Merced Solutions Overview

Hemant Dhulla

IA-64 Programs Manager

IA-64 Processor Division

Intel Corporation

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Agenda

- Roadmap
- Processor
- Features
- Performance
- Software
- Call to Action

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Year 2000 Market Segments

- High End Servers
  - Availability
    - Downtime measured in minutes per year
    - Enterprise OS, Systems Management, Clusters/Failover
  - Scalability
    - 4, 8-way and above systems
    - Architectural headroom
  - Performance
    - Large memory addressability, over 4GB physical memory
    - High tpc performance
- High End Workstations
  - 3D Graphics
    - Large data set modeling, simulation, rendering
    - High performance cards, graphics bandwidth
  - Performance
    - Large memory addressability, over 4GB physical memory
    - High fp performance
  - Scalability
    - System expandability
    - Multiple PCI segments

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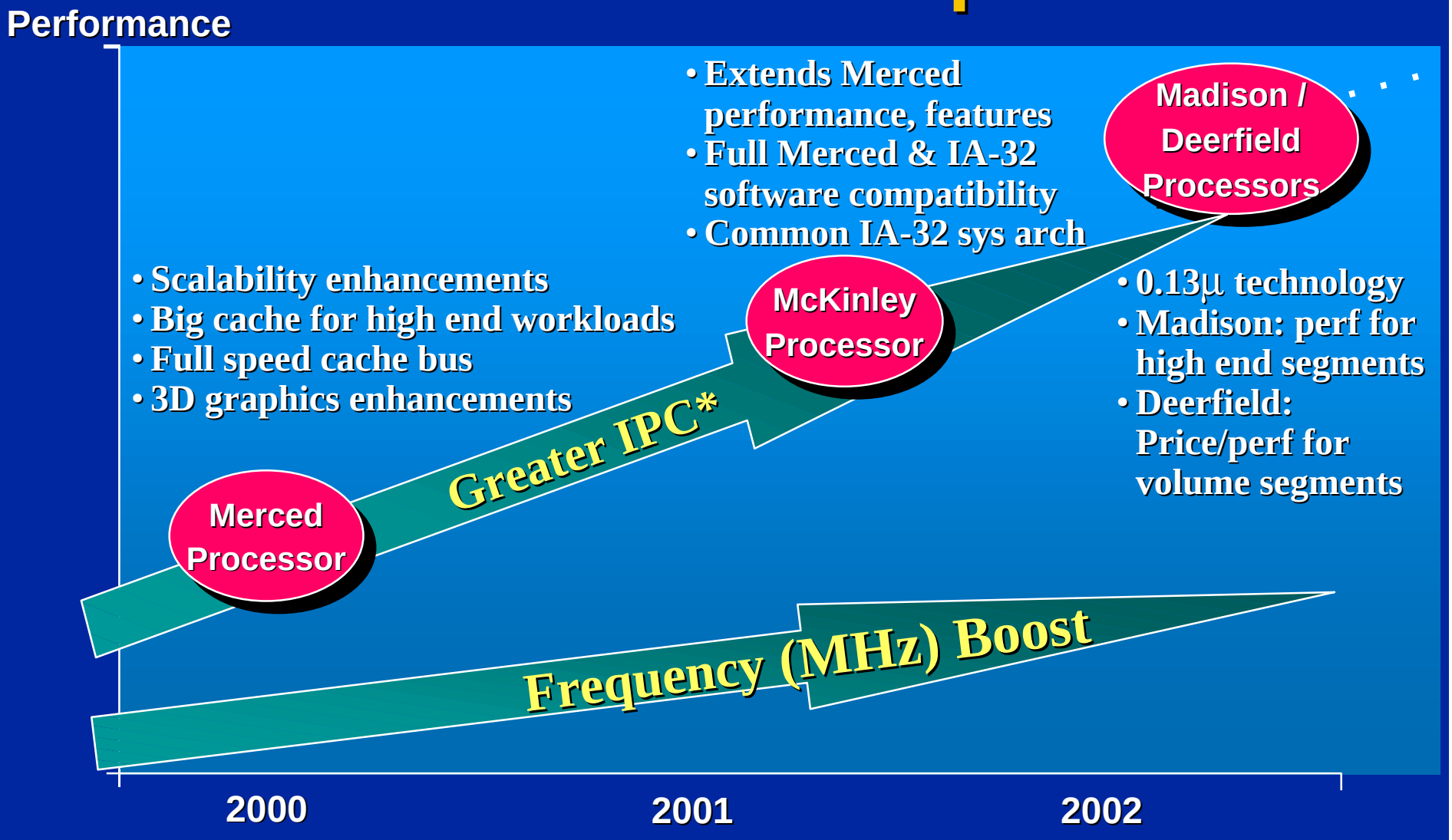
IA-64 Roadmap



