IBM Software Group

DB2 for z/OS Beyond Version 8

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ibm.com/software/db2zos

DB2 Information Management Software

e business on demand software

DB2 for z/OS Version 8 News

- **New function**
  - **Cross loader with LOBs**
  - **Built in functions ASCII, TIMESTAMPDIFF**
  - **DSN1COPY with 1000 OBIDs**
  - **QMF with multirow fetch**
  - **Online Check Index**
  - **z/OS 1.7 up to 7257 extents**

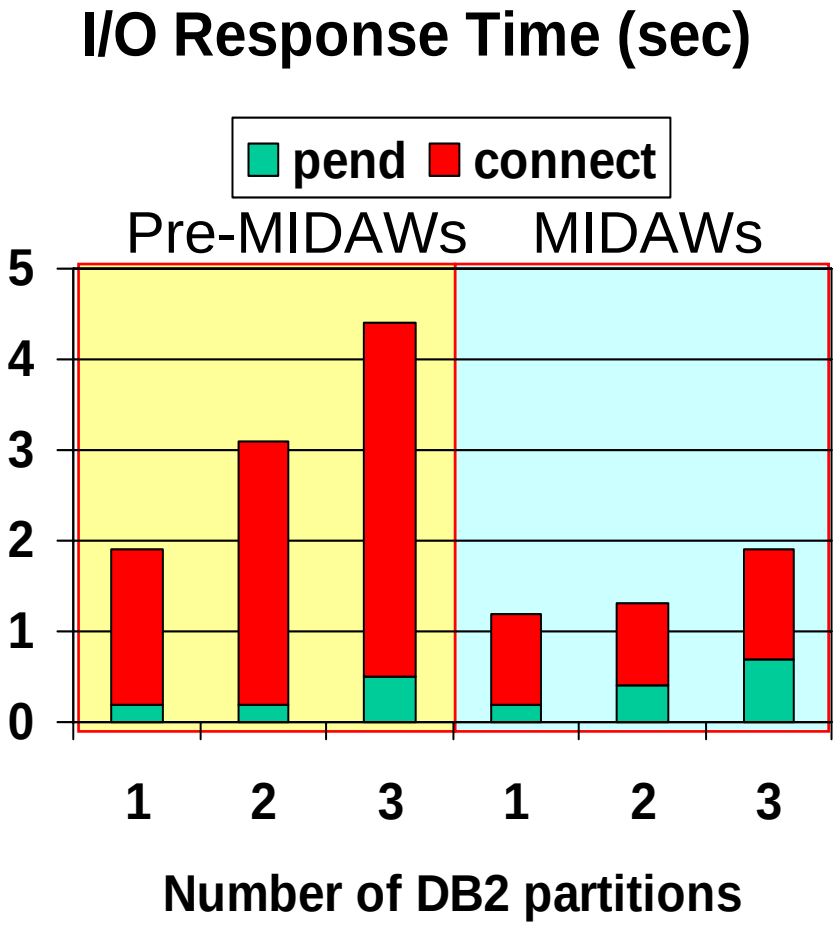
  now
  - **LOAD, UNLOAD with LOBs**
  - **IBM System z9 Integrated Information Processor (IBM zIIP)**
- **New and updated books: Library refresh April 2005, Messages, Codes became separate books August 2005**
  - **Redbooks: Design Guidelines for High Performance and Availability, Business Value, Performance Topics, WebSphere, MLS, Disaster Recovery, others updated …**
  - **Customer information on the web**

IBM System z9, z/OS & DB2 for z/OS

- ✓**System z9 Integrated Information Processor (zIIP)**
- ✓**Enhanced channels (MIDAW)**
- ✓**Enhanced Cryptography**
- ✓Faster Processors
- ✓Up to 54 Processors
- ✓More memory, better value; 64 bit virtual storage
- ✓…

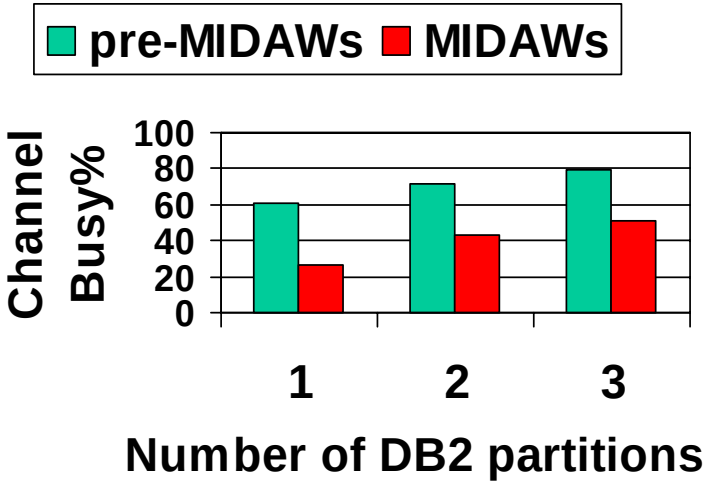
- ✓Backup and restore
- ✓Multilevel Security
- ✓Unicode conversion
- ✓Compression
- ✓zSeries Application Assist Processor
- ✓z/Architecture new instructions
- ✓WLM enhanced
- …

