System Tecnology Group

zSeries IBM for SAP

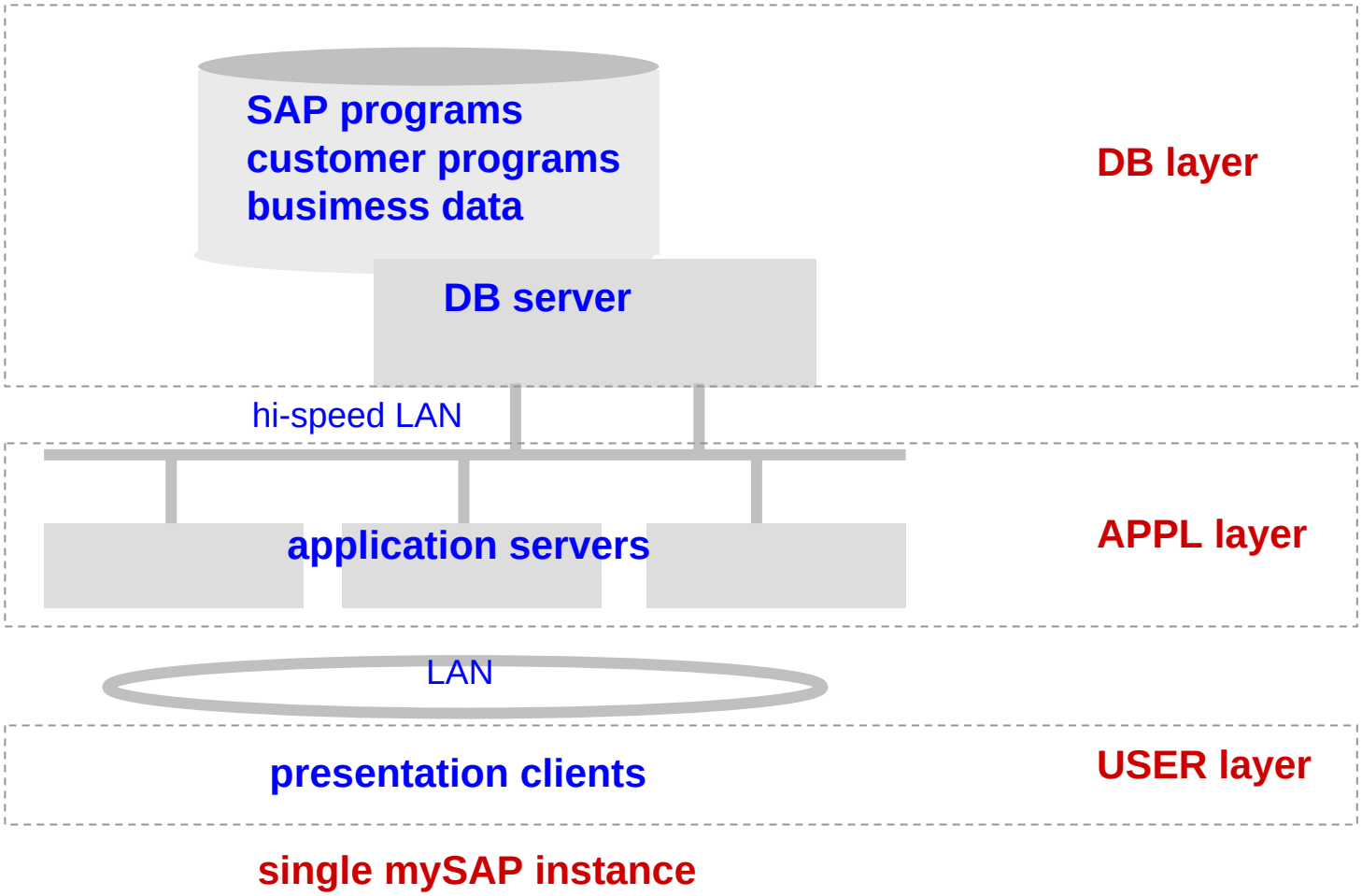
Unmatched platform: is it still true?

Business partner's workshop

Paolo Barberis – IBM Italia – System Tech Group (SAP)

