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THE INFORMATION COMPANY

Architecting a Consolidated Grid Platform for Oracle E-Business Suite, PeopleSoft, Oracle Portal & Oracle Collaboration Suite

Four different Workloads – same Grid on Sun Fire T2000 servers

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Grid Architect

Technology Presales – Oracle Greece & SEE

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The Prospect Customer

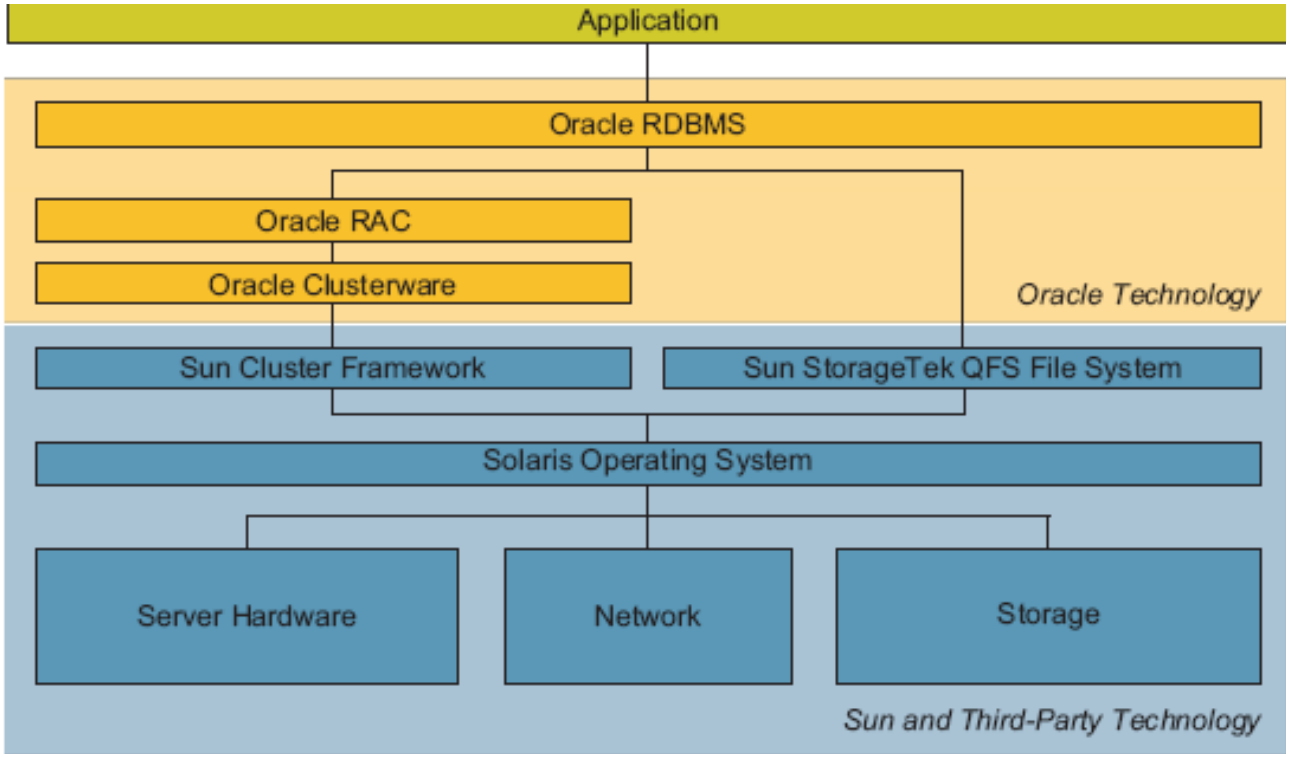
- New European University located in Skopje, FYROM

F.Y.R.O. Macedonia position in the Balkans

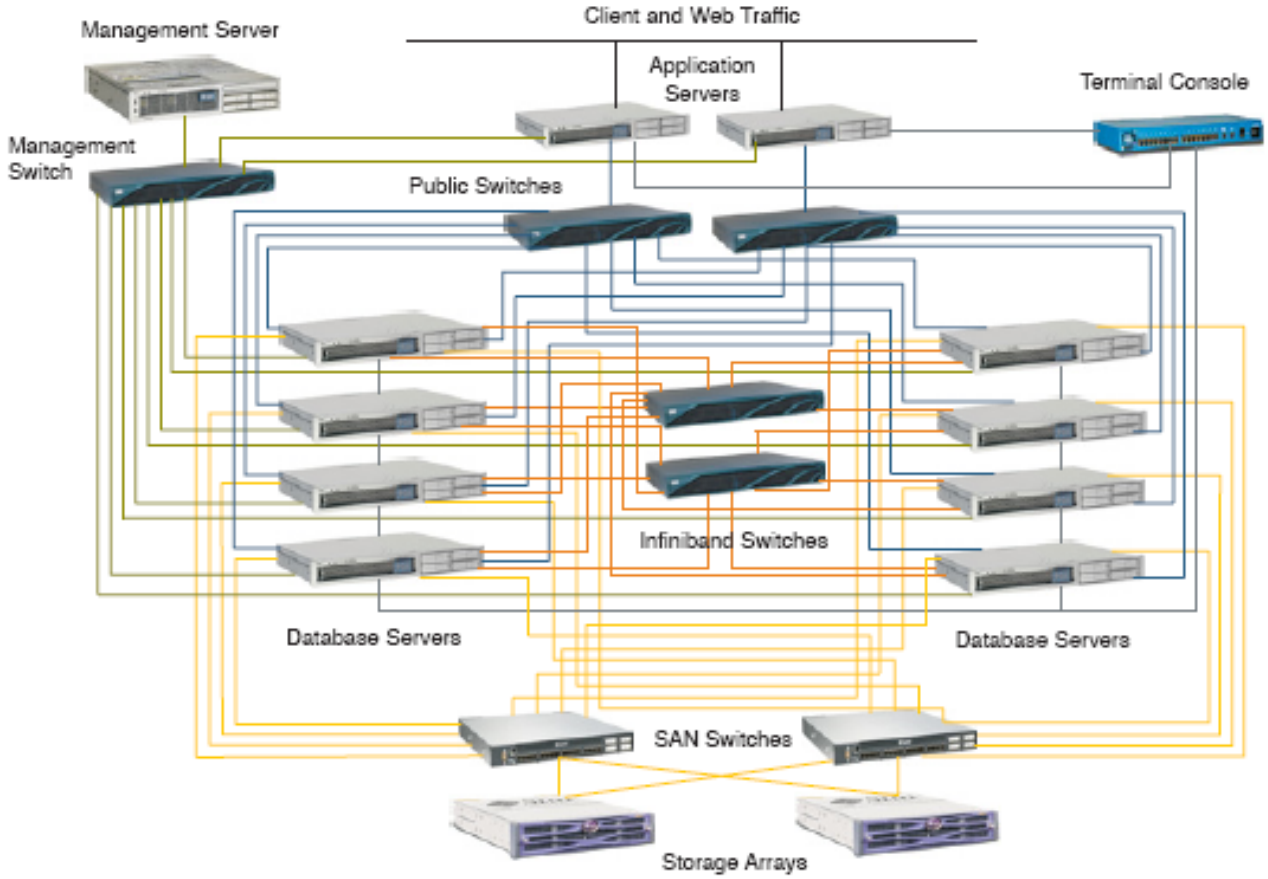
The Challenge

- Design a consistent Grid reference architecture with sizing guidelines that:
  - Uses the least possible number of CPUs
  - Uses only Sun Fire T2000 servers (based on Sun Microsystems UltraSPARC T1 (Niagara) CPUs
    - 1-socket per server, 8-cores per socket
  - Provides infrastructure for 4 fundamentally different workloads:
    - Oracle eBusiness Suite, PeopleSoft, Oracle Portal, Oracle Collaboration Suite