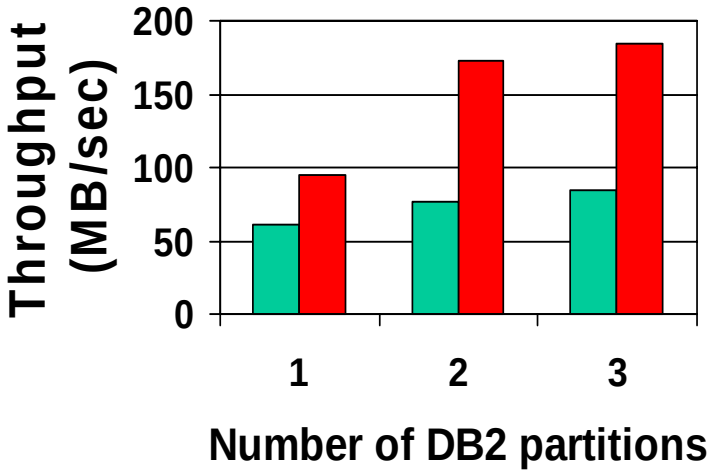
Parallel DB2 Table Scan, EF 4K (single channel)



Configuration:
- **MIDAW:** z/OS 1.7
- **Pre-MIDAW:** z/OS 1.4

- DB2 for z/OS V8
- 4000 byte row size
- System z9 109
- FICON Express 2
- 2 Gbit/sec link
- DS8000 control unit





IBM Encryption Facility for z/OS, 1.1

Licensed Program Product
MSU-based pricing*

Runs on servers: System z9 109 (z9-109),
zSeries z900 or z990,
zSeries z800 or z890, or equivalent
Requires: z/OS 1.4 or higher z/OS.e 1.4 or higher

Feature: *Encryption Services*

Optional Priced Feature*
Planned availability:
Oct. 28, 2005

- **Supports encrypting and decrypting of data at rest (tapes, disk)**
- **Supports either Public Key/Private keys or passwords to create highly secure exchange between partners**

Encryption Facility Client

Web download
Planned availability:
October 28, 2005

- **Java™ technology-based code that allows client systems to decrypt and encrypt data for exchange with z/OS systems**

Feature: *DFSMSdss Encryption*

Optional Priced Feature*
Planned availability:
December 2, 2005

- **Allows encryption and compression of DUMP data sets created by DFSMSdss™**
- **Supports decryption and decompression during RESTORE**

* Variable Workload License Charges (VWLC), Entry Workload License Charges (EWLC), zSeries Entry License Charges™ (zELC), Parallel Sysplex License Charges (PSLC)

Technology Evolution with Mainframe Specialty Engines

Building on a strong track record of technology innovation with specialty engines, IBM intends to introduce the System z9 Integrated Information Processor

IBM System z9 Integrated Information Processor (IBM zIIP) planned for 2006

Designed to help improve resource optimization for eligible data workloads within the enterprise

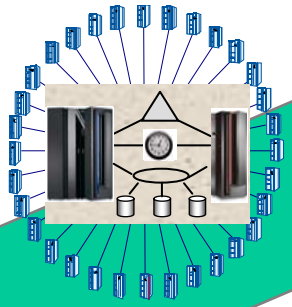
System z9 Application Assist Processor (zAAP) 2004

Incorporation of JAVA into existing mainframe solutions

Integrated Facility for Linux (IFL) 2001

Support for new workloads and open standards

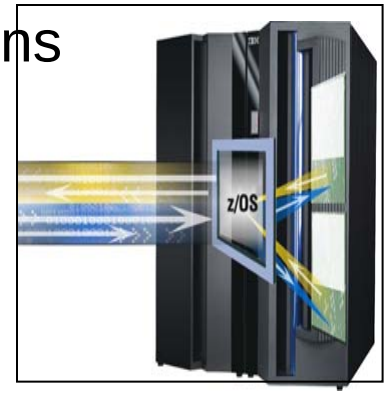
Centralized data sharing across mainframes



Internal Coupling Facility (ICF) 1997

New IBM System z9 Integrated Information Processor (IBM zIIP)

- New specialty engine for the System z9 mainframe (planned for 2006) designed to help:
  - Customers integrate data across the enterprise
  - Improve resource optimization and lower the cost of ownership for eligible data serving workloads
- z/OS manages and directs work between the general purpose processor and the zIIP
  - Number of zIIPs per z9-109 not to exceed number of standard processors
  - No changes anticipated to DB2 for z/OS V8 applications
- DB2 for z/OS V8 will be first user of the zIIP with
  - System z9 109
  - z/OS 1.6 or later
  - DB2 for z/OS V8



DB2 V8 and IBM zIIP can add value to database work

- Portions of the following DB2 for z/OS V8 workloads may benefit from zIIP*:

1 - ERP, CRM, Business Intelligence or other enterprise applications

- Via DRDA over a TCP/IP connection

New Specialty Engine

2 - Data warehousing applications*

- Requests that utilize star schema parallel queries

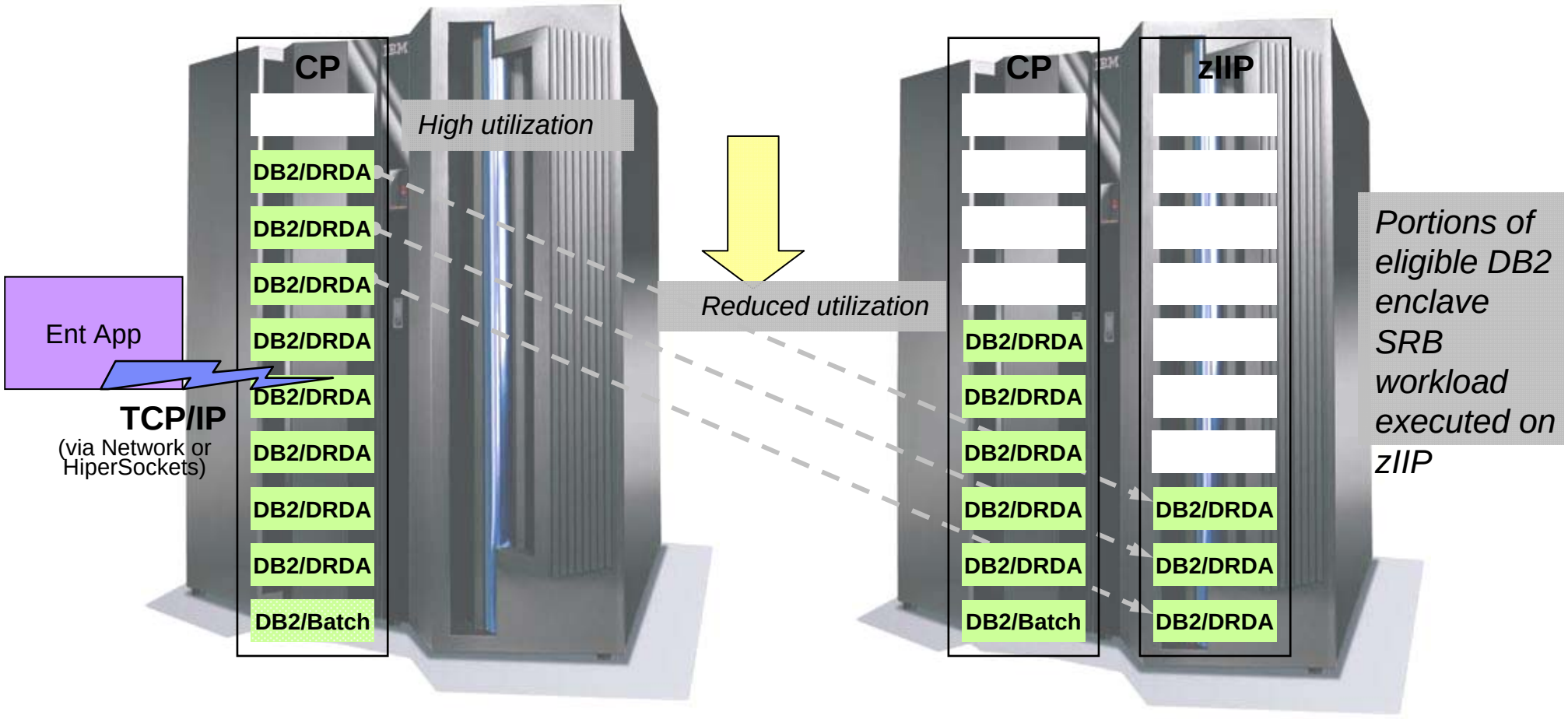
3 - DB2 for z/OS V8 utilities*

- Internal DB2 utility functions used to maintain index maintenance structures

*** The zIIP is designed so that a program can work with z/OS to have all or a portion of its enclave Service Request Block (SRB) work directed to the zIIP. The above types of DB2 V8 work are those executing in enclave SRBs, of which portions can be sent to the zIIP.**

Example 1: Enterprise Applications

Enterprise Applications that access DB2 for z/OS V8 via DRDA over a TCP/IP connection will have portions of these SQL requests directed to the zIIP

