



Sun Microsystems, Inc.

**High Performance and
Technical Computing (HPTC)
Strategy**

**Oklahoma Supercomputing
Symposium 2005**

John Fragalla

Business Development Manager

High Performance and Technical Computing

Global Education and Research

Sun's HPTC Strategy

- Leverage Opteron for best price performance in x86 cluster market
 - > Partner with AMD on 64-bit OS design, compilers/tools, and HyperTransport interface
- Push Chip Multi-Threading Innovation with SPARC
- New SPARC-64 and APL partnerships with Fujitsu
- Continue extreme performance and security innovation with Solaris
 - > Solaris Containers, ZFS File System, Dtrace
 - > Sun Studio Development Tools
 - > HPC ClusterTools
- Sell and Support Linux: RedHat/SUSE



Sun's HPTC Strategy (cont)

- Back to our “roots” with education and research
 - > Global Science and Technology Network
- Partner with all interconnect players
 - > Infiniband, Myrinet, 10 Gig Ethernet
- Partner with Open Source Community
 - > Lustre parallel file system
 - > Sun N1 Grid Engine
 - > Open Solaris
- Sun is the #1 Contributor to the Open Source Community

Future AMD Product Line Galaxy Systems

x2100: **1U, 1S, 4 DIMM, 4GB,
1 PCI-E slots, 2 disks**

x4100: **1U, 2S, 8 DIMM, 16GB,
2 PCI-X/E slots, 2 disks**

x4200: **2U, 2S, 8 DIMM, 16GB,
5 PCI-X/E slots, 4 disks**



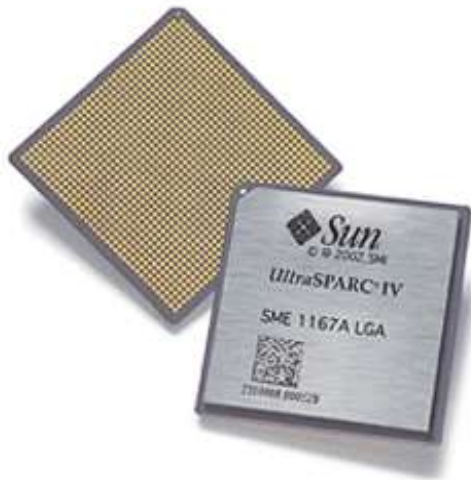
And more to Come...

100% Sun Designed

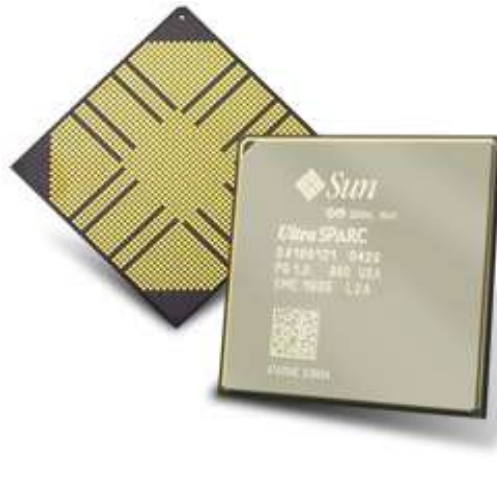
Sun Microsystems, Inc: Non-NDA Presentation

CMT Throughput Computing

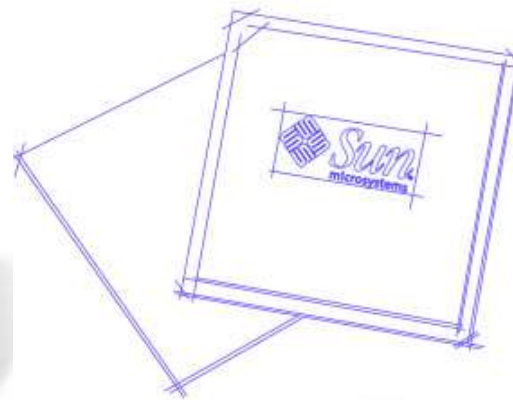
***Chip R&D Matters - 64 Bit Moves Ahead