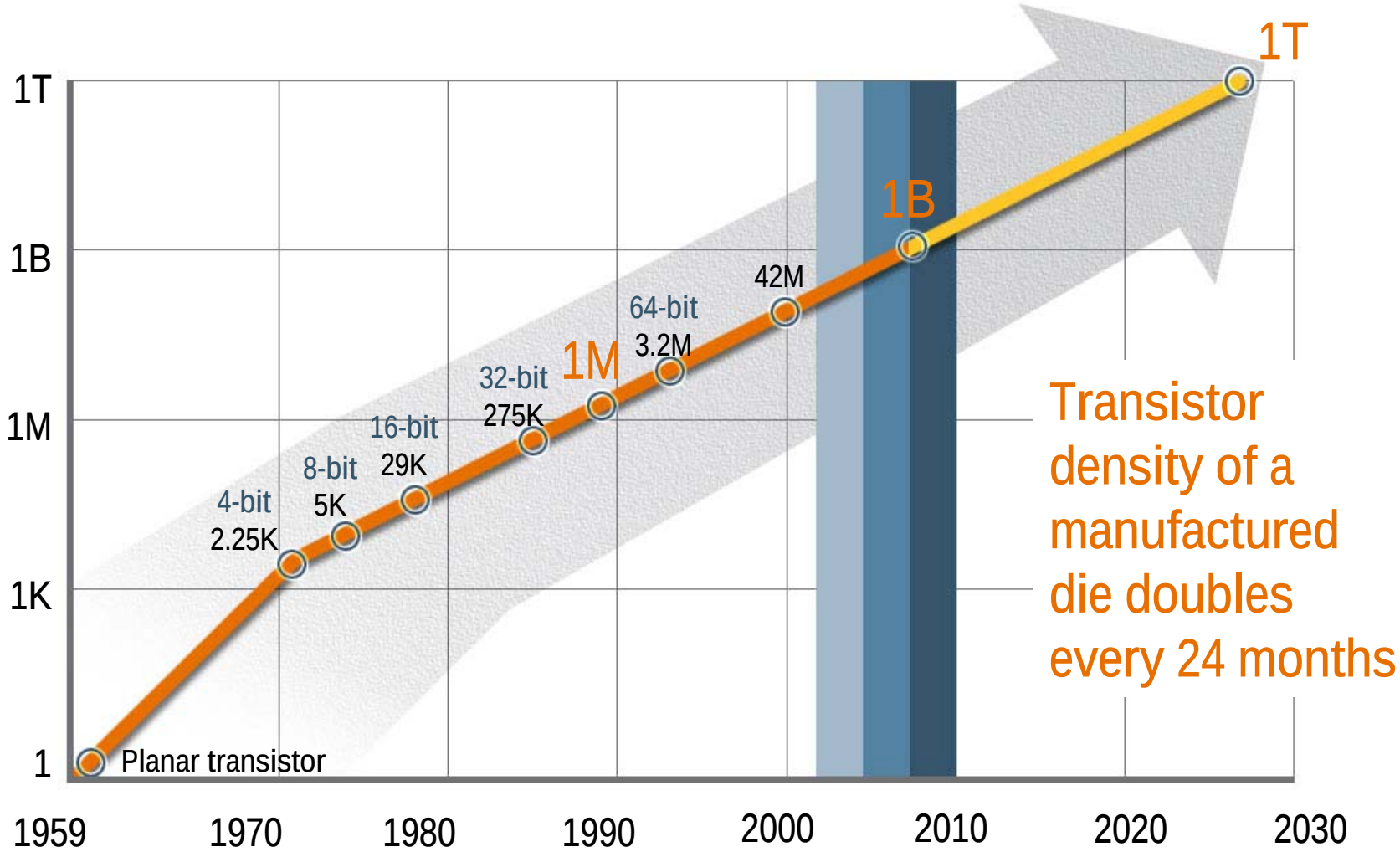
Sun technology provides an integrated foundation for Sun's Reference Architecture for Oracle 10g Grid



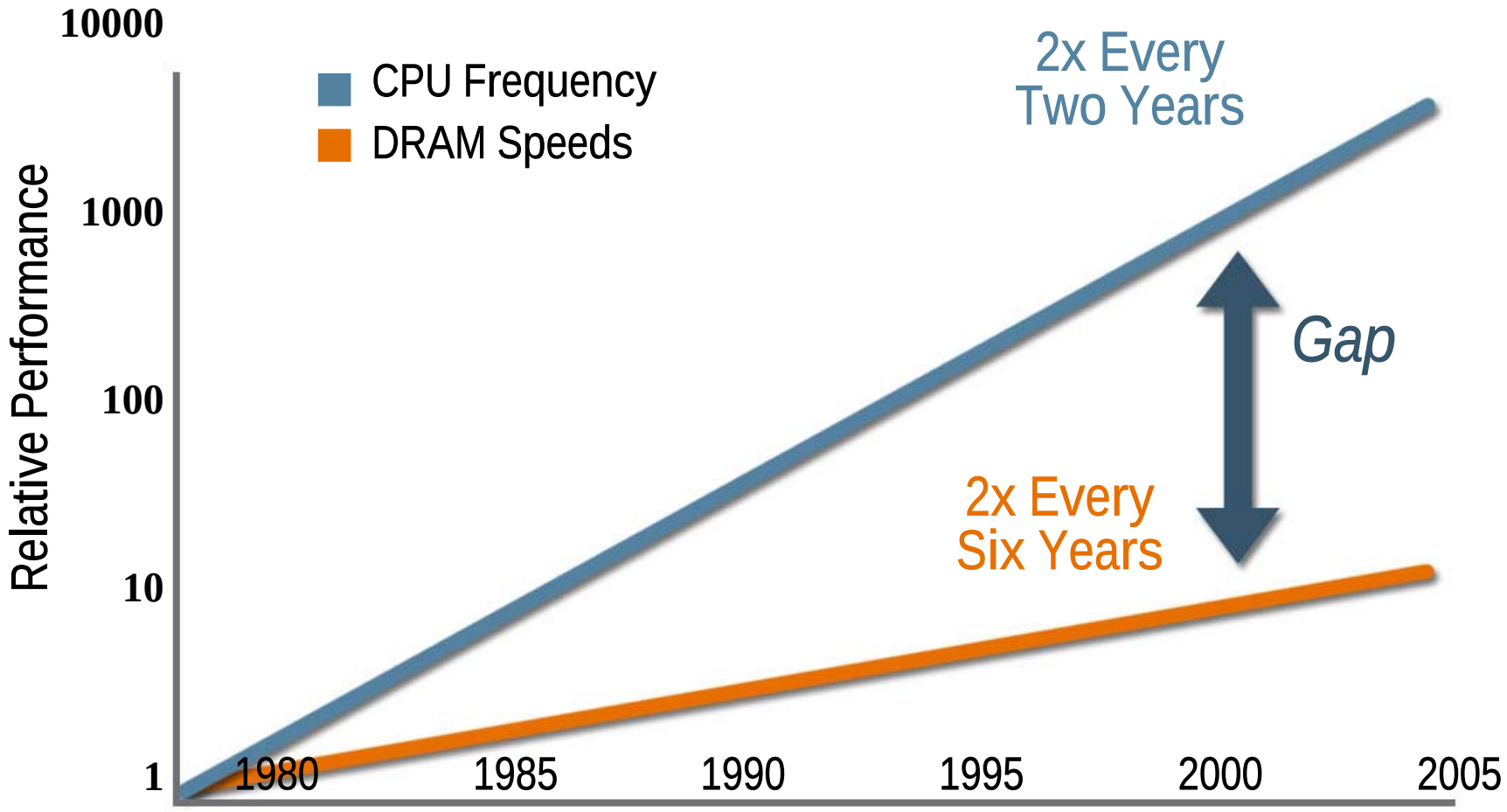
Sun's Reference Architecture for Oracle 10g Grid provides redundant high speed connectivity, a choice of x64 or UltraSPARC processor-based systems, and a choice of storage.



Moore's Law


1T
1B
1M
1K
1
1959
1970
1980
1990
2000
2010
2020
2030
Planar transistor
4-bit
2.25K
8-bit
5K
16-bit
29K
32-bit
275K
1M
64-bit
3.2M
42M
1B
1T
Transistor density of a manufactured die doubles every 24 months

The Memory Bottleneck



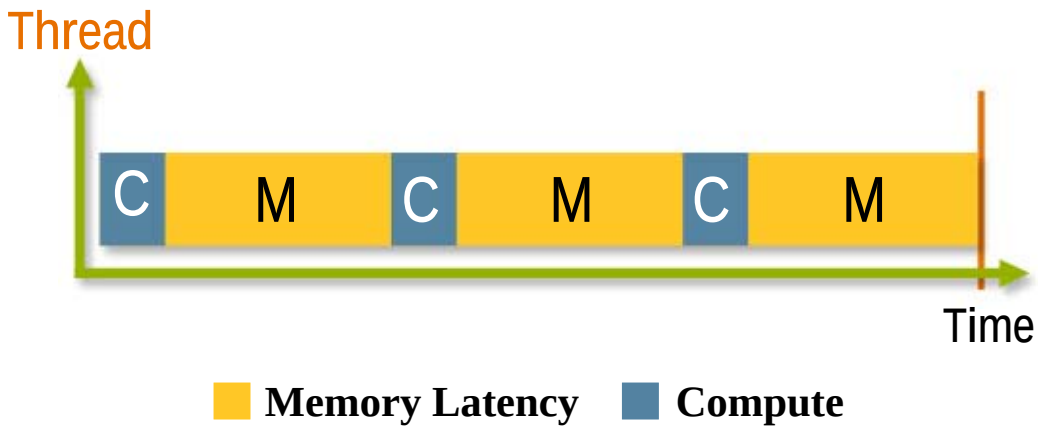
Single Threading

Up to 75% Cycles Waiting for Memory

HURRY UP AND WAIT!

