

# Sistemas multiprocesador de memoria compartida comerciales

ATC– Arquitecturas Paralelas

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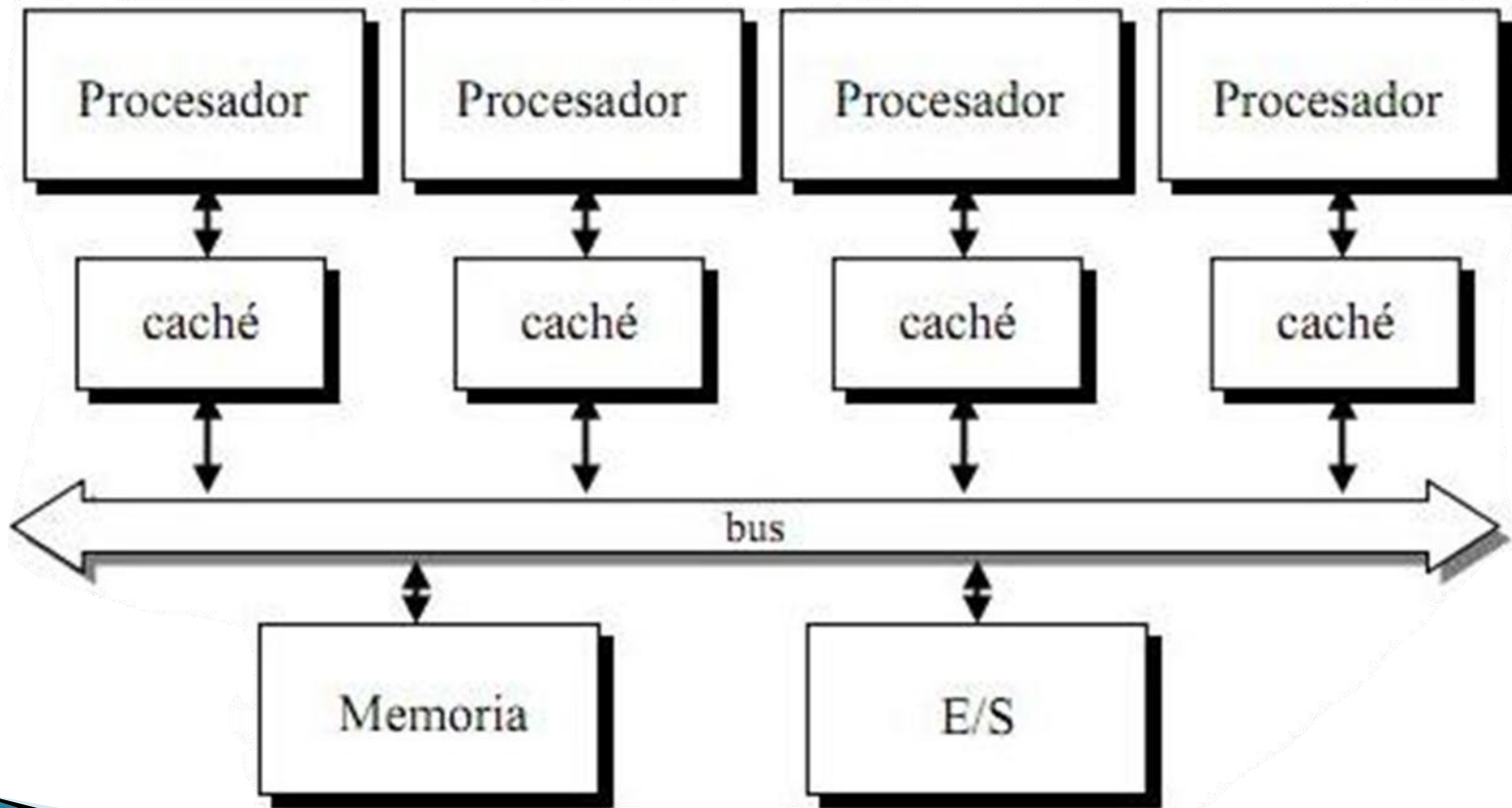
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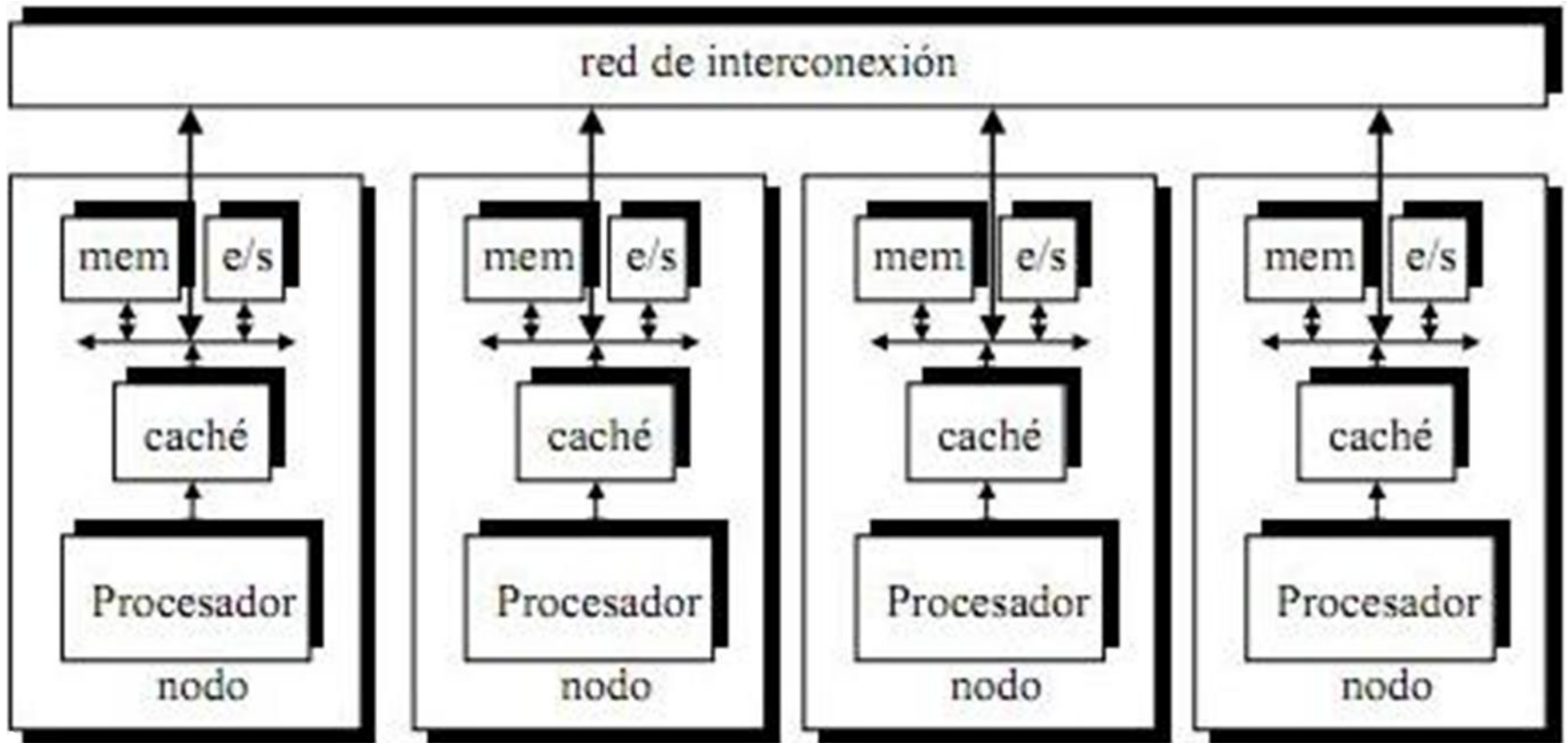
# Sistemas Multiprocesadores