Strong roadmap with great headroom

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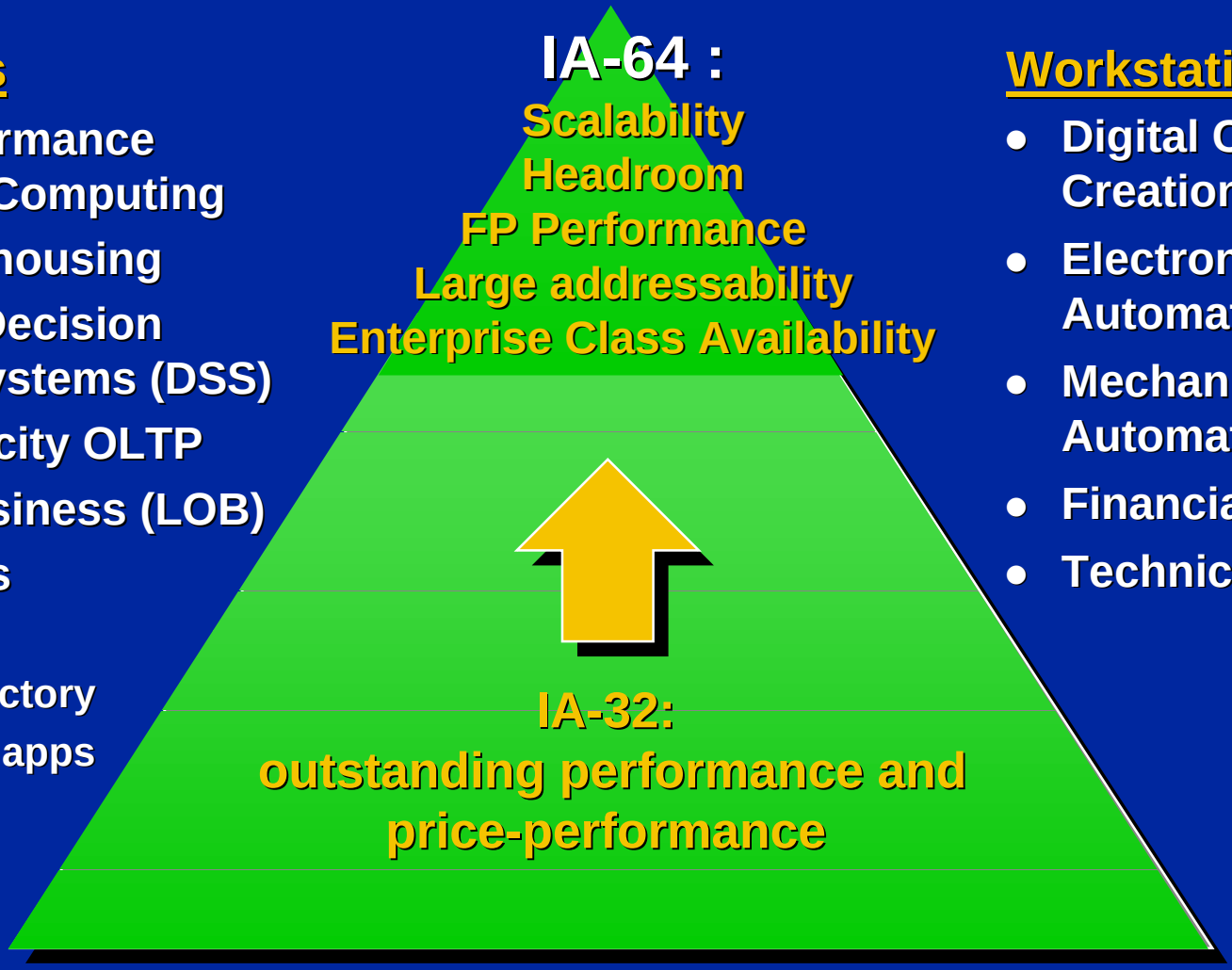
*IPC = Instructions Per (clock) Cycle

Extending the Intel Architecture

Server Apps

- High Performance Technical Computing
- Data Warehousing
- High-end Decision Support Systems (DSS)
- High-Capacity OLTP
- Line of Business (LOB)
- E-Business
  - Security
  - Web/Directory
  - Dynamic apps
  - Java



Workstation Apps

- Digital Content Creation (DCC)
- Electronic Design Automation (EDA)
- Mechanical Design Automation (MDA)
- Financial Analysis
- Technical Analysis

Complementary IA-32 and IA-64 solutions

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Unprecedented Industry Commitment

IA and RISC OEMs

AST
Bull
Compaq
Data General
Dell
Fujitsu
Gateway
Hewlett Packard
Hitachi
IBM
ICL
NEC
NCR
Silicon Graphics
Sequent
Siemens Nixdorf
Unisys

Third Party Vendors

American Arium
AMI
Evans & Sutherland
Phoenix
3D-Labs

Operating System Vendors

Compaq
Hewlett Packard
Microsoft
Novell
IBM/SCO
Silicon Graphics
Sun

Software Tools & Inf. Vendors

EPC
Hummingbird
IBM
MetaWare
Microsoft
NAG
PGI
SCO
Sun

Workstation Software Vendors

ALTech
Ariba
Baan
Adobe
IBM
Avid
Informix
Cadence
Microsoft
MacNeal Schwendler
Mental Images
Mentor Graphics
Parametric
Softimage
Synopsys

Enterprise Software Vendors

Nuance
Open Market
Oracle
PeopleSoft
SAP
SAS
Torrent
WebLogic

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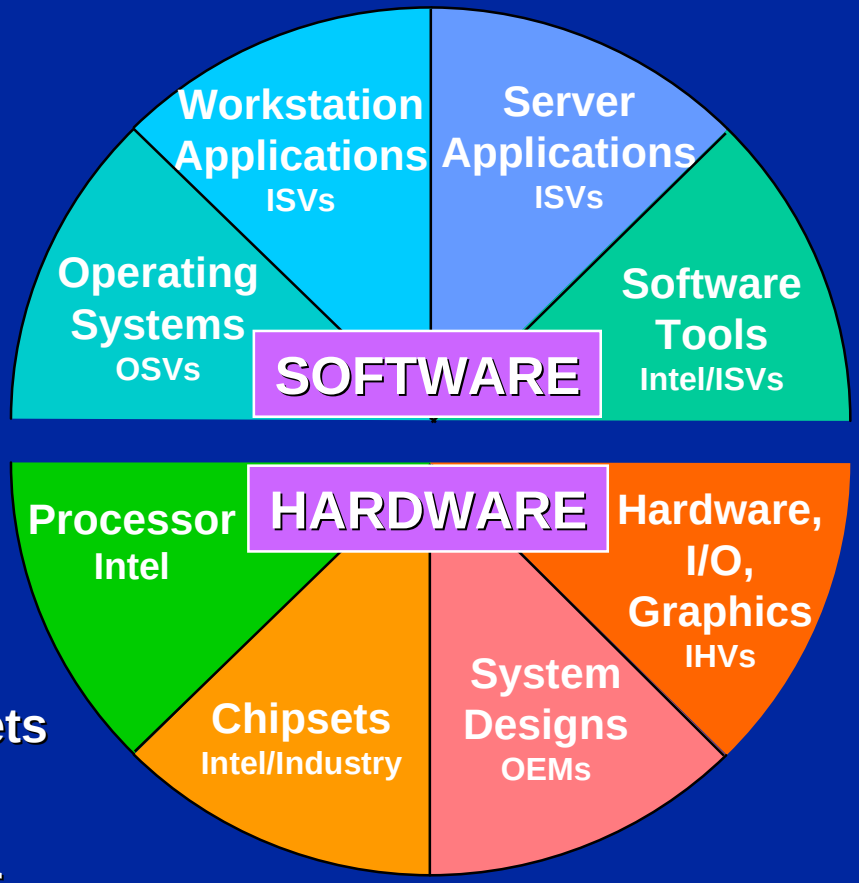
Make sure your plans include Merced / IA-64