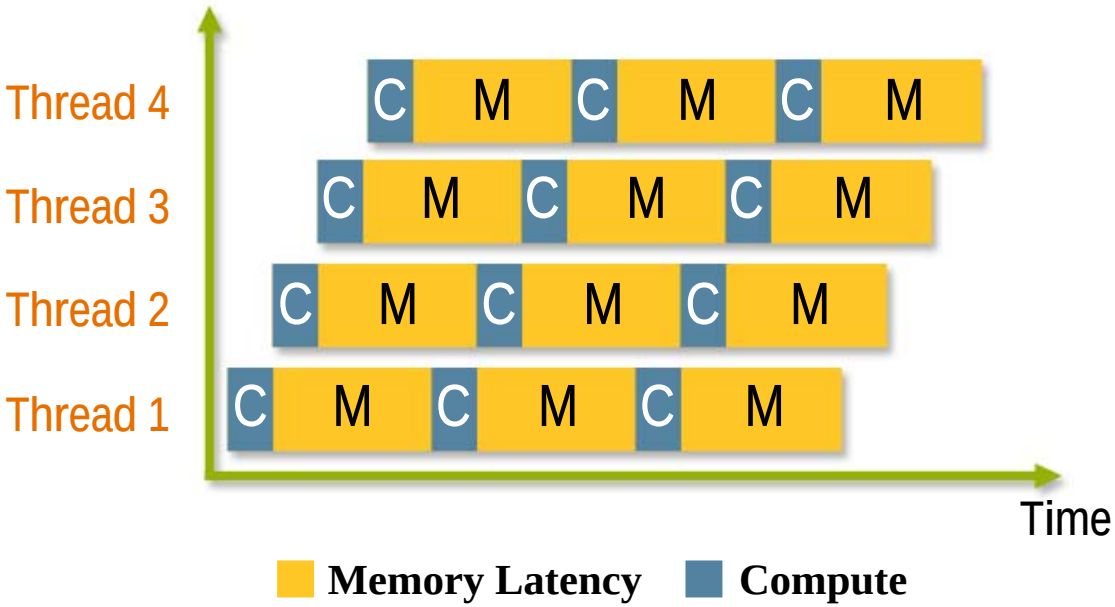
Single Threaded Performance

Typical Processor Utilization:15–25%

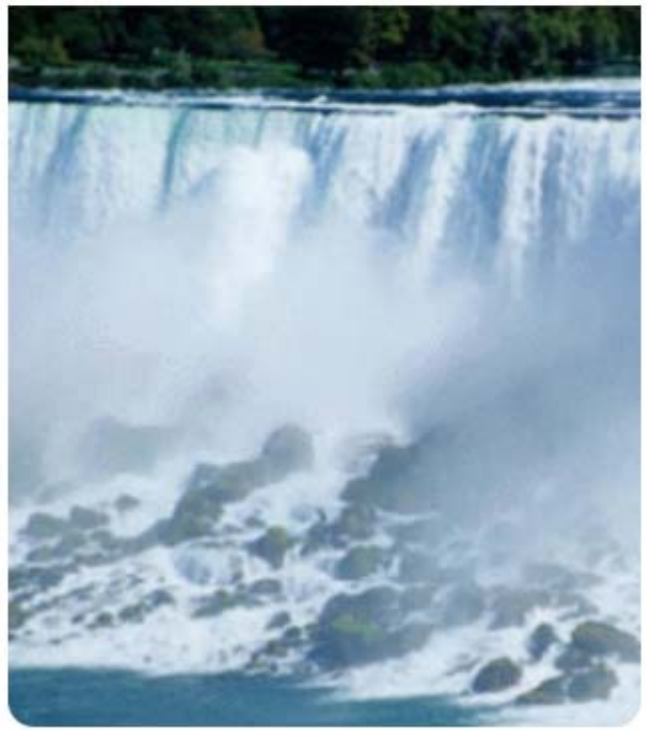


The Power of CMT

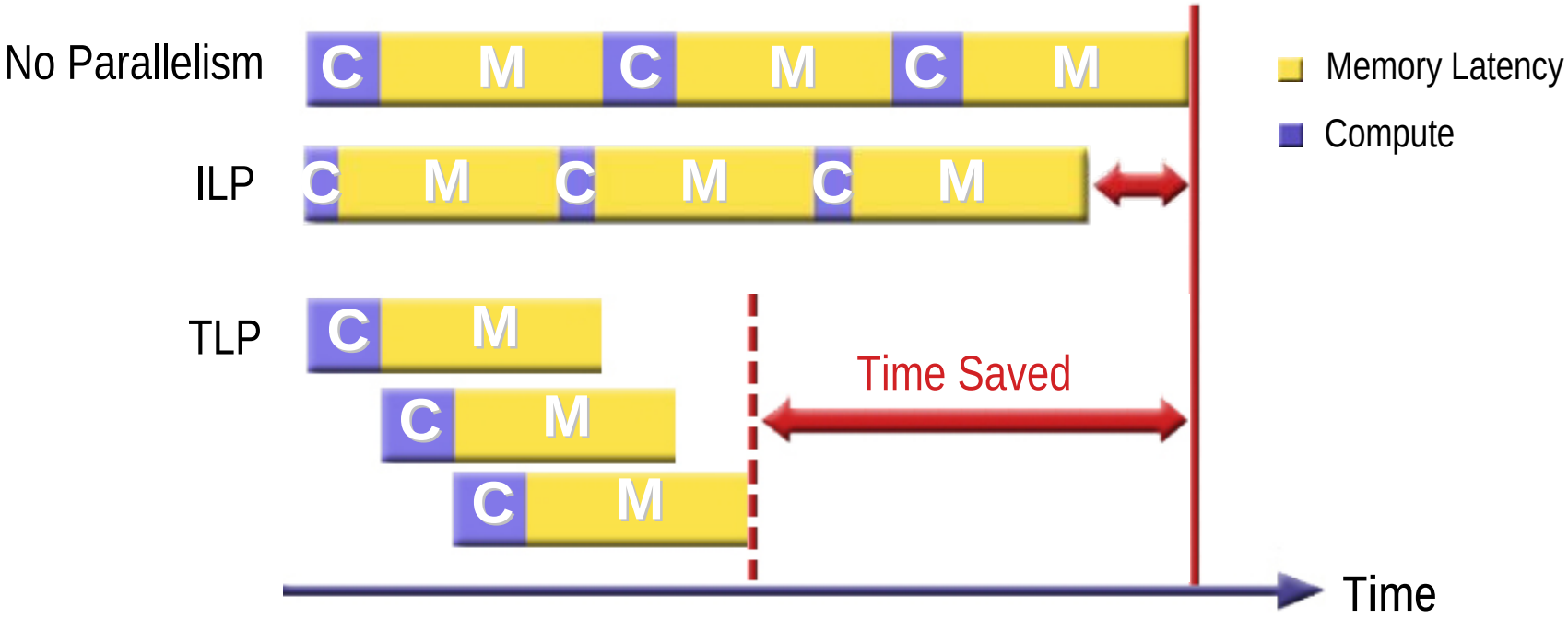
Increased Processor Utilization: Up to 85%



