IBM® zEnterprise™
IBM Smart Analytics Optimizer

© 2010 IBM Corporation

Agenda

- zEnterprise basics
  - Hardware Overview
  - Networking
- IBM Smart Analytics Optimizer
- Disk/Storage Considerations
  - IBM Smart Analytics Optimizer
  - IBM POWER7 Blades
- Aplicability

© 2010 IBM Corporation

zEnterprise basics

© 2010 IBM Corporation

IBM zEnterprise System – Best-in-class systems and software technologies

A "System of Systems" that unifies IT for predictable service delivery

IBM zEnterprise 196 (z196)

- Optimized to host large-scale database, transaction, and mission-critical applications
- The most efficient platform for large-scale Linux consolidation
- Capable of massive scale-up
- New easy-to-use z/OS V1.12

zEnterprise Unified Resource Manager

- Unifies management of resources, extending IBM System z qualities of service end-to-end across workloads
- Provides platform, hardware and workload management

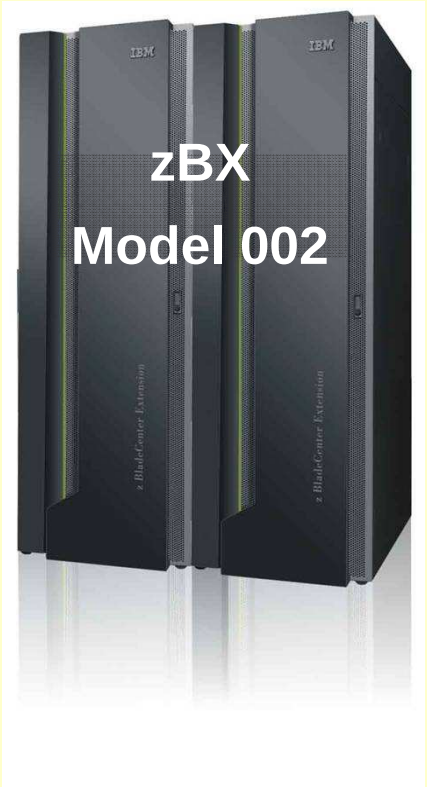
zEnterprise BladeCenter Extension (zBX)

- Selected IBM POWER7 blades and IBM System x Blades* for tens of thousands of AIX and Linux applications
- High-performance optimizers and appliances to accelerate time to insight and reduce cost
- Dedicated high-performance private network

* All statements regarding IBM future direction and intent are subject to change or withdrawal without notice, and represents goals and objectives only.

zBX Hardware Components

zBX Infrastructure



- Rack
- Top-of-Rack Switch
- BladeCenter Chassis
- Ethernet & FC Cables
- BC Switches (ESM, FC)
- Power Dist. Units
- Opt: Heat Exchanger, Power cord types