Focus on Complete Solutions

- Hardware Development Aligned
  - Processor design on track
  - Chipset components taping out
  - Critical IHVs engaged
- OEM Designs Progressing
  - Over 30 server and workstation designs meeting milestones
  - System schematics finalized
- Software Progress on All Fronts
  - Compiler hitting performance targets
  - Multiple OS's booting on simulator
  - Multiple apps running on simulator



Complete solutions available starting 2H '00

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Merced Processor

- Features for the high end
  - Terabytes of memory addressing
  - High availability features
  - Enhanced scalability
- Performance for the high end
  - World class fp performance
  - World class tpc performance
  - World class security algorithm performance
  - Large, three level cache
- Full IA-32 backward binary compatibility
- Industry leading 0.18μ process

Performance, Compatibility, Scalability, Availability

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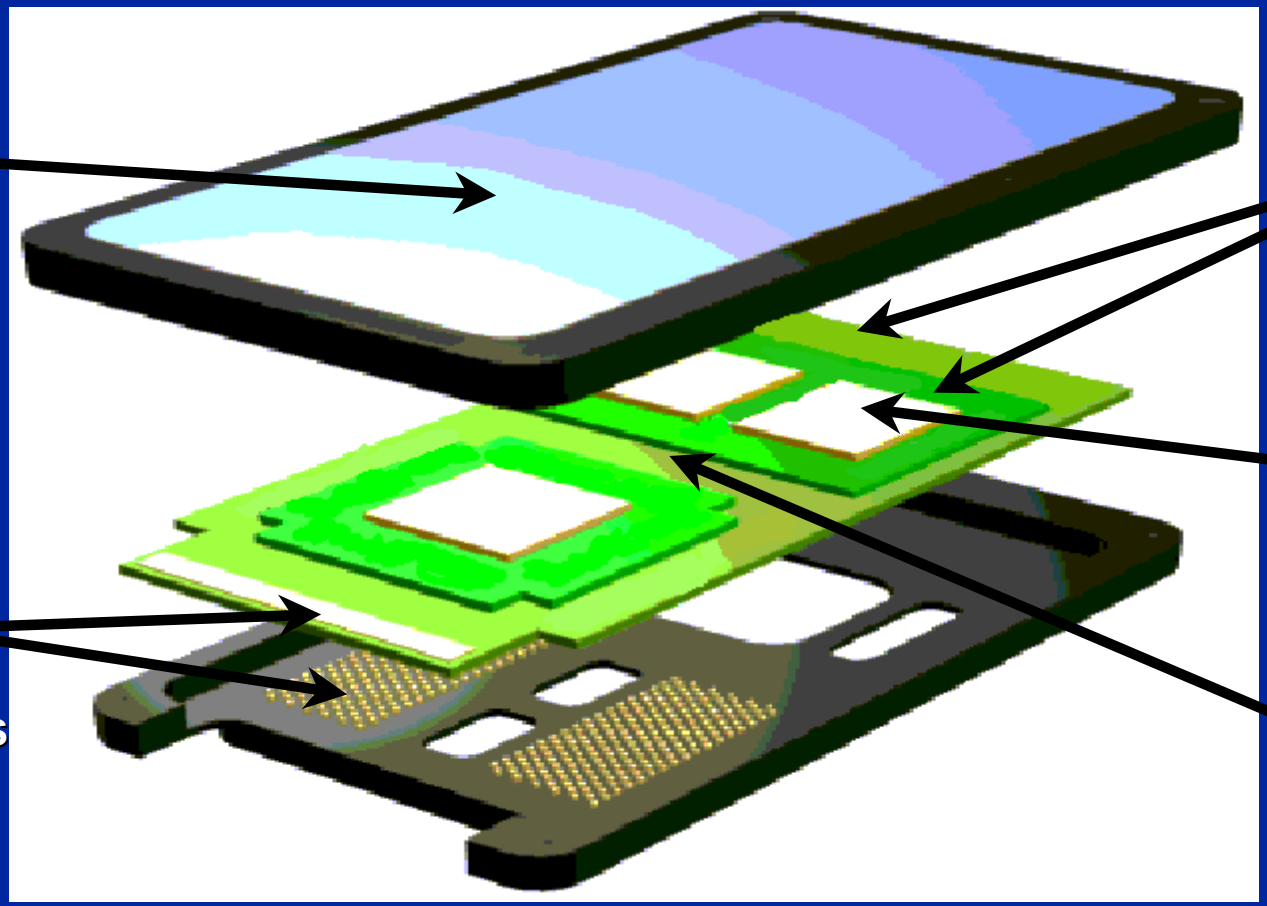
Merced Cartridge Features

Efficient heat dissipation technology

Cost effective performance substrate



Intel designed static cache RAM

Separate signal & power connections for signal integrity

Full speed cache bus

Optimized for manufacturability and cost

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Merced Processor Progress

- Final stages of functional logic validation
  - Multiprocessor OS Kernel booting on Merced logic model
- Thorough MP system validation underway
  - Elaborate logic simulation on pre-silicon
  - Large number of post-silicon tests already ported
- Physical implementation well on track
  - Timing convergence nearing completion
  - Circuit design making excellent progress
  - Layout completion in lock step with circuit design