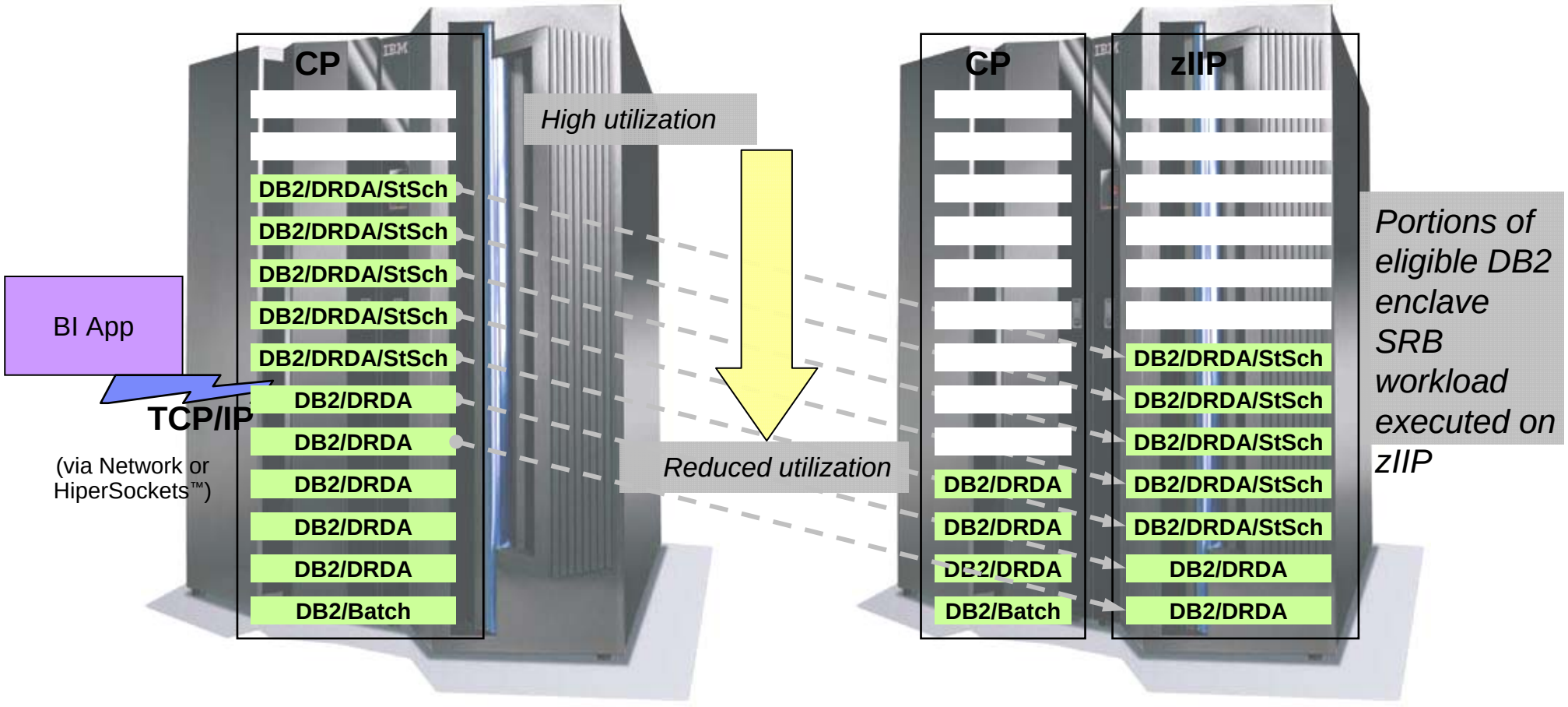


For illustrative purposes only

Actual workload redirects may vary

Example 2.0: Business Intelligence Applications

Complex star schema parallel queries via DRDA over a TCP/IP connection will have portions of this work directed to the zIIP