SAP: application and technology layer

SAP System Landscape Complexity

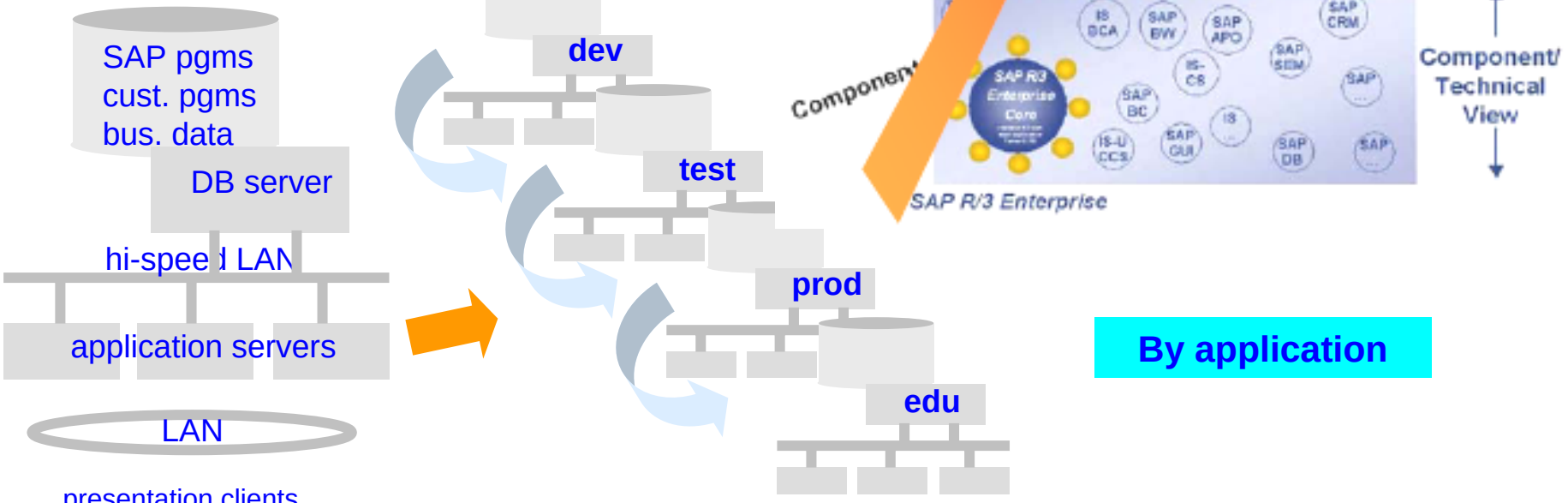


SAP: application and technology layer

SAP System Landscape Complexity

By architecture components

By usage



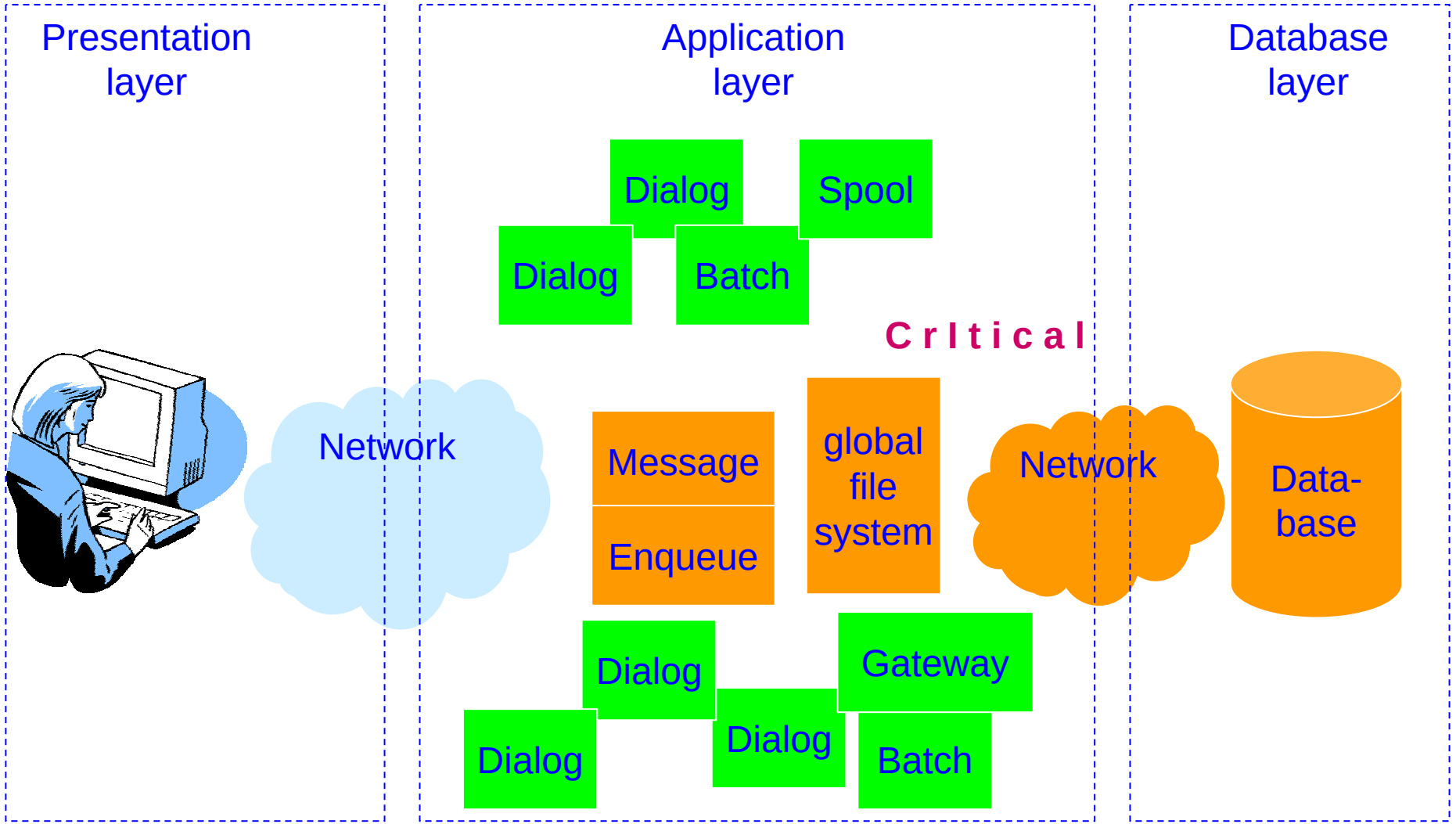
By application

single mySAP instance

mySAP system landscape

mySAP business solutions

Design of an SAP System
critical components

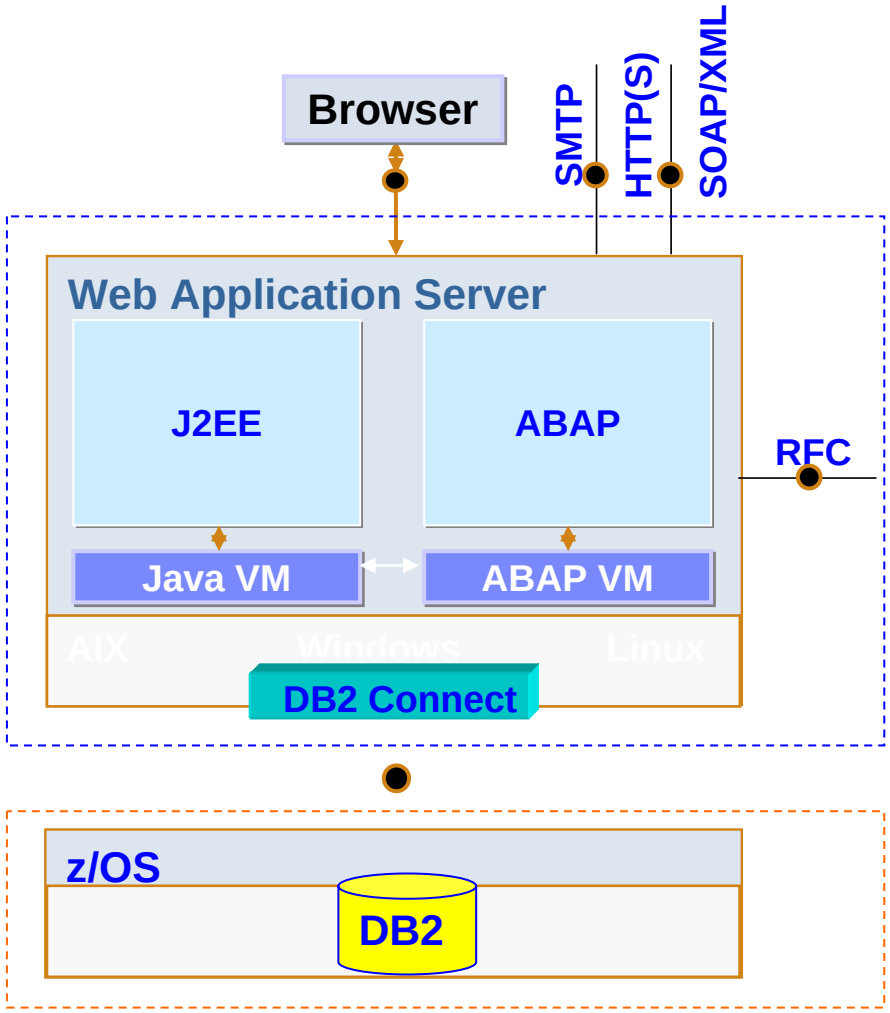


SAP tier based architecture

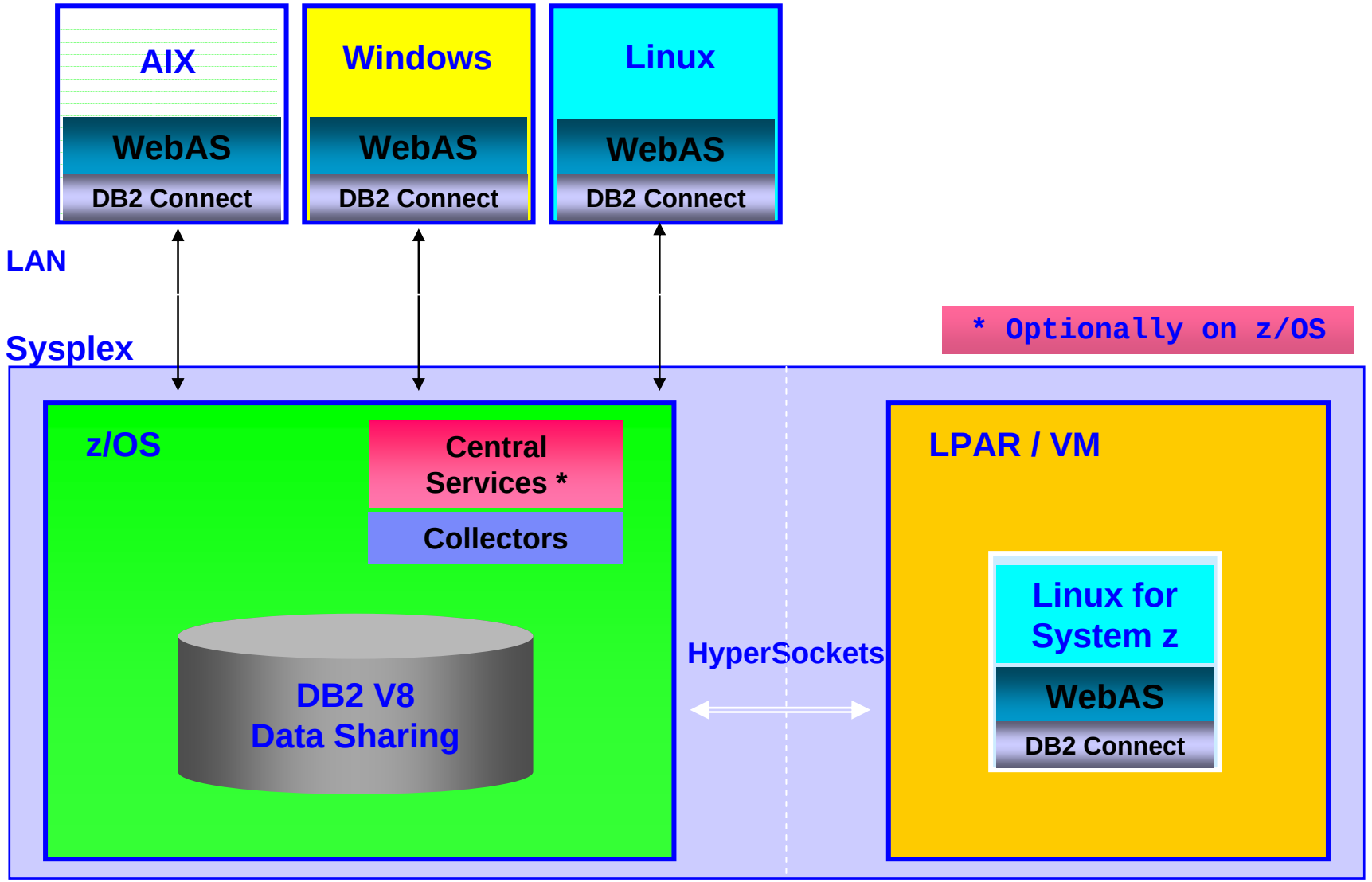
Widest SAP Application Server options

- **AIX**
- **Linux**
- **Windows**

No options best of breed: DB2

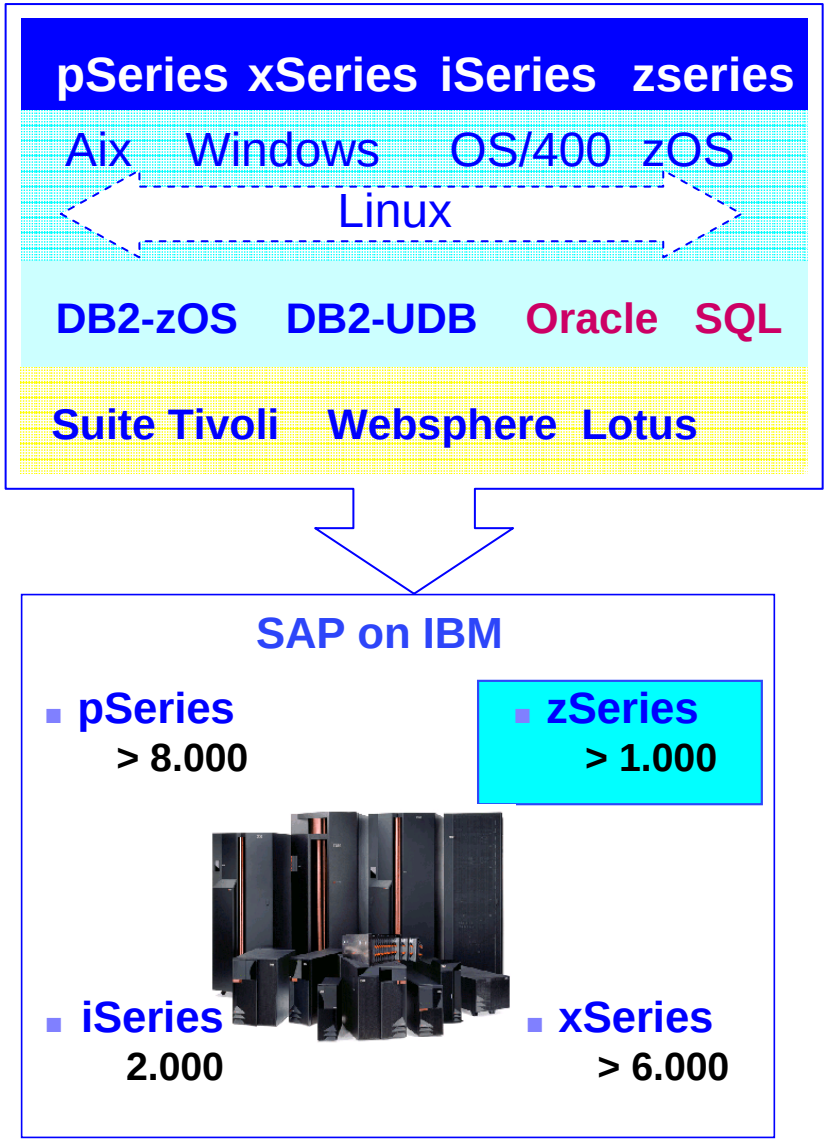


Base z architecture for SAP



IBM and SAP - Where zSeries best fits?

- Platforms
- Operating systems
- Database managers
- Management tools



Functions for SAP

- Availability
- Reliability
- Perfomance
- Scalability
- Partitioning / sharing
- Workload management
- Continuous availability
- Storage optimisation
- . . .

IBM and SAP - Where zSeries best fits?

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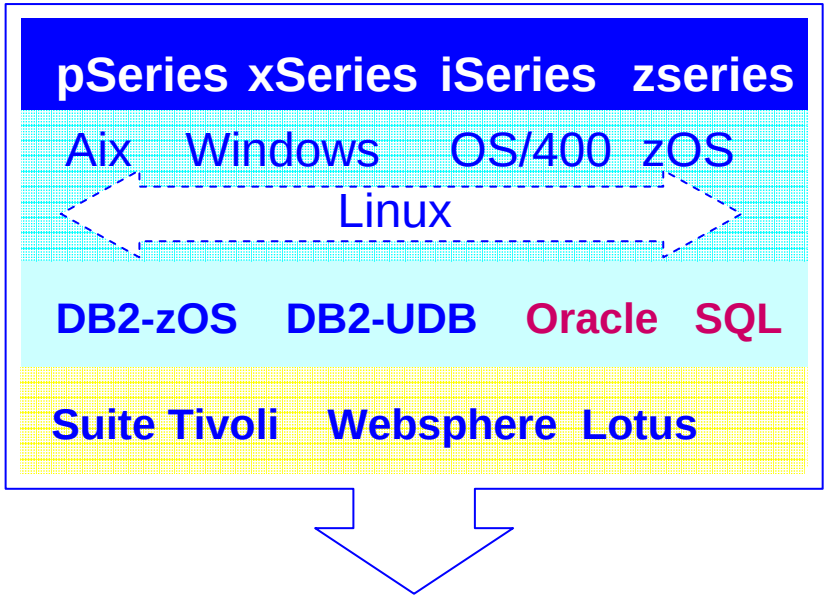

Functions for SAP
- Availability
- Reliability
- Performance
- Scalability
- Partitioning / sharing
- Workload management
- Continuous availability
- Storage optimisation
- . . .