Samples in '99, production in mid-2000

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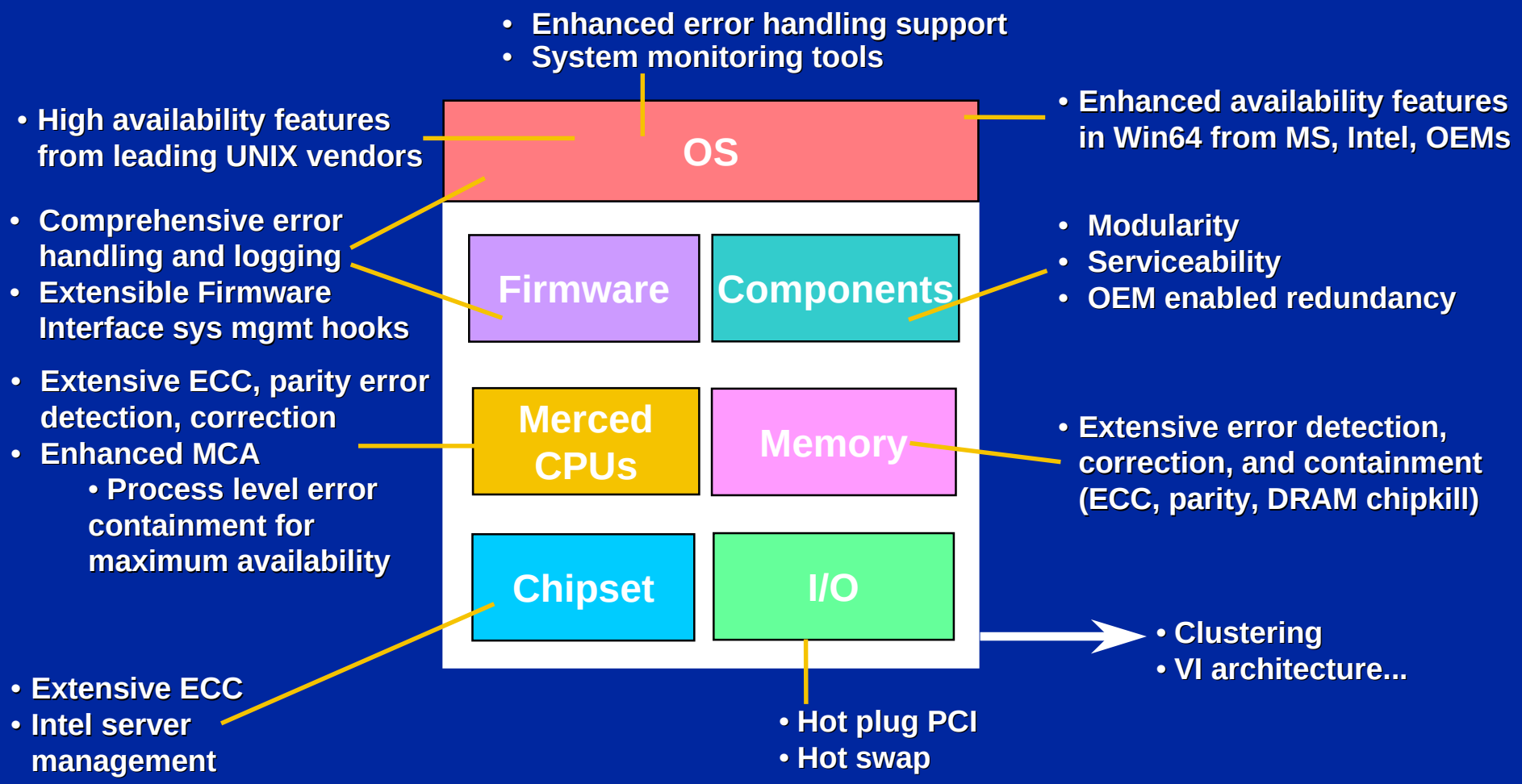
Merced = High Availability



Integrated Solution for Enterprise Availability Requirements

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Merced = Enterprise Scalability

- Optimized memory utilization
  - 64 bit memory architecture
  - Flexible page sizes up to 256MB reduces overhead
  - Innovative, large 3 level cache hierarchy reduces bus traffic
- Highly efficient bus
  - Enhanced deferred transaction support increases bus utilization
  - Cache line size optimized to conserve bandwidth
- Advanced architectural features
  - Speculation reduces memory latency effects

Scalability for the most demanding requirements

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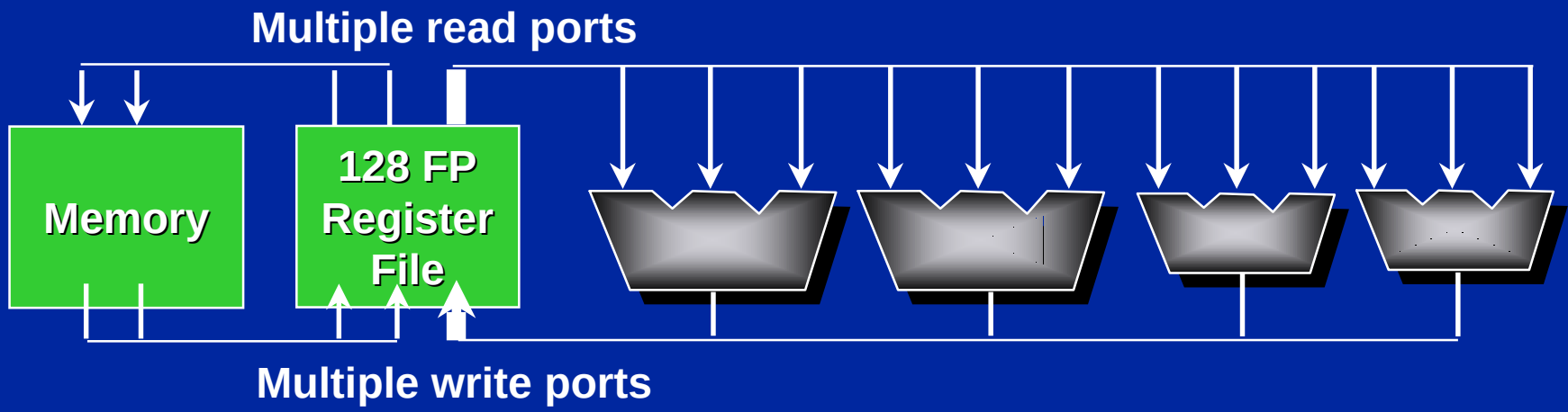
High Performance Computing for Workstations



- Better Performance for improved graphics:
  - Register based architecture
  - Large register resources (128)
- 2 Extended Precision (EP) FMACs, 2 SP FMACs
  - ~3 GFLOPs extended precision peak performance
  - ~6 GFLOPs single precision peak performance