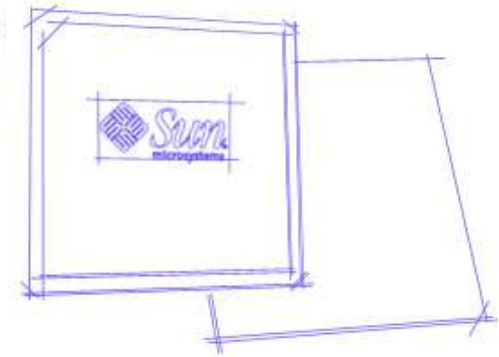
USIV+
Panther



Niagara



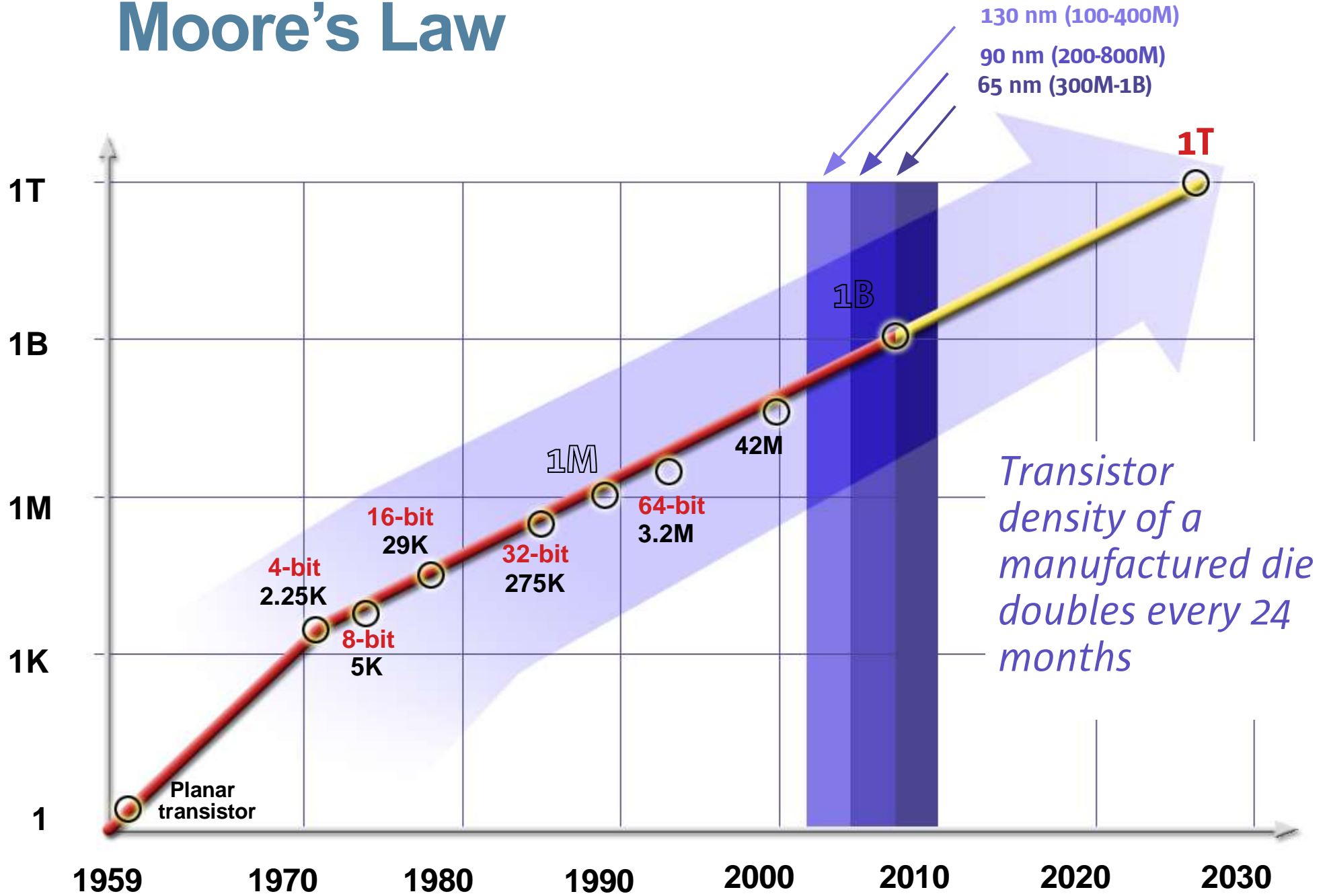
