

IBM POWER4 – Arquitectura 64-bit

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IBM POWER4 – Arquitectura 64-bit

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- Objectivos a alcançar
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- IBM POWER4 vs Intel IA-64

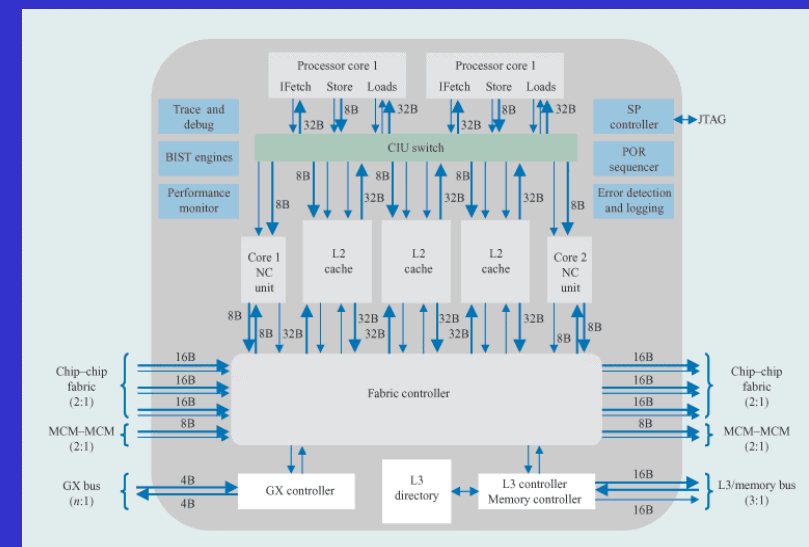
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Evolução da Arquitectura POWER

Processador	Ano	Características
POWER1	1990	32-bit 8KB I-Cache 32-64KB D-Cache 1 FMA
POWER2	1993	2 FMA 1 fixed-point unit
PowerPC 601	1993	SMP ISA modificado
RS64	1997	64-bit 64KB L1 I-Cache 64KB L1 D-Cache 4MB 2-way L2-Cache 1 FP 1 Load/Store 12-processadores
RS64-II, III e IV		64-128KB L1-Cache 8-16MB 4-way L2-Cache HW multithreading 24-processadores
POWER3	1998	2 FP SMP-enabled PowerPC

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POWER4 – Desenho Lógico



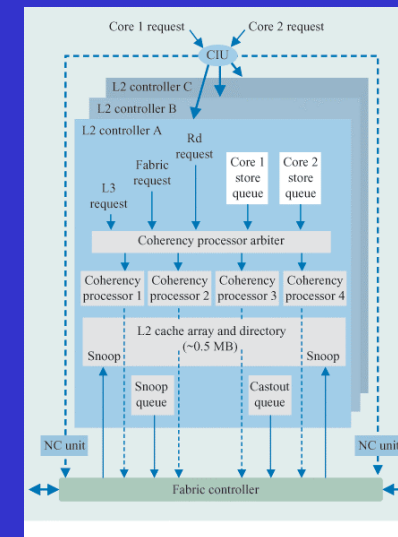
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POWER4 – Hierarquia de Memória

Component	Organization	Capacity per chip
L1 Instruction Cache	Direct map, 128-byte line managed as four 32-byte sectors	128 KBytes (64 KBytes per processor)
L1 Data Cache	2-way, 128-byte line	64 KBytes (32 KBytes per processor)
L2	8-way, 128-byte line	~1.5 MBytes
L3	8-way, 512-byte line managed as four 128-byte sectors	32 MBytes
Memory		0 - 16 GBytes

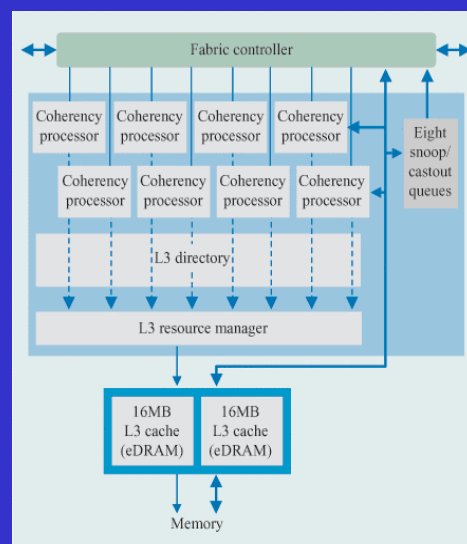
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POWER4 – L2 Cache



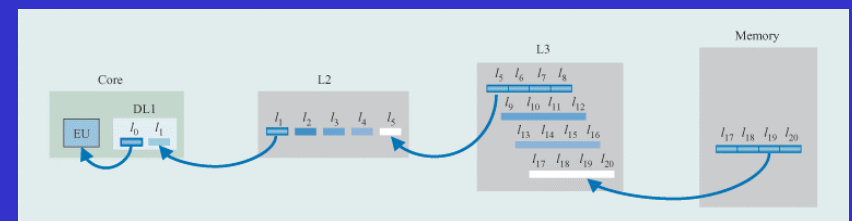
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POWER4 – L3 Cache