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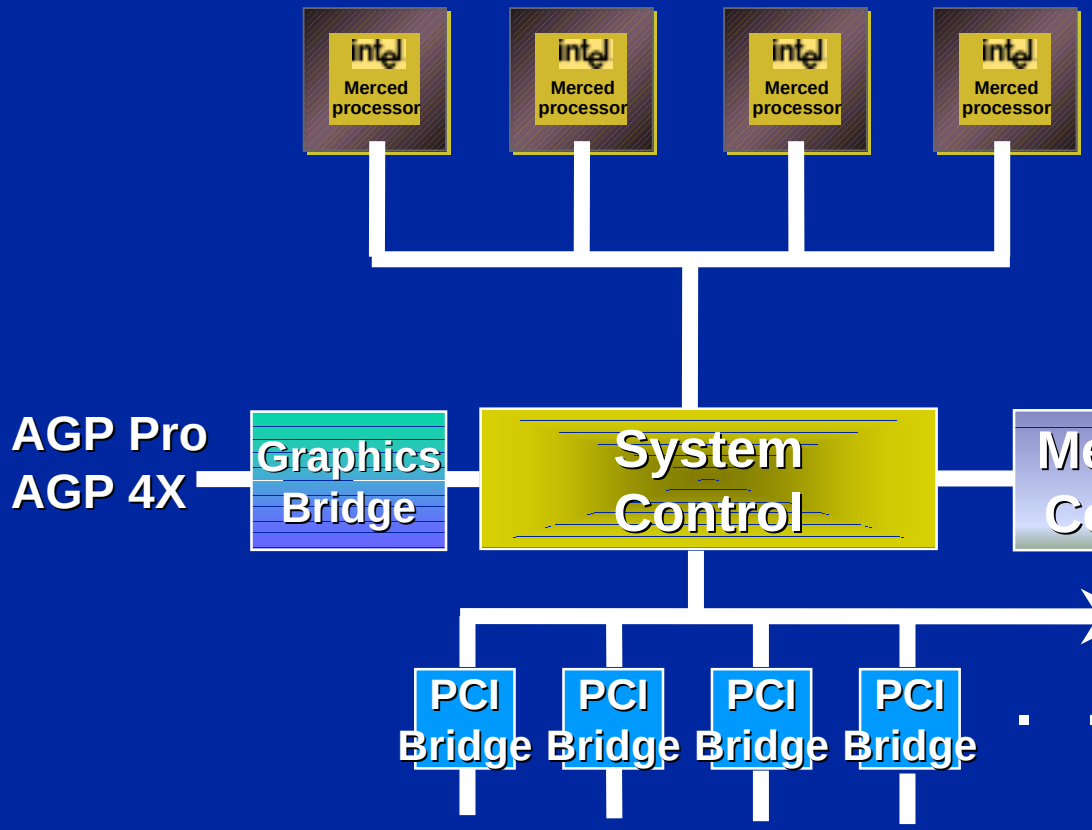
Intel® 82460GX Chipset



- Time-to-money chipset for 1-4P Merced systems
- OEMs using Intel components to build 32P+ systems

I/O

- Integrated PCI Hot Plug
- Supports 66MHz / 64 bit PCI

Availability Features

- ECC on memory and data paths
- Supports Intel server management
- Memory Chipkill

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OEM Merced Designs

Worldwide Information Systems

Bull

COMPAQ

DELL

FUJITSU

HEWLETT PACKARD

HITACHI

IBM

NEC

NCR

SEQUENT

SIEMENS

SiliconGraphics

UNISYS

Driving Merced into the highest ends

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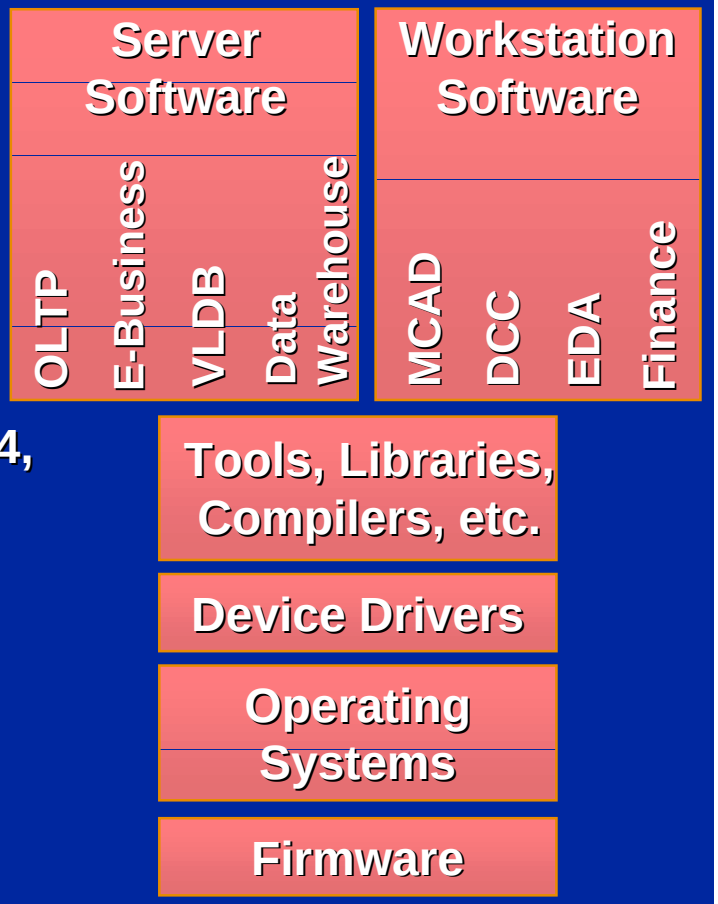
Software Program Deliverables

- **Tools reduce ISV effort, TTM**
  - Choice of leading compilers, libraries, tools
  - Comprehensive pre-silicon software development environment
- **Optimized high end OS's**
  - Production quality IBM/SCO Monterey, Win64, Modesto, Linux, HP-UX, IRIX, Solaris, Bravo
  - Concurrent with Merced system availability
- **Production ready applications**
  - Industry leaders committed to availability concurrent with Merced systems
  - IA-32 compatibility instantly enables broad software base