Chip Multi-threaded (CMT) Performance

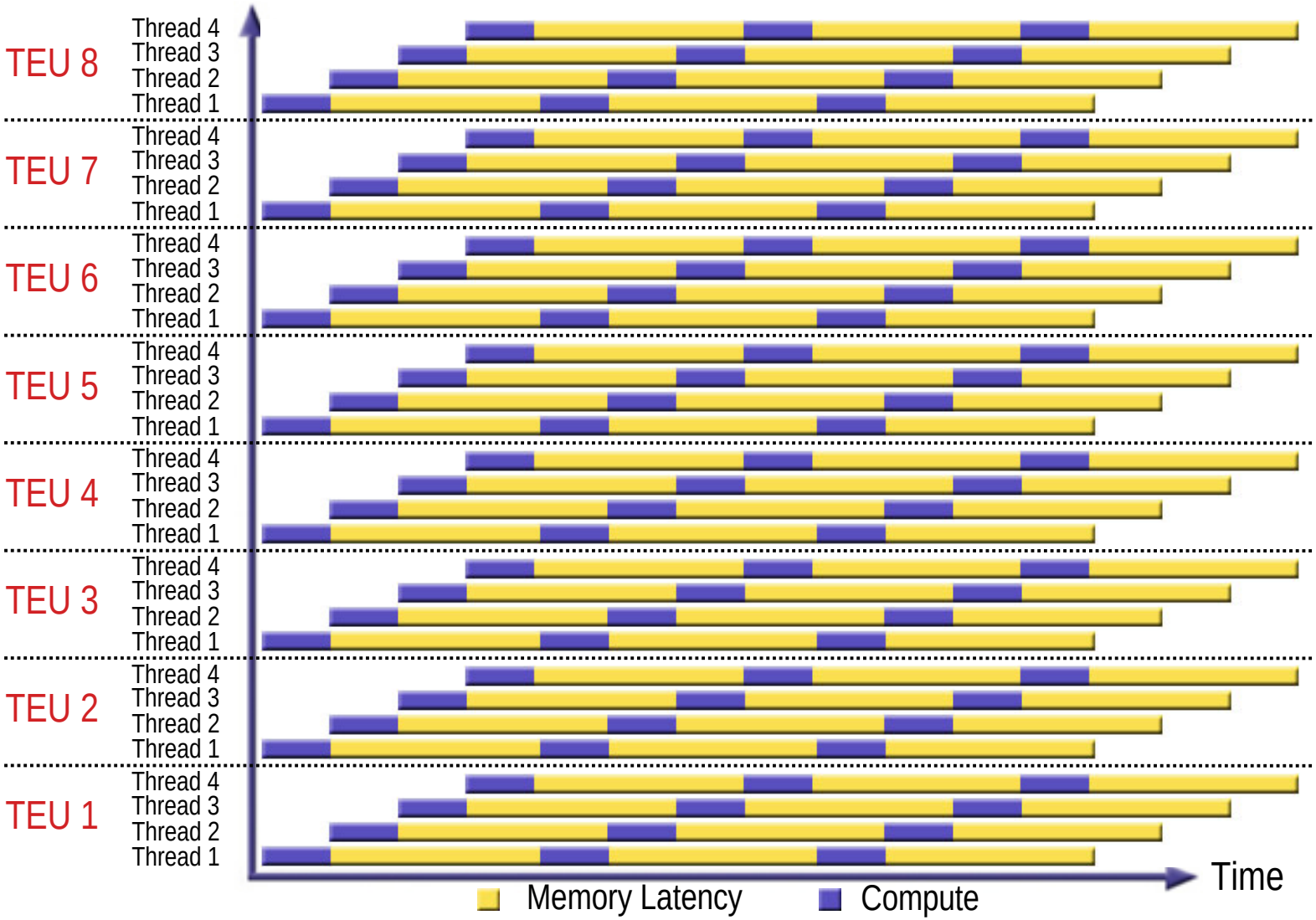


Comparing Modern CPU Design Techniques

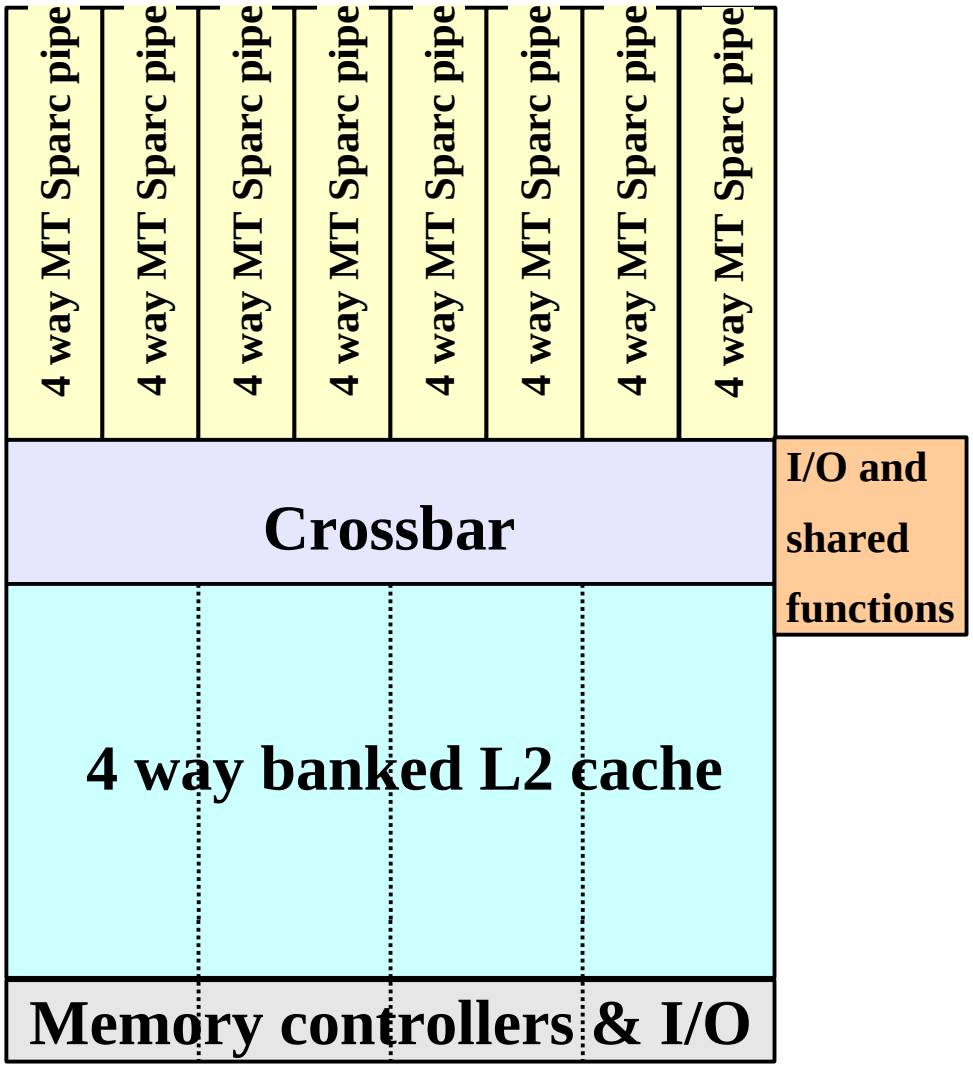


- ILP Offers Limited Headroom
- TLP Provides Greater Performance Efficiency

CMT – Multiple Multithreaded TEUs

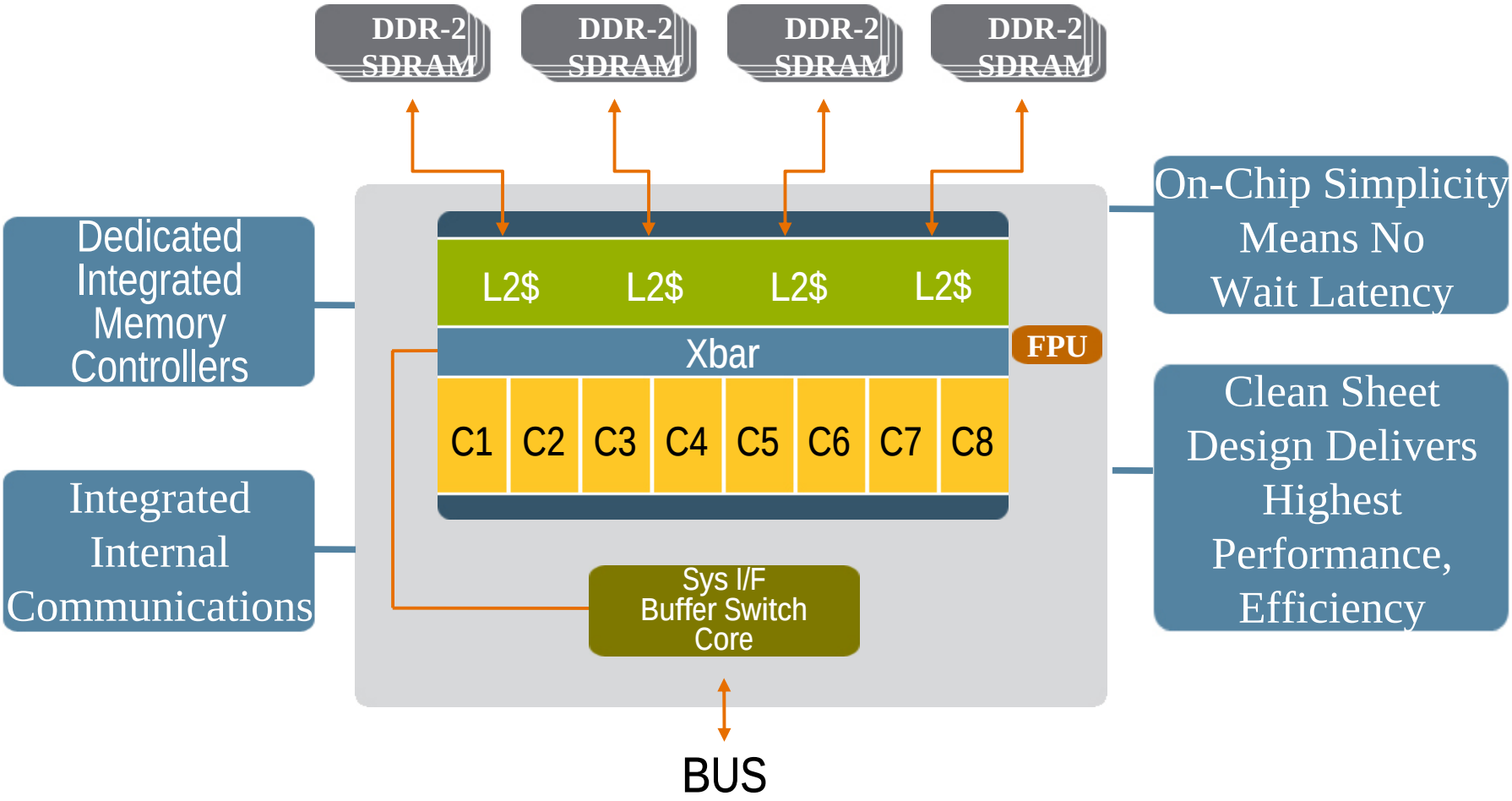


32 Thread Niagara 1 CPU



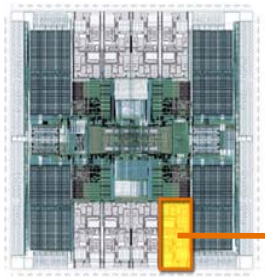
- An implementation of SPARC V9 architecture
- Eight 64-bit 4 way multithreaded pipelines
- 4 way banked 3MB secondary cache
- High bandwidth crossbar interconnect for on chip communication
- High bandwidth DRAM interface