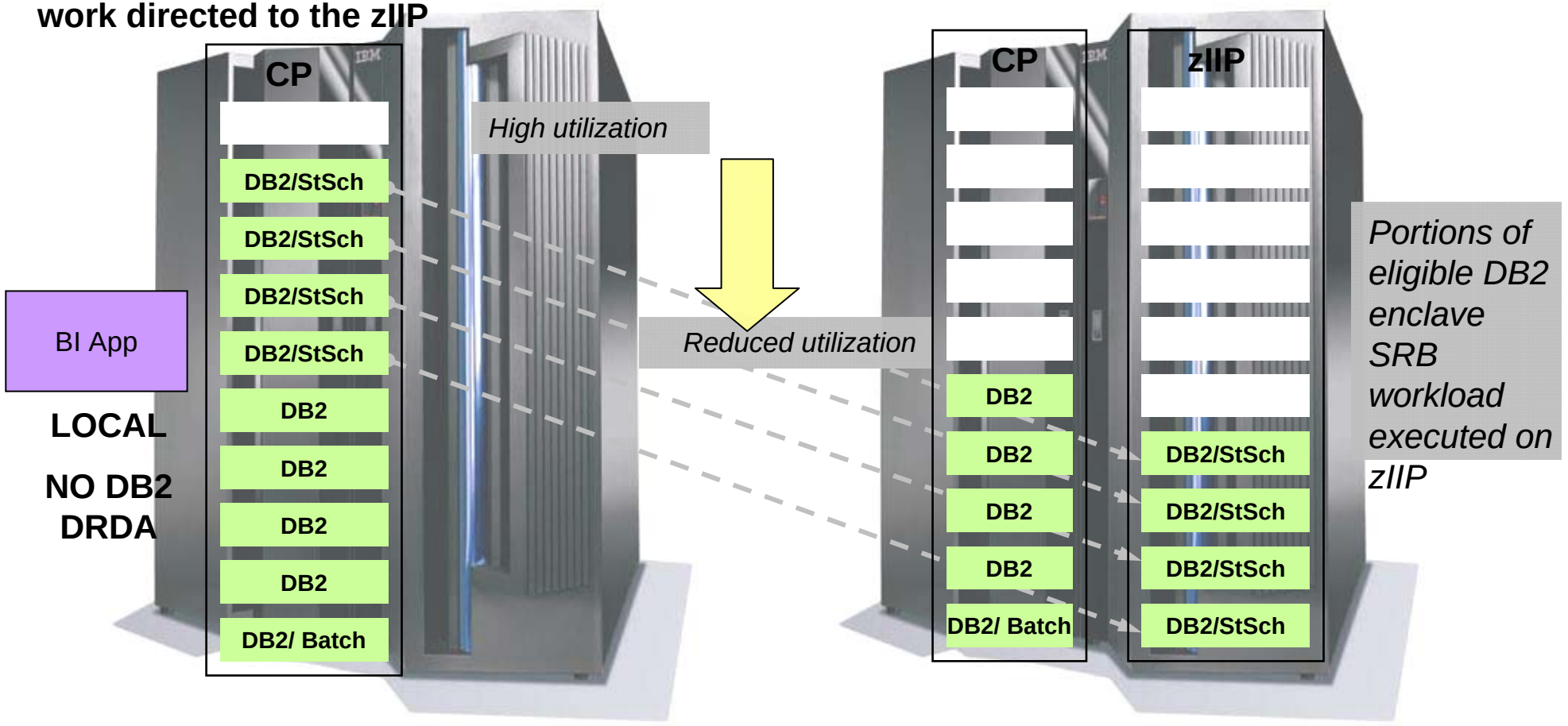


For illustrative purposes only

Actual workload redirects may vary depending on how long the queries run, how much parallelism is used, and the number of zIIPs and CPs employed

Example 2.5: Business Intelligence Applications (local - no DRDA)

Complex star schema parallel queries via LOCAL connection will have portions of this work directed to the zIIP