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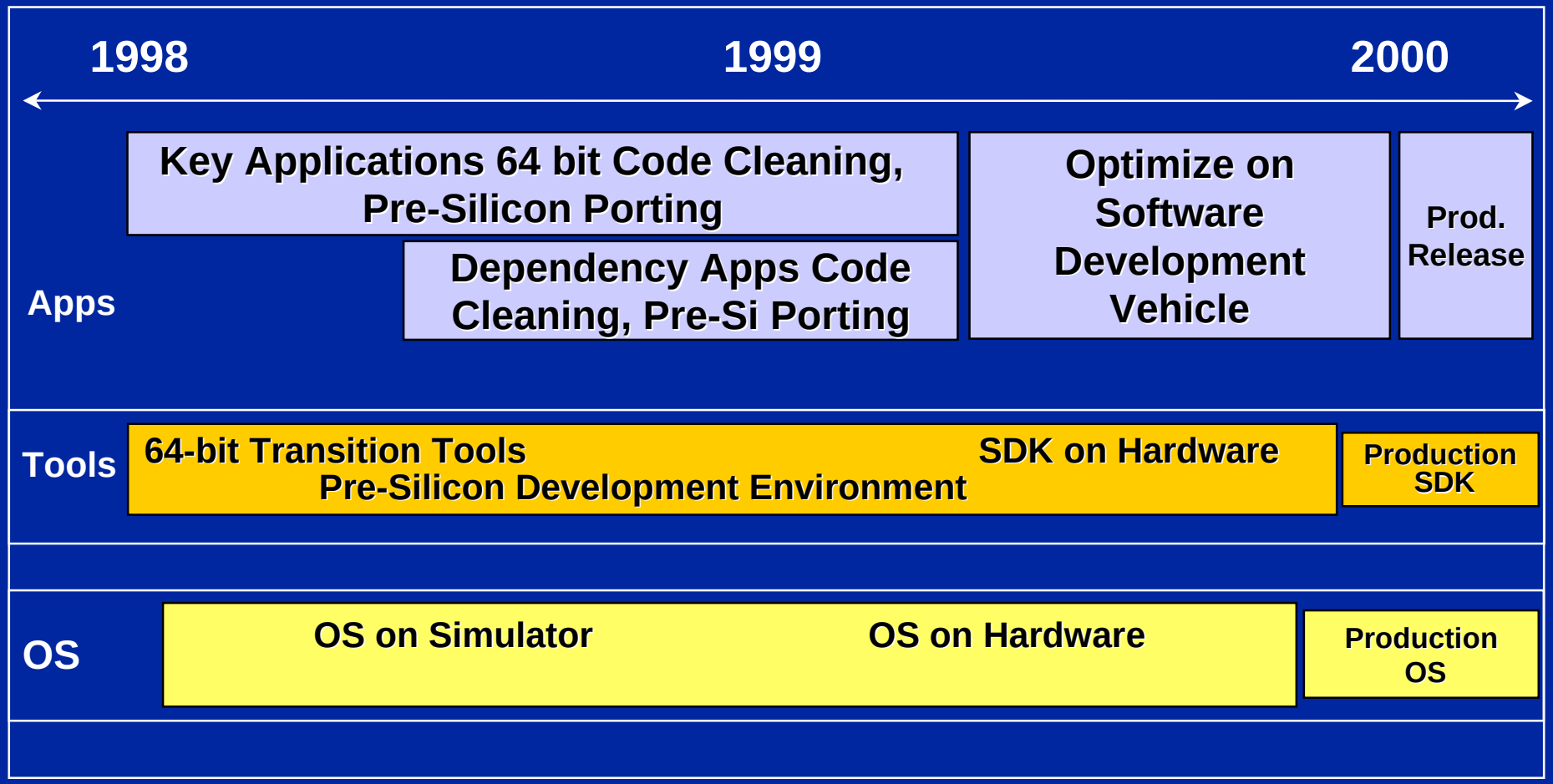
Merced Software Program Timeline



Tools, OSs, Apps converging on Merced production

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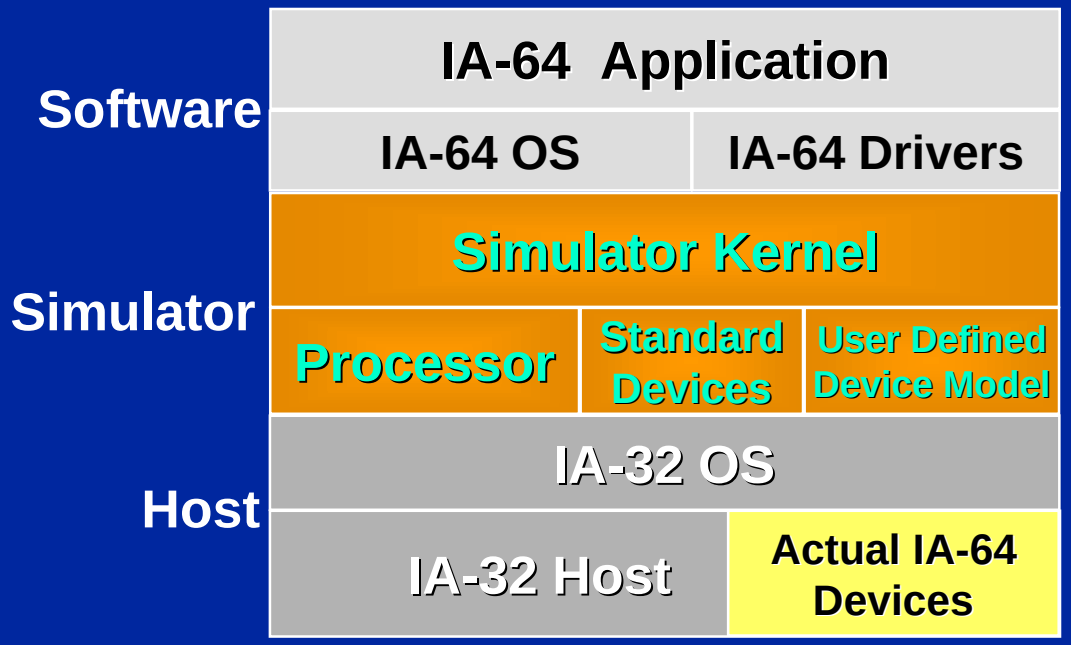
Pre-Silicon Software Development Kits