APL



Rock

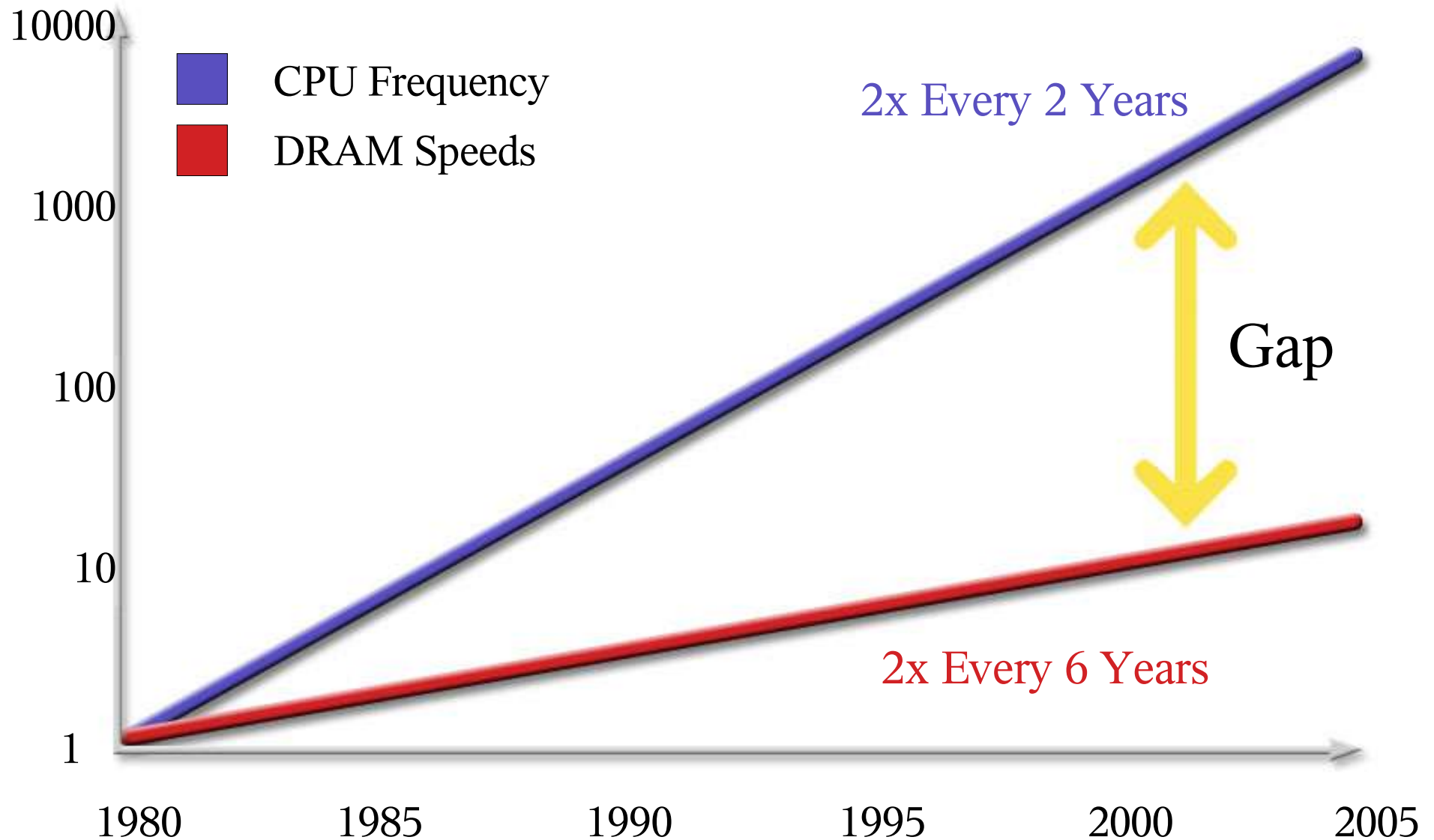
www.sparc.org—The SPARC Architecture Manual