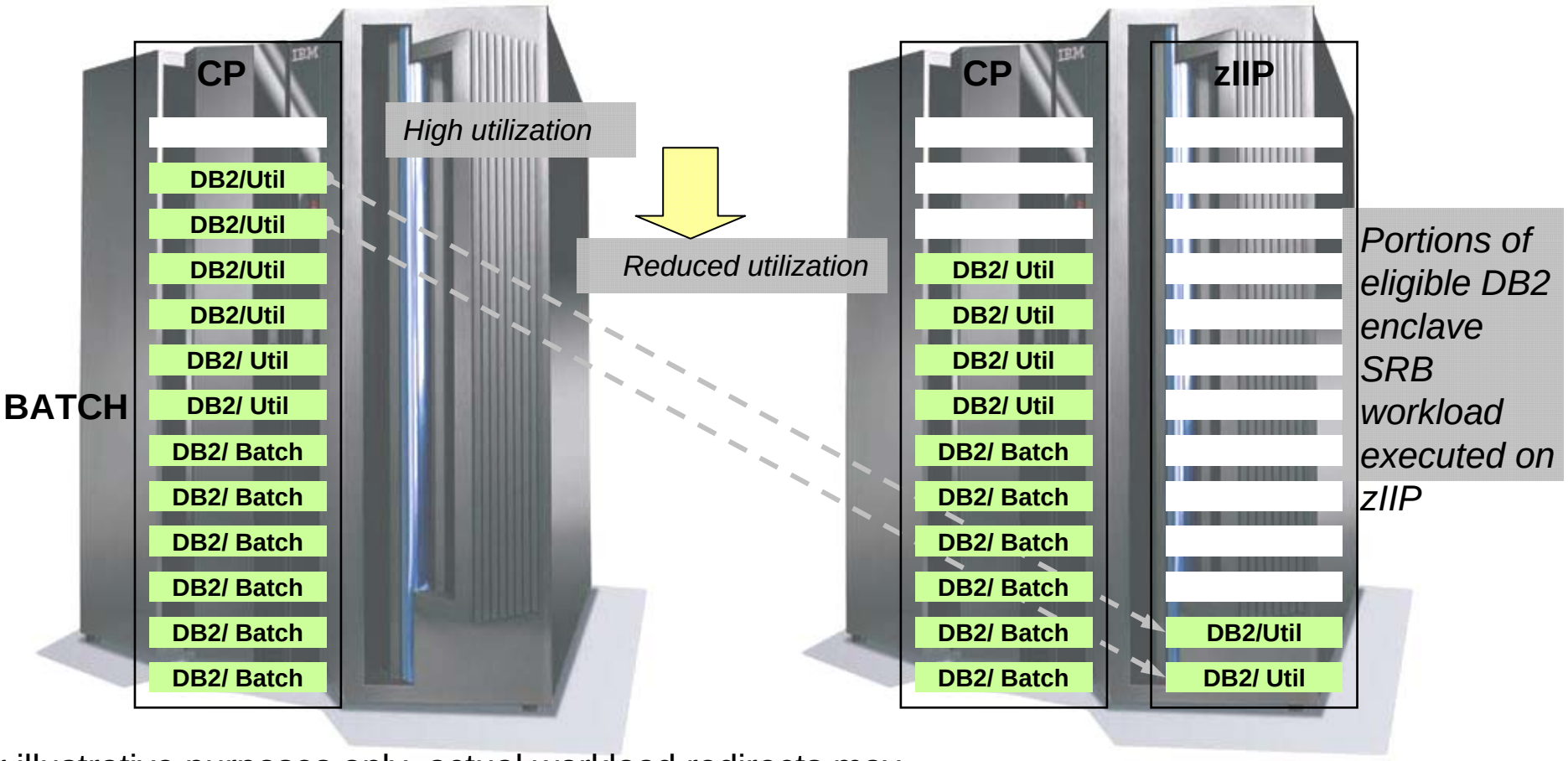


For illustrative purposes only

Actual workload redirects may vary depending on how long the queries run and how much parallelism is used

Example 3: DB2 for z/OS utilities

DB2 for z/OS utilities used to maintain index structures



For illustrative purposes only, actual workload redirects may vary.

Only the portion of the DB2 utilities used to maintain index structures (within LOAD, REORG, and REBUILD) is redirected

How does the zIIP work .....

The zIIP is designed so that a program can work with z/OS to have all or a portion of its enclave Service Request Block (SRB) work directed to the zIIP. The types of DB2 V8 work listed below are those executing in enclave SRBs, portions of which can be sent to the zIIP.

Example 1 = Distributed SQL requests (DRDA)

Queries that access DB2 for z/OS V8 via DRDA over a TCP/IP connection are dispatched within z/OS in enclave SRBs. z/OS directs a portion of this work to the zIIP.

Example 2 = Complex parallel query (BI)

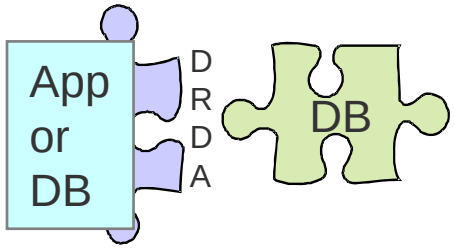
Complex star schema parallel queries will now use enclave SRBs. z/OS directs a portion of this work to the zIIP.

Example 3 = DB2 utilities for index maintenance

DB2 utilities LOAD, REORG, and REBUILD will now use enclave SRBs for the portion of the processing that is related to index maintenance. z/OS directs a portion of this work to the zIIP.

What is DRDA?

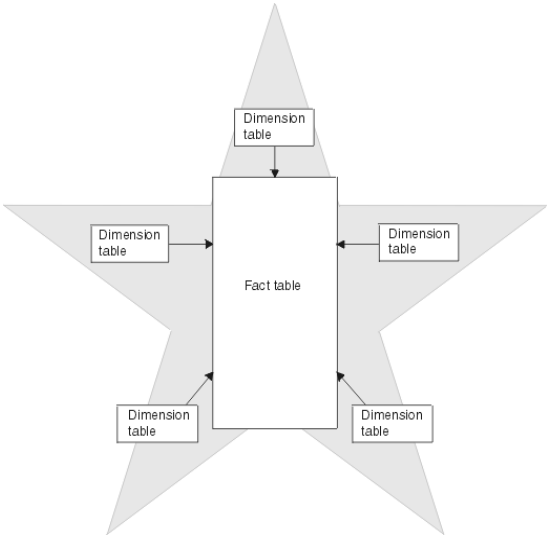
- DRDA = Distributed Relational Database Architecture. It is an architecture, developed by IBM, that enables relational data to be distributed among multiple platforms – 'any app to any db and any db to any db'. DRDA is the architecture only – applications and APIs accomplish the actual implementation.

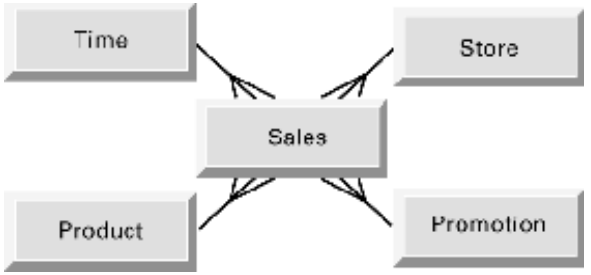


- DRDA is native to DB2 for z/OS – and this is good, because this reduces the need for additional gateway products which may affect performance and availability.
- In 1998 the Open Group adopted DRDA as the open standard for database access interoperability.
- An application or DB can be written to DRDA standards directly or use another application to request DRDA for it (DB2 Connect is an example of a DRDA application requestor)
- Can DRDA be accessed without TCP/IP? – yes, APPC/LU6.2 (Advanced Peer-to-Peer Communications – SNA (Systems Network Architecture)) is an example of another communications protocol that may access DRDA – though this is rare.
- Can TCP/IP access DB2 for z/OS without DRDA? – yes, proprietary gateway applications may be used to access DB2 for z/OS – these too are rare.
- **So.... regarding the zIIP**: if the DB2 for z/OS V8 work load comes over TCP/IP and is DRDA compliant (and most all DBAs and ISVs will know if the app uses TCP/IP and DRDA) then a portion of that DB2 workload is eligible to be redirected to the zIIP – you need BOTH TCP/IP and DRDA.