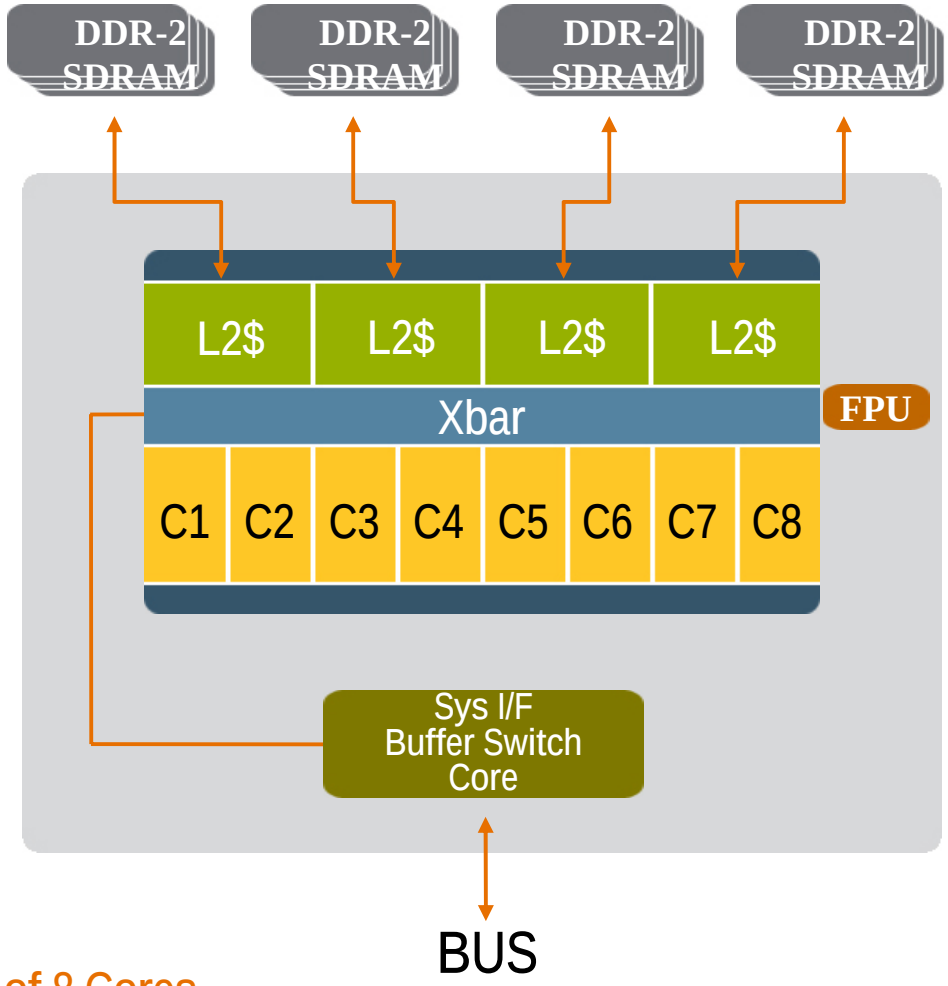
Designed for Performance and Efficiency



UltraSPARC T1

- SPARC V9 implementation
- Up to eight 4-way multi-threaded cores for up to 32 simultaneous threads
- All cores connected through a 134.4GB/s crossbar switch
- High-bandwidth 12-way associative 3MB Level-2 cache on chip
- 4 DDR2 channels (23GB/s)
- Power : < 80W !
- ~300M transistors
- 378 sq. mm die





Sip Energy,

Gulp Data

Sun Fire T1000

Sun Fire T2000

CoolThreads™ Servers

Common Attributes

- Single UltraSPARC T1 Processor
  - 4, 6, or 8 Cores
  - 16-32 threads
- Extensive Processor RAS, Throughput and Low Power
- DDR-2 Memory, Chipkill, Memory Sparing
- Advanced Lights-Out Management
-

Java™ solaris™ ULTRASPARC™ DRIVEN

Sun Fire T2000

Sun Fire T2000

Java Application Servers, Enterprise Application Servers (ERP, CRM), Web Tier Consolidation

- Rackmount dense
  - ✓ 2RU chassis, 24.3” depth
  - ✓ Up to 32 GB DDR-2 memory
  - ✓ 16 memory slots
- High reliability
  - ✓ Hot pluggable disk drives
  - ✓ Redundant hot swappable Power supplies and fans
- Expandable
  - ✓ 3 PCI-E, 2 PCI-X expansion slots
  - ✓ Up to 4 SAS 2.5” disk drives
  - ✓ 4 10/100/1000 Mbps Ethernet
  - ✓ 4 USB ports
- Low power/low TCO
  - ✓ 275 watts typical consumption

Workload #1: Oracle eBusiness Suite 750 concurrent users

Tier	Database	iAS	Web Cache
# of Servers	2	2	1
# of CPUs / Server	1	1	1
Max. # of CPUs / Server	1	1	1
Memory per Server (GB)	16	24	8
Usable Database Space (GB)	612		
Min. # of Drives for Database	16		

Workload #2: PeopleSoft 2000 concurrent users

Tier	Database	iAS	Web Cache
# of Servers	4	6	1
# of CPUs / Server	1	1	1
Max. # of CPUs / Server	1	1	1
Memory per Server (GB)	16	24	8
Usable Database Space (GB)	1224		
Min. # of Drives for Database	34		

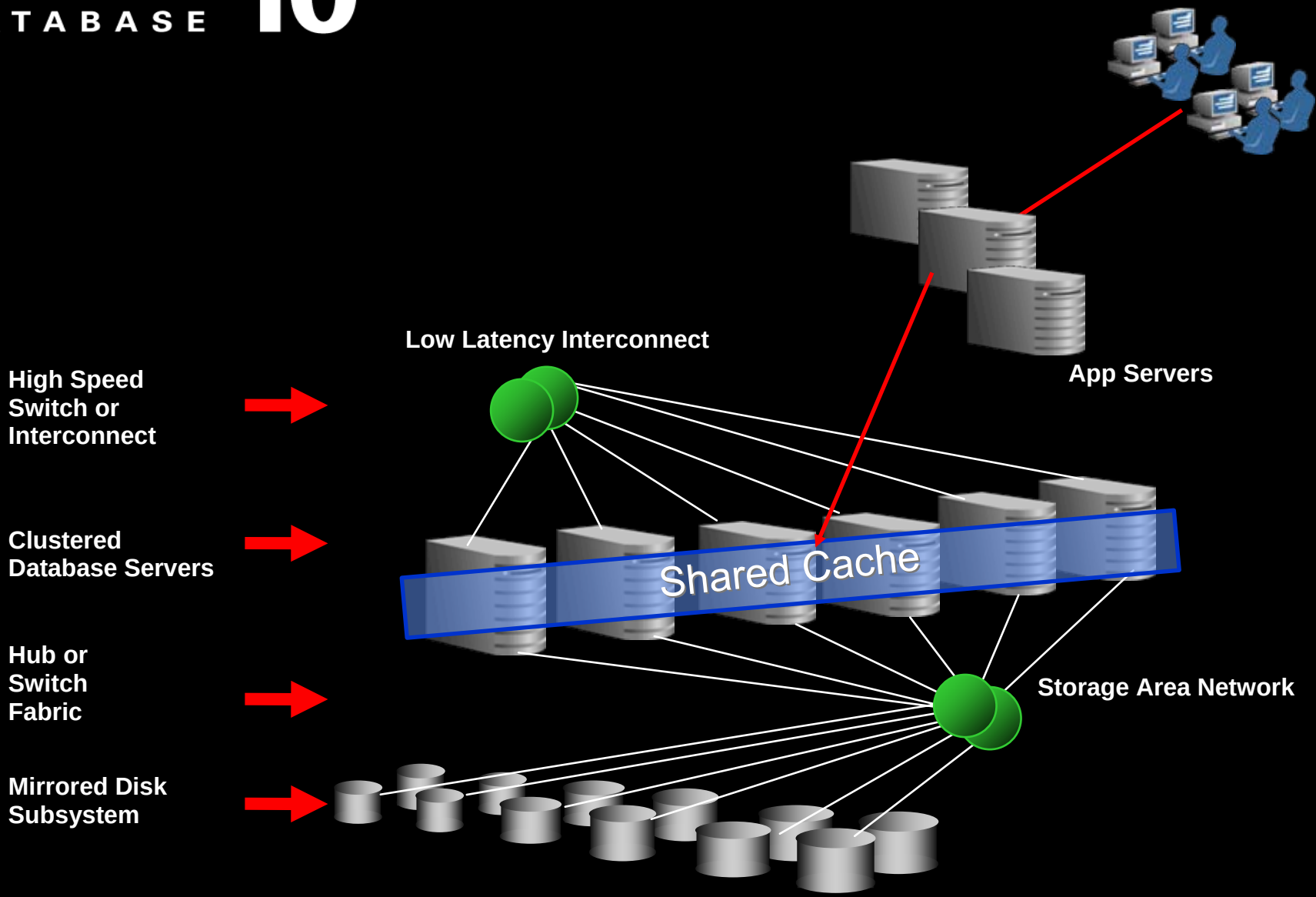
Workload #3: Oracle Portal 2000 concurrent users