Blades

Smart Analytics Optimizer

IBM Blades

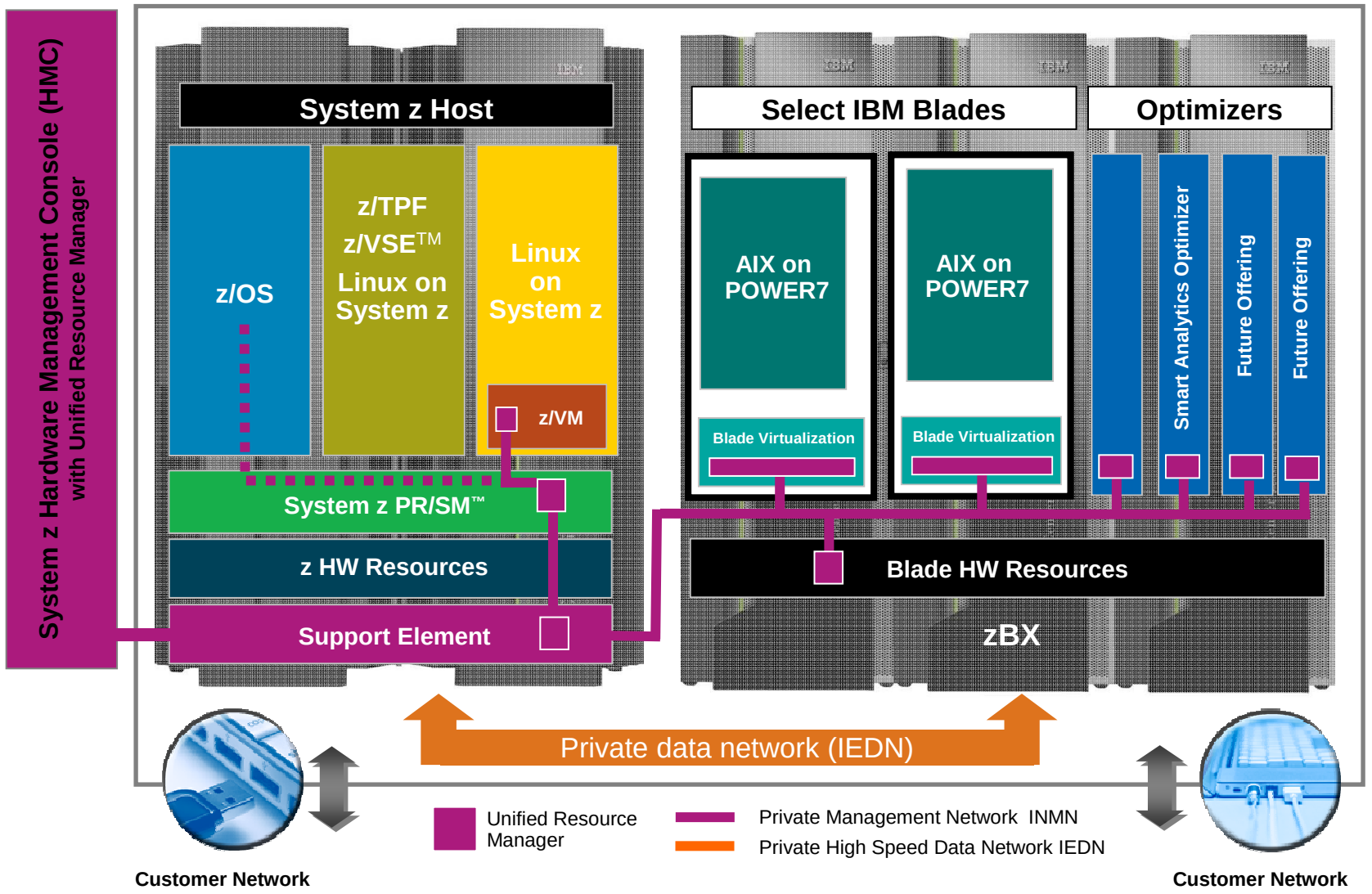
© 2010 IBM Corporation

zBX Overview

- **Machine Type/Model 2458-002**
  - 1 Model with 5 pre-configured Solutions for IBM Smart Analytics Optimizer
- **Racks – Up to 4 (B, C, D and E)**
  - 42U Enterprise, (36u height reduction option)
  - 4 maximum, 2 chassis/rack
  - 2-4 power line cords/rack
  - Non-acoustic doors as standard
  - Optional Acoustic Doors
  - Optional Rear Door Heat Exchanger (conditioned water required)
- **Chassis – Up to 2 per rack**
  - 9U BladeCenter
  - Redundant Power, cooling and management modules
  - Network Modules
  - I/O Modules
- **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
- **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

© 2010 IBM Corporation

Putting zEnterprise System to the task



Ensemble networking

1. **Intra-Node Management Network (OSM)**
   - 2 ports from 2 different OSA Express-3 1000BaseT Ethernet adapters, for redundancy.
   - To allow the HMC, to talk to the System z hypervisors, within the ensemble.

2. **Intra-Ensemble Data Network (OSX)**
   - A pair of OSA Express-3 10 GbE adapters, for redundancy.
   - To allow the zEnterprise applications to communicate between OS images to share data.
   - To allow the zEnterprise application to communicate to the zBX
   - Ensemble zBX to zBX communications.

