IBM Software Group

Four Expert Tools to Advise You with DB2 for z/OS

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IBM Information Management software

ON DEMAND BUSINESS

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Four Expert Tools to Advise You

1. OMEGAMON XE for DB2 Performance Expert on z/OS

- Full Range System and Application Monitor

2. DB2 Optimization Expert for z/OS

- SQL Performance Analysis

3. DB2 Recovery Expert for z/OS

- Recovery Management

4. DB2 Audit Management Expert for z/OS

- Compliance Auditing

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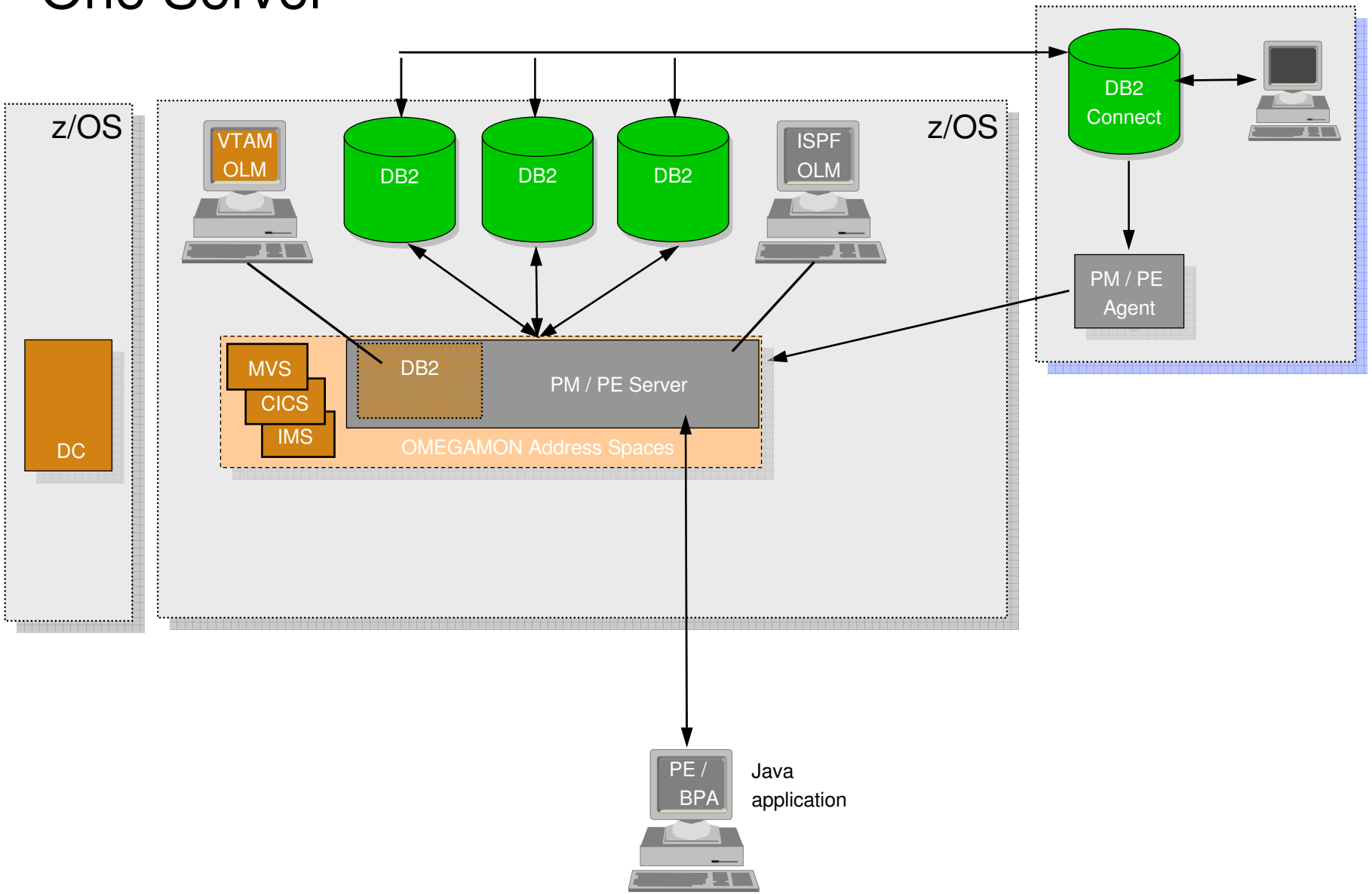
One Server