- ▶ Arquitectura Centralizada de Memoria Compartida



# Sistemas Multiprocesadores

- ▶ Arquitectura Distribuida



# Symmetric MultiProcessor (SMP)

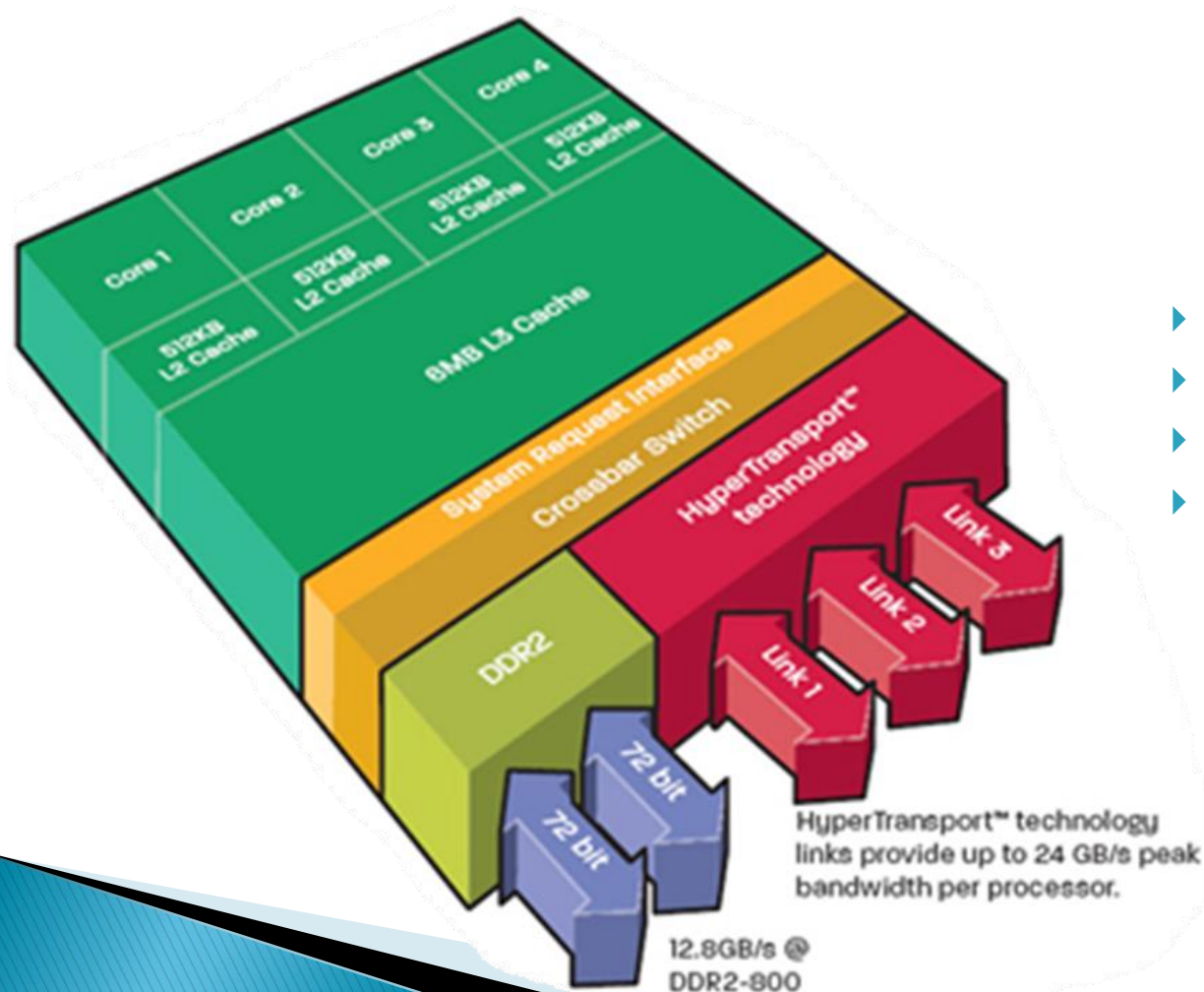
- ▶ Características
  - Varios procesadores independientes
  - Memoria compartida físicamente
- ▶ Jaguar Cry XT5 – HE Opteron



- ▶ 37376 AMD Opteron 6-core
- ▶ 300 TB DDR2
- ▶ 7832 AMD Opteron 4-core
- ▶ 62 TB DDR2