All industry platforms are growing and pretend to provide everything CERTIFIED BY SAP

zSeries is certainly outstanding for
- ✓ **Continuity**
- ✓ **Consolidation**
- ✓ **Storage optimisation**
- ✓ **Workload management**

Focus on:

- ✓ **Continuity**
- ✓ **Consolidation**
- ✓ **Storage optimisation**
- ✓ **Workload management**

- ✓ **Continuity**
- ✓ **Consolidation**
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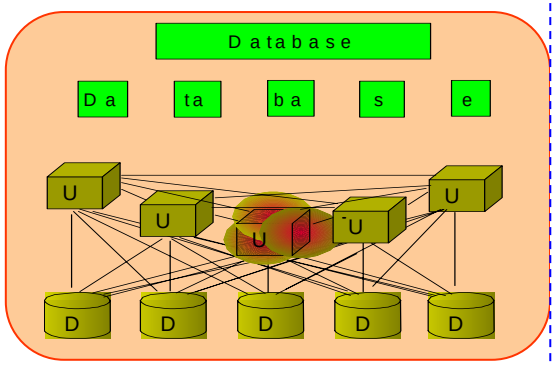
- ✓ **Workload management**

Focus on: alternatives for DB SAP

- ✓ **Continuity**
- ✓ Consolidation
- ✓ Storage optimisation
- ✓ Workload management

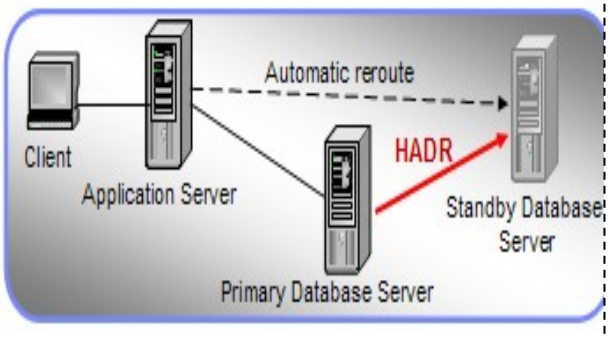
Oracle RAC
Unix / Windows



Datasharing
Exploits Oracle base
(most used for SAP)

Performance overhead
Limitation in scalability
More inter-system mess
(locks mngt via network)
DB partitioning,
(application may need c

DB2 UDB
Unix / Windows



Standby database
(no datasharing)
High performances
High availability Disaster Rec
Functionalities
Used by SAP Internal systems

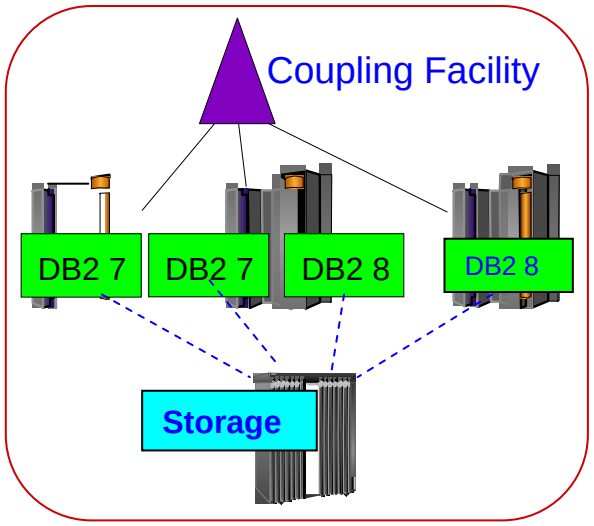
Less used than Oracle
Limitation in scalability

SQL Server
Windows/Linux

Standby database
(no datasharing)

Small-medium environments
Less functionalities than
Oracle and DB2-UDB
Limitation in scalability

zSeries solution for DB SAP



- ✓ **Coupling technology**: High performance HW infrastructure
  10 years experience in high volumes
  and high transaction rate
- ✓ **HW + Operating systems + DBMS + tools**
  Joint development
- ✓ **Maintenance while running**:
  DB2 and System upgrades
  (one system at a time)
- ✓ **Many implementation** on all industries

- Use of coupling facility provides for industry leading performance and scaling
- Failures are truly isolated
- Manage planned maintenance without downtime
- Dynamically react to changing workload conditions
- Consolidate workloads
- Industry leading RACF Security
- Simplified management – do more with existing resources

Sysplex / DB2 datasharing vs Oracle RAC

	Oracle RAC	DB2 for z/OS	
Survey Base	198 Organisations 203 Clusters	168 Organisations 260 Clusters	Oracle RAC sample has many DW, other apps
OLTP applications	78 Clusters (typically single application)	260 Clusters (typically multiple applications	
Transaction Volumes (Production)	81% < 100K /day max. 600K[1]; avg. 138K	87% > 1 Million/day max. >45 M; avg 8.8 M	Sysplex- approx 10x daily volumes
Cluster Size (Prod & Planned)	81% 2node; 18% 3&4 node; 1% 6 node	36% 2 node; 37% 3&4node; 26% 5+ nodes	
Cluster Overhead (Locking, Coherency ..)	20% 2 node; 30% 4 node, 39% 6 node	11% 2node; 13% 4 node; 15% 8 node	RAC has approx double overhead with known bottlenecks
Production Tps (Peak & Sustained)	Peak ~400 tps Sustained ~100 tps	Peak & Sustained - 13 orgs > 1000 cplx tps	Sysplex - at least 10x sustained tps proven
12-month Availability (all outage types)	16% achieved 100% + 32% >99.90%	31% achieved 100% +31% >99.90%	
Recovery Time	Failover: 60-90 seconds Full recovery: 5-20 mins	Failover: 0-20 seconds Full recovery: 1-10 mins	

Source: Enterprise Database Cluster Solutions - ITG - Oct 2003:
compares transaction processing workload on 78 Oracle RAC clusters and 260 DB2 for z/OS sysplex clusters
Oracle includes planned and production sites. Sysplex sites are all production
[1]Planned systems - 15% > 1 million/day

DB2 on zOS

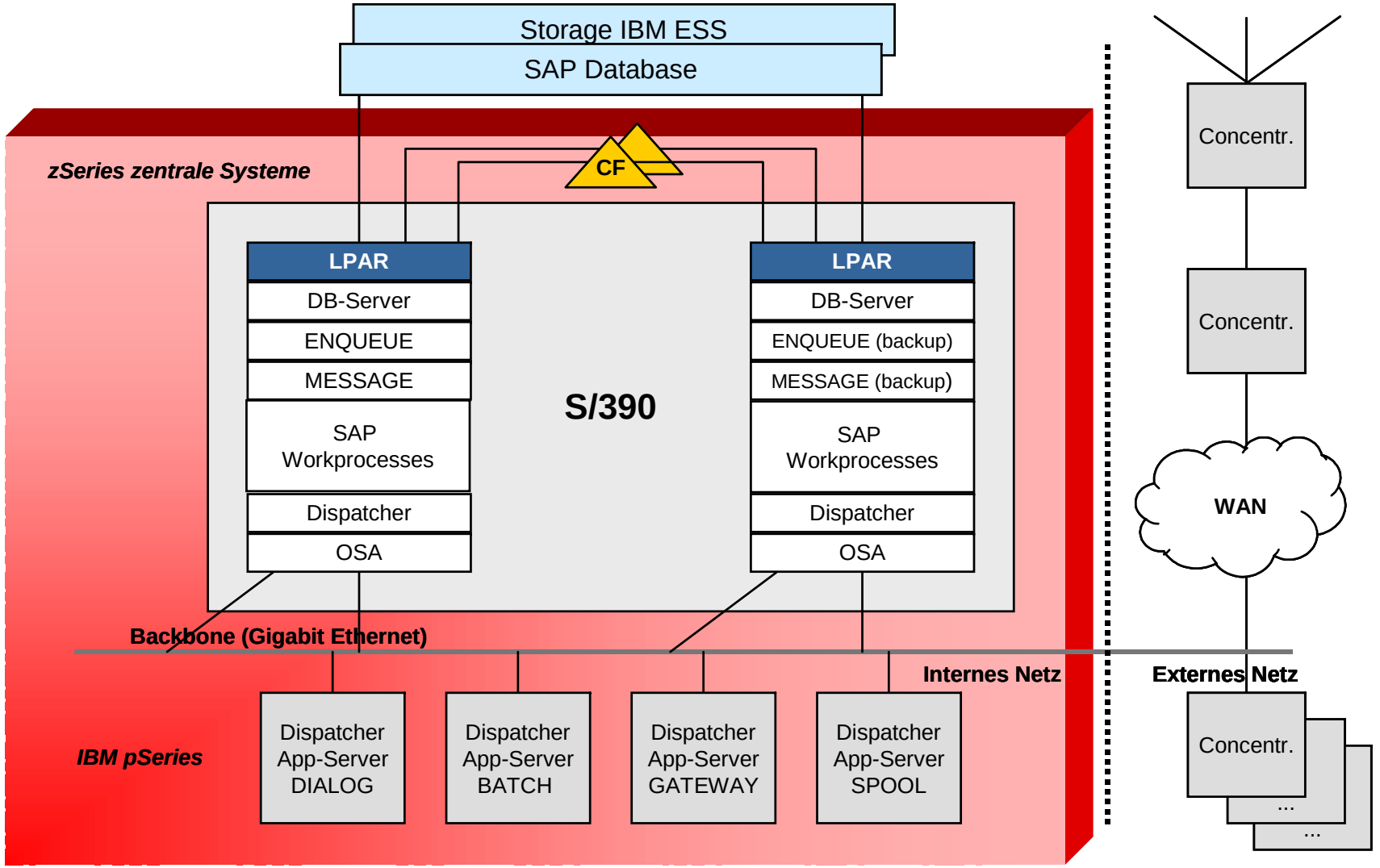
DB2 on mainframe since mid ’80
DB2 for SAP since 1996 general availability 1997
DB2 versions for SAP. v5 → v6 → v7 → v8
DB2 growth: functions specif for SAP

