

**Machine Type 2817** (A new mainframe generation)

- 5 Models M15, M32, M49, M66 and M80
- **Processor Units (PUs)** 20 (24 for M80) PU cores/book
- Up to 14 SAPs per system, standard
- Dependent on the H/W model: Up to 15, 32, 49, 66 or 80 PU cores available for characterization
- Central Processors (CPs), Integrated Facility for Linux (IFLs), Internal Coupling Facility (ICFs), System z Application Assist Processors (zAAPs), System z Integrated Information Processor (zIIP), optional - additional System Assist Processors (SAPs) for I/O Operations.

- 2 spares designated per system
- Sub-capacity available for up to 15 CPs
- 3 sub-capacity points (See lower left)

**Memory** System minimum of 32 GB

- Up to 768 GB per book
- Up to 3 TB for System and up to 1 TB per LPAR
- 32/64/96/112/128 GB increments
- 16 GB Fixed HSA, standard
- I/O Up to 48 I/O Interconnects per System @ 6 GBps each
- Up to 4 Logical Channel Subsystems (LCSSs) and STP
- zNext is System z's 1st CMOS Out Of Order (OOO) core
- OOO yields significant performance benefit for compute intensive apps through re-ordering instruction execution (see illustration below)
- Later (younger) instructions can execute ahead of a stalled instruction

**Re-ordering storage** accesses and parallel storage accesses

- Re-ordering storage accesses and parallel storage accesses
- OOO maintains good performance growth for "traditional" applications

**Vision:** To deliver the best of all worlds mainframe UNIX, x86 function processors integrated in a single system for ultimate simplicity, service and cost effectiveness across multiple heterogeneous workloads. The IBM zEnterprise™ System is a first-of-a-kind workload-optimized multiprocessor (or multi-architecture) computing environment that spans (and tightly integrates) mainframe and distributed technologies.

Includes 16KB cache  
Shared by two cores  
24MB eDRAM L3 Cache  
Shared by all four cores  
Interface to SC chip / L4 cache  
40+ GB/sec to each of 2 SCs  
I/O Bus Controller (GX)  
Interface to Host Channel Adapter (HCA)  
Memory Controller (MC)  
Interface to controller on memory DIMMs  
Supports RAIM design  
Over 100 new instructions

**Up to Four active cores per chip**

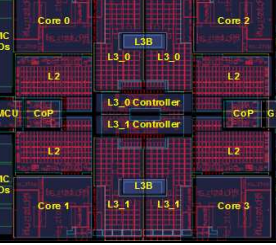
- 5.2 GHz
- L1 cache/core
- 64 KB I-cache
- 128 KB D-cache
- 1.5 MB private L2 cache/core

**Two Co-processors (COP) Crypto & compression accelerators**

- Includes 16KB cache
- Shared by two cores
- 24MB eDRAM L3 Cache
- Shared by all four cores
- Interface to SC chip / L4 cache
- 40+ GB/sec to each of 2 SCs
- I/O Bus Controller (GX)
- Interface to Host Channel Adapter (HCA)
- Memory Controller (MC)
- Interface to controller on memory DIMMs
- Supports RAIM design
- Over 100 new instructions



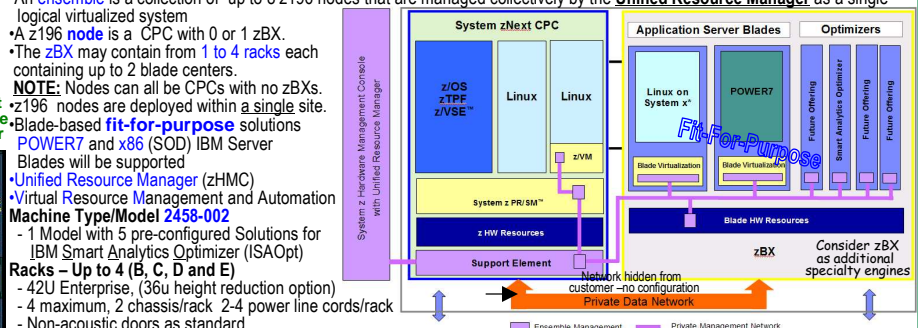
**Industry's fastest and most scalable enterprise server**