3. **Existing customer network**
   - 10 GbE connections in the zBX TOR Switch
   - For CPC's or switches not in the ensemble

1 intra-node management network
2 intra-ensemble data network
3 existing customer network

© 2010 IBM Corporation

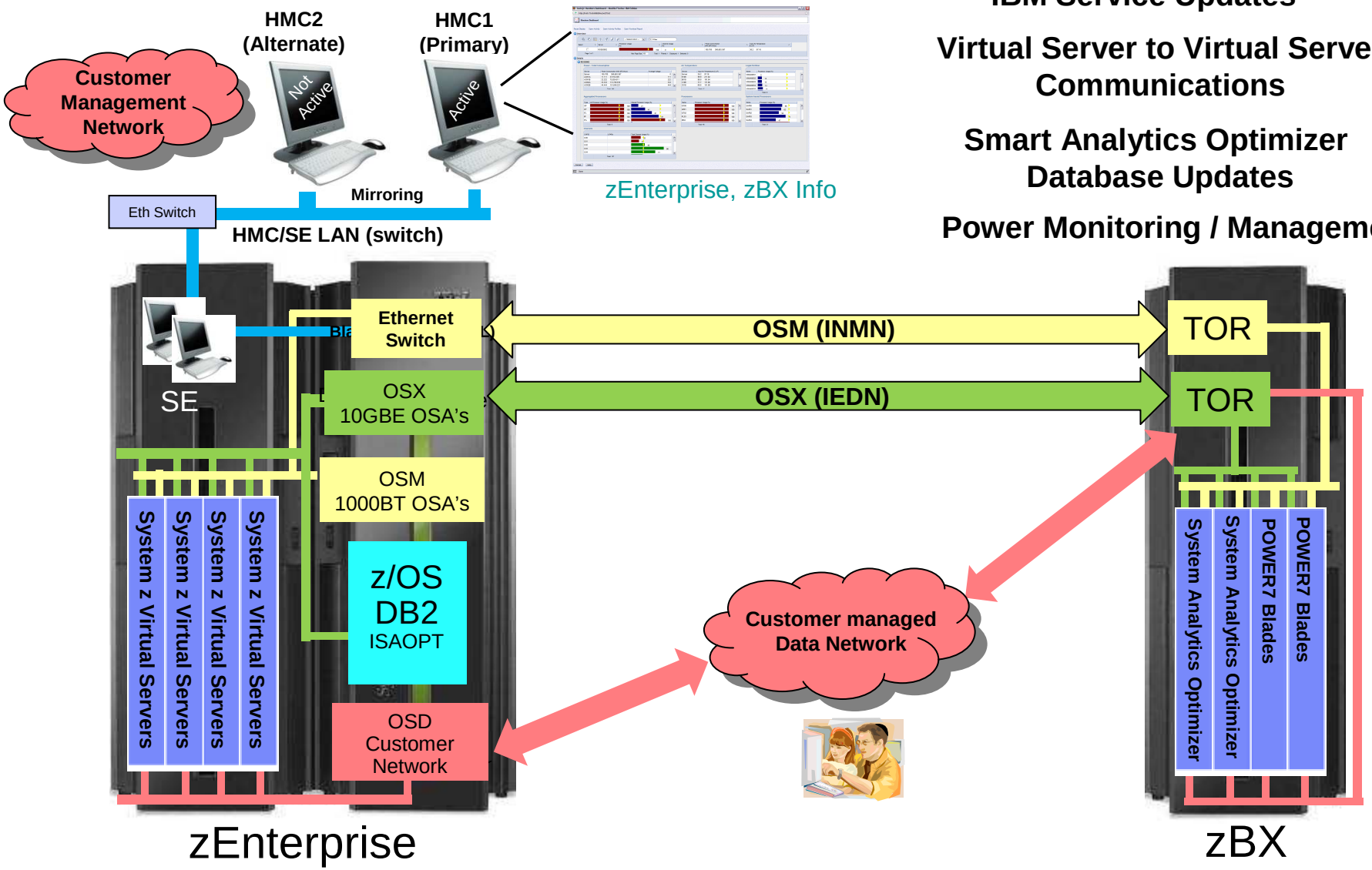
zEnterprise zBX Model 002 – Communications

