



IBM Systems for Oracle Data Warehousing

Increase Performance and Flexibility of your Oracle® Database Warehouse with IBM Systems

Rick A. Kearns
Solutions Consultant
Oracle on IBM Systems

Marty Carangelo
Manager IOCC
Advanced Technical Support

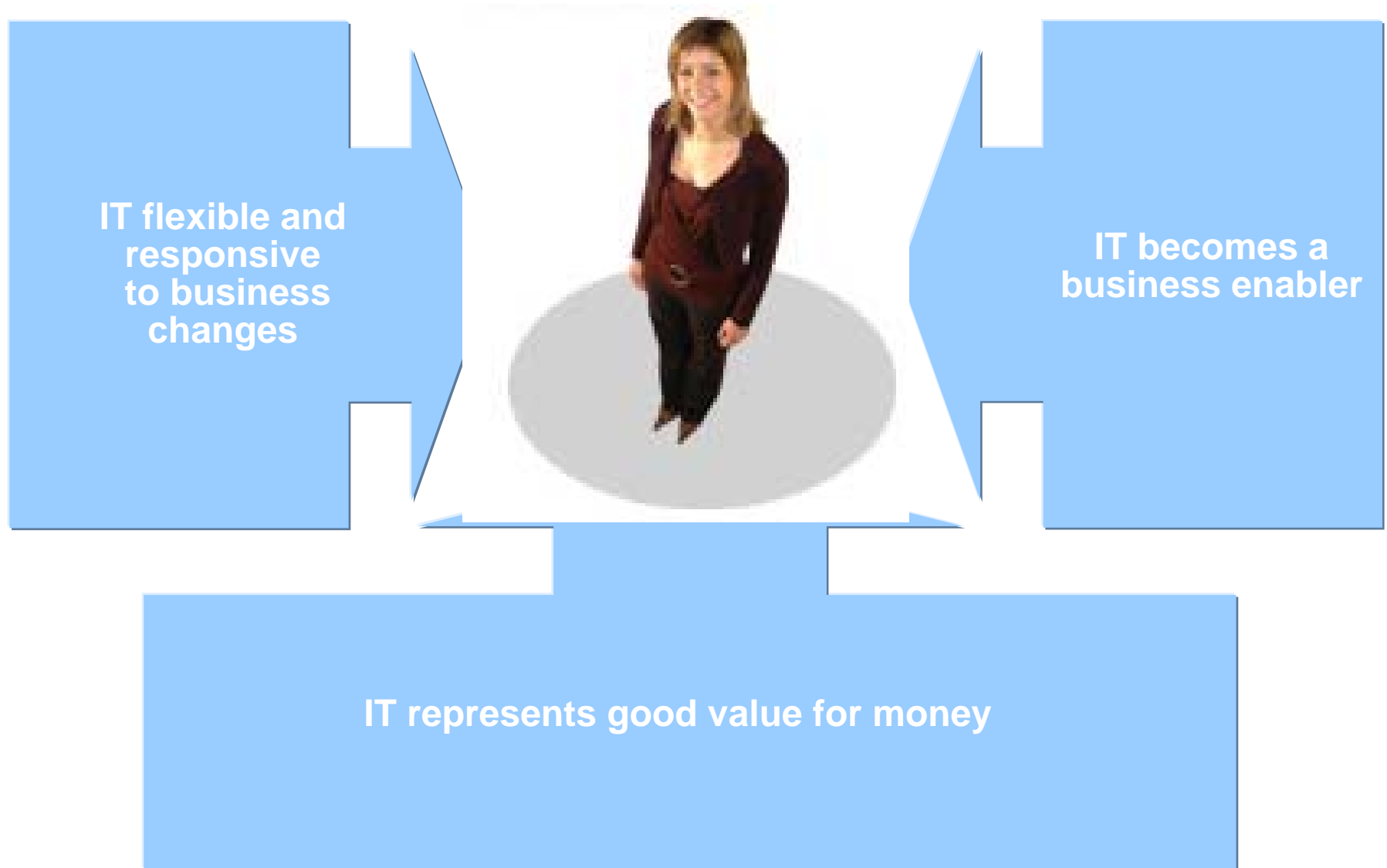


IBM Systems

Agenda

- **Data Warehouse Requirement for IT Infrastructure**
- IBM System p Solutions for Data Warehousing
- IBM System x Solutions for Data Warehousing
- IBM Optimized Warehouse Offerings

IT Challenges Shared by IBM and Oracle Customers



Oracle and IBM

The Technology Relationship

www.Oracle.com/IBM

Did You Know?

- Long History working together
 - Oracle: **20+** years,
 - PeopleSoft: **17** years
 - JD Edwards: **28** years
 - Siebel: **9** years
- **20,000** + joint application customers
- Oracle is **#1 database** for UNIX servers
- Oracle is **#1 database** for Linux servers
- Strong affinity for **Oracle on IBM Systems**
 - IBM System p is **#1 UNIX server** for 11 consecutive quarters
 - IBM System x is **#1 x86 high-end server** (8-socket and above)

ORACLE®

IBM®

ORACLE AND IBM THE TECHNOLOGY RELATIONSHIP

KEY FEATURES

Did You Know?

- Oracle and IBM have worked together for over 30 years and collaborate daily on development, marketing and sales activities.
- IBM maintains a team of engineers onsite at Oracle as well as hundreds of servers and hundreds of Terabytes of storage for development and support.
- Senior IBM and Oracle architects work together to influence technical product direction for each company and are continually looking years ahead when developing future advanced solutions.
- IBM Systems hold benchmark leadership positions for all Oracle applications including EBS, Peoplesoft, JDE and Siebel.

Oracle and IBM are committed leading platforms and operating the platform they choose, customer or level of support they receive preference and nor make record choice. Customers who select confident of Oracle's current and IBM Systems and Technology and support of Oracle products delivers products that are well Systems to meet customers' expectations. Oracle products are delivered support all of IBM's operating Linux, and Windows. Oracle's operating environment choice