Tier	Database	iAS	Web Cache
# of Servers	2	2	2
# of CPUs / Server	1	1	1
Max. # of CPUs / Server	1	1	1
Memory per Server (GB)	16	24	8
Usable Database Space (GB)	136		
Min. # of Drives for Database	6		

Workload #4: Oracle Collaboration Suite 2000 concurrent users

Tier	Database	iAS	Web Cache
# of Servers	1	1	1
# of CPUs / Server	1	1	1
Max. # of CPUs / Server	1	1	1
Memory per Server (GB)	16	24	8
Usable Database Space (GB)	136	Yes	
Min. # of Drives for Database	6	153	

ORACLE DATABASE 10g



A Possible Grid Topology to consider

Data Centre B

Data Centre A

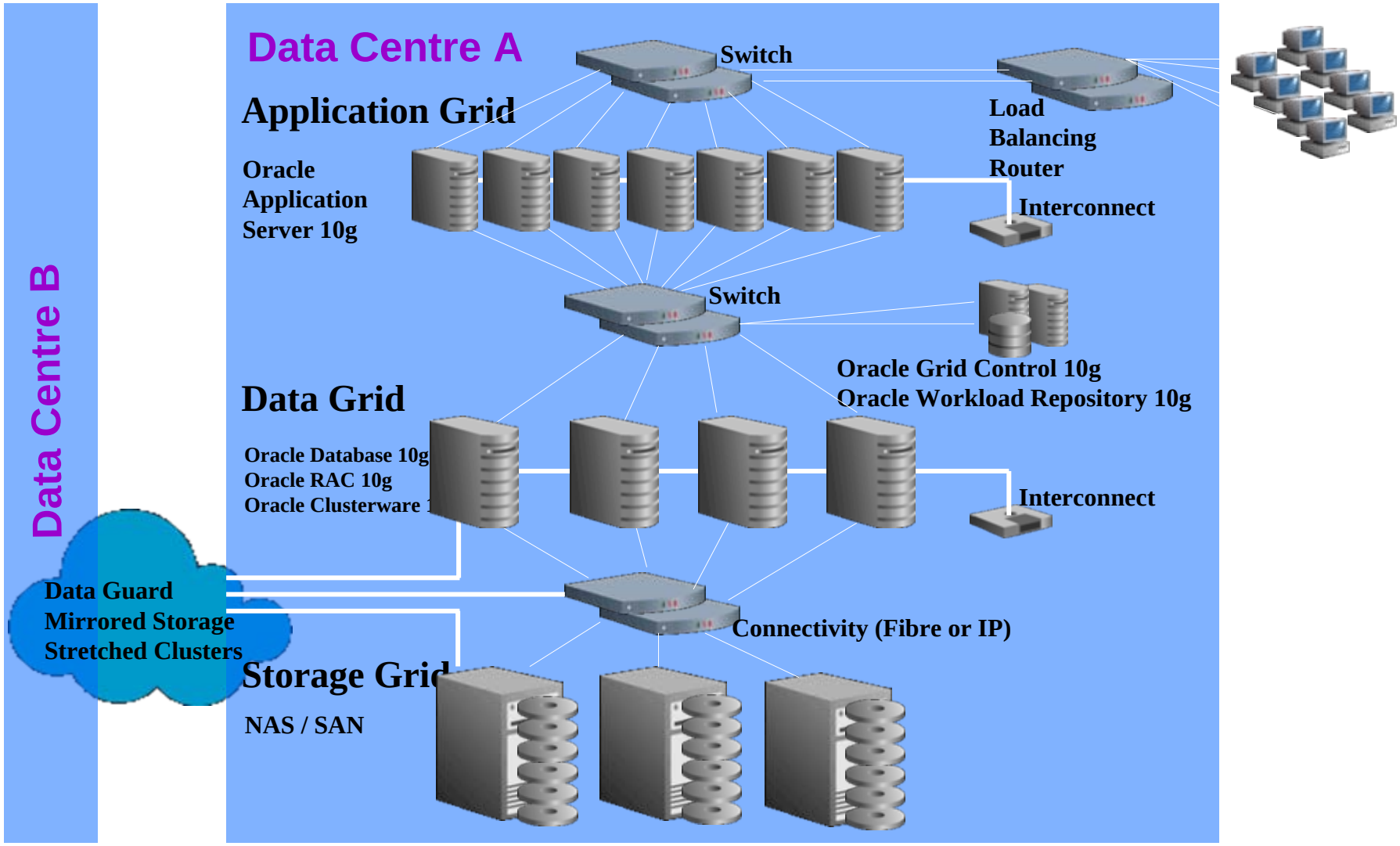
Switch Blades

Application Blades
Database Blades
Management Blades

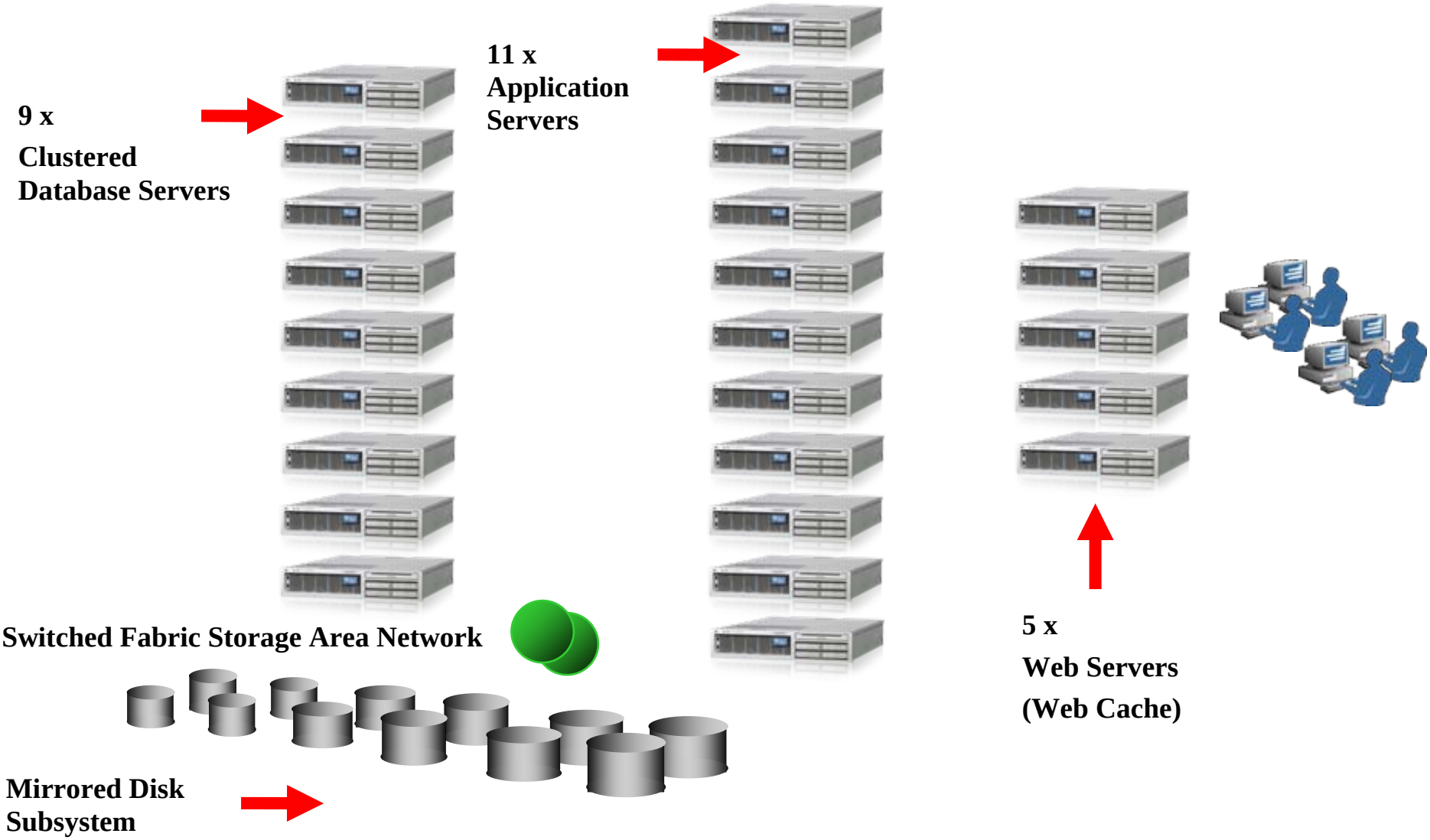
SAN

Data Guard
Mirrored Storage
Stretched Clusters

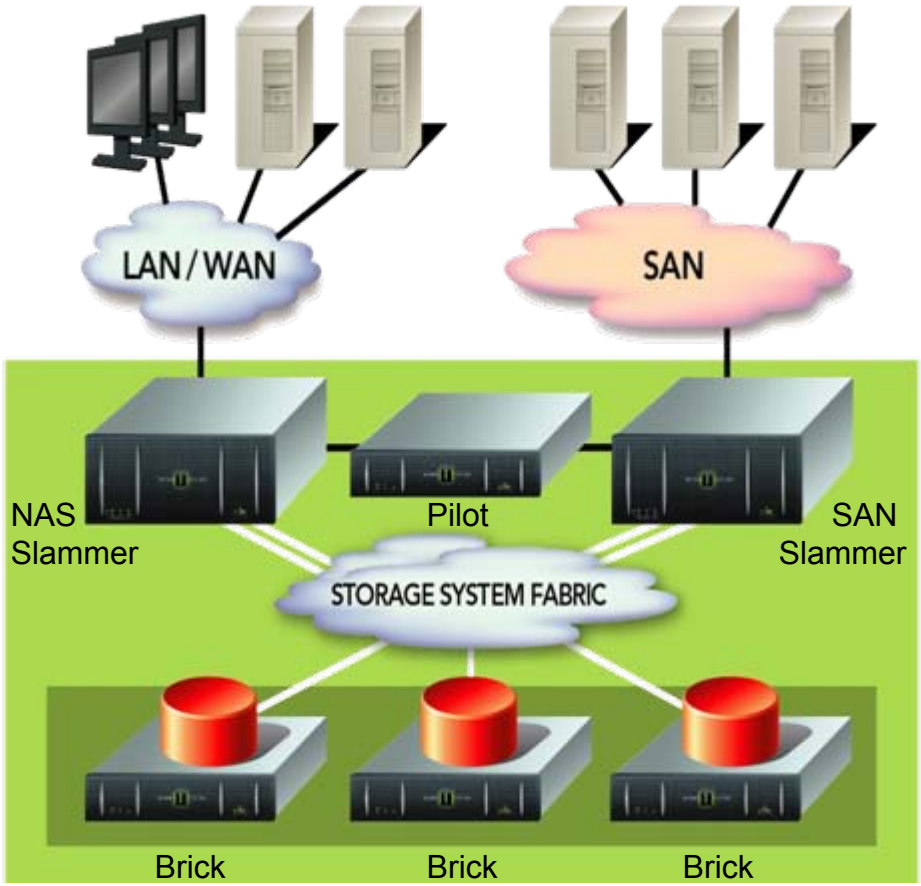
Grid Topology Actually Used



The Resulting Grid



Pillar Axiom Storage System



- **Modular Architecture**
  - Designed to natively serve files over LANs/WANs, or blocks over SANs as peers