V8 **includes** **53** features explicity requested by SAP

V5	V6	V7	V8
- Dynamic Statements Cache - Statement Level Perf Indicators - 255-char Columns as Short Strings - Update of Partitioning Key Column - Alter Table to Extend Column Length - Data Sharing Scalability Improvements - Rename Table - ASCII Tables - Reduce Impact of DBD Locks - Improve Recover Performance - Read Stability - Keep Update Locks - DDL Concurrency: Create Objects - New Client Correlation Identifiers - Table/Index Growth Monitor - Streamline UPDATEs/DELETEs	- Index Access on Small Tables - Snowflake Scheme Join - Unlimited Number of Tables in Join - Defer Dataset Creation - Switching off Logging - Local Predicates in Join ON Clause - Accounting Class 3 Enhancements - Non-JCL API to DB2 Utilities - 8K and 16K Page Tablespaces - COPY Utility Consistent Backup - DB2 Logging Bottleneck Relief - Table Self-Reference on Mass Insert - Index Access 'IN non-corr subquery' - Triggers, UDFs, UDTs - Suspend Log Write Activity - Log Shortage Avoidance - Changing Partitioning Key Ranges - DDL Concurrency: Drop Database	- Lockout Diagnostics - Deadlocks at Insert - FETCH FIRST n ROWS ONLY - Online REORG Switch Phase - Report IRLM Start Parameters - Evaluate uncommitted - Option on Timeouts for Utilities - Retained Locks Concern - Simplify Monitoring VS Usage - Row Level Locking for Catalog - Statement Id for Cached Stmts - Real-time Statistics - Preformatting - Business Warehouse Joins	- VS Constraints - Unicode - Automate BackupRecovery - 64bit DB2 Connect for zLinux - Array Fetch, Insert - Multiple DISTINCT Clauses - Lock Contention on R/3 Cluster Tables - Fast Retrieval of Most Recent Value - Transparent ROWID - Create Deferred Index Enhancement - Longer Table Names - Provide DSTATS Functionality - Convert Column Type - Altering CLUSTER Option - Adding Columns to Index - Index-only Access Path for VARCHAR - Changing Number of Partitions - Partitioning Nonclustering Keys - Control Center Enhancement - DRDA Performance - ...

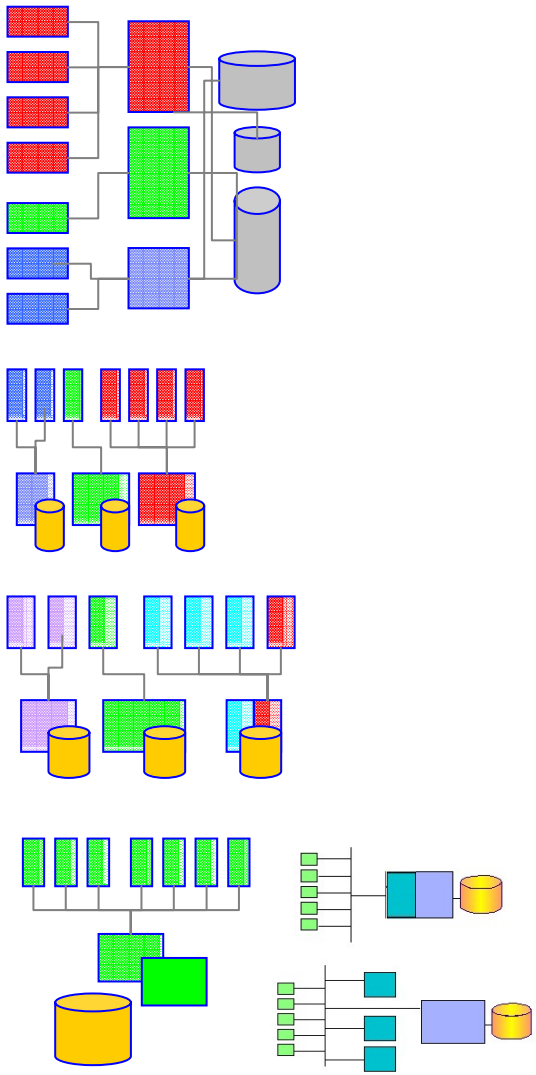
Postbank AG

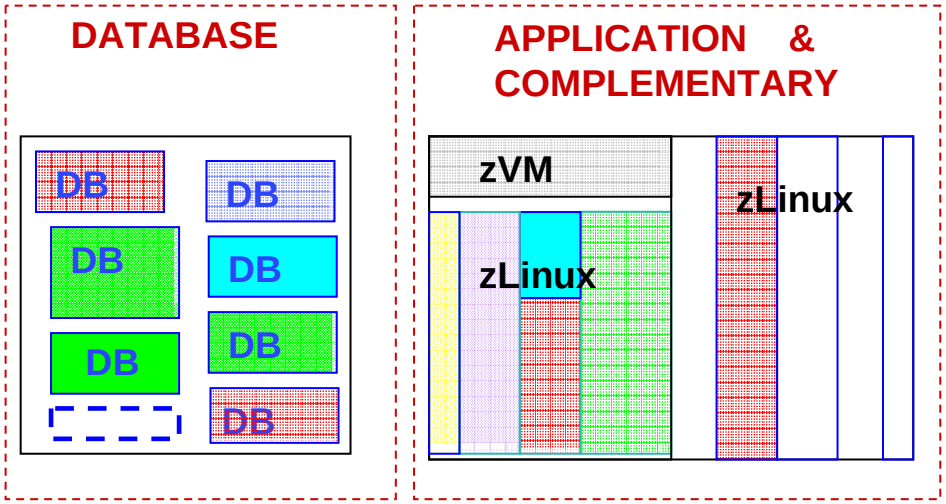
- ✓ **Continuity**
- ✓ **Consolidation**
- ✓ **Storage optimisation**