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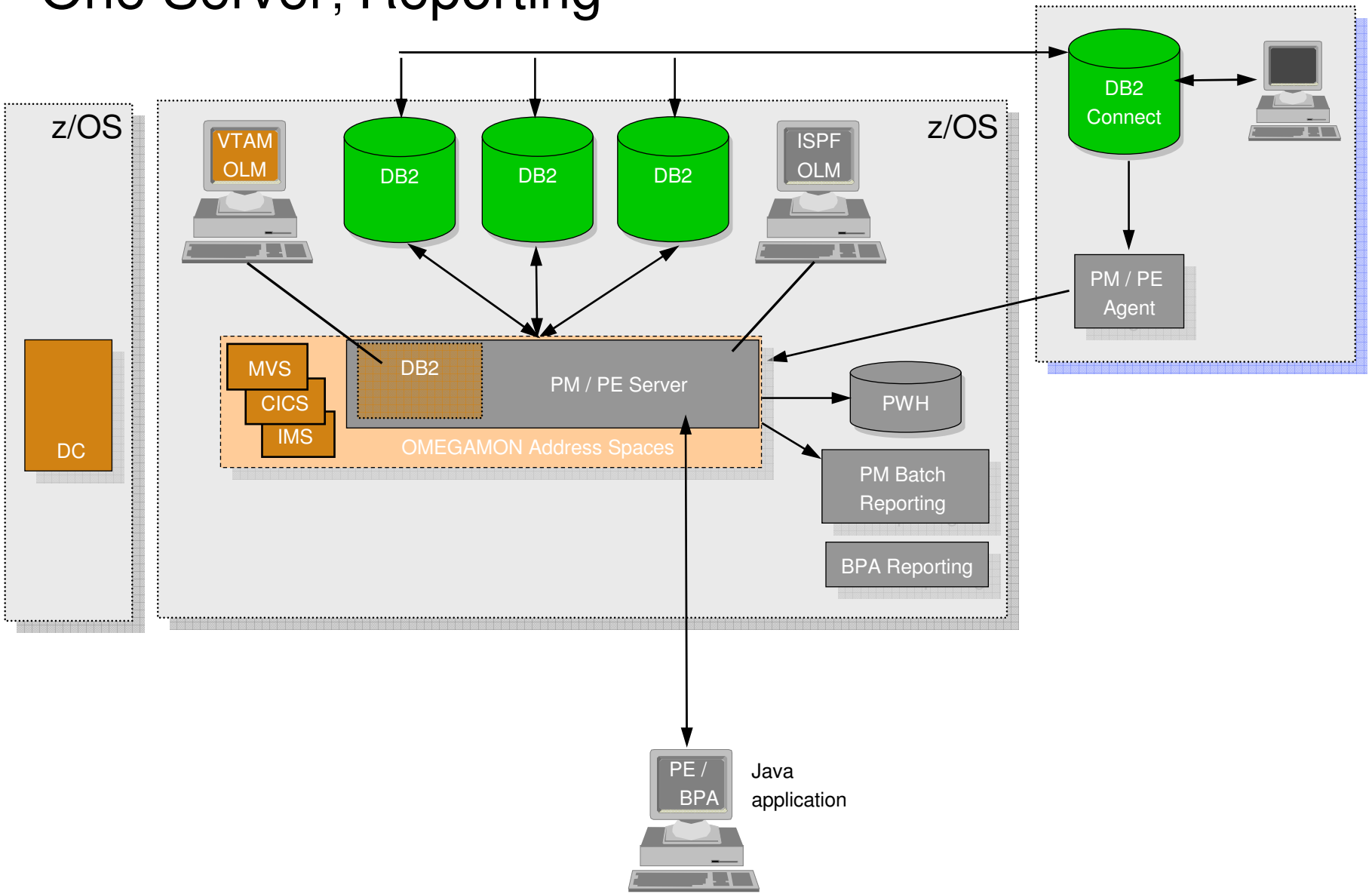
One Server, Reporting