- SDKs Include:
  - Compiler
  - Linker
  - Libraries
  - Debugger
  - IA-64 OS
  - Merced Simulator

- Simulation Environment:



Pre-silicon development enables concurrent availability

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Merced Software Tools Progress

- Compiler progress
  - Almost 100% of functional tests passing
  - Exceeding performance targets
- Development tools progress
  - SDKs delivered to key OEMs, OSVs and tools vendors
  - Full SDKs with OS, Compiler and Tools to select ISVs in Q1
- Variety of 64-bit cleanup tools publicly available
  - HP, Microsoft, SCO (URLs in Backup)
  - LINT tools, DLL finders

Start your 64 bit code cleaning and optimizations now

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Merced OS Progress

- 7 OS's Booting on Merced simulator:
  - Win64
  - SCO UnixWare
    - Monterey booting later in Q1
  - Novell Modesto
  - HP-UX
    - Several ISV applications running
    - Software transition kits available on the web
  - Solaris
  - IRIX
  - Compaq Unix
- Full support for Linux

Fully functional, high availability OSs concurrent with Merced

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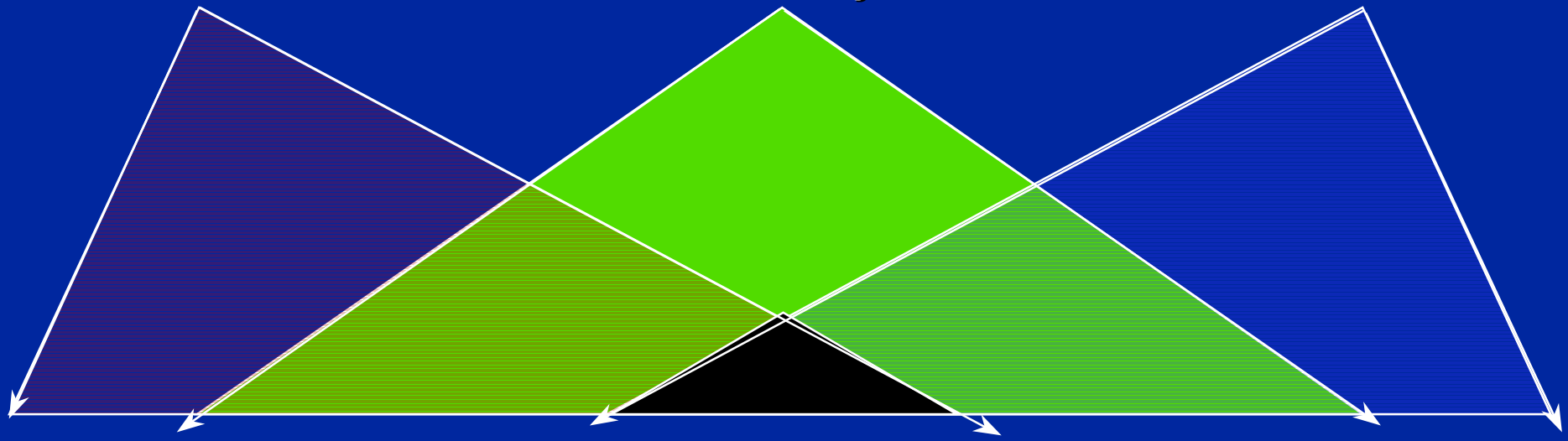
Merced Application Targets

- Large memory
- Large, fast caches

- Explicit parallelism
- Scalability

- FMACs = faster FP
- SIMD calculations
- Full speed EP



Data Warehouse

OLTP, DSS, LOB

Large Dataset Computation, High end EDA

3-D Graphics, High end DCC

Simulation, Modeling, Security

Matching application needs with architecture benefits

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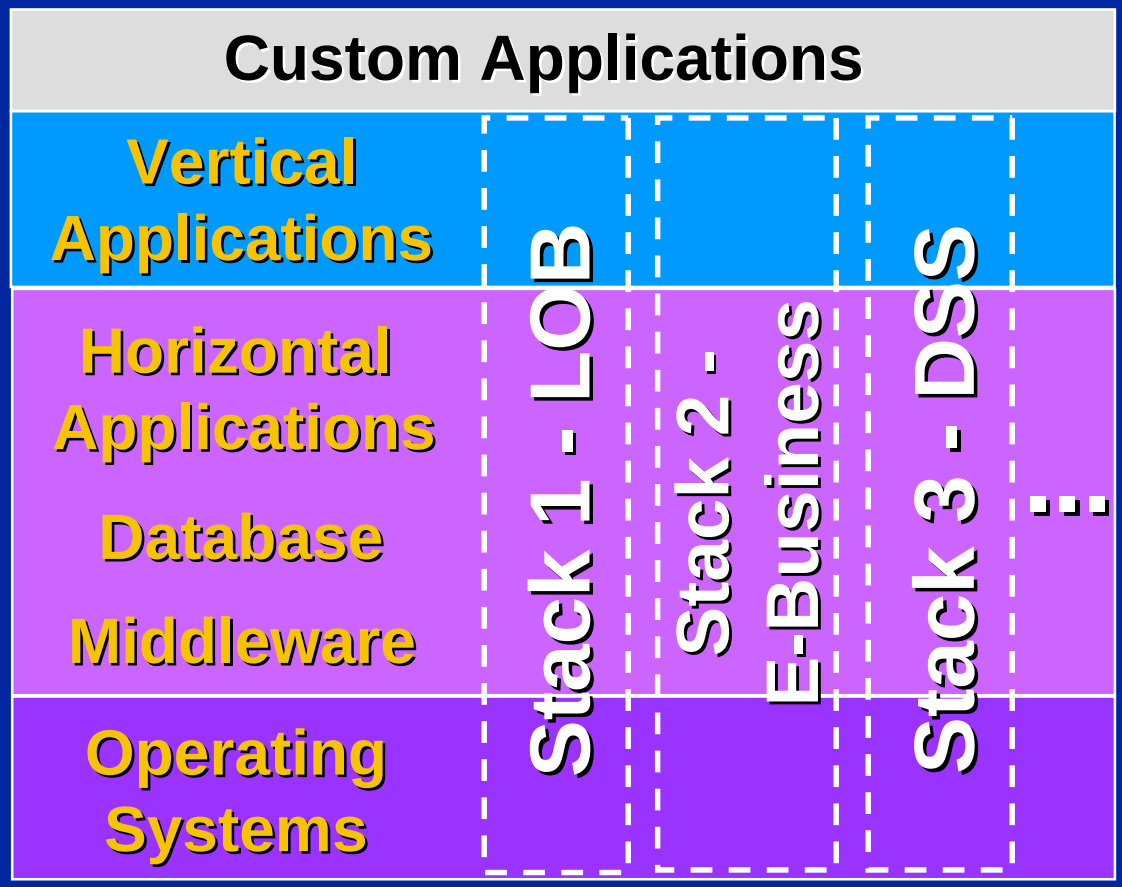
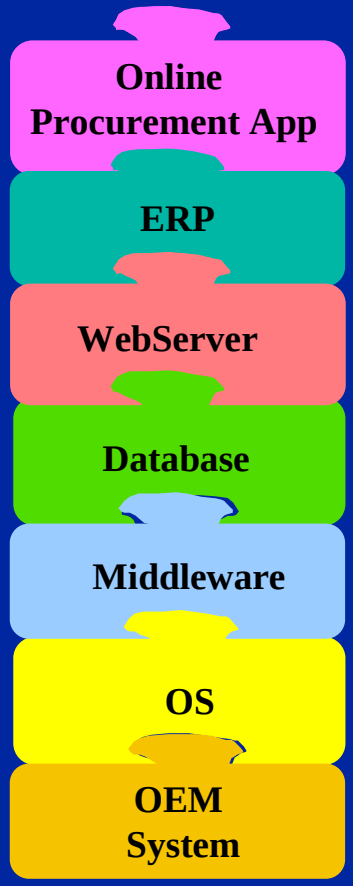
Server Solution Stacks