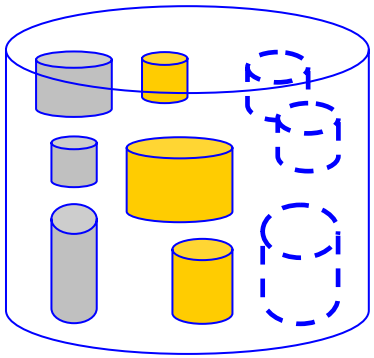
Resource consolidation

Continuity
✓ **Consolidation**
✓ **Storage optimisation**
Workload management



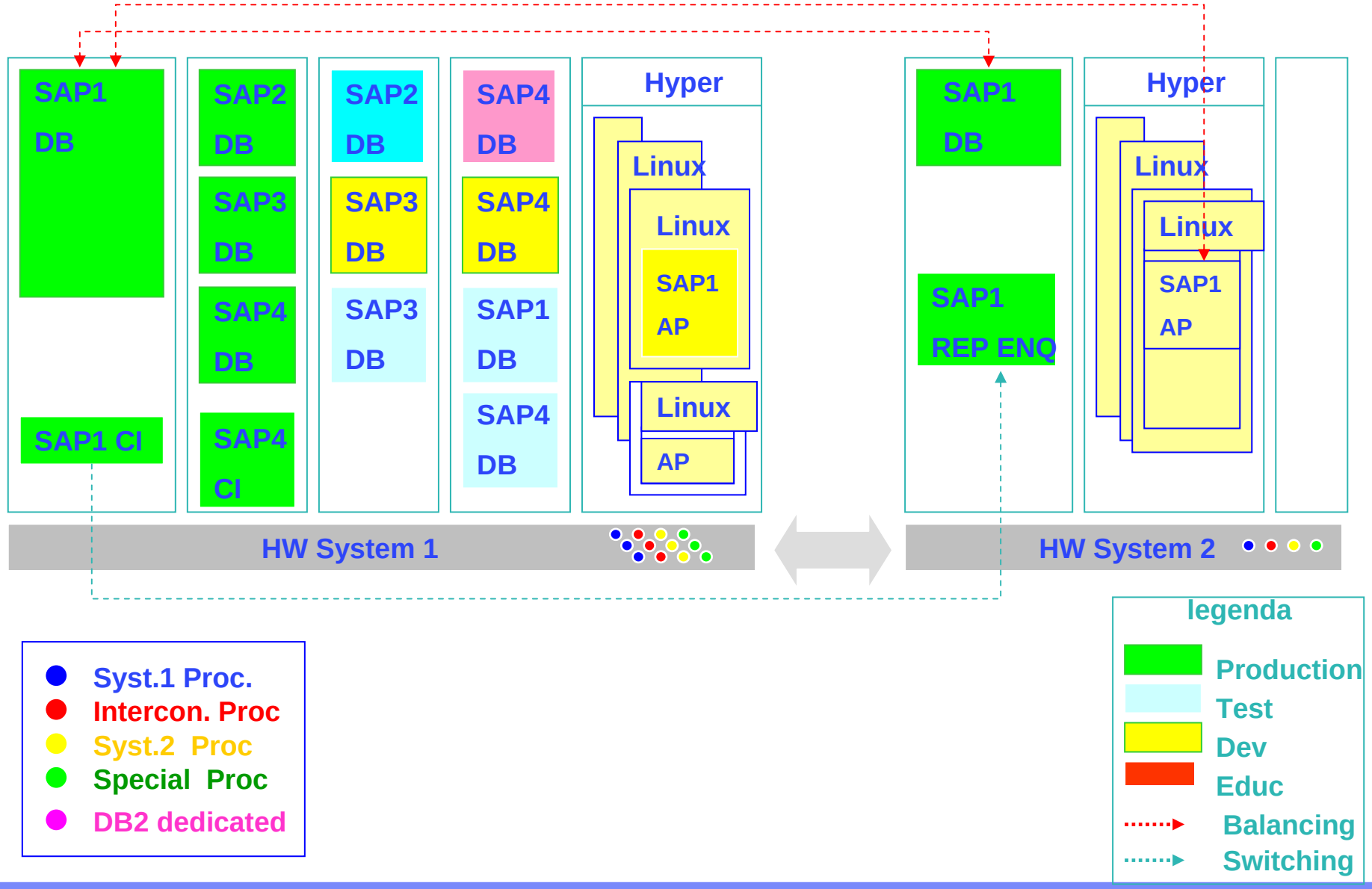


Capacity, memory, devices



Storage,

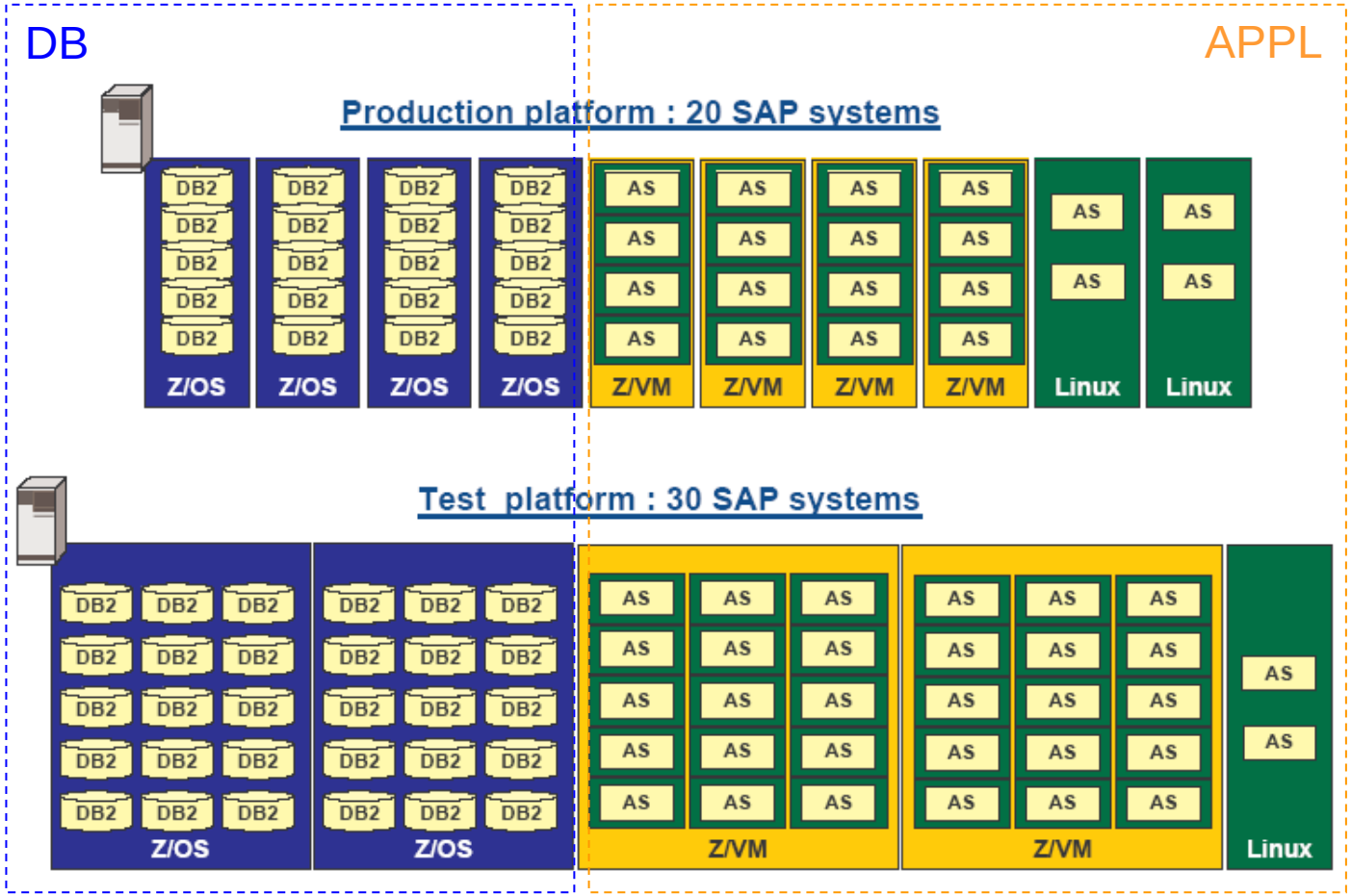
Consolidation



Focus on:

Living example

- ✓ Continuity
- ✓ **Consolidation**
- ✓ Storage optimisation
- ✓ Workload management



Different workload on specialized components

- **7 processor types available**

		Utilisation for SAP environments
– Standard CPs (provide MIPS)		SAP DB support Central Services
– Integrated Facility per Linux	**IFL**	SAP Application server +Complementary components
– Internal Coupling Facility	**ICF**	High avail. infrastructure DB integrity
– zSeries Application Assist Processor	**zAAP**	Not exploited by SAP Customer code
– z9 Integrated Information Processor	**zIIP**	DB2 (SRB component) DB2 Utility functions
– Service Assist Processor		Maintenance RAS
– On demand processors		Capacity Availability

Baldor Electric Company

Challenge

Core SAP R/3 Enterprise Resource Planning (ERP) software was spread across multiple systems, creating an environment that was increasingly complex and expensive to support.

Solution

- Baldor selected IBM DB2 UDB for z/OS V8 and DB2 Connect Application Server Edition V8.2. They were able to consolidate their SAP servers to a single machine, allowing them to quickly assign and reassign resources to support user demand.
- Weighing heavily in the decision: no mainframe downtime since 1997

Value

- Near continuous availability
- Perform regular systems management activities with server still in production
- Reduced cost & complexity
- IT spending reduced from 1.7% to 1.2% of sales

Focus on:

- ✓ Continuity
- ✓ Consolidation
- ✓ **Storage optimisation**
- ✓ Workload management

Data compression

Hw assisted minimal impact on processors (about 2%)

Physical space reduced, fundamntal for large tables (> 100 GB)

Inproves performance over channels and storage controllers

Optimizes memory utilisation, reduces overhead

Important effect on LOG (physical writes)

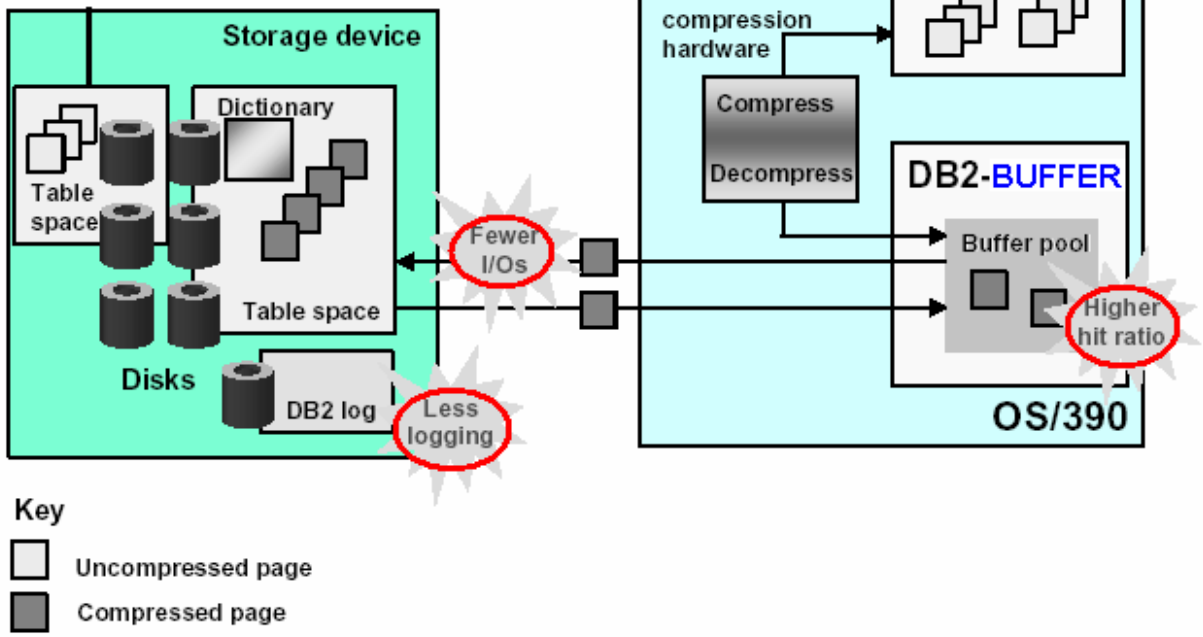
Example: Performance

Max compre

Database si

Reduced LC

in addition to DI



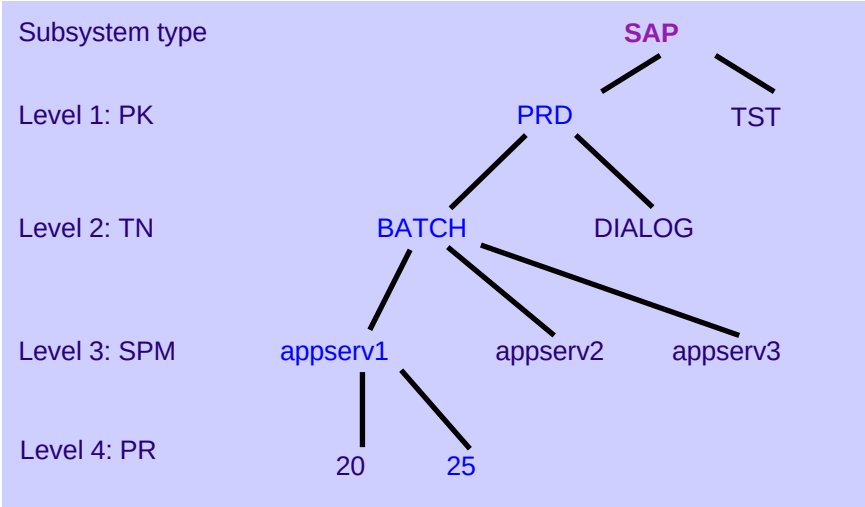
Performance)

z/OS Workload Manager

- ✓ Continuity
- ✓ Consolidation
- ✓ Storage optimisation
- ✓ **Workload management**

WLM enclave is classified by the following attributes:

- Server userid **UI**
  - <icliuser> or <sapsid>adm
- Process type **TN**
  - BATCH, DIALOG, UPDATE,
  - GATEWAY, ENQUEUE, ...
- SAP system id <SAPSID> **PK**
- SAP system number **PR**
- Host name of the app server **SPM**



Define any hierarchy of attributes and associate them with service classes

- Levels are interpreted as a tree
- Deepest rule determines **service class**
- Natural starting point...
  - Level 1: SAP system name
  - Level 2: Work process type

SAP Business Warehouse:
why on z/OS DB2

- ✓ **Continuity**
- ✓ **Consolidation**
- ✓ **Storage optimisation**
- ✓ **Workload management**

- **SAP BW is to the DBMS much more OLTP than OLAP**
  - Consequently, all the traditional zSeries OLTP values apply to SAP BW
- **Contrary to traditional Data Warehouse systems, BW typically requires very high level of availability and reliability**
  - Especially so in NetWeaver
- **Multiple workloads consolidation**
  - WLM and IRD
  - MCOD and Data Sharing
- **Very high compression ratios for BW data:**
  - significant DASD saving
- **Tight integration with DB2 utilities**:
  - invoked by SAP and transparent to user
- **No need for special indexing schemes**

- **Very high attention level within DB2 development organization**
  - Major V8 enhancemens
  - Innovative enhancements for Vnext
  - SAP BW is a standard test workload for DB2 system test

SAP on z Wrap-up for technical guys

- **Parallel Sysplex (also geographically dispersed) - datasharing**
- **Hardware Compression for DB2**
- **Availability 99.99%**
- **CPU and memory sparing**
- **Dynamic Reconfiguration**
- **Intelligent Resource Director**
- **Workload Manager (WLM)**

- **CISC complex instruction set computer**
- **PAV parallel access volume**
- **I/O priority queueing**
- **Sysplex failover (coupling technology)**
- **Reorg online, backup online since 1995**