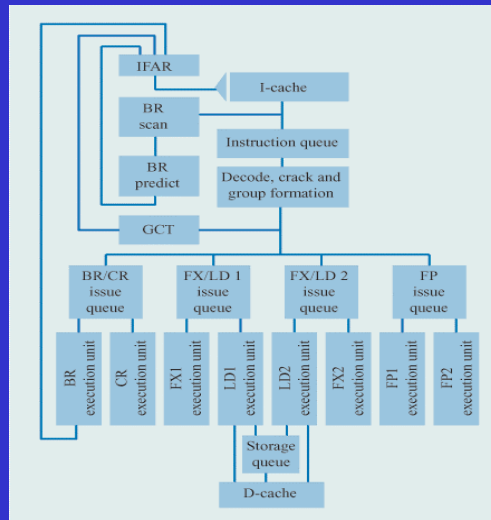
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POWER4 – Hardware Data Prefetch



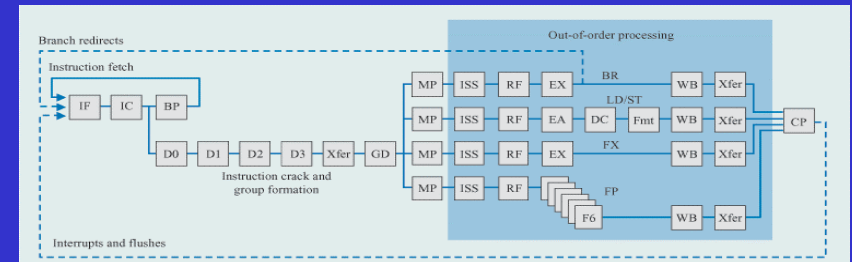
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POWER4 - Core



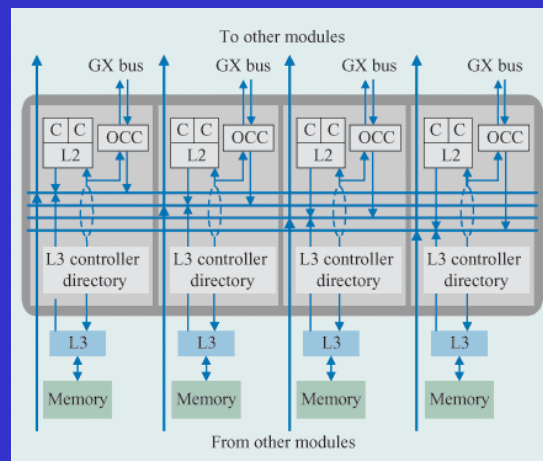
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POWER4 - Pipeline



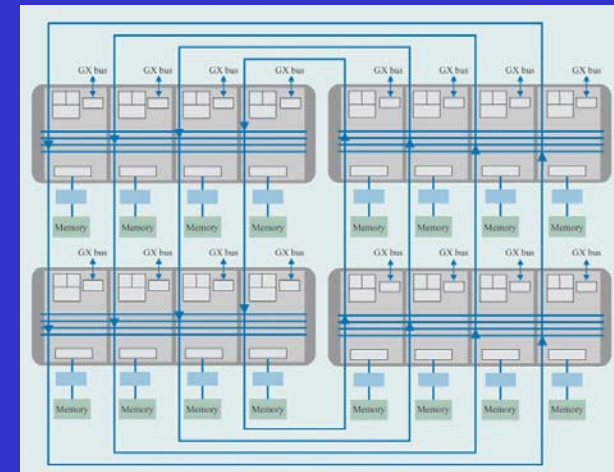
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POWER4 – multichip 8-way SMP



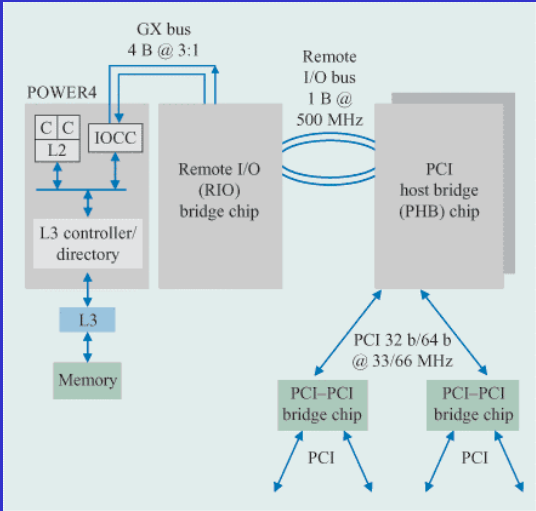
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POWER4 – multichip module interconnection



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POWER4 –I/O vista lógica



IBM POWER4 vs Intel IA-64

IBM-POWER4	Intel IA-64
TLP	Single-thread ILP
Largura de banda ↑	Largura de banda ↓
ISA ↓	ISA ↑
Escalonamento Dinâmico	Escalonamento Estático
Execução out-of-order	Execução in-order
Código OO	Código tradicional
Mercado High-End	Mercado Low-End

Questões