Moore's Law

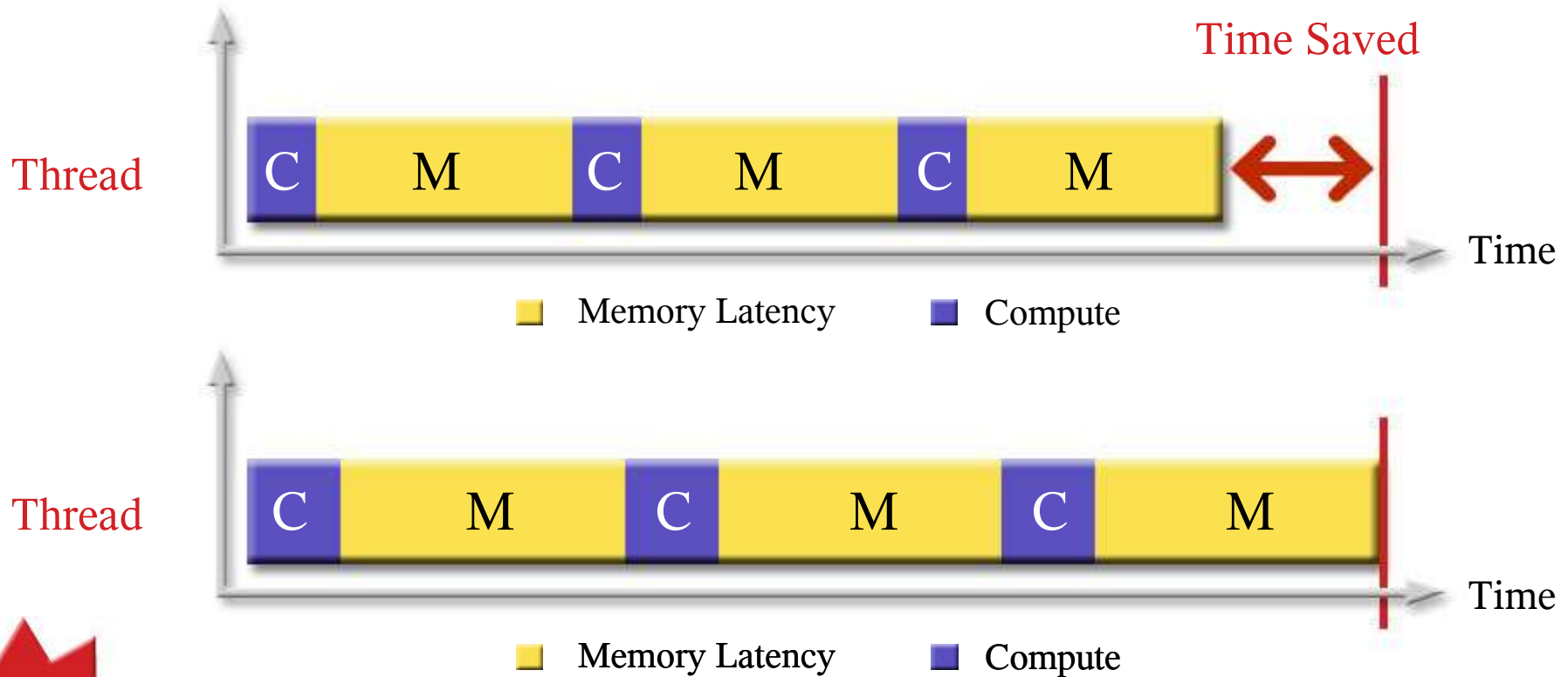


Memory Bottleneck

Relative Performance