Backup foils

The last issue

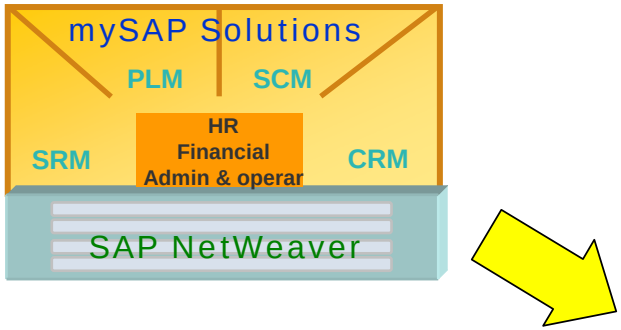
It's great
but
expensive

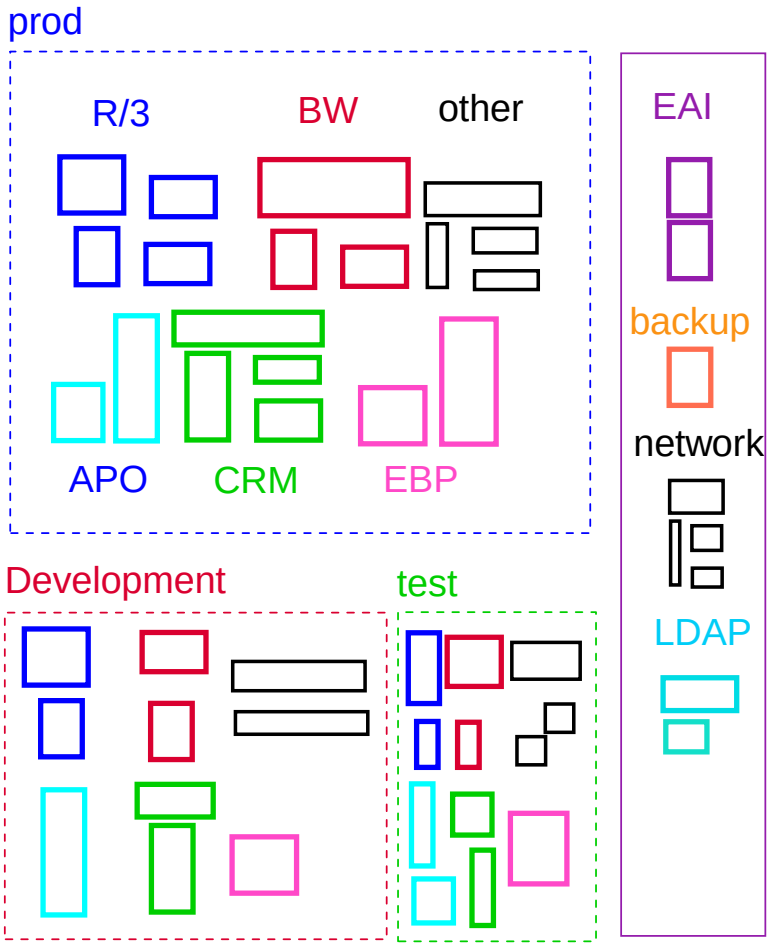
IBM worked on it

- ✓ **Dedicated HW** **IFL** **Linux for Application serving**
- ✓ **Offload DB2** **zIIP** **reducing DB2 utilisation**
- ✓ **Software pricing**
- ✓ **Integrated offerings**
- ✓ **Special offering for support**
- ✓ **Migration tools**
- ✓ **Competence centres, benchmark centers, LABs**

Ask your IBM sales support
zTeam is ready

SAP real architecture





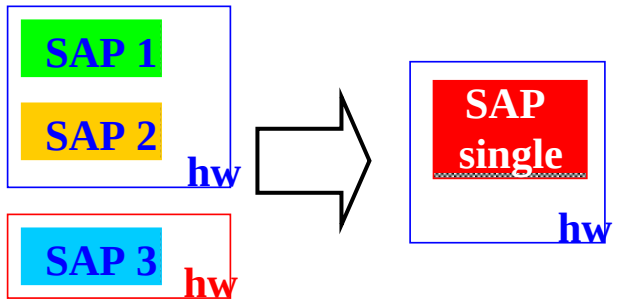
Complex
Etherogeneous
Isolated

System z helps to reduce complexity

features

1) **Application consolidation**

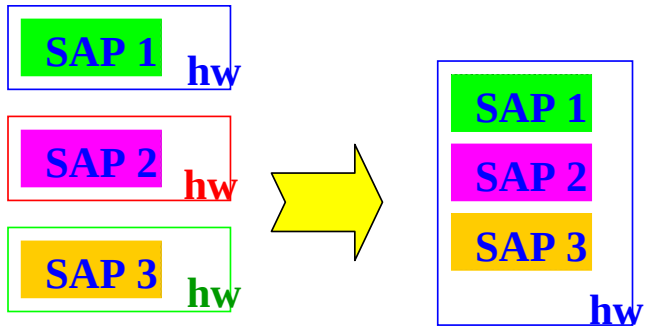
Application driven
Technology can help



Integration
only R/3
Virtualisation

2) **Server consolidation**

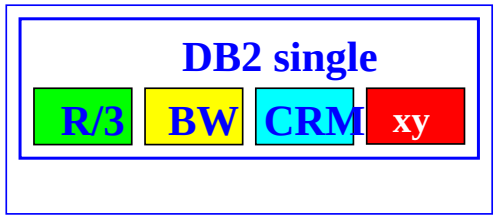
Resource sharing
Workload mngt
Peak workload mngt
Unified management
Technology is fundamental



Virtualisation

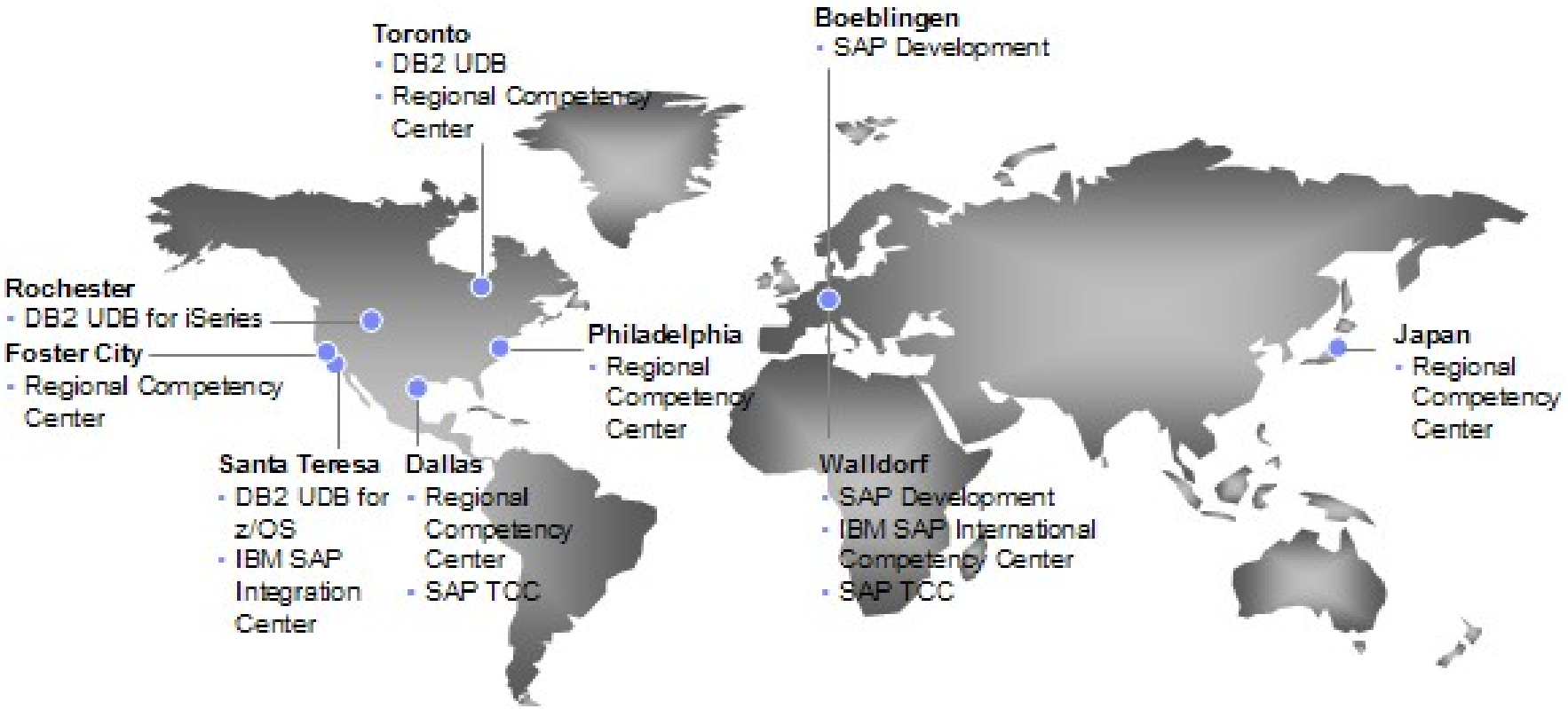
3) **DB consolidation**

New MCO possibilities
Technology + application



Integration
multiple mySAP
Virtualisation

Where to get help



+ local teams

Montpellier

- **230 Benchmarks & Proof-of-Concepts /year**
  - Average duration 2 weeks (up to 20)
- **4 DP rooms**
  - + 1100 workstation setups
  - + 1000 network setup
  - + 500 DP items purchased
  - + 200 systems (p-z-i-x) from MOP and Dublin
  - + 50 storage systems from Vak (Hungary)
  - + disaster recovery test (long distance cables)
- **>30 rooms for educ & teams → growing**
  - average utilisation 95% of time

SAP™ SIEBEL eBusiness ORACLE Ascential Software PeopleSoft

WebSphere Lotus Tivoli DB2 Universal database

HW environment

zSeries	82,000 MIPs	60 Terabytes
pSeries	20 Teraflops	55 Terabytes
iSeries	10 servers 110,000 CPW	30 Terabytes
xSeries	> 100 servers	High-end x440, x335 clusters, Blades Inlcuding EXA & FAStT