40% improvement for n-way processors  
60% more total capacity than System z10

**The integration of System z and distributed technologies into a revolutionary combination using the IBM Blade Center(zBX)**

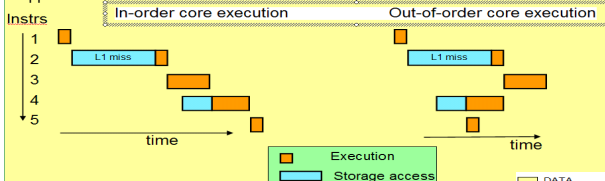
- Runs applications unchanged and supports what you know using logical device integration between System z and distributed resources
- Workload specific accelerators to deliver significant performance and/or lower cost per transaction
- An ensemble is a collection of up to 8 z196 nodes that are managed collectively by the Unified Resource Manager as a single logical virtualized system
- A z196 node is a CPC with 0 or 1 zBX.
- The zBX may contain from 1 to 4 racks each containing up to 2 blade centers.
- NOTE: Nodes can all be CPCs with no zBXs. z196 - nodes are deployed within a single site.
- Blade-based fit-for-purpose solutions POWER7 and x86 (SOD) IBM Server Blades will be supported
- Unified Resource Manager (zHMC)
- Virtual Resource Management and Automation



**Ensemble: A collection of like systems or resources manageable as a single system**

All Blades will be registered and certified for use by the zManager

- Runs apps unchanged and supports what you know
- Accelerator Blades:
  - Smart Analytics Optimizer (SAO)
  - Data Power Blades - provide deep-content routing and data aggregation (SOD)
  - Application-layer security and threat protection
  - Protocol and message bridging
  - Internet Security Services (ISS) appliances
  - High-Performance Computing (HPC)



**z10 MCM**

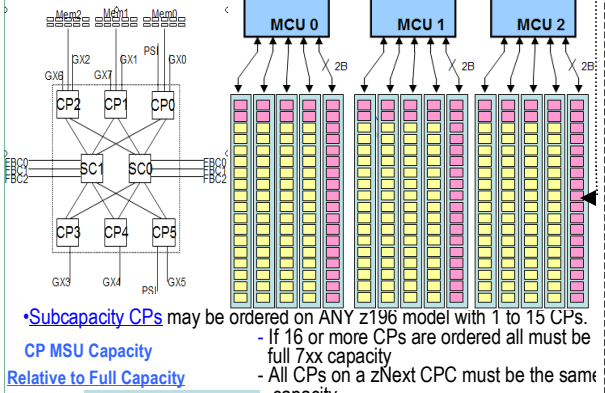
- 96mm x 96mm in size
- 5 PU chips per MCM
- Quad core chips: 3 or 4 active cores
- PU Chip size 21.97 mm x 21.17 mm
- 4.4 GHz
- Superscalar, In order execution
- L1: 64K I / 128K D private/core
- L1.5: 3M I+D private/core
- 2 SC chips per MCM
- L2: 2 x 24 M = 48 M L2 per book
- SC Chip size 21.11 mm x 21.71 mm
- Power 1800 Watts

**zEnterprise (z196) MCM**

- 96mm x 96mm in size
- 6 PU chips per MCM
- Quad core chips: 3 or 4 active cores
- PU Chip size 23.5 mm x 21.8 mm
- 5.2 GHz
- Superscalar, OOO execution
- L1: 64K I / 128K D private/core
- L2: 1.5M I+D private/core
- L3: 24MB/chip - shared
- 2 SC chips per MCM
- L4: 2 x 96 MB = 192 MB L4 per book
- SC Chip size 24.4 mm x 219.6 mm
- Power 1800 Watts

**Redundant Array of Independent Memory**

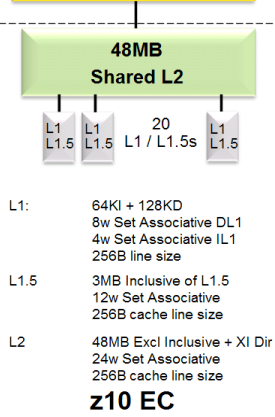
- 5 channel memory controller
- DIMM bus CRC error retry
- "Industry" leading reliability
- Up to 3TB Memory capacity
- 3 MCUs per MCM
- 2-deep DIMM cascade



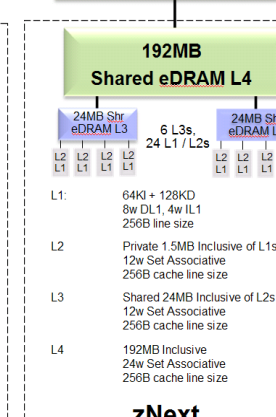
**Subcapacity CPs** may be ordered on ANY z196 model with 1 to 15 CPs.