# Symmetric MultiProcessor (SMP)

## ▶ AMD Opteron Quad Core



- ▶ 4 núcleos 2,1GHz
- ▶ 512 KB L2
- ▶ 6 MB L3
- ▶ 8 GB DDR2

# Parallel Vector Processor (PVP)

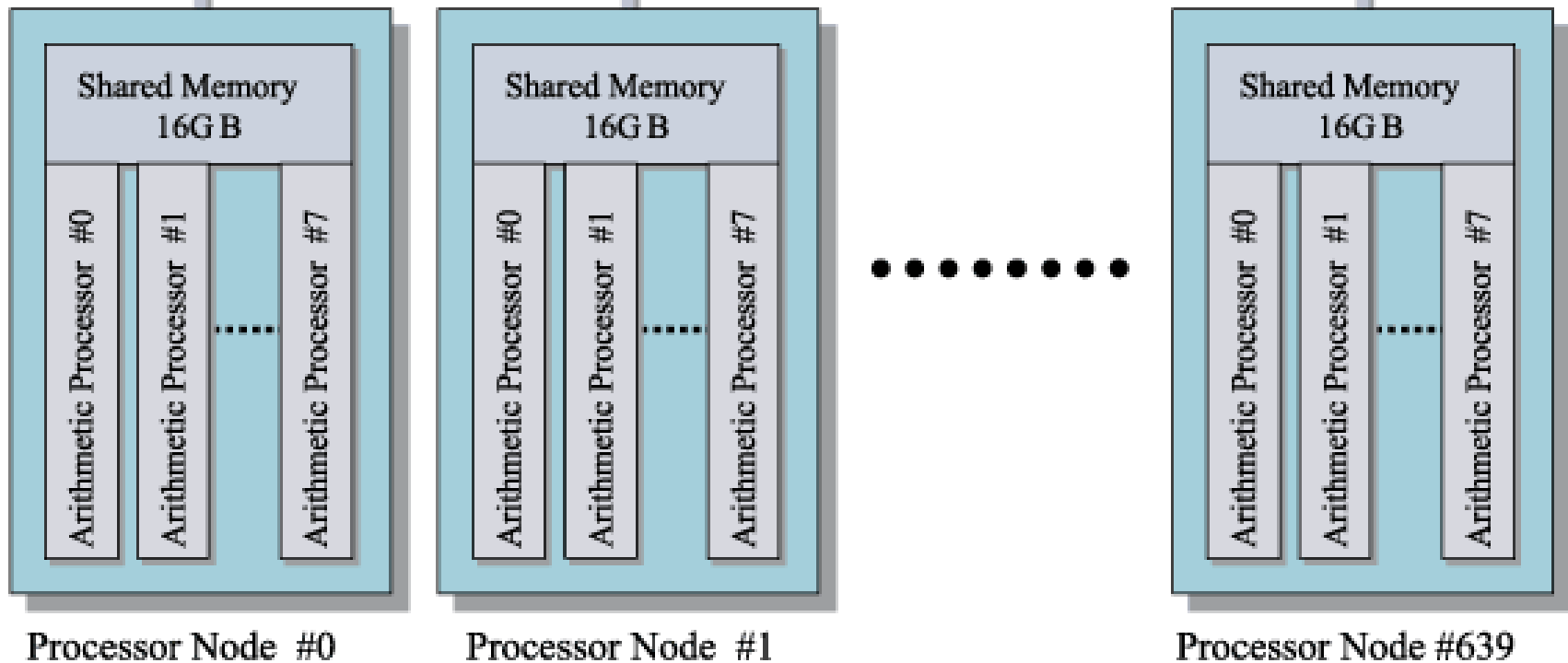
- ▶ Características
  - Microarquitectura orientada a vectores
  - Instrucciones específicas para operar sobre matrices
- ▶ Earth Simulator NEC SX-9/E/1280M160)



- ▶ 640 nodos de procesamiento
- ▶ 5112 NEC 3,2 GHz
- ▶ 10 TB RAM

# Parallel Vector Processor (PVP)

Interconnection Network (fullcrossbar, 12.3GB/s x 2)