IBM Service Updates

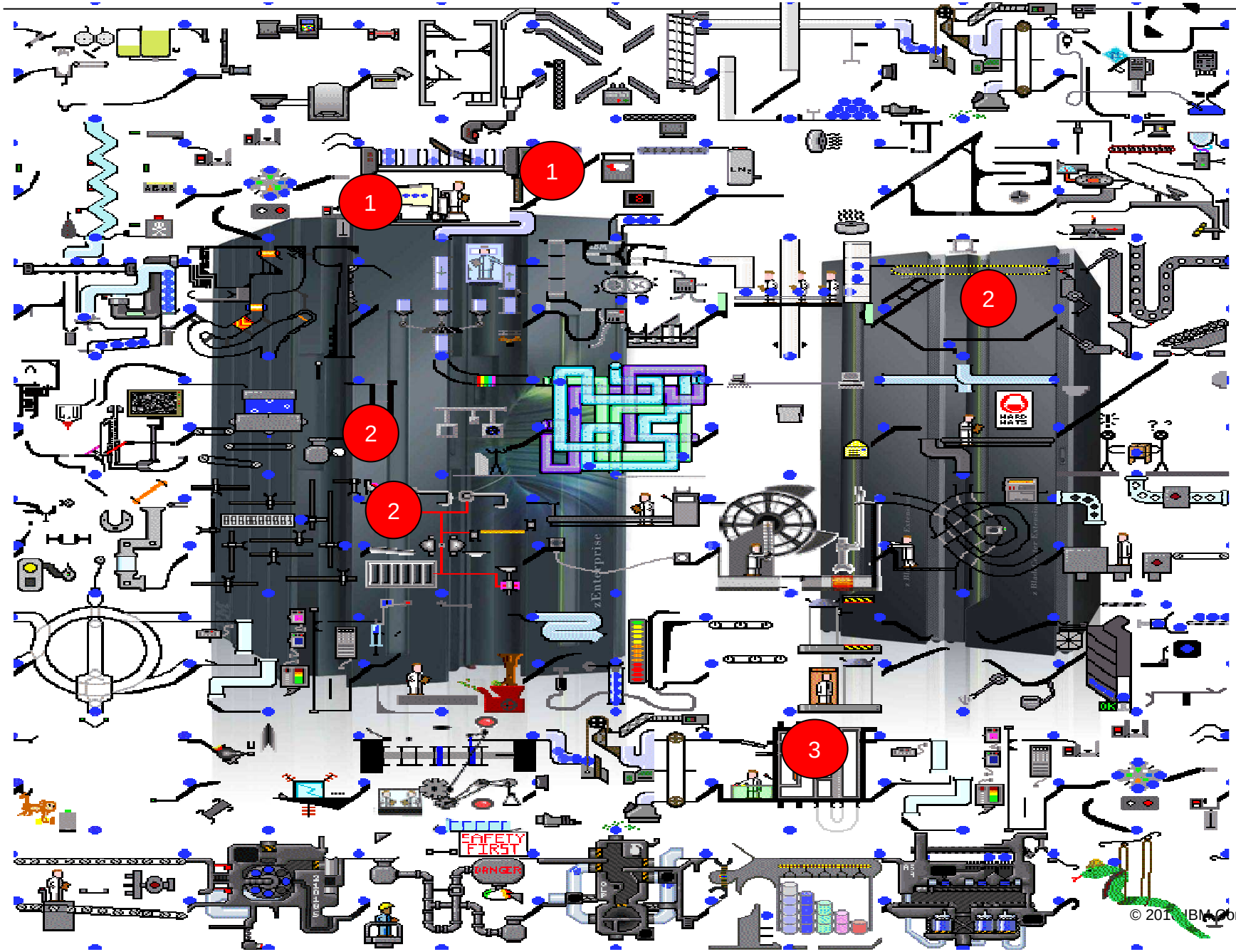
Virtual Server to Virtual Server Communications

Smart Analytics Optimizer Database Updates

Power Monitoring / Management



© 2010 IBM Corporation



© 2011 IBM Corporation

IBM Smart Analytics Optimizer

© 2010 IBM Corporation

IBM Smart Analytics Optimizer

Delivering powerful analytics to existing System z customers

- **Creates new opportunities for existing systems by using new technology approaches**
- **High performance**
  - Significantly improve query-intensive workloads on IBM data systems
  - Improved query performance
- **Requires no change to existing applications**
- **Lower administration costs**
- **Better decisions**
- **No changes to DB2 query application**

© 2010 IBM Corporation

2458-002 - IBM Smart Analytics Optimizer

- **Pre-packaged and pre-tested**
- **zBX components are a logical extension to System z as a new System z Machine Type/Model.**
  - Machine Type 2458
  - Model 002
- **Used for specialized workload processing which can be handled more economically than if those workloads were processed directly in the System z server**
- **zBX processing components are provided using standard BladeCenter® components.**
- **Impressive Performance**
  - **Compressed DB2 data**
  - **Parallel file system**
  - **In memory execution**