  - Storage system fabric enables front and back-end to scale independently
- **Simplified Management**
  - QoS-based provisioning tools
  - Application-centric context
  - Predictive performance allocation
  - Policy-based system operation
- **Built-in Serviceability**
  - Simple installation and management
  - Remote Call Home
  - Online access to software upgrades
  - Guided Maintenance

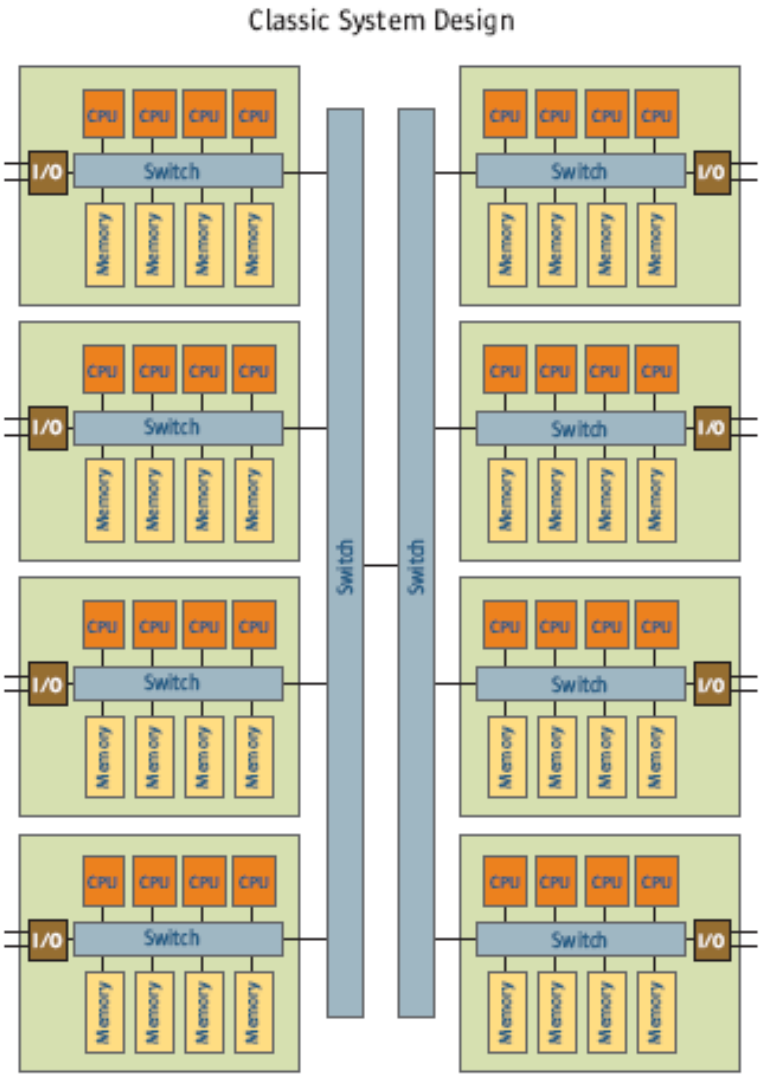
Enabling the Storage Grid

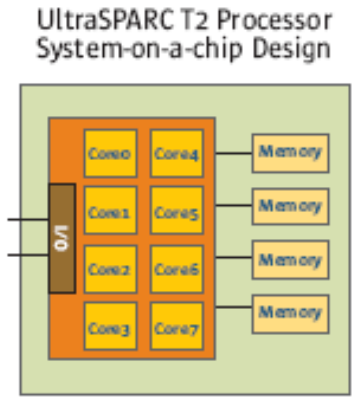
Next Steps – Implementing Sun SPARC® Enterprise T5220 Unleashing the UltraSPARC® T2 Processor with CoolThreads™ Technology

Sun SPARC Enterprise T5220 Server

The UltraSPARC T2 (left) and UltraSPARC T1 Processors with CoolThreads Technology

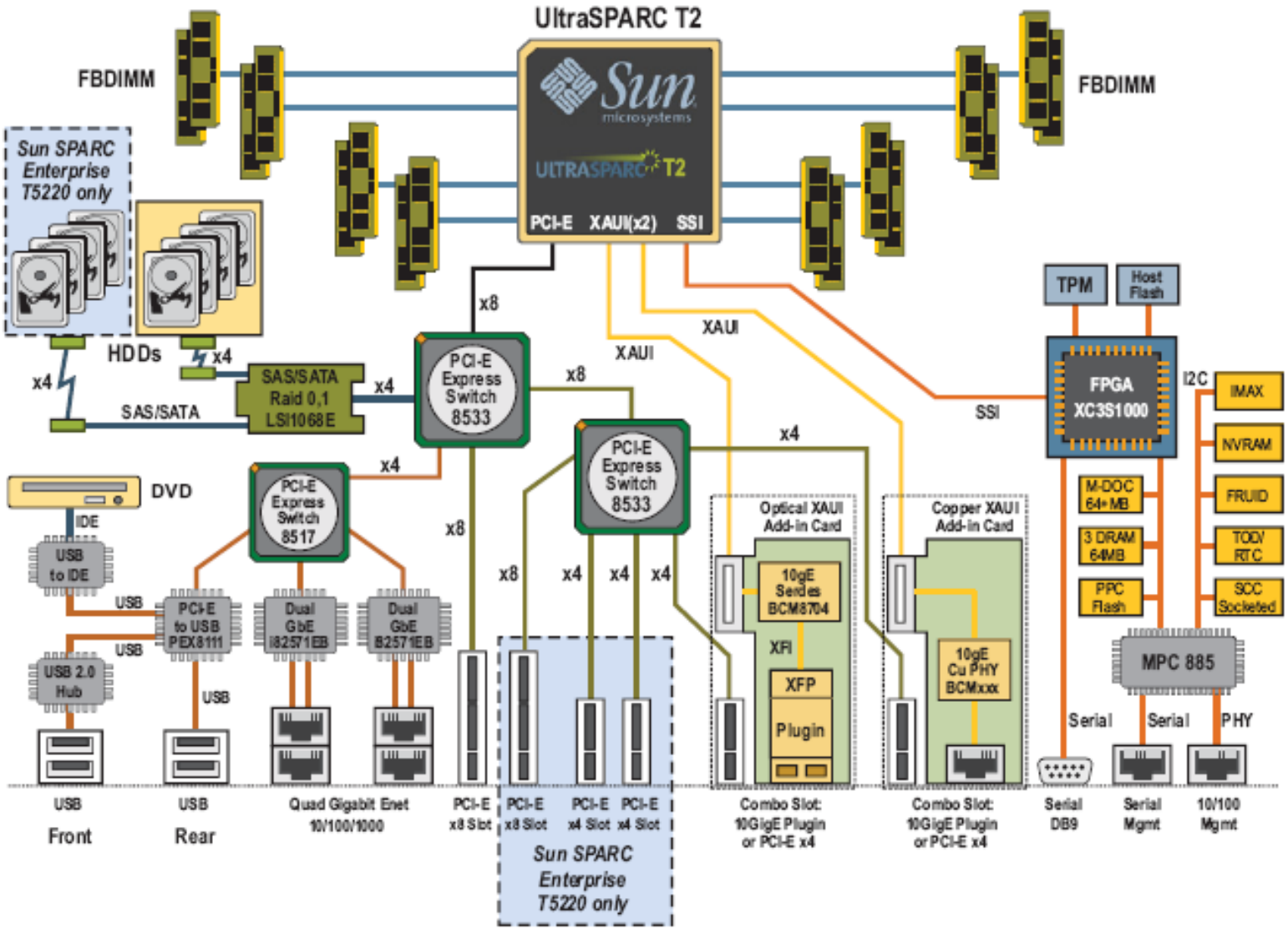
With eight cores providing 64 threads, the UltraSPARC T2 processor maximizes compute power and minimizes system component count at the same time — delivering greater reliability than systems with many more processors, multiple system boards, and far more complicated designs.