# Distributed Shared Memory (DSM)

## ▶ Características

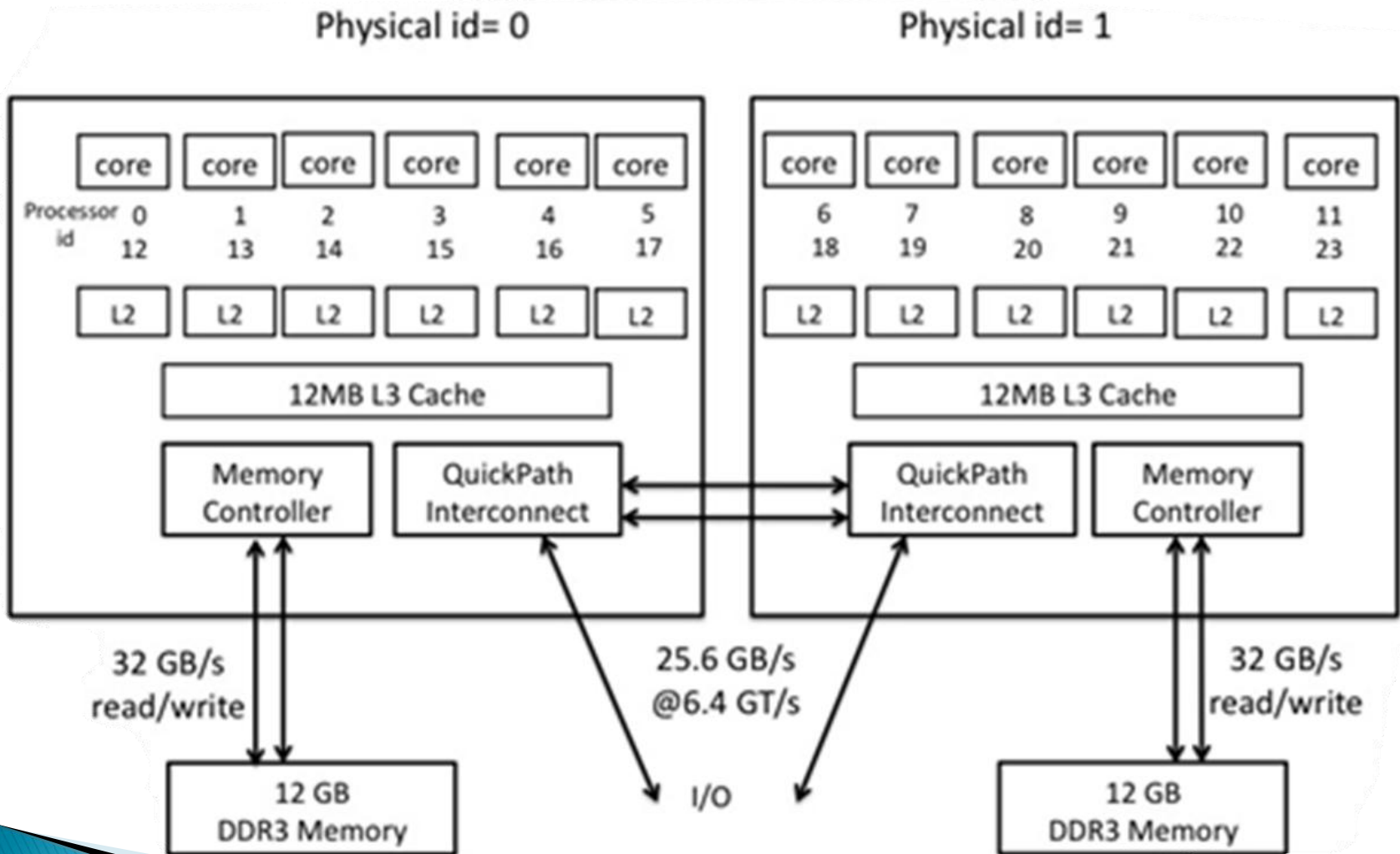
- Relativamente más baratos que los SMP
- Simulación de un espacio común de direcciones

## ▶ Pleiades



- ▶ 10702 nodos
- ▶ 21504 Xeon 4/6 cores  
2,93 GHz
- ▶ 164 TB RAM

# Distributed Shared Memory (DSM)



# Referencias

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- ▶ Earth Simulator Center Architecture, [http://www.jamstec.go.jp/es/en/images/system\\_b.gif](http://www.jamstec.go.jp/es/en/images/system_b.gif)
- ▶ Thomas H. Dunigan, Jr., Jerrey S. Vetter, James B. White III, Patrick H. Worley Oak Ridge National Laboratory, \Performance Evaluation of the Cray X1 Distributed Shared Memory Architecture".

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- ▶ NASA, "\Westmere's architecture", [http://www.nas.nasa.gov/Users/Documentation/Ice/hardware\\_pleiades.html](http://www.nas.nasa.gov/Users/Documentation/Ice/hardware_pleiades.html)
- ▶ NASA, "\Pleiades", <http://www.nas.nasa.gov/Resources/Systems/pl eiades.html>