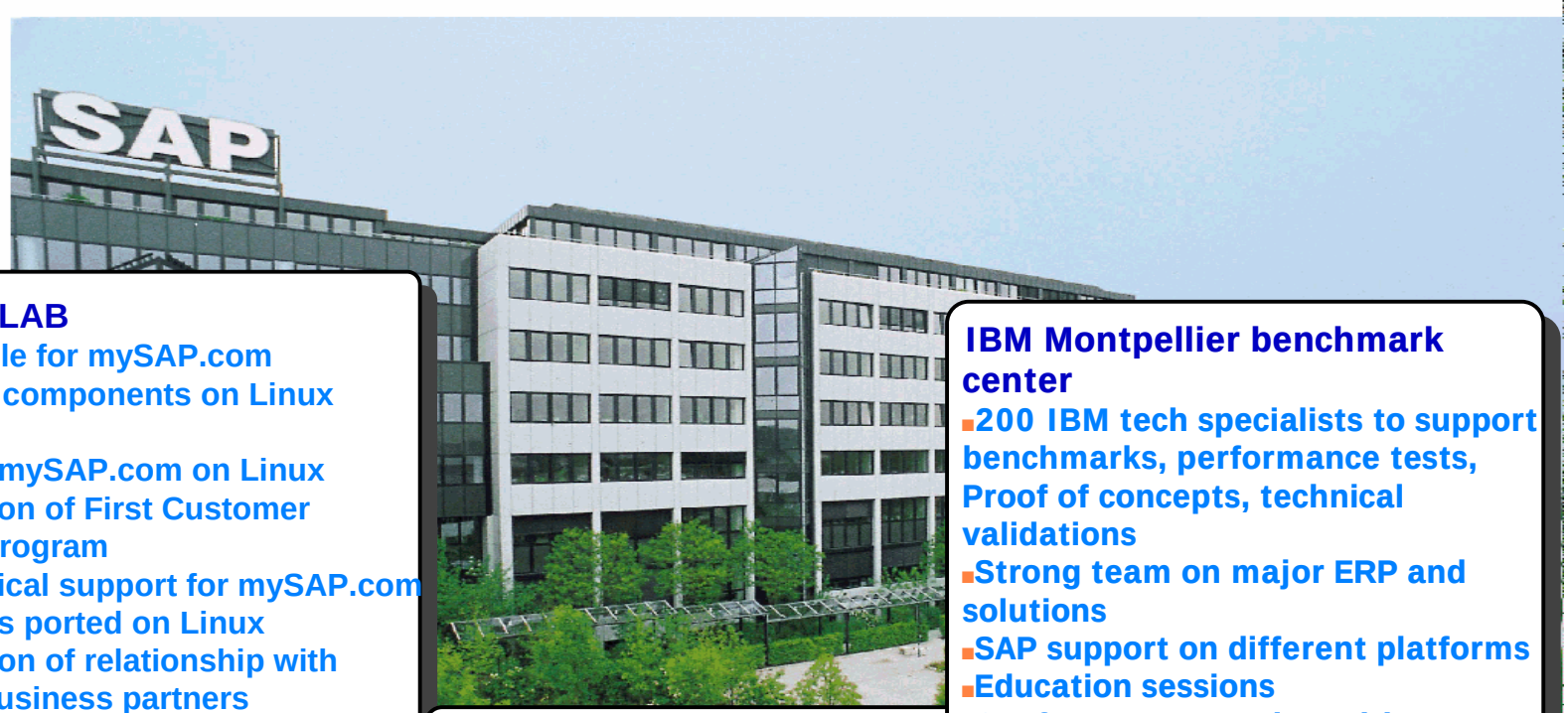
2004 data

People

Internal Skills
External IBM skills
External non IBM Skills

- **200** Professionals, several certified
- All platforms, Operating Systems
- RDBMS, IBM SW
- Latest Technology knowledge
- Learn, practice, support, teach

IBM resources: Competence centers + Benchmark centers



SAP LinuxLAB
- Responsible for mySAP.com application components on Linux rollout
- Porting of mySAP.com on Linux
- Coordination of First Customer Shipment program
- SAP technical support for mySAP.com components ported on Linux
- Coordination of relationship with hardware business partners

The SAP LinuxLAB is located at Walldorf - Germany SAP Headquarters

IBM in the SAP LinuxLAB
- IBM technical experts fully dedicated
- IBM hardware certification
- Technical support to First Customer Shipment customers
- Teach to Teachers education sessions for IBM and Business Partners

IBM Montpellier benchmark center
- 200 IBM tech specialists to support benchmarks, performance tests, Proof of concepts, technical validations
- Strong team on major ERP and solutions
- SAP support on different platforms
- Education sessions
- Conferences, meeting with customers and Business Partners

IBM and SAP areas of interest

Platforms:

- all
- Storage

Channels:

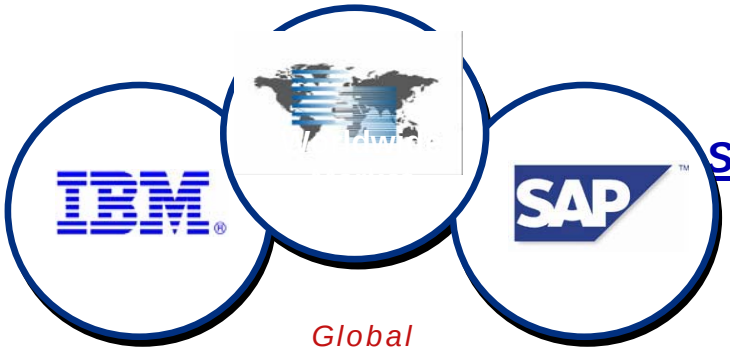
- Joint business partner recruitment
- Utilization of mutual channels
- Joint Sales Engagements

Middleware:

- IBM is Complementary Software Partner:
  - DB2
  - WebSphere
  - Lotus
  - Tivoli

Marketing:

- Joint market planning
- Joint business development
- Joint marketing campaigns



Services:

- >10000 SAP consultants
- Application Hosting
- Education

Industries:

- Joint multi-industry solution maps for Banking, Retail, Insurance, Utilities, Automotive, Public

Technology:

- Joint solutions development
- 100+ IBM technology projects

Customer Support:

- Joint competency centers
- Seamless problem handling
- Joint reference customers

IBM SAP Partnership

Global Technology Partner

- **Support of mySAP Business Suite on IBM eServer and IBM DB2**
- **Linux on Power**

Global Service Partner

- **Largest number of SAP Service consultants with BCS**
- **Member of the SAP Implementation Quality Program**

- SAP and IBM partner now for over 30 years
- > 8000 joint customer
- continuous enlargement and enrichment

Software Partner

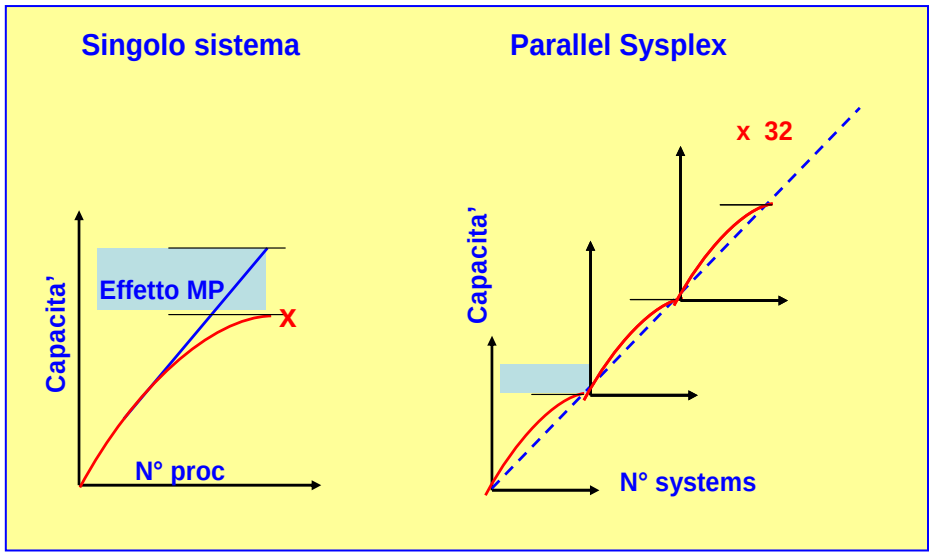
- **Collaboration Technology Support Center**
- **Lotus, Tivoli and WebSphere Integration**

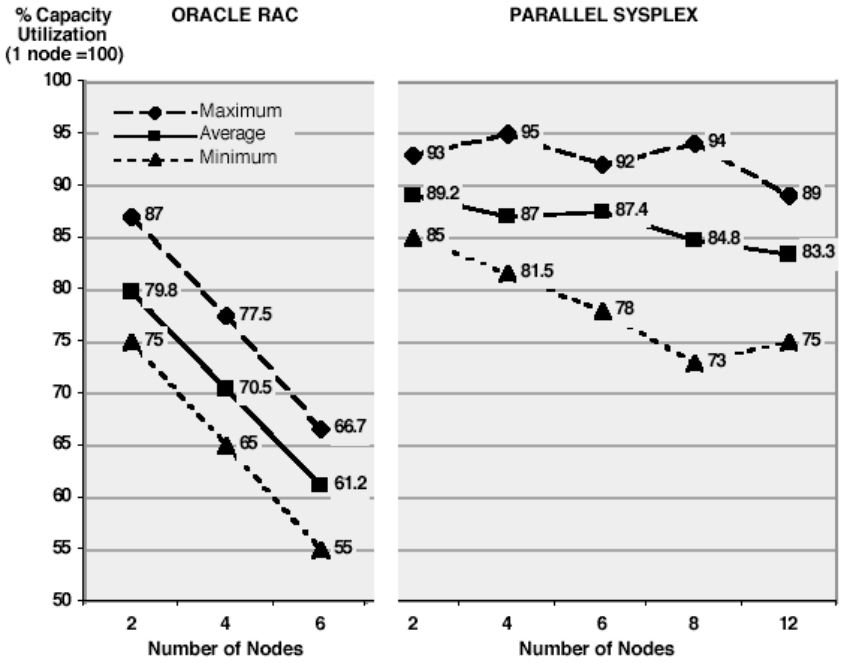
Hosting Partner

- **Certified Hosting Partner in major markets**
- **Largest number of SAP customer users hosted**

Capacita' – scalabilità

- ✓ Overcome multiprocessing effect through Parallel Sysplex – Datasharing
- ✓ Linear capacity growth (with number of systems)
- ✓ Theorethycal limite is currently 32 systems (each z9 full capacity !!)