© 2010 IBM Corporation

zBX – Coordinator and Worker node roles

- **The blades can play two different roles. The of Blades allocated for each role are predetermined based on the size of the zBX configuration**
- **Coordinator node**
  - Communicates to the CPC via TCP/IP addresses.
  - Coordinates which worker nodes will work in parallel on a specific task/workload
  - zBX always has one coordinator in the TOTAL configuration. Rest are used/available for ‘sparing’
  - If all coordinator nodes fail, zBX processing will continue on the zEnterprise CPs
  - At anyone time, the zBX processes only one query. The coordinator node builds and manages the queues for the query
- **Worker node**
  - Blades work together to solve a large problem

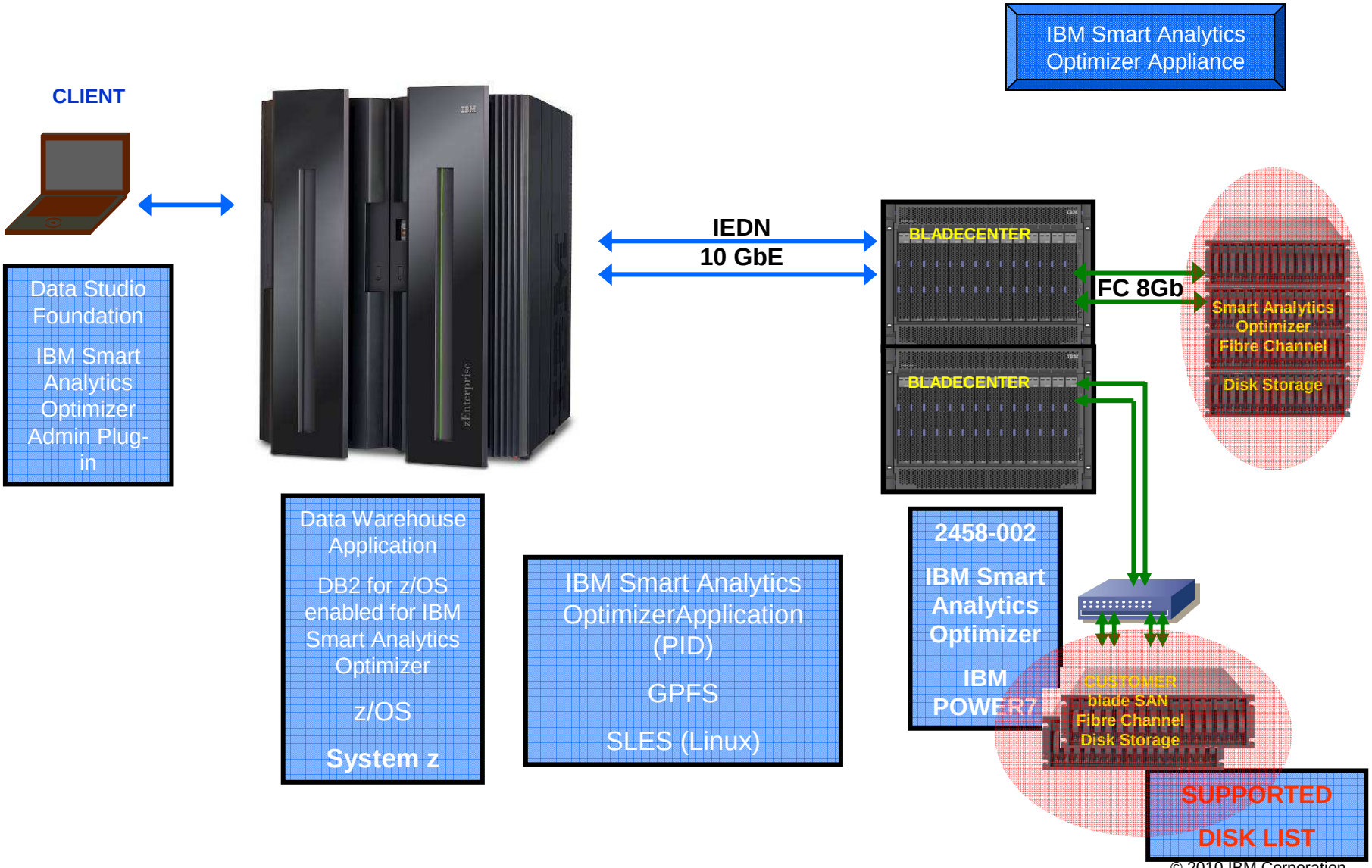
Raw (uncompressed) DB2 Data (TeraBytes)	Number of Blades	Number of Coordinator Nodes	Number of Worker Nodes	‘Spares’ included in the Coordinator Node count
0.5	7	2	5	1
1	14	3	11	2
2	28	5	23	4
3	42	7	35	6
4	56	10	46	9