What is Star Schema?

- Star schema = a relational database schema for representing multidimensional data. This data schema is sometimes graphically represented as a ‘star’. The data is stored in a central fact table (the center of the ‘star’) and is surrounded by additional dimension tables holding information on each perspective of the data (the points of the ‘star’).
- Complex star schema parallel queries are the acts of joining several dimensions of a start schema data set (like promotion vs product). These complex queries can be quite long.
- **So.... regarding zIIP:** if the work load uses that part of DB2 for z/OS V8 that utilizes joining of star schemas (and most all DBAs and ISVs will know if the app uses star schemas) then a significant portion of that DB2 workload is eligible to be redirected to the zIIP

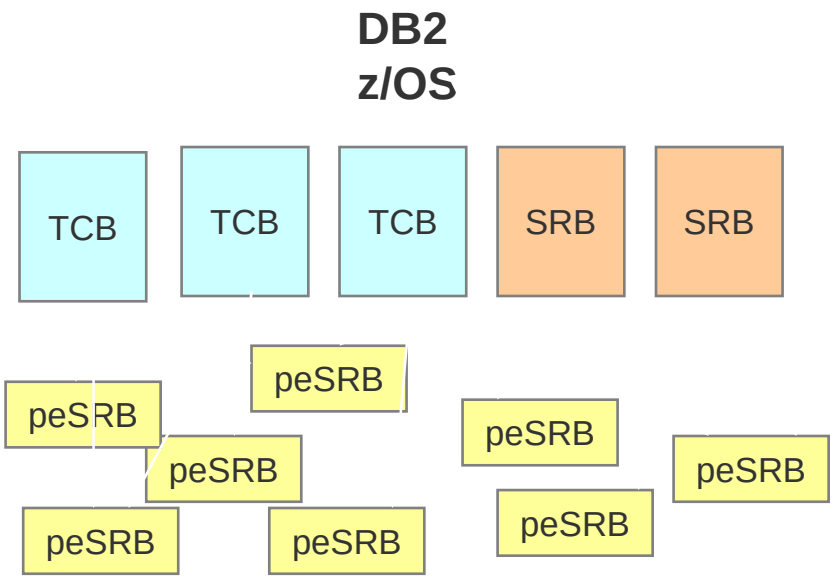




What is index maintenance?

- An **index** is a feature in a database that allows quick access to the rows in a table. The index is created using one or more columns of the table. Not only is the index smaller than the original table (due to having fewer columns), it can be searched/ queried against more efficiently.
- As the data in a large database is manipulated, over time the original indexes become less efficient and therefore have to be updated and maintained. For large databases this can be a very big task.
  - Load--loads your tables
  - Rebuild Index--creates or rebuilds your indexes
  - Reorg Index--reorders your indexes
- So.... regarding the zIIP: Portions of the LOAD, REORG, and REBUILD index utilities that perform index maintenance are eligible to be redirected to the zIIP.

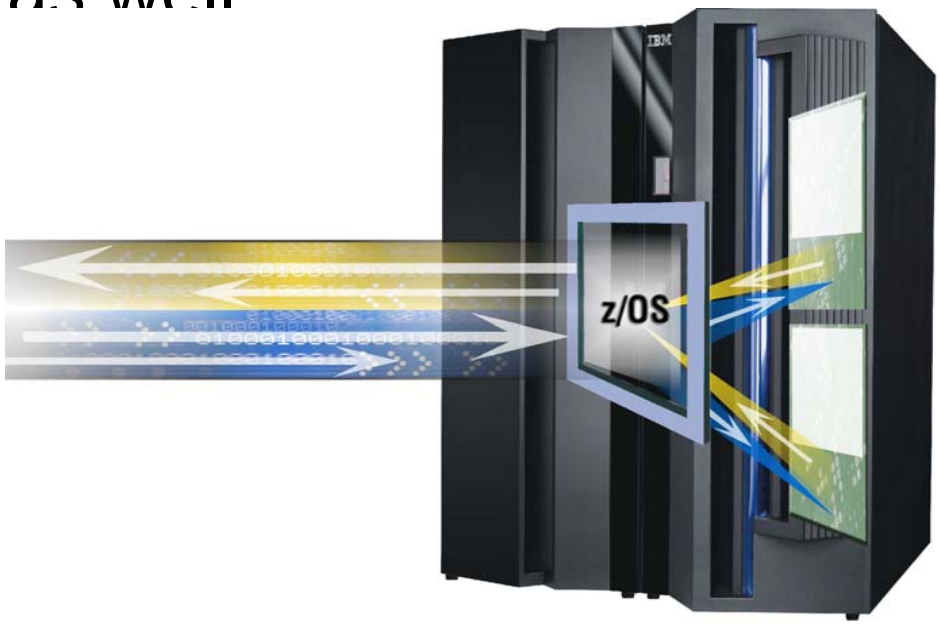
What are enclave SRBs?