Primary Target Apps

Critical Dependencies



Example: Online Procurement



- Major DB & ERP ISVs actively porting, running on simulator

Focus on full stacks to accelerate availability

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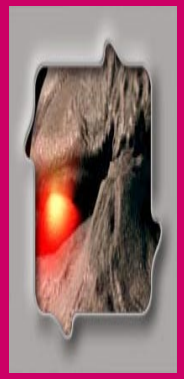
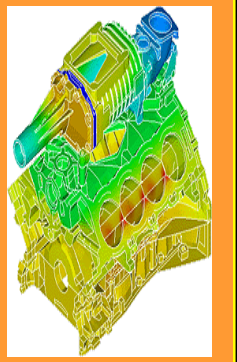
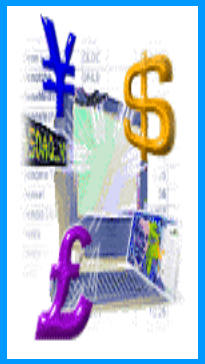
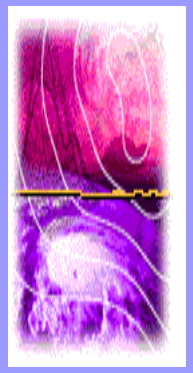
Workstation Applications

DCC	EDA	MDA	Finance	Other
•Rendering •Editing •3D Animation	•Verification •Synthesis •DRC	•FEA •Modeling •Hi-end CAE	•Equity •Treasury •Risk Analysis	•CFD •GIS •Molecular Modeling









- Top ISVs in key segments publicly committed to Merced
- Several apps actively porting, running on simulator

Focus on leaders in target segments

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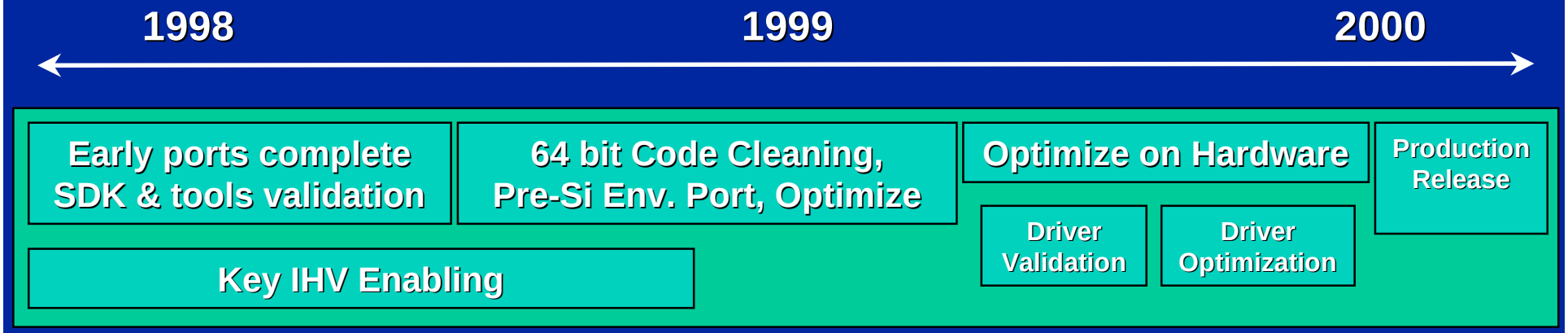
IHV Program Deliverables



- Optimized drivers for critical devices:
  - Graphics, Storage, Networking/Comm, Clustering, Video, Audio, Printer
  - 64 bit DDIs
  - PCI Hot Plug

Production ready concurrent with Merced systems

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Summary

- Merced - features for the high end
- Merced - highly competitive performance
- Merced - focus on complete solutions
- Merced - samples in ‘99, production in mid-2000
- Merced - unprecedented industry support

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Call to Action

- OEMs
  - Continue working with Intel on Merced system designs
- OSVs
  - Continue IA-64 optimization
  - Deliver ISV and IHV development kits
- ISVs
  - Attend “Preparing 32 bit code for IA-64” session
  - Get your code 64 bit ready
  - Identify your key dependency apps
  - Drive your key dependency apps to 64 bit readiness
- IHVs
  - Attend “Preparing 32 bit code for IA-64” session
  - Get your drivers 64 bit ready
  - Discuss IA-64 product requirements with OEM customers
  - Prepare for IA-64 driver porting using Intel and OSV tools

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