© 2010 IBM Corporation

Storage for IBM Smart Analytics Optimizer and IBM POWER7

© 2010 IBM Corporation

IBM Smart Analytics Optimizer & IBM POWER7 Disk Storage



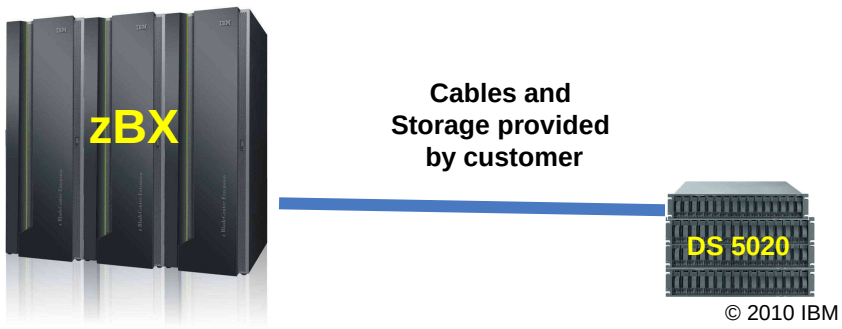
© 2010 IBM Corporation

IBM Smart Analytics Optimizer Disk Attachment Details

- **Includes two 20 port – 8 Gb FC switches in each BladeCenter to allow connectivity to disk**
  - Must be directly attached
  - Supports 8 Gbps, 4 Gbps, 2 Gbps
    - 1 Gbps is NOT supported
  - Allows for connectivity to:
    - DS5020 with 1 TB HDD

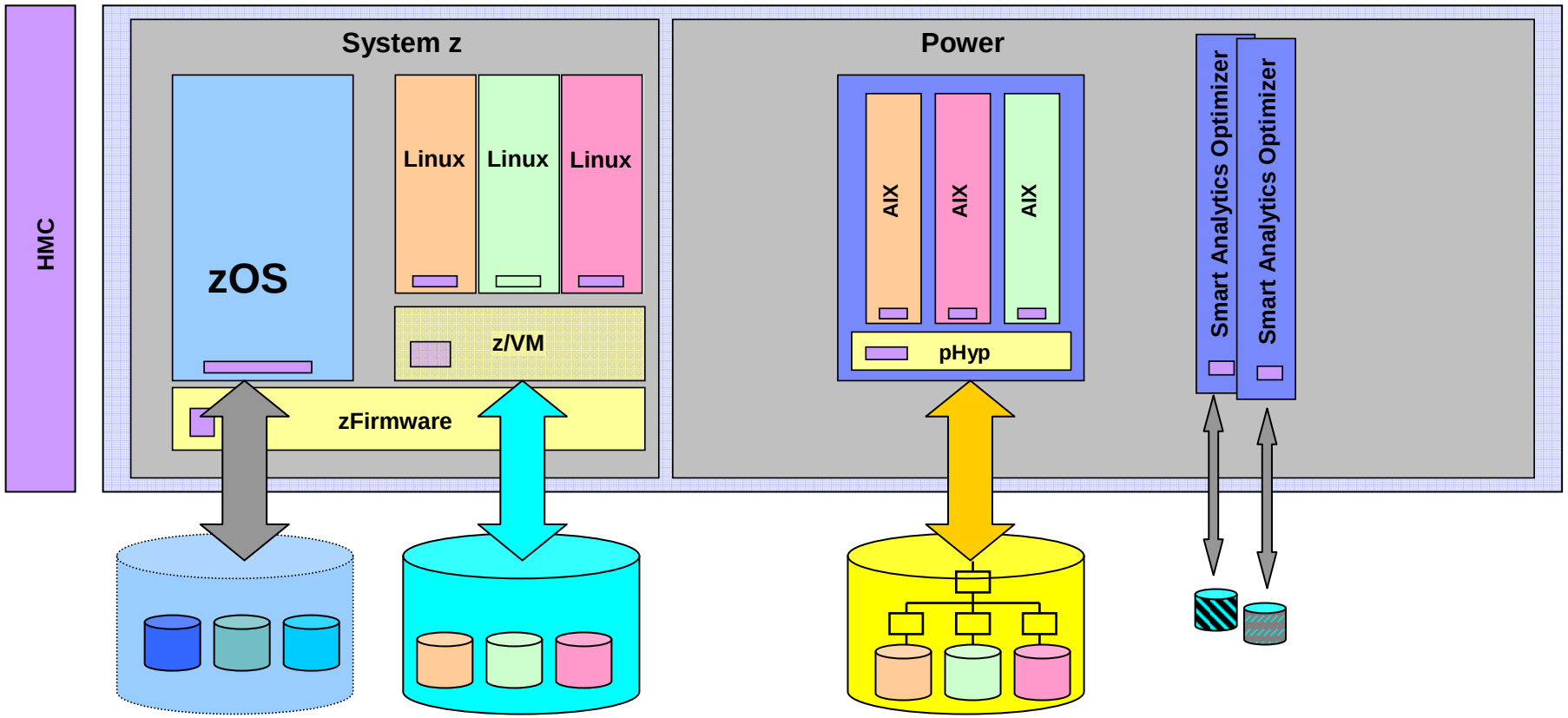
7	14	28	42	56
Intended to handle up to x TBs of DB data				
0.5 TB	*1 TB*	*2 TB*	*3 TB*	*4 TB*
16 Drives	*16 Drives*	*16 Drives*	*32 Drives*	*32 Drives*
2 ports	*2 ports*	*4 ports*	*4 ports*	*4 ports*