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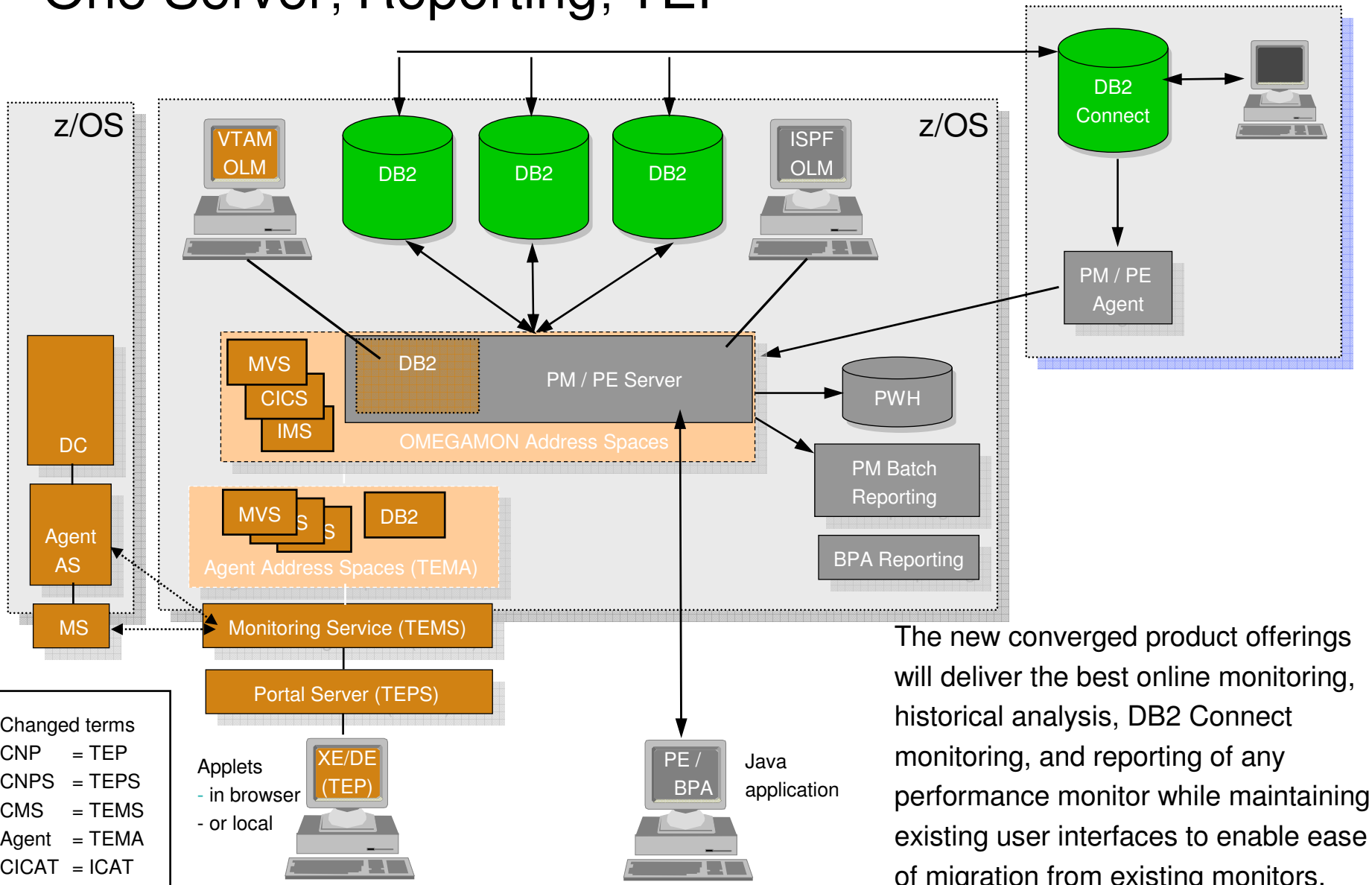
One Server, Reporting, TEP