- CP MSU Capacity Relative to Full Capacity
- 7xx = 100% Three different sub-capacity levels, giving a total of 125 distinct capacity settings in the system, and providing for a range of over 1,200 in processing power.
- 6xx ~ 64%
- 5xx ~ 49%
- 4xx ~ 20%
- xx = 01 through 15

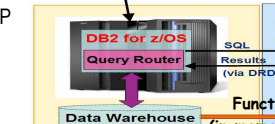
**4 L2 Caches**



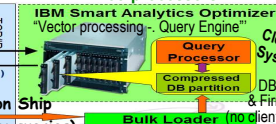
**4 L4 Caches**



**z10 EC**



**zNext**



**Blades (Maximum 112 in 4 racks)**

- IBM Smart Analytic Optimizer Blades (up to 7 to 56)
- POWER7 Application Server Blades (up to 0 to 112)
- x-Application Server Blades (up to 0 to 112)

**Management Firmware**

- SE/HMC Hardware management
- Fully configured 8 system cluster ~ 900 blades
- Top of Rack (TOR) Switches - 4
- 1 GbE intra node management network (INMN)
- 10 GbE intra ensemble data network (IEDN)

**Network and I/O Modules**

- 1 GbE and 10 GbE modules
- 8 Gb Fibre Channel (FC) connected to customer supplied disks
- IBM Smart Analytic Optimizer uses DS5020 disks

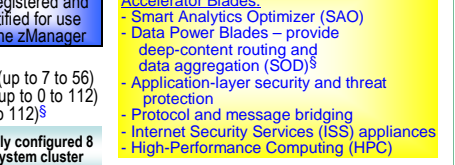
**Ensemble-related functions: zEnterprise™ Unified Resource Manager (aka. zManager)**

- The HMC will now be authoritative holder of some ensemble-scoped configuration not held by any of the Nodes in the ensemble
- Some configuration actions will be available ONLY from the HMC managing the ensemble, not the SE
- HMC will have a role in monitoring of workload performance
- Any V2.11.0 HMC can become either the Primary HMC (that controls the ensemble) or an Alternate (back up) HMC
- The Primary HMC can perform all non-ensemble HMC functions on CPCs that aren't members of the ensemble
- The Alternate HMC is specified when executing the "Create Ensemble" wizard after running the "Manage Alternate Hardware Management Console" task
- NOTE: A Primary HMC is the only HMC that can perform ensemble related management tasks (create virtual server, manage virtual networks, create workload...)

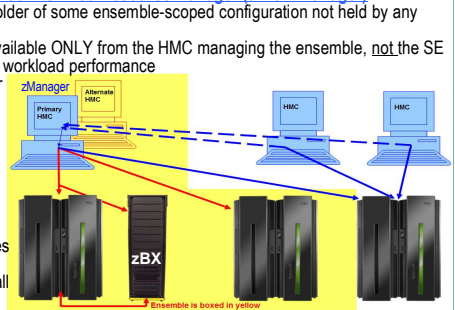
**IBM Smart Analytics Optimizer is designed for OLAP-style SQL queries:**

- Relational star schema (large fact table joined to multiple dimensions)
- Large subset of data warehouse accessed, reduced significantly by...
- Aggregations (SUM, AVG, COUNT) and optional grouping (GROUP BY)
- Looking for trends or exceptions
- DB2 for z/OS routes SQL queries to accelerator transparently
- User need not change SQL or applications.

**DS5020 Disk Storage**



Up to 112 drives in EXP520  
8 Gbps FC or 1 Gbps iSCSI  
2 or 4 GB of cache  
Note: ISAO disk is not a SAN (customer responsibility)



**Appliance Optimizer up to 50x better performance**

- Options to help in the elimination of hotspots and save energy
- Optional water cooling, high voltage DC power, top exit I/O
- Static Power Savings
- Query Max Potential Power
- Humidity and Altitude Sensors

