating include: CompUSA, First Trust, BMW, Wells Fargo, CitiStreet, ...

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Intel® Itanium® 2 Processor Plans

Itanium architecture delivering >2X Moore's Law Performance *

Performance

+30%-50% in '04

Itanium Platforms

+50%-100% in '07+

Intel Xeon-Based Platforms

Moore's Law

'04 '07+

Lowest Cost of Ownership

Platform Price

ITANIUM² = +30%-60% in '04

~0% in '07+

XEON = 1.0

'04 '07+

- Up to 2X higher performance than Xeon™ processor-based platforms expected by '07
 - Itanium's EPIC architecture + smaller core than IA-32 enable up to 2X more cores/die
- Itanium processor-based platforms expected to be reduced to same cost as Xeon-based platforms by '07

Increasing the performance pace at lower platform cost

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Intel® Itanium® Processor Technologies Enhancements

	2003	2004	2005 +
	<p>EPIC 1.5GHz 6MB iCache FSB400 DDR Memory PCI-X AGP-GFX</p>	<p>EPIC Architecture 1.6GHz 9MB iCache FSB400/533 DDR Memory PCI-X AGP-GFX</p>	<p>Dual/Multi-Core CPUs (Socket) Multi-Threading Enhanced EPIC Architecture Additional Instructions 2.0+GHz 24MB iCache FSB400/667 Fully-Buffered DIMMs Memory PCI-Express I/O PCI-Express GFX Virtualization Technology Foxton/Pellston Technologies CSI</p>

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Intel-based Platforms Span Enterprise

Workstations	Front-End (Edge)	Mid-Tier (Enterprise)	Backend (Databases)	High Performance Computing
Intel® Itanium™ 2 Processor				Itanium™ 2 Processor
Intel® Xeon™ Processor				Xeon™ Processor
Workloads EDAM/CAD/DCC/CAE	Mail/Calendar Web Server Gaming	CRM ERP SCM	BI Database	CAE Life/Med Sci Finance Oil&Gas

Best for general purpose IT infrastructure: Workstation, front-end & mid-tier solutions

Best for business critical enterprise mid-tier & back-end servers & tech computing

Price/Performance	Highest Performance (over Xeon and RISC processors in enterprise and HPC apps)
Reliable data integrity	Intel's highest Reliability & Availability features
Scale-Out & Up	Scale-Out & Up

Itanium 2 processors for world-class performance and reliability features in back-end & mid-tier and Xeon processors for price/performance front-end & mid tier

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Intel® Software Tools

Optimized for on

Intel® software development products

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