The new converged product offerings will deliver the best online monitoring, historical analysis, DB2 Connect monitoring, and reporting of any performance monitor while maintaining existing user interfaces to enable ease of migration from existing monitors.

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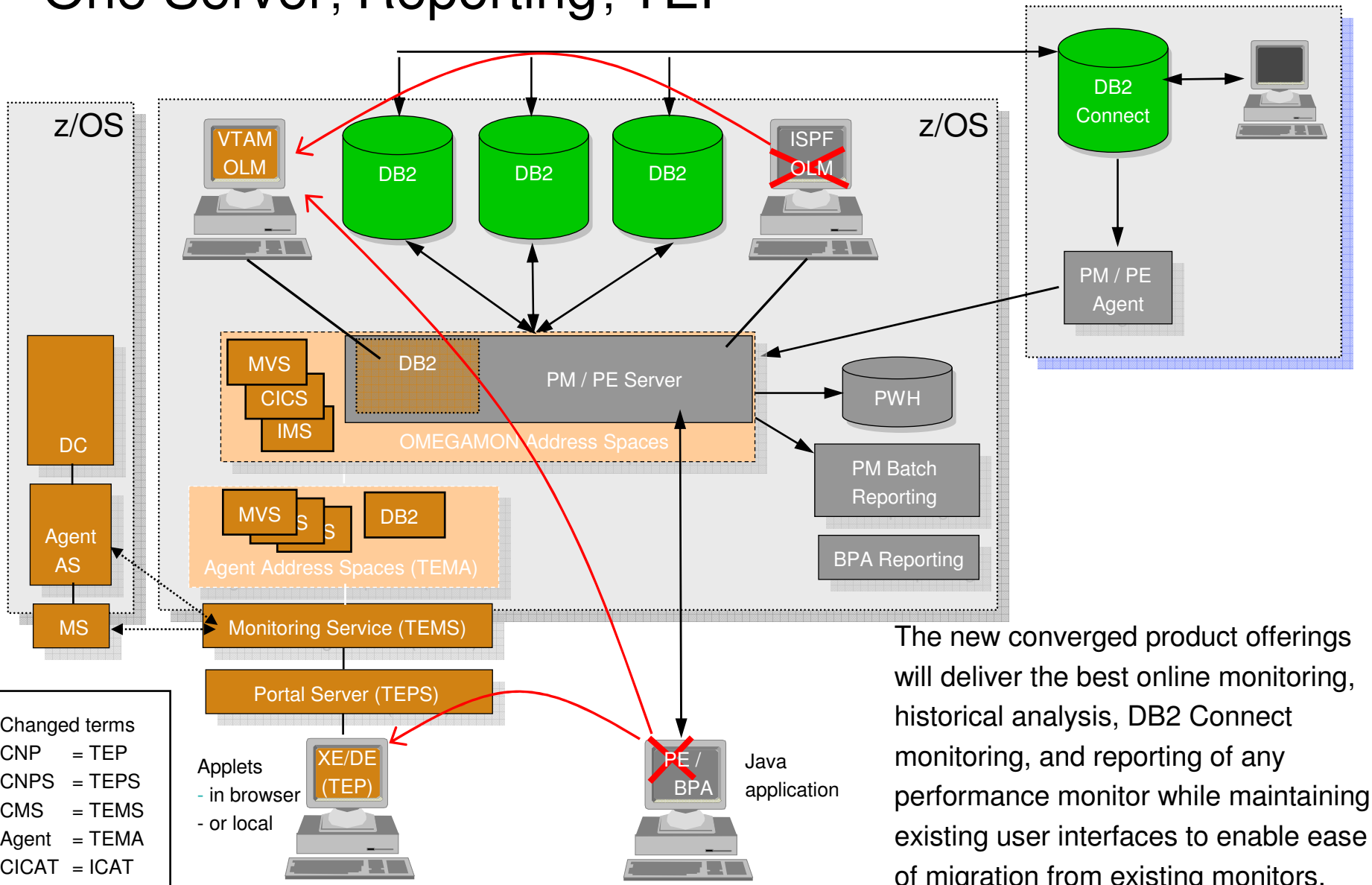
One Server, Reporting, TEP and future UI consolidation