- **Disk is not part of the integrated Smart Analytics Optimizer offering**
  - Customer is responsible for:
    - supplying disk (separate order)
    - disk cabling
    - disk configuring



© 2010 IBM Corporation

zEnterprise Node Storage



© 2010 IBM Corporation

IBM Smart Analytics Optimizer - Aplicability

© 2010 IBM Corporation

IBM Smart Analytics Optimizer - Sizing

- **How do I size the right machine?**
  - Watch this space, things may change
  - Initially, go here
- **For requests outside of North America**
  - dwhz@de.ibm.com
- **For requests in North America**
  - Forward the sizing request to the BI Swat team under Beth Hamel
  - DW on System z/Silicon Valley/Contr/IBM
- https://w3.tap.**ibm.com**/w3ki08/display/isao/Home
  https://w3.tap.**ibm.com**/w3ki08/display/isao/Process
  - Download an off-line version of the questionnaire (ISAO_Assessment_Questionnaire.doc) from https://w3.tap.**ibm.com**/w3ki08/display/isao/Process
  - Complete Questionnaire

    System Environment and Data Warehouse workload (to make sure that the customer meets the requirements)
- Send the completed Questionnaire to the User ID dwhz@de.ibm.com or to BI Swat team under Beth Hamel in North America DW on System z/Silicon Valley/Contr/IBM.

  It is not recommended that you approach the customer until you have had feed back on the ISAO Assessment
  - a quick analysis of real workload should be performed (Quick Workload test)
- Down load the ISAO Assessment Description.zip from the https://w3.tap.**ibm.com**/w3ki08/display/isao/Process

© 2010 IBM Corporation

End of Presentation

© 2010 IBM Corporation

Dank u
Dutch

Merci
French

Спасибо
Russian

Gracias
Spanish

شكراً
Arabic

감사합니다
Korean

Tack så mycket
Swedish

धन्यवाद
Hindi

תודה רבה
Hebrew

Obrigado
Brazilian Portuguese

谢谢
Chinese

Dankon
Esperanto

Thank You

ありがとうございます
Japanese

Trugarez
Breton

Danke
German

Tak
Danish

Grazie
Italian

நன்றி
Tamil

děkuji
Czech

ขอบคุณ
Thai

go raibh maith agat
Gaelic

© 2010 IBM Corporation