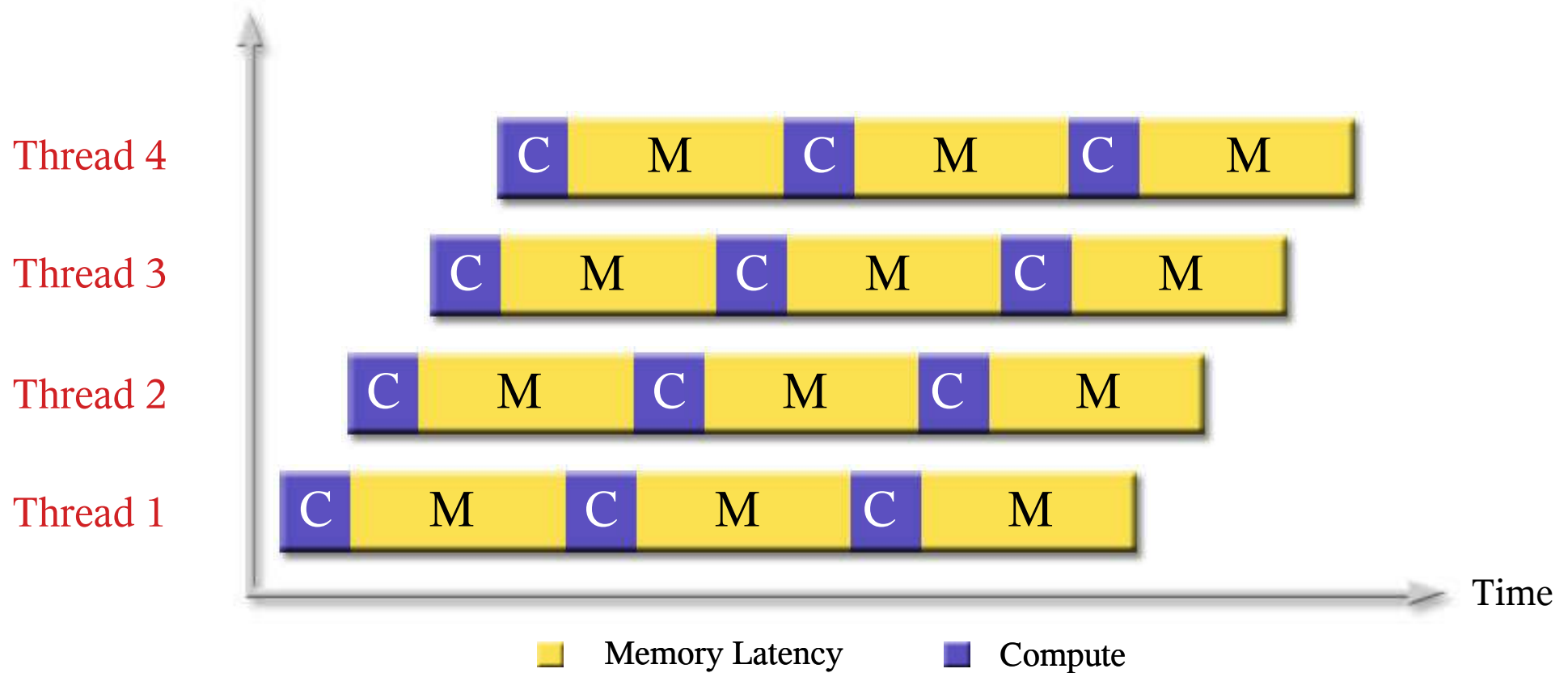
Typical Complex High Frequency Processor