- z/OS dispatches DB2 work in either TCB (Task Control Block) mode if request is local or SRB (Service Request Block) mode if request is distributed. Under these modes of operation parallel tasks are assigned the same importance as the originating address space.
- Preemptable enclaves are used to do the work on behalf of the originating TCB or SRB address space. Enclaves are grouped by common characteristics and service requests and since they are preeptable, the z/OS dispatcher (and WLM) can interrupt these tasks for more important ones (ie manage a transaction end-to-end). There are two types of preemptable SRBs: client SRBs and enclave SRBs.
- If the DB2 for z/OS V8 request is coming in over distributed (ie DRDA over TCP/IP) then that work is executed in enclave SRBs.
- If the request is coming over local/ native connection, then that work is distributed between TCBs, client SRBs, and enclave SRBs (star schema queries and Index maintenance now use enclave SRBs)
- So..... regarding the zIIP, only the enclave SRB work (not the client SRB work) is eligible to be redirected to the zIIP.
- DB2 V8 knows how its work is dispatched and directs z/OS 1.6 to dispatch (redirect) a portion of the eligible work to the zIIP.

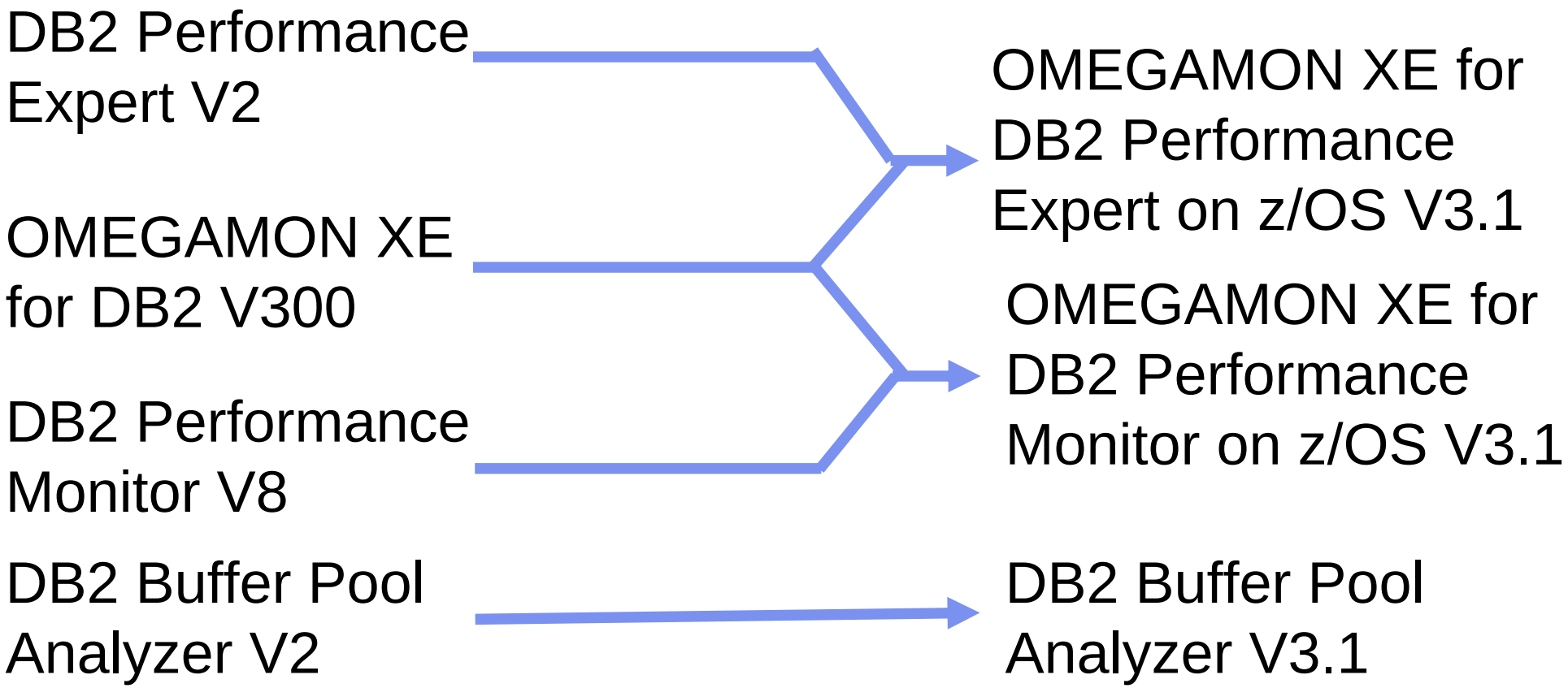
Important technical notes

- Utilization of the zIIP is expected to be transparent to the application.
  - No anticipated changes to applications that use DB2 for z/OS V8
- The enclave SRB interface is available upon request to non-IBM vendors as well
  - ISVs are interested



OMEGAMON for DB2 and DB2 Performance Monitor/Expert – Convergence: Available Now

Best of breed DB2 monitoring, analysis, and tuning solution



DB2 for z/OS Vnext news

- Integration
- Availability
- Scalability
- Productivity
- Total cost of ownership

- XML, Unicode, LOBs

- SQL for DB2 family

- Data Definition On Demand

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