Optimisation

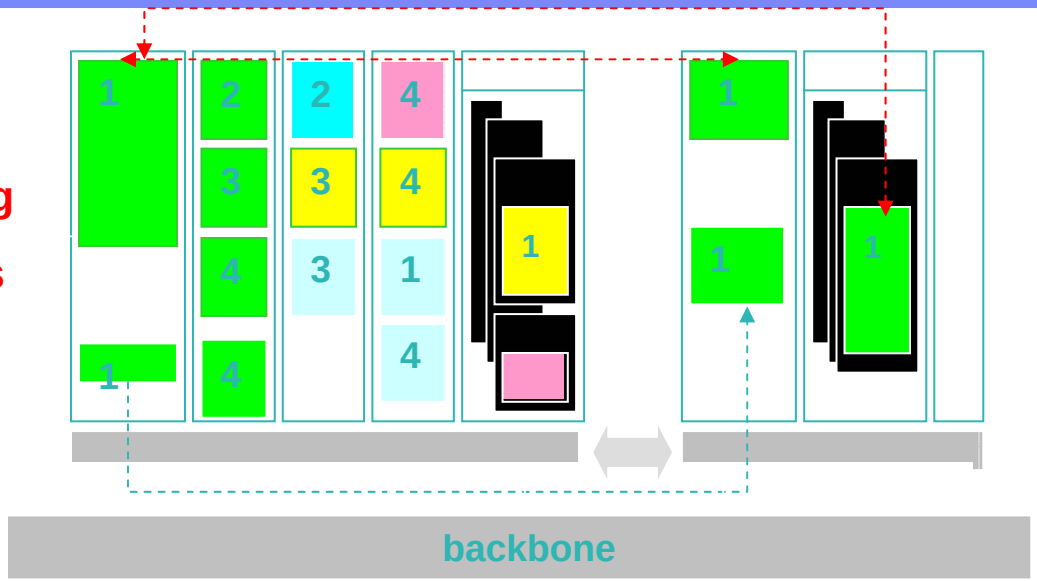
DB serving

Automatic balancing

Critical components

Continuity

- **Virtual**
- **Autonomic**

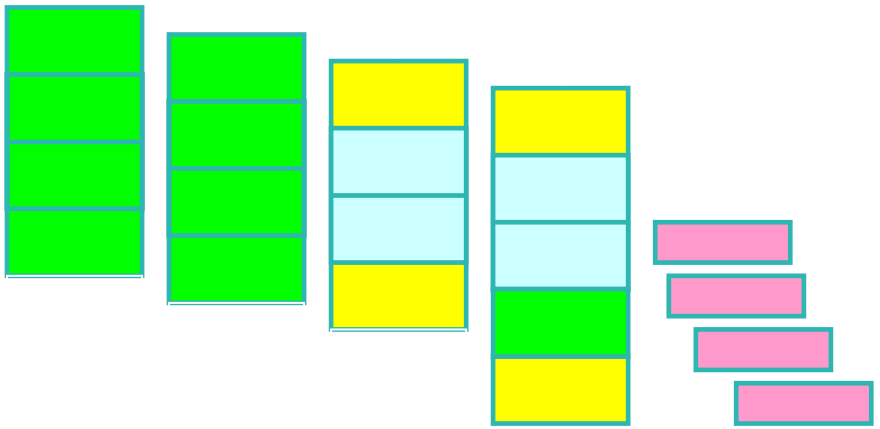


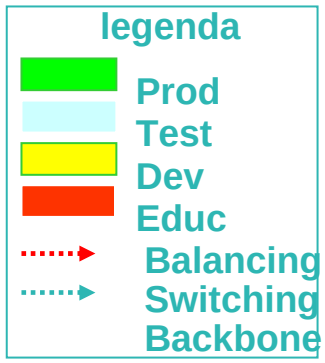
AP Performances

Cost effective

Special components

- **Integrated**





Exploit the best of every platform

System Tecnology Group

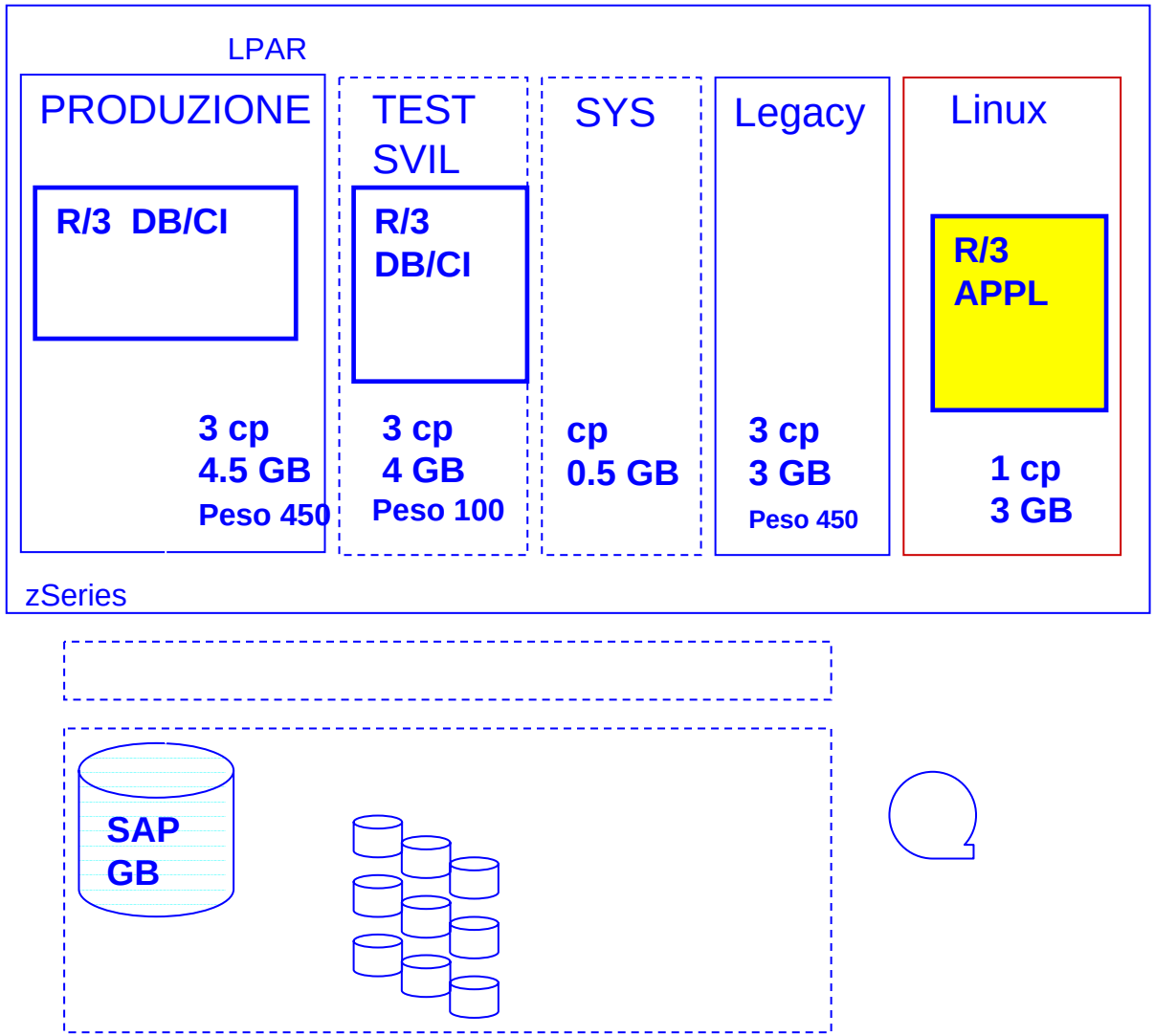
zSAP

Esempi cliente

Configurazioni esistenti
in fase di realizzazione

Paolo Barberis – IBM Italia – System Tech Group (SAP)

Cliente Transportation

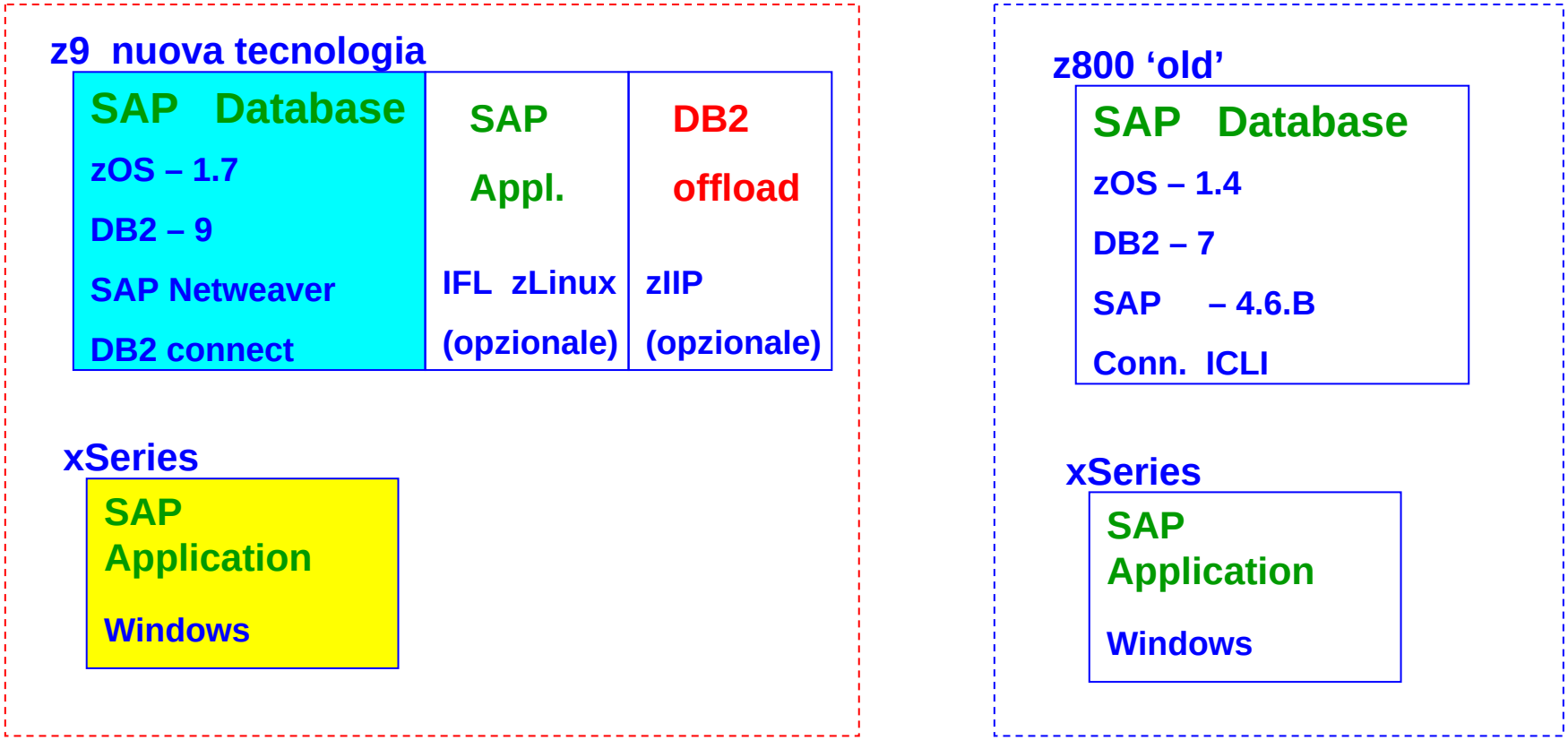


1 sistema SAP

1 mandante

5 aziende

Cliente Industriale



Attuale

Previsto

Cliente 'Process Manufactoring' - evoluzione sistema

INIZIALE

Max 4 cp

1 cp std	1 cp std	1 cp std	1 cp IFL
2086-250 332 mips		**365**	**365**

SCENARIO PROPOSTO

- tecnologia **z9**
- = /- mips standard
- crescita zLinux (x C.I)
- zIIP = offload DB2
- possibilita' di crescita

Max 7 cp

1 cp std	1 cp std	1 cp IFL	1 cp IFL	1 cp zIIP		
Z9 BC S07 N02		**480**	**480**	**480**		

Soluzione scelta

Max 7 cp

1 cp std	1 cp std	1 cp IFL	1 cp IFL	1 cp zIIP	1 cp ICF	
SAP DB		**SAP APPL**		**DB2 offload**	**GRS**	

Ambiente ‘classico’ – medium/small