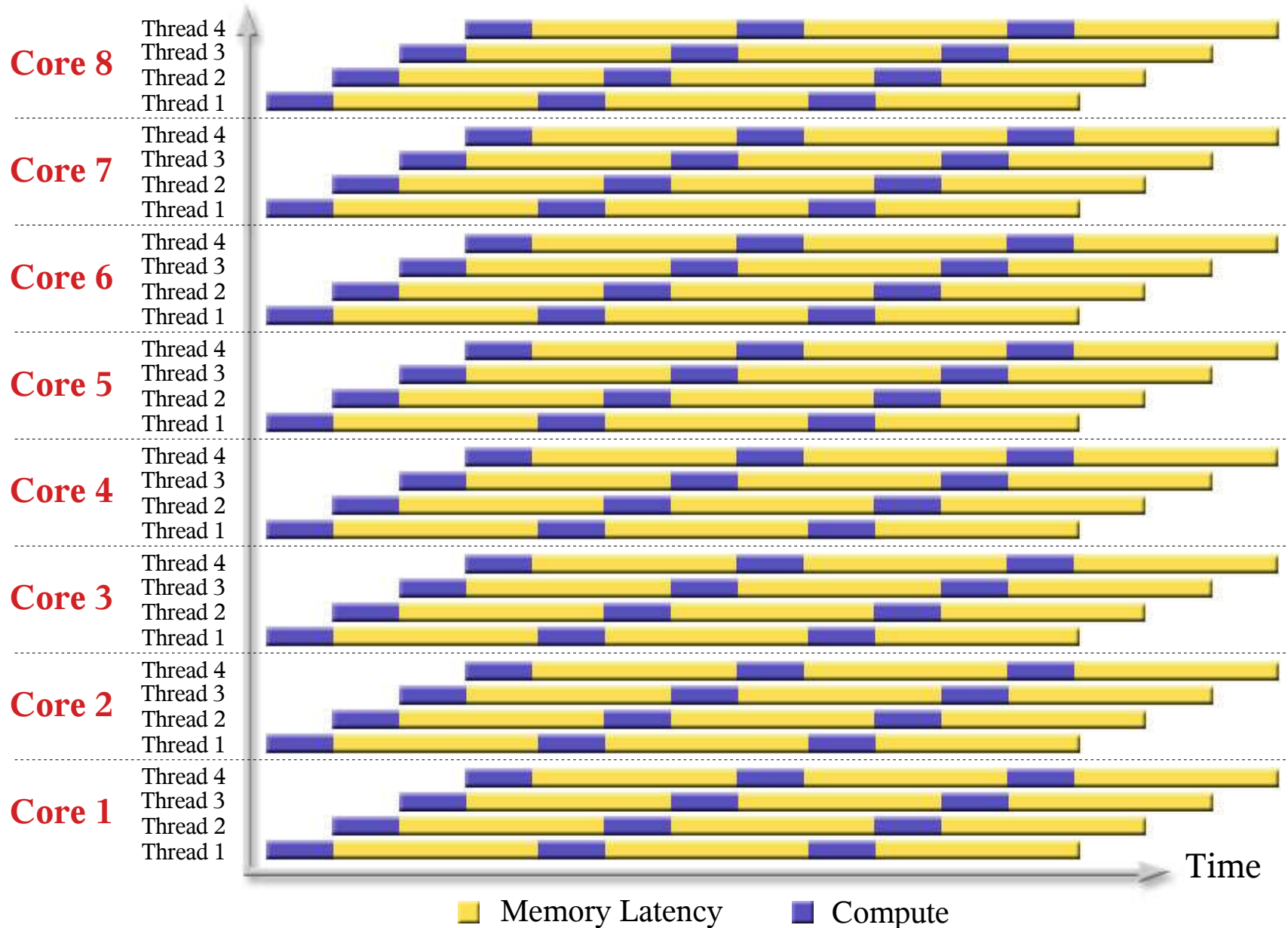
HURRY UP AND WAIT!

Note: Up to 75% Cycles Waiting for Memory

Chip Multithreading (CMT)



CMT – Multiple Multithreaded Cores



High Productivity Computing Systems



Providing a new generation of **economically viable** high productivity computing systems for the national security and industrial user community (2009 – 2010)

Awards For Each Phase

2002

1 yr

**I: Industry
Concept
Study**



~ 3M

CRAY



IBM



Sun
microsystems

3 yrs

II: Research



~50M

(July 2003)



Sun
microsystems

IBM

CRAY

4 yrs

**III: Product
Development**



100M

??

1 or 2

to be selected

2010

Solaris in HPTC

- Re-Designed with AMD Engineers
- CMT Ready today
- Sun Studio 10
 - > C/C++/Fortran Compilers
- MPAVICH MPI support on x64
 - > Ohio State University Collaboration
 - > Next Release – Better x64 support and SPARC support
- HPC ClusterTools is Back!!
- InfiniBand, Myrinet, and 10 Gigabit Ethernet support



Conclusion

- HPTC is a Growth Target with Sun Corporate Support
- AMD Opteron for low cost, high performance distributed computing
- SPARC – Innovation with CMT for high performance large shared memory computing
- Solaris OE – Single OS across all hardware providing high performance Compilers and MPI stack
 - > InfiniBand, Myrinet and 10 Gigabit Ethernet Support
- Sun Microsystems, Inc. is ready to take over the HPTC Market.



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John.Fragalla@Sun.COM

Thank You