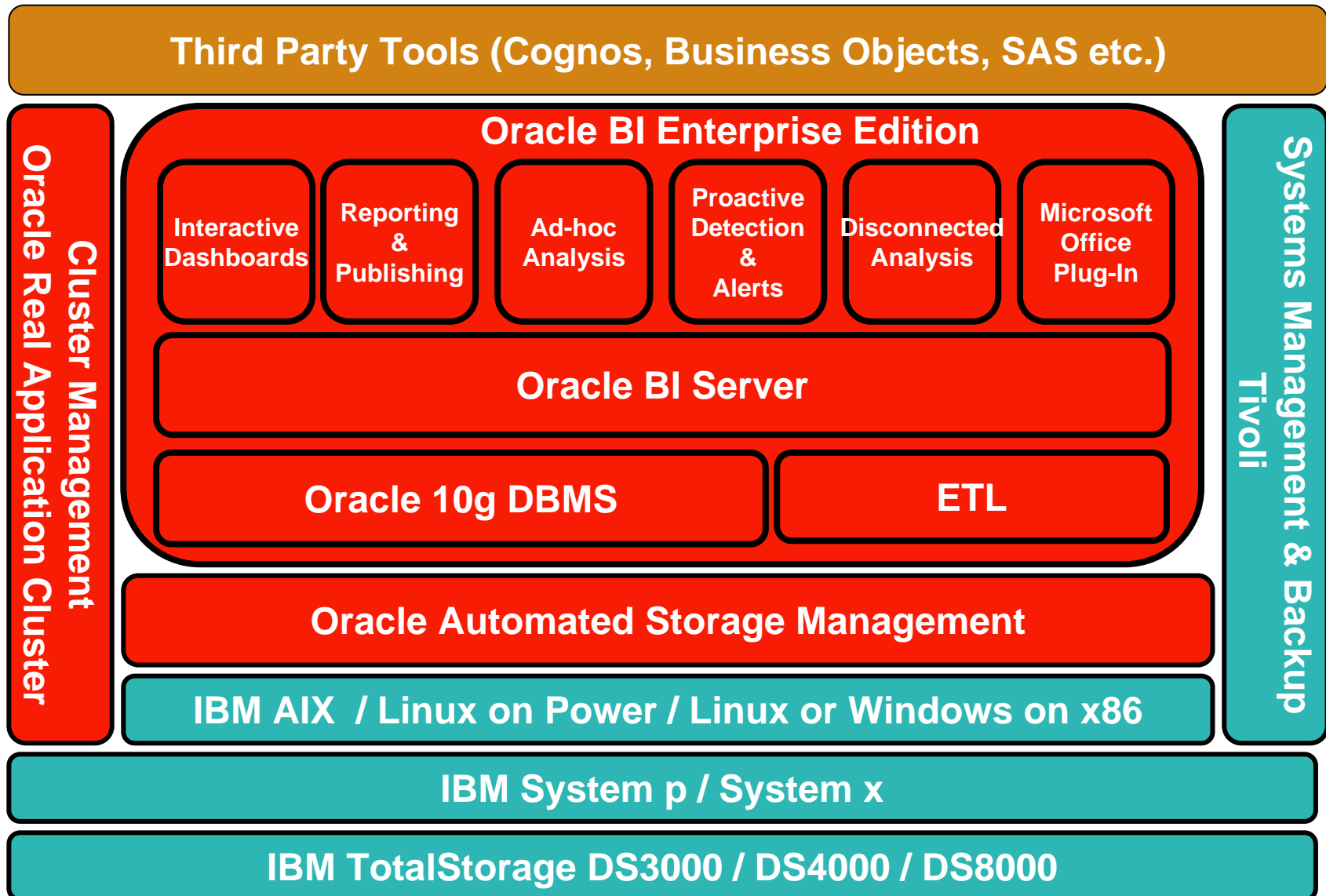
Oracle for IBM Systems

Oracle views IBM System p as Oracle Database 10g, Oracle A

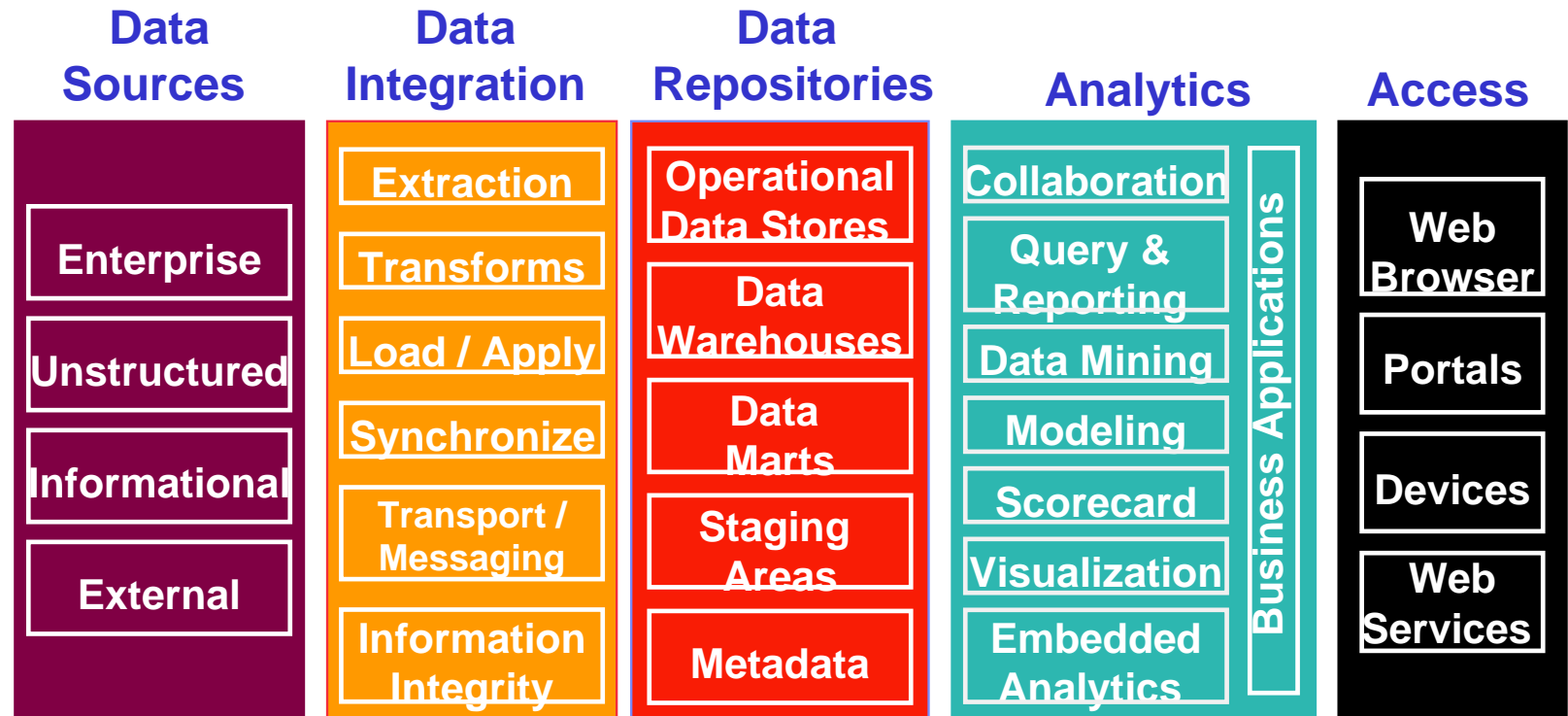


<http://www.oracle.com/partnerships/hw/ibm/oracle-ibm-relationship.pdf>

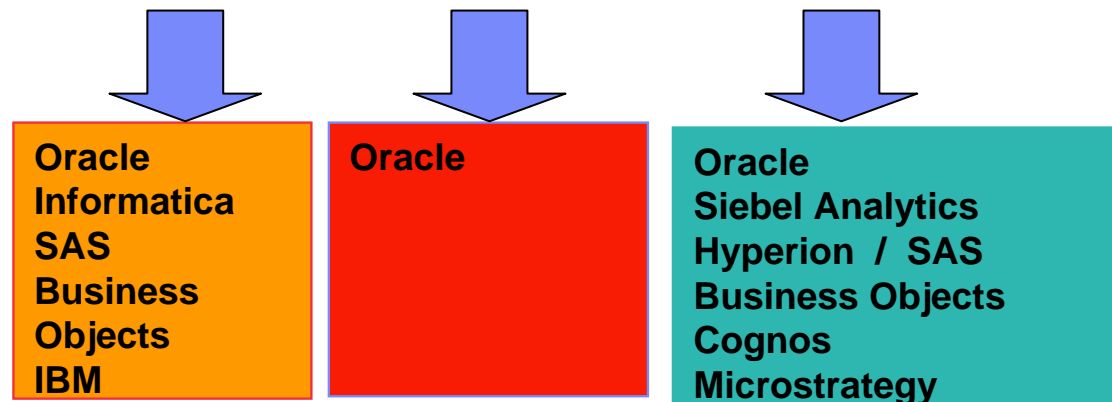
BI - DW Reference Architecture



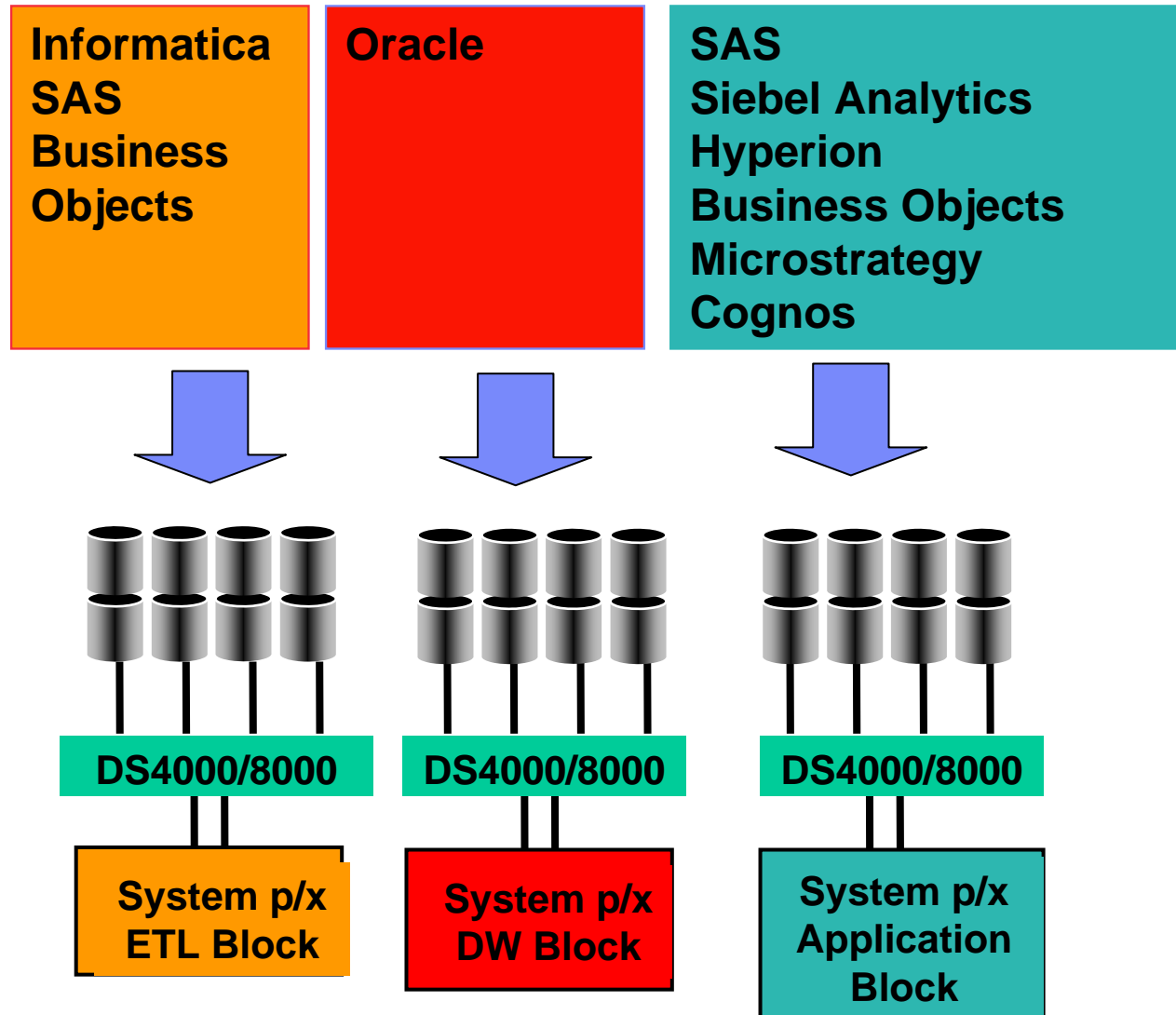
Function



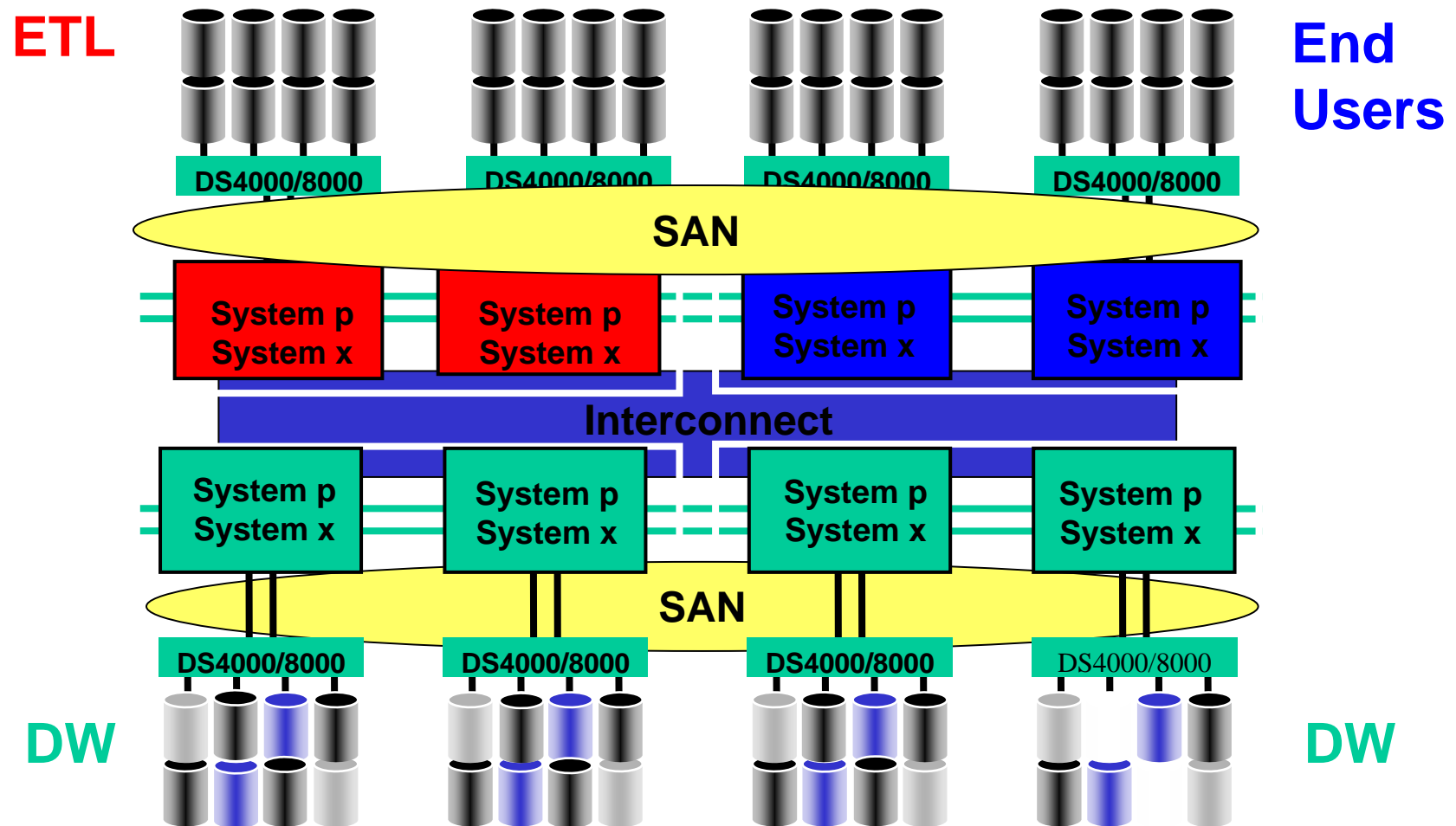
Product



Product to Node Design



Typical Data Warehouse



Agenda

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IBM was the fastest growing UNIX vendor in 2007, growing 9 percent year-to-year and capturing 34.1% revenue share for Q407 according to Gartner.

IBM Power Product Line



Power 6

Power 5



Midrange

p570

p5-570

p5-560Q

High-end

p575

p5-575

p595

p5-590

p5-595

Entry Towers

p5-550
p5-550Q

p5-520
p5-520Q

p5-510
p5-510Q

p5-505
p5-505Q

p550

p520

Entry Rack

Blades

JS22
JS12

Oracle Certifies for the O/S. Once certified all Power servers running the O/S are certified.

System p Technology Value To Oracle Customers

■ More Performance per Core and per System

- Results in smaller hardware configurations that deliver the same performance – hardware and facility cost savings
- Saves on software costs when software is licensed by the core

■ Virtualization Technology

- Allows one physical server to run multiple logical/virtual servers
- Allows customer to choose when and how to use vertical and horizontal scaling
- Without IBM Virtualization, the only choices were horizontal scaling or buying large systems that were under utilized in order to allow growth or to absorb capacity spikes

■ Increased Utilization

- Do more work with fewer processors
- Better return on investment
- Saves on hardware and software costs

■ Roadmap

- We own our entire chip and system roadmap, development, and production
- Our chips and systems are designed synergistically – development of each is done with the needs and requirements of the other taken into consideration
- We deliver a vertically integrated solution that provides industry leading business value to our customers.

Agenda

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4+ Socket System x Rack Servers for 2008

x3755

Cost Optimized,
Entry/Mid-Tier
Applications and DB



4U, 4 Socket

Sample Applications

- ERP
- CRM
- Small or RAC Database
- Graphics Rendering

x3850 M2

Compact Mid-tier
Applications & Small DB



4U, 4 Socket

Sample Applications

- ERP Application Logic
- CRM
- RAC Database
- SCON
- Collaboration

x3950 M2

Scalable Database,
Server Consolidation &
Mission Critical Apps

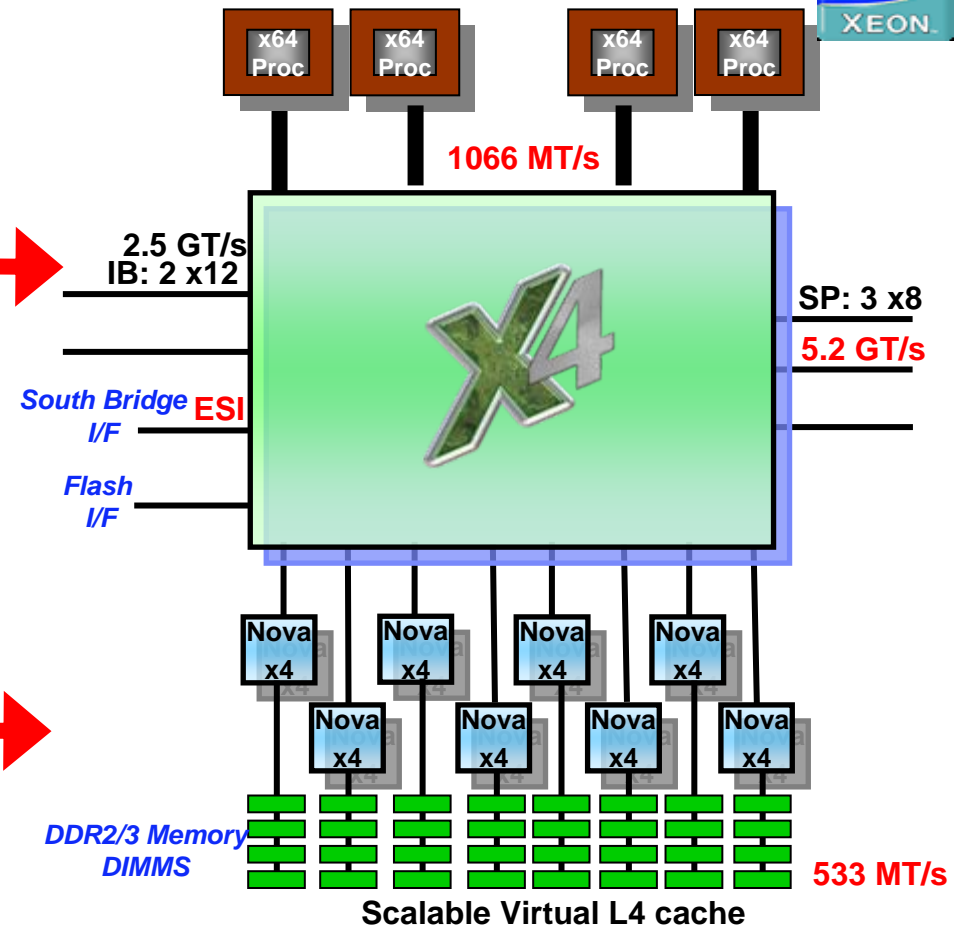
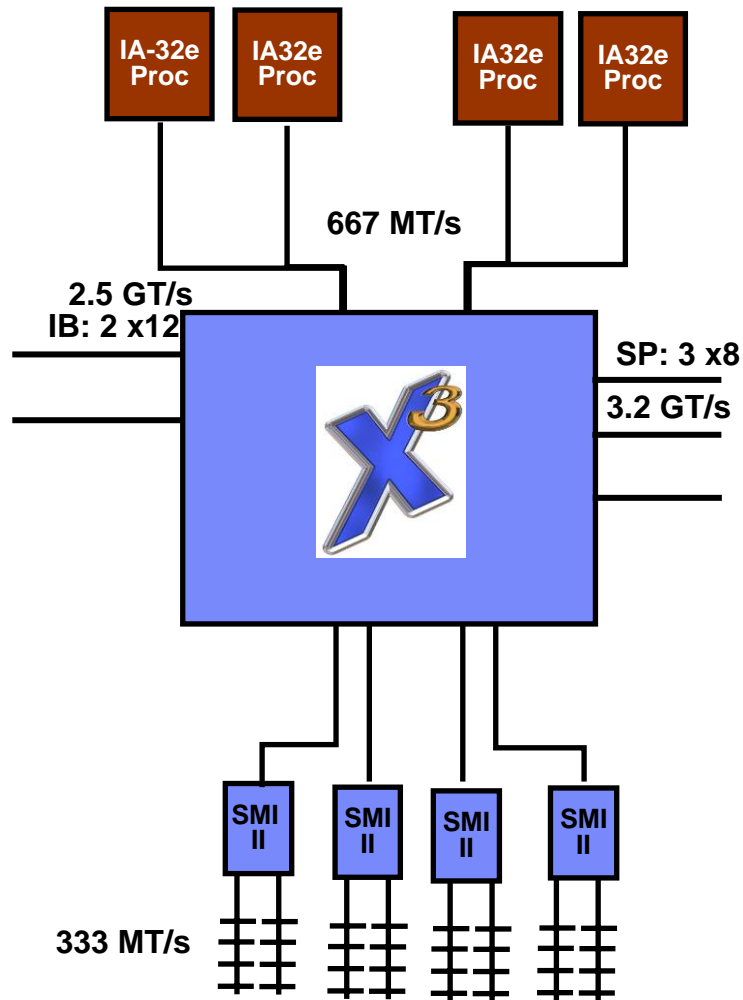


4U, 4 Socket

Sample Applications

- Large SMP Database
- 2-Tier ERP
- CRM
- SCON

X³ Chipset evolves to the new eX⁴



x3950 M2 Provides Unique Flexibility...

TODAY

ORACLE[®] **11^g**
DATABASE



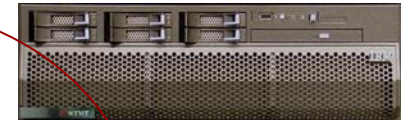
x3950 M2
Four Chassis 16-proc
Up to 1TB Memory



TOMORROW*



ORACLE[®] **11^g**
DATABASE
with RAC

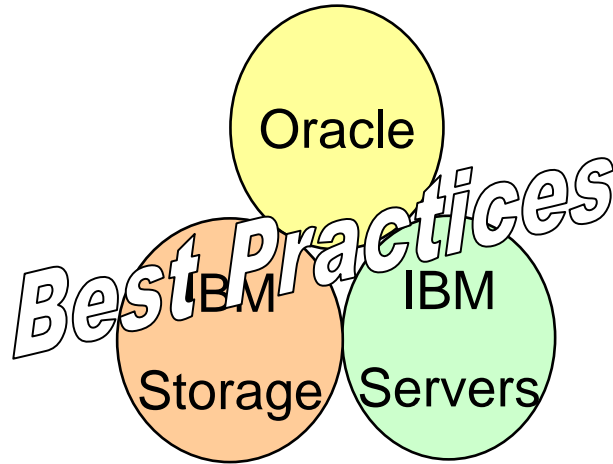


...in a move to RAC.

* Requires 3 additional operating system licenses and the purchase of Real Application Clusters (RAC) licenses from Oracle.

Agenda

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- **IBM Optimized Warehouse Offerings**



IBM Oracle International Competency Center

A presentation for the New York City Metro Oracle Users Group

Marty Carangelo
Manager IBM International
Oracle Competency Center
cmarty@us.ibm.com



IBM Oracle International Competency Center

Mission: IBM maintains on-site presence to further strategic planning, development, enablement, marketing and sales support activities with the ISV. Provide technical pre-sales solution support for Oracle applications and technology with IBM platforms including: PeopleSoft, JD Edwards, Siebel, EBS, and others.



- provide worldwide solution technical mkt info & sizing meth to differentiate IBM/ISV solutions
- provide a visible on-site presence to the ISV, customers & prospects
- to provide technical deliverables for IBM/ISV go to market plans
- to help drive IBM/ISV revenue
- develop & deliver ISV specific technical sales education for IBM partners & IBM community
- provide 3rd level technical sales support to IBM personnel on IBM/ISV related questions

■ On-Site Resources

- IBM Hardware and Software Brand Experts
- Technology Managers
- Solutions Sales
- Project Managers

■ Labs

- Located at Oracle and IBM
- Benchmarking/Sizing tests
- Redbooks and Whitepapers

■ Sizing Tools

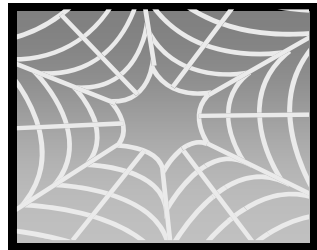
- Creation and ownership of worldwide sizing tools and processes
- Support the Techline resources

■ Technical Sales Support

- IBM Technical Sales
- Business Partners
- On-site briefings

■ Third level support when necessary

How to size Oracle Applications with IBM hardware



Step 1 - Download the Sizing Questionnaire from the Web
www.ibm.com/erp/sizing

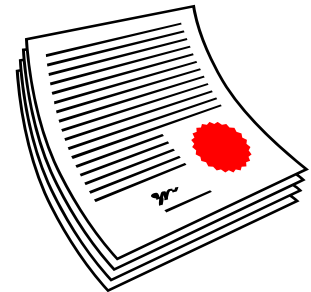


Step 2 - Certified Business Partners and IBM Specialists assist in completing



Step 3 - E-mail completed Questionnaire to the IBM Sizing Center

Refine if necessary



Step 4 - Sizing estimate is returned from Sizing Center

Direct Questions of how to obtain IBM Hardware Sizing information for Oracle Applications to
800-426-0222 or 888-426-5525 option 6 Or ibmoracl@us.ibm.com

What is a Sizing? (Accuracy vs Precision)

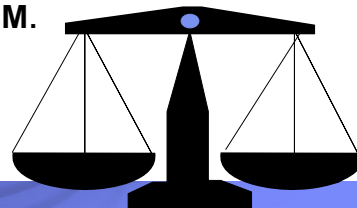
A sizing is an **estimation** that includes a workload from a provider other than IBM. IBM is not responsible for the **accuracy** of the data contained in such a workload. Any reliance by you on the third party workload is at your sole risk and will not create any liability or obligation for IBM. If you have any questions or are unsatisfied with the third party workload information, you should contact the third party provider.

The system resources quoted to you in any sizing related communications are sufficient only for the workload(s) estimated. Other factors may require additional resources (e.g. additional non-estimated workloads, minimum configurations for RAID, allowance for growth, workspace, etc).

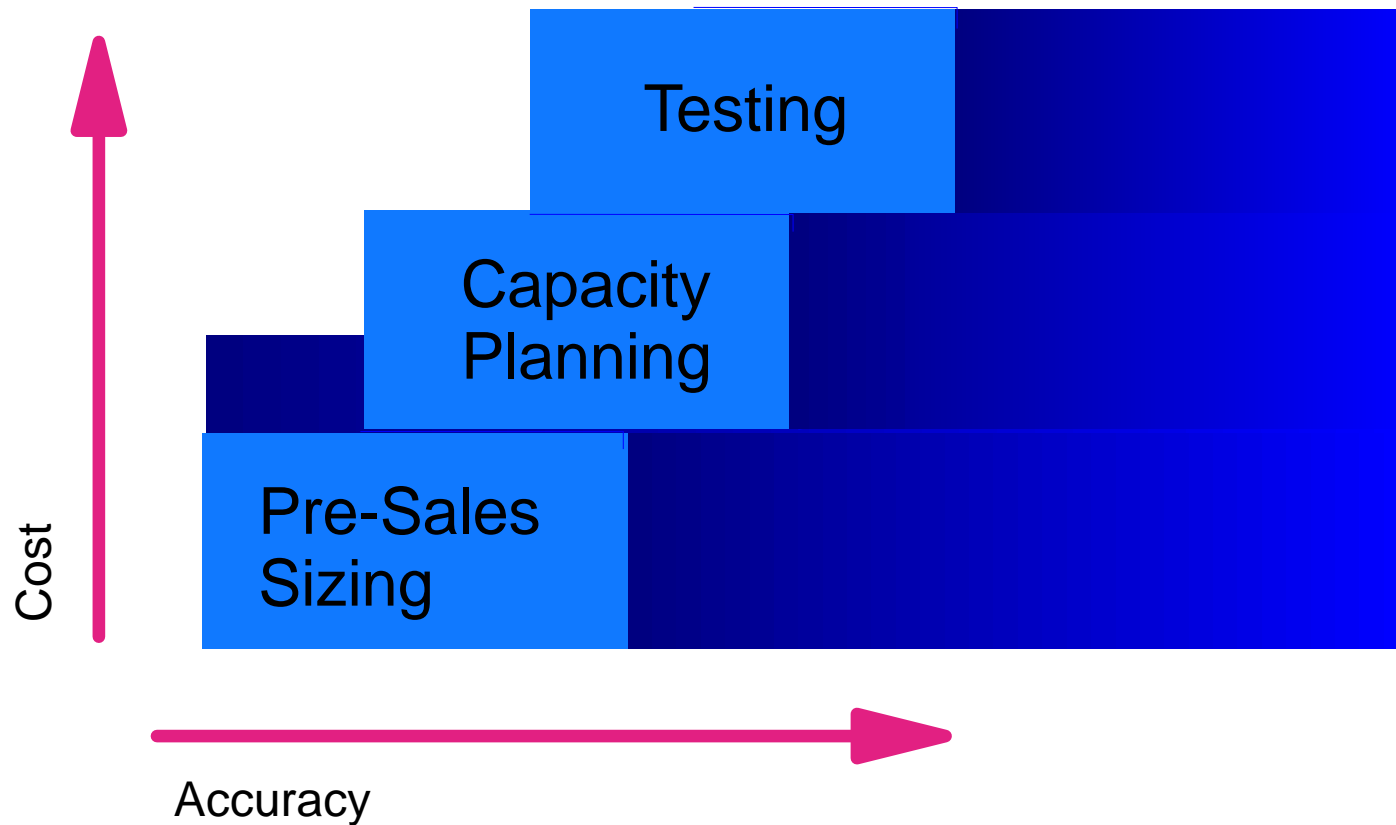
The information provided to you in any sizing related communications are provided by International Business Machines Corporation (IBM) as a service to you and may be used for informational purposes only.

Use of any sizing related communications is restricted to the purpose of helping you predict a possible IBM eServer model processor, memory and disk resources for a given workload. All representations of processor utilization, throughput, response time, memory, disk, and other performance data in the sizing communications are estimates and averages based on certain assumptions and conditions. No representation is made that these throughputs and their corresponding response times or other performance data will be accurate or achieved in any given IBM eServer installation environment. They are based on specific configurations and run time environments. Customer results will vary. Any configuration recommended by the sizing information communicated should be tested and verified.

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Positioning of Pre-Sales Sizing



Important considerations when Sizing Non-OLTP Databases

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[Cluster servers](#)
[Mainframe](#)
[System i](#)
[OpenPower servers](#)
[Intel processor-based servers](#)
[UNIX servers](#)
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Version: 2008.3.1 29-Aug-08 www-912

IBM Systems Workload Estimator

[Workload Selection](#) [Questionnaire](#) [Help/Tutorials](#)

- Database Workloads
 - [Reset This Page](#)
- [Save This Questionnaire](#)

Database Workloads

Database Workloads Workload Definition

Workloads & Options

- Select [database workloads](#) to estimate.

☒ Generic Non-OLTP
☐ N/A
- Choose the [system hardware](#) type desired.

☒ Power System
☐ Modular System
- Choose the optional [hardware options](#) desired.

☐ Limit Models
☐ Adjust CPU or memory weight factor

Related Links

- [Warranty info](#)
- [alphaWorks](#)
- [IBM Business Partners](#)

ON DEMAND BUSINESS™

Important considerations when Sizing Non-OLTP Databases

The screenshot displays the IBM Systems Workload Estimator web application. The top navigation bar includes links for Home, Business solutions, IT services, Products, Support & downloads, and My IBM. A left sidebar lists various IBM Systems categories like BladeCenter, Cluster servers, Mainframe, System i, OpenPower servers, Intel processor-based servers, UNIX servers, Solutions, Storage, Support, Developers, Education, Literature, and News and events. The main content area is titled 'IBM Systems Workload Estimator' and shows the 'Database Workloads' section. It includes a version number (2008.3.1), a date (29-Aug-08), and a URL (www-912). The 'Database Workloads' section has tabs for Workload Selection, Questionnaire, and Help/Tutorials. Below the tabs, there are links for 'Database Workloads', 'Reset This Page', and 'Save This Questionnaire'. The 'Database Workloads' section is further divided into 'Database Workloads Workload Definition' and 'Hardware Options'. The 'Hardware Options' section contains three numbered steps: 1. Enter the target CPU utilization for the server(s), 2. Adjust the CPU weight factor as desired for the overall workload, and 3. Adjust the Memory weight factor as desired for the overall workload. Each step has a corresponding slider control. The first slider is for 'target CPU utilization' with a range from 0% to 100% and a current value of 65%. The second slider is for 'CPU weight factor' with a range from 0 to 10 and a current value of 1.0. The third slider is for 'Memory weight factor' with a range from 0 to 10 and a current value of 1.0. A 'Related Links' section at the bottom left lists 'Warranty info', 'alphaWorks', and 'IBM Business Partners'.

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IBM Systems

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Cluster servers

Mainframe

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OpenPower servers

Intel processor-based servers

UNIX servers

Solutions

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Related Links

- Warranty info
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IBM Systems Workload Estimator

Workload Selection Questionnaire Help/Tutorials

- Database Workloads
- Reset This Page
- Save This Questionnaire

Database Workloads

Database Workloads Workload Definition

Hardware Options

1. Enter the [target CPU utilization](#) for the server(s)
0 % 100 %
65 %
2. Adjust the CPU [weight factor](#) as desired for the overall workload.
0 10
1.0
3. Adjust the Memory [weight factor](#) as desired for the overall workload.
0 10
1.0

Important considerations when Sizing Non-OLTP Databases

[BladeCenter](#)[Cluster servers](#)[Mainframe](#)[System i](#)[OpenPower servers](#)[Intel processor-based servers](#)[UNIX servers](#)[Solutions](#)[Storage](#)[Support](#)[Developers](#)[Education](#)[Literature](#)[News and events](#)

Related Links

- [Warranty info](#)
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- [IBM Business Partners](#)

[Database Workloads](#)[Reset This Page](#)[Save This Questionnaire](#)

Database Workloads

Database Workloads Workload Definition

non-OLTP

1. What [DB and version](#) will be used for this workload?
2. How many DB Nodes are [to be used](#) for this workload?
3. How many extra [HA Nodes](#) do you wish to configure?
4. Size of the [raw data](#) of the database:
5. Default [size unit](#) for DB

Oracle 10g ▼

1

0

300

GB ▼

6. Percent of database [active](#):

100 %

7. Default [disk expansion factor](#)?

4

8. Please choose one of the [scenarios](#) for sizing:

- ☒ Queries only
☐ ETL/Batch only
☐ Concurrent (Both)

9. Concurrency factor for queries.

100

Important considerations when Sizing Non-OLTP Databases

ETL/Batch

Transforms

1. Time required for transforms

2 Hours

2. Input Volume (MB)

100 MB

3. Input row length

300 Bytes

4. Output row length

100 Bytes

5. Transform Complexity

1

Loads (Insert/Selects)

6. Time required for loading

2 Hours

7. Number of secondary indexes

2

Aggregates

8. Time required for aggregation

2 Hours

9. Number of aggregates

2

10. Avg. aggregate size

0.1 GB

11. Number of secondary indexes per aggregate

0


12. Average row size in summary tables

100

13. Percent of active data to extract

100 %

Important considerations when Sizing Non-OLTP Databases



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IBM Systems Workload Estimator

Workload Selection Questionnaire Selected System Help/Tutorials

Database Workloads

Reset This Page

Save This Questionnaire

Database Workloads

Database Workloads Workload Definition

non-OLTP

1. Peak vs off peak ratio
2. Percent of data touched by simple queries.
3. Percent of data touched by medium queries.
4. Percent of data touched by complex queries.
5. Query Groups

| Active Users | Queries per user per day | Length of online day | Query mix |
|--------------|--------------------------|----------------------|---|
| 1 | 1 | 8 | <div><div></div><div>0 %</div><div>Simple 50 %</div><div>Medium 30 %</div><div>Complex 20 %</div><div>100 %</div></div> |

Add Query Group

Related Links

- Warranty info
- alphaWorks
- IBM Business Partners

Reasons for Sizing Inaccuracies – (Marty's Fab 5)

- **Reporting / General Batch Processing**
 - It is up to the users which batch jobs they submit, when they submit them and how many of all kinds they run. It is very difficult for the customer or IBM, to predict these usage patterns. Non-OLTP usually has a smaller number of users but the queries they generate are much more resource intensive. They access larger amounts of data and perform intensive function against this data.
- **Ad-Hoc Nature of Non-OLTP Workloads**
 - Queries, as in ad hoc queries, are especially difficult to size. The ultimate question is how do you size something (Ad-hoc) defined as a process defined for specific or immediate purpose often improvised or impromptu. Just the fact that you don't know what will be asked, how often and what will be looked for makes this a difficult, no-win, scenario.
- **Data Loads, Data Transformations, Aggregations.**
 - These types of processes are needed but all Non-OLTP systems but they largely depend on how many of each you want to run, how much data each of them is processing, and how often you are going to run them. Interfaces are another type of process within this group of job however interfaces may bring data into the system, as well as taking data out of the system.
- **Security.**
 - Security setup and how many cycles it takes to authenticate can cause major performance implications for the end user community. In my example a simple company birthdays report without department level security takes 30 seconds to complete for an average sized company. With security added to only allow the submitter to see their departments and no others the time to run took 35 minutes.

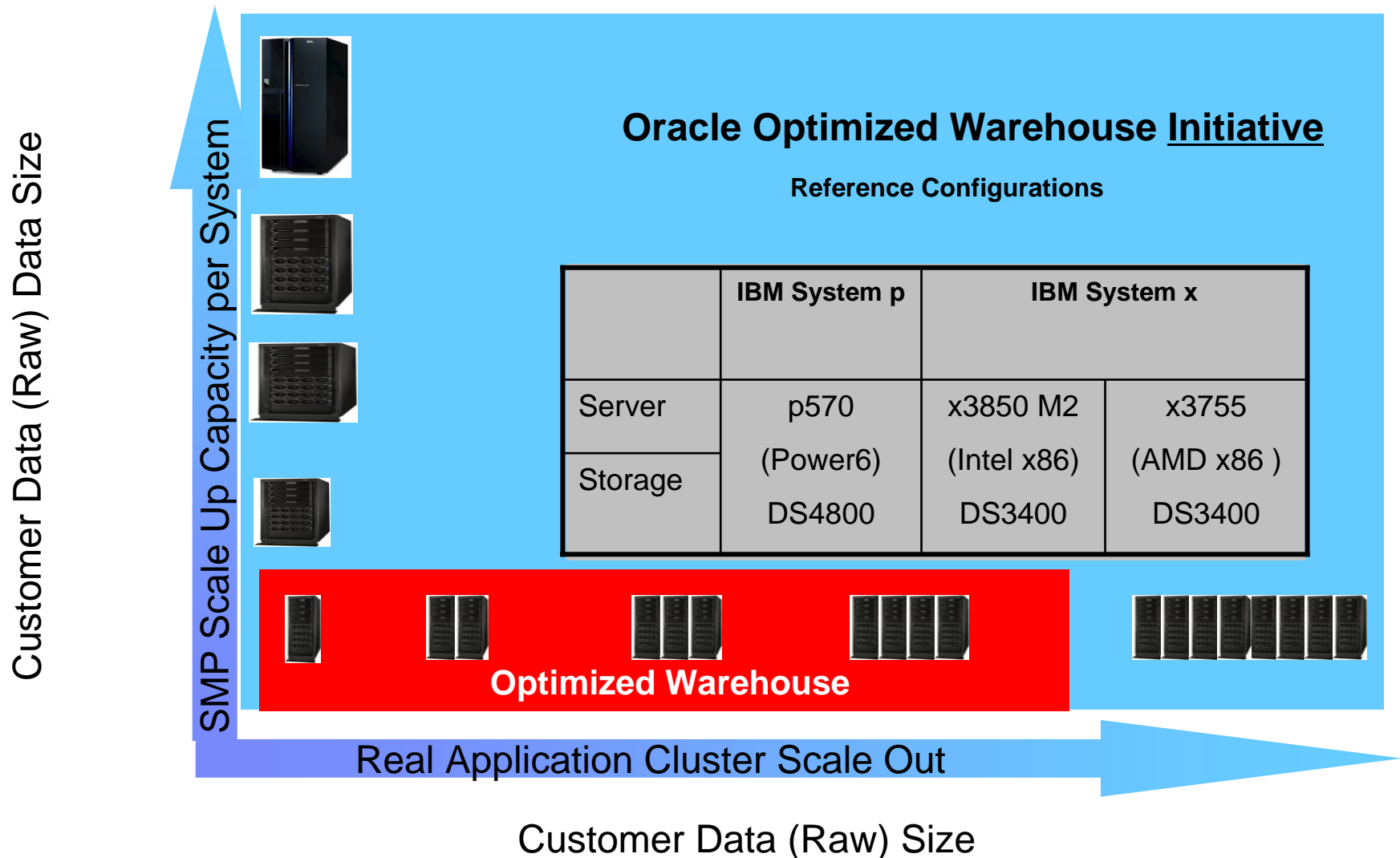
Reasons for Sizing Inaccuracies – (Marty's Fab 5)

- **Customizations.**
 - Not just ad hoc queries fall into this category. Also queries submitted from query generation tools and from developers and designers. Good coders are hard to find and is usually not written with performance in mind the first time it is developed. This code can be written poorly in many formats, like SQL, java, HTML, C and all the others.
- **Application Characterization - i.e. Budgeting.**
 - An application that often is not in the Non-OLTP category that is bundled in as part of the non-oltp system because you have process the width of data in the non-oltp database. Very heavy at the app and web and also heavy on the Intel side....
- **Purge Archive Frequency.**
 - Most customers only add data to their databases and never consider archiving older data or even purging the data. In a Non-OLTP implementation this is also something to consider. A customer who has 10 years of history data in tables and never queries more than 3 to 5 years is going to be paying a huge penalty for having to process the additional 7 to 10 years of data for their jobs. This is a huge factor in the overall performance and sizing of the system.
- **Database Maintenance tasks.**
 - These are tasks such as Backups, re-organizations, storage updates, and index creations. There can be times when this maintenance has to be completed and can cause issues with the day to day operations of the system.

Learning Points

- Sizing Recommendation – **Is it Gospel?**
- **Accuracy vs. Precision**
- Direction is a closed-loop process
- Recommended solution can handle defined workload
 - **If your workload in reality is different may not be able to handle**
- Changes in the ISV Application will impact solution
- Changes in technology will impact solution
- Setting the correct expectations is key!
- Testing is the KEY !!!
 - **If you want accuracy, then test YOUR exact workload, volumes and configurations. It's the only way.**

IBM Systems Reference Configurations Summary



IBM Systems Architecture for Oracle Optimized Warehouse

System p 570 and System Storage DS4800

Single rack building block



HMC additional

Rack components



5TB

DS4800
EXP810

3TB

storage
expansion
drawers

1TB



DS4800
Controller



SAN
Switch



p570 server
4-core, 4.7GHz
POWER6

Scale out building blocks: 5TB to 20 TB



Oracle Components

- Oracle Database 10g EE
- Oracle RAC
- Oracle Partitioning

DS4800 Benefits for Data Warehousing

- **Scalability** to keep pace with warehouse data growth
 - f To 67 TB FC, 168 TB SATA ... per DS4800
- **Performance**
 - f Up to 575,000 IOPS burst from cache and 1500 MB/sec sequential throughput from disk
 - f 4Gbps Fibre Channel technology end-to-end ... from host server to disk ... for fastest access to data
- Data **Protection** and Continuous **Availability**
 - f High availability architecture with redundant, hot-swap components
 - f Multiple RAID levels
 - f Remote Support Manager for “call home” support
 - f FlashCopy®, Volume Copy and Enhanced Remote Mirror
- Ease of **Management**, Ease of **Use**
 - f SAN-ready, centralized storage simplifies management
 - f “Anytime Administration” and “Recovery guru”
- Low **Total Cost of Ownership**
 - f Investment protection throughout DS4000 Family
 - f 3-year Warranty*
 - f Open, non-proprietary solution



IBM Systems Architecture for Oracle Optimized Warehouse

System x3755 (or x3850M2) and System Storage DS3400

Single rack building block



HMC additional

Rack components



3TB

DS3400
EXP3000

1TB

storage
expansion
drawers



DS3400
Controller



DS3400
Controller



SAN
Switch



x3755
server
(8-core)

Scale out building blocks: 3TB to 12 TB



Oracle Components

- Oracle Database 10g EE
- Oracle RAC
- Oracle Partitioning

IBM System Storage DS3400 Overview

- **Direct attach or SAN solution**
- **External storage solution for System x & BladeCenters**
- **Two auto-negotiating 4-Gbps host ports per controller**
- **Suited for building new SANs or extending existing 1-Gbps or 2-Gbps SANs**
- **2U, 19" enclosure with 3.5" SAS drives**
 - **Expandable up to 3 EXP3000s for a total of 48 drives**
 - **14.4TB max capacity 300GB SAS**
- **Managed by DS3000 Storage Manager**



Oracle Optimized DW Competitive Comparisons

IBM System x - Optimized Warehouse



IBM System p - Optimized Warehouse



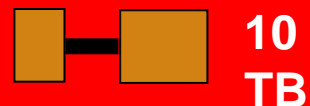
HP - Optimized Warehouse




DELL / EMC - Optimized Warehouse



SUN - Optimized Warehouse



IBM System p and System x & IBM System Storage™ ... the right systems for data warehousing



Lower your warehouse TCO by reducing:

- ✓ *Maintenance costs*
- ✓ *Software licensing costs*
- ✓ *Electrical and cooling costs*
- ✓ *Downtime costs throughout your enterprise*

Increase the operational efficiency of the warehouse through:

- ✓ *Improvement of resource utilization*
- ✓ *Ability to quickly add new services to grow the warehouse on demand*
- ✓ *Delivery of high levels of availability, response time and security to meet business productivity requirements*



Thank you.

Notes to Presenter

REQUIRED CHARTS

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Revised January 9, 2003

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Revised September 26, 2006

Special Notices (Cont.)

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Notes on Benchmarks and Values

The IBM benchmarks results shown herein were derived using particular, well configured, development-level and generally-available computer systems. Buyers should consult other sources of information to evaluate the performance of systems they are considering buying and should consider conducting application oriented testing. For additional information about the benchmarks, values and systems tested, contact your local IBM office or IBM authorized reseller or access the Web site of the benchmark consortium or benchmark vendor.

IBM benchmark results can be found in the IBM Power Systems Performance Report at http://www.ibm.com/systems/p/hardware/system_perf.html.

All performance measurements were made with AIX or AIX 5L operating systems unless otherwise indicated to have used Linux. For new and upgraded systems, AIX Version 4.3, AIX 5L or AIX 6 were used. All other systems used previous versions of AIX. The SPEC CPU2006, SPEC2000, LINPACK, and Technical Computing benchmarks were compiled using IBM's high performance C, C++, and FORTRAN compilers for AIX 5L and Linux. For new and upgraded systems, the latest versions of these compilers were used: XL C Enterprise Edition V7.0 for AIX, XL C/C++ Enterprise Edition V7.0 for AIX, XL FORTRAN Enterprise Edition V9.1 for AIX, XL C/C++ Advanced Edition V7.0 for Linux, and XL FORTRAN Advanced Edition V9.1 for Linux. The SPEC CPU95 (retired in 2000) tests used preprocessors, KAP 3.2 for FORTRAN and KAP/C 1.4.2 from Kuck & Associates and VAST-2 v4.01X8 from Pacific-Sierra Research. The preprocessors were purchased separately from these vendors. Other software packages like IBM ESSL for AIX, MASS for AIX and Kazushige Goto's BLAS Library for Linux were also used in some benchmarks.

For a definition/explanation of each benchmark and the full list of detailed results, visit the Web site of the benchmark consortium or benchmark vendor.

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| TPC | http://www.tpc.org |
| SPEC | http://www.spec.org |
| LINPACK | http://www.netlib.org/benchmark/performance.pdf |
| Pro/E | http://www.proe.com |
| GPC | http://www.spec.org/gpc |
| NotesBench | http://www.notesbench.org |
| VolanoMark | http://www.volano.com |
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| Ideas International | http://www.ideasinternational.com/benchmark/bench.html |
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