The new converged product offerings will deliver the best online monitoring, historical analysis, DB2 Connect monitoring, and reporting of any performance monitor while maintaining existing user interfaces to enable ease of migration from existing monitors.

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Different Types of History

- Near-term history — Online monitor
- Long-term history — Reports, Perform.DB

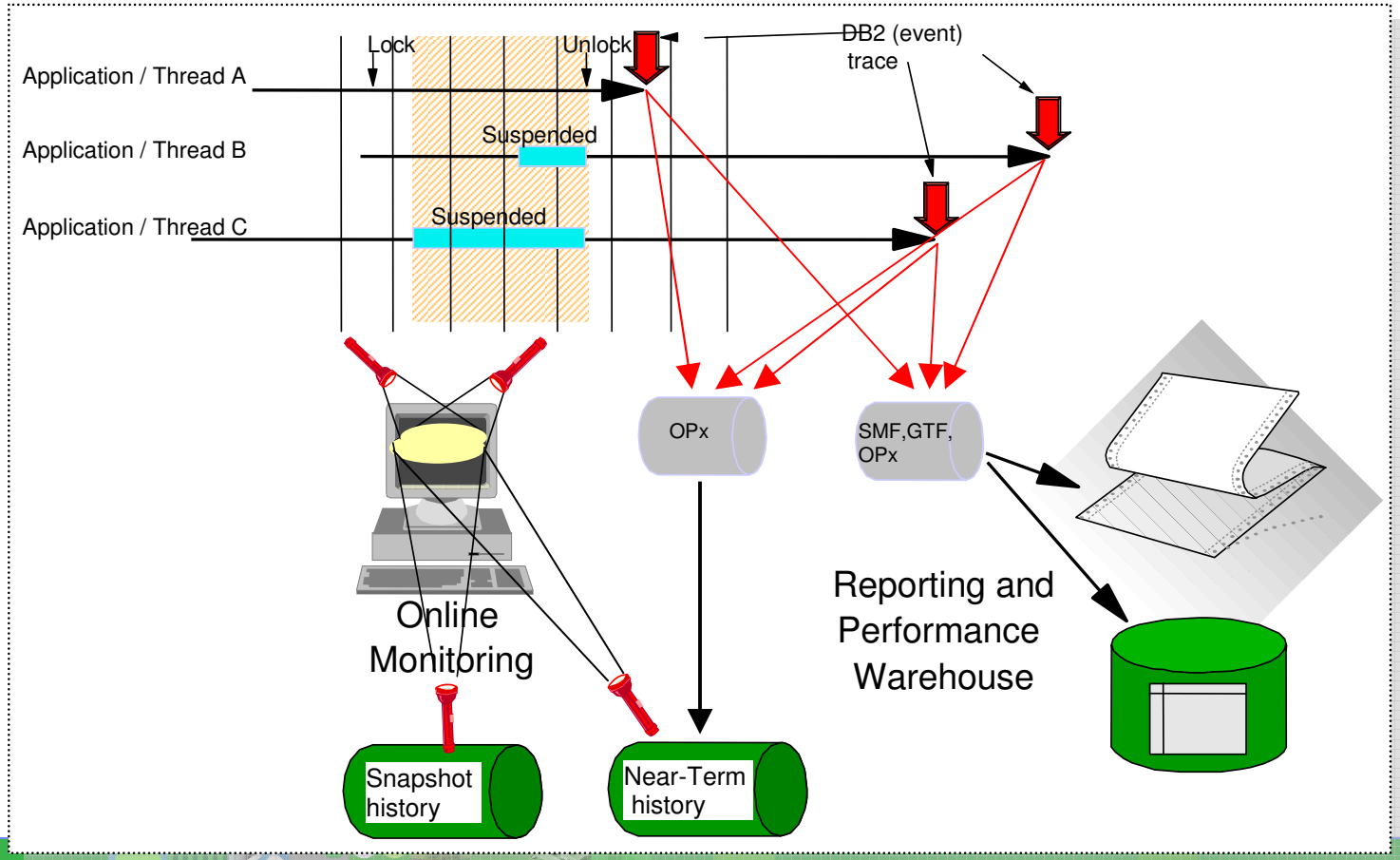
} Based on DB2 (event) traces

- Snapshot history — Online Monitor

Based on DB2 snapshot data

- Short-Term history — TEP GUI

Collected and saved by TEMS or TEMA



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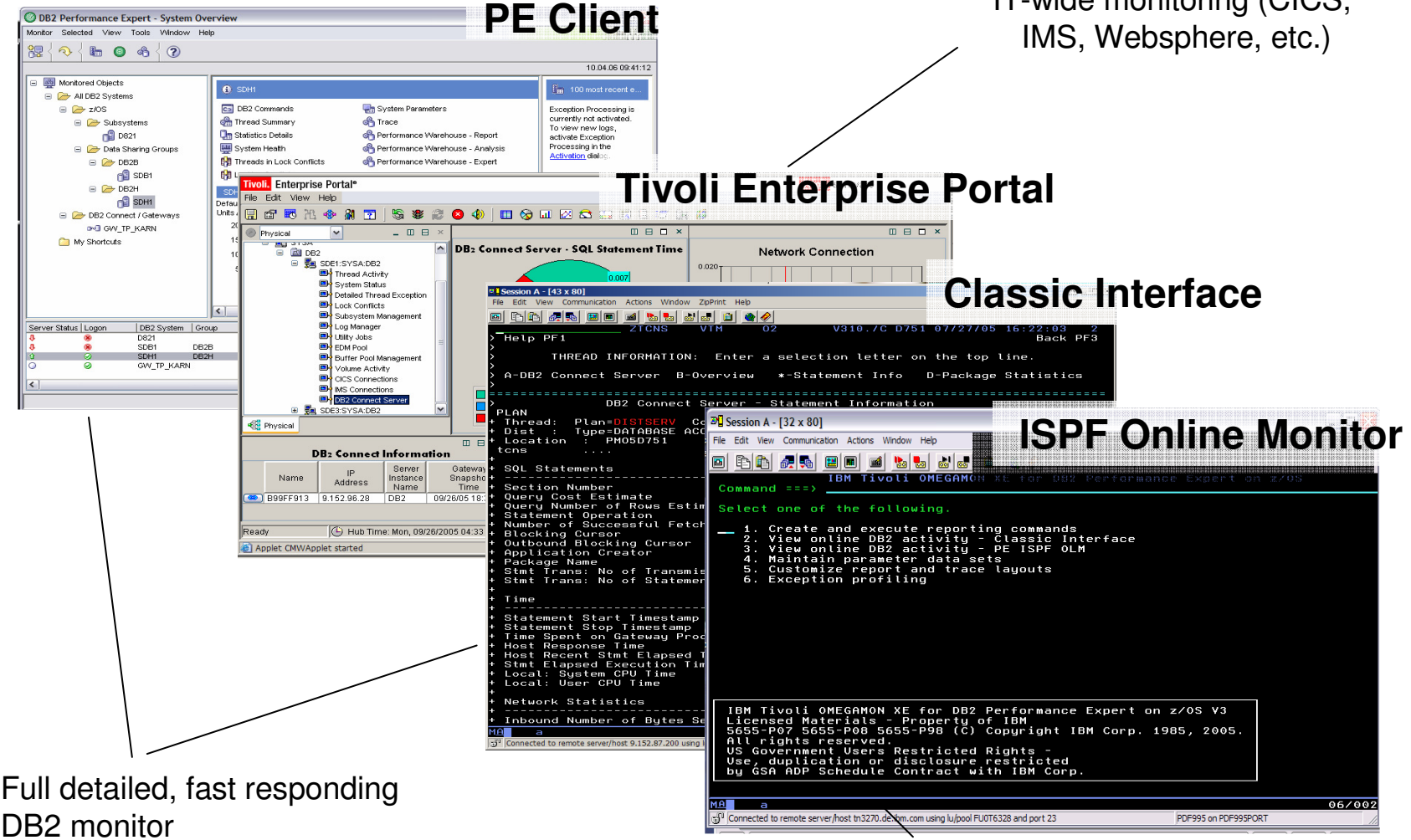
Available user interfaces

Web based monitor suite for DB2 health checking and IT-wide monitoring (CICS, IMS, Websphere, etc.)



Full detailed, fast responding DB2 monitor

No longer enhanced; will go away soon

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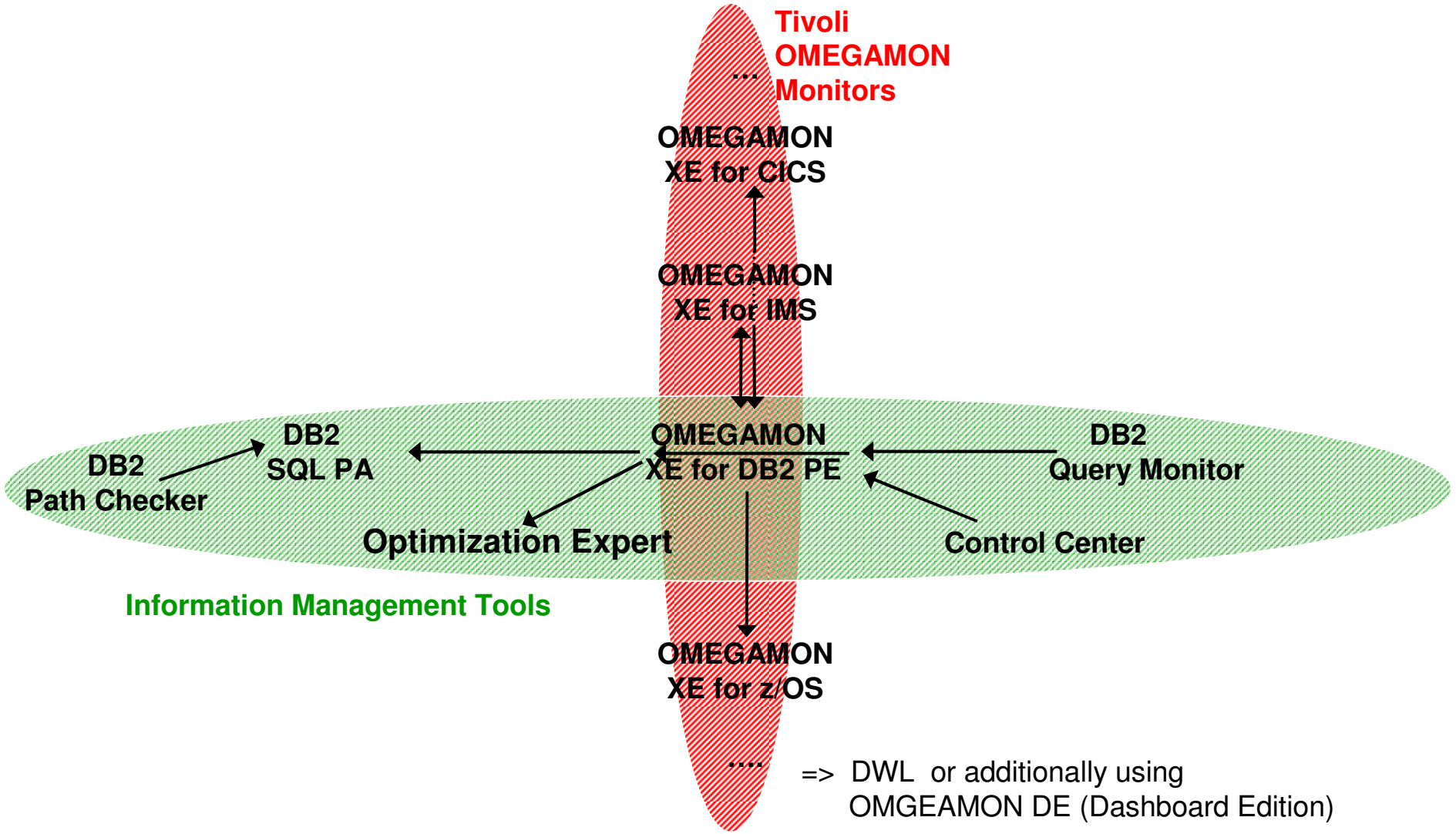
Horizontal and vertical Integration from the OM/PE perspective



=> DWL or additionally using
OMGEAMON DE (Dashboard Edition)

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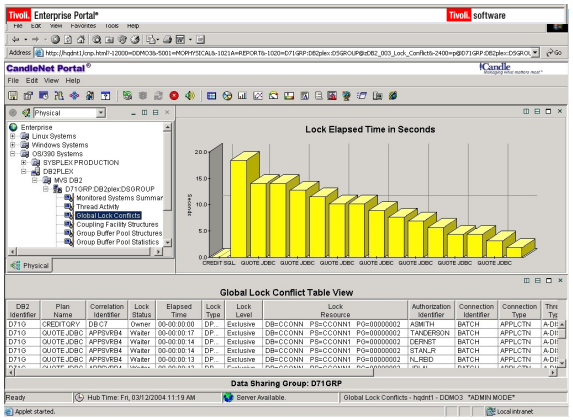
Summary of functions

- Integrated cross zSeries monitoring
  - **OMEGAMON Classic (VTAM)**
  - **OMEGAMON XE client GUI (TEP)**
  - DB2 PM/PE ISPF and PE client GUI
- The DB2 PM/PE Batch Reports
  - Statistics
  - Accounting
  - Subsystem Parameters
  - Locking
  - SQL Activity
  - I/O Activity
  - Utility
  - Audit
  - Record Trace
  - Explain
- The DB2 Connect Monitoring
  - **OMEGAMON Classic**
  - **TEP/XE**
  - PE Client



- The DB2 PM/PE Performance Warehouse and Performance DB
- Includes Buffer Pool Analysis
- One single Server
  - Only one started task per LPAR
  - One separate collector subtask per DB2 subsystem
  - Complementary functions
    - Near-term history (OM)
    - Short-term history (OM)
    - Object analysis (OM)
    - Snapshot history (PE)
    - Exception processing (PE/OM)
    - PWH processing (PE)

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