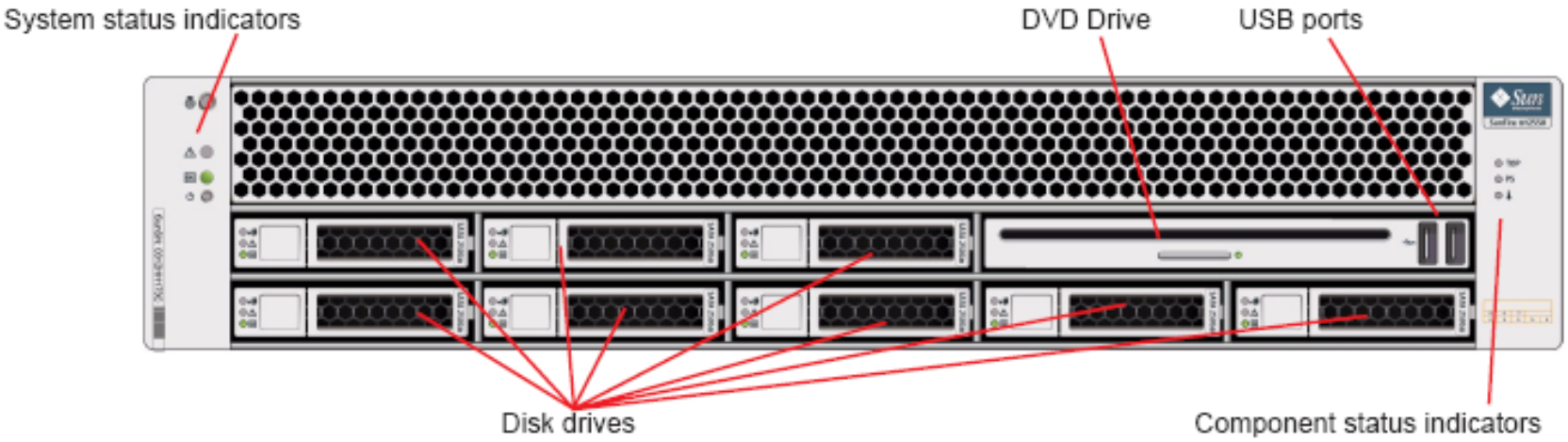


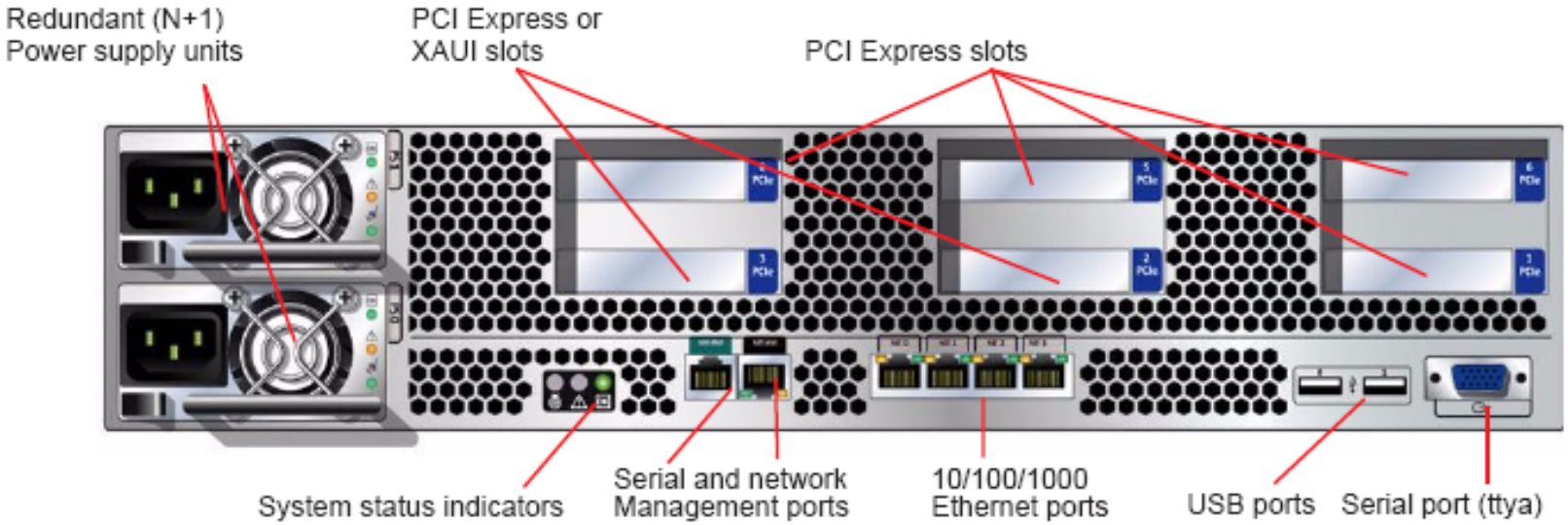
The UltraSPARC T2 processor combines eight cores, memory management, cryptographic support, 10 Gb Ethernet, and PCI Express on a single chip

Block-level diagram of the Sun SPARC Enterprise T5220 server motherboard

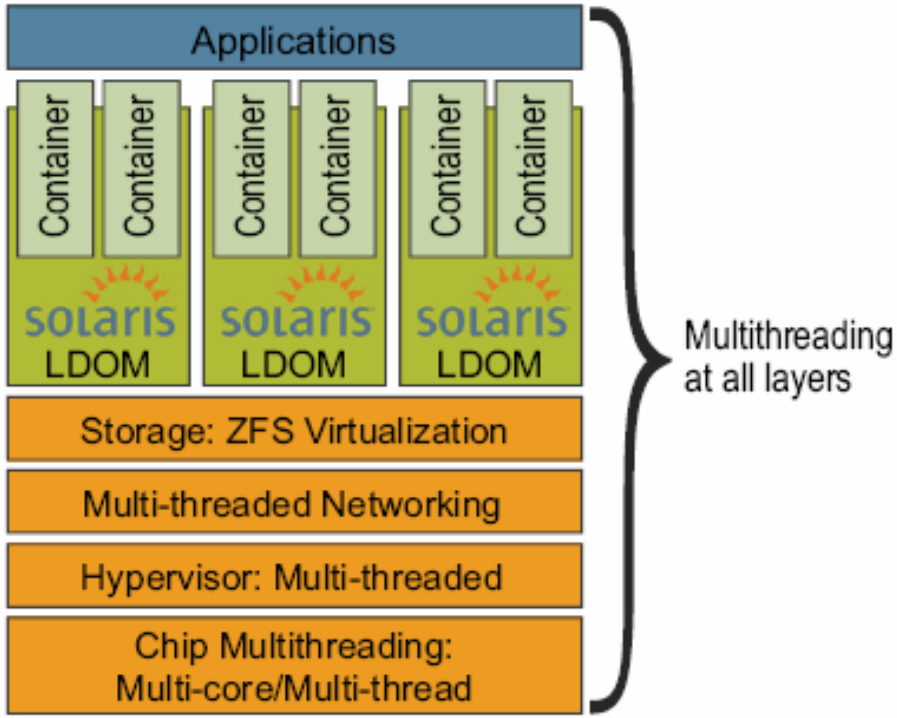


Sun SPARC Enterprise T5220 server, front and rear panels





Sun provides parallelization and virtualization at every level of the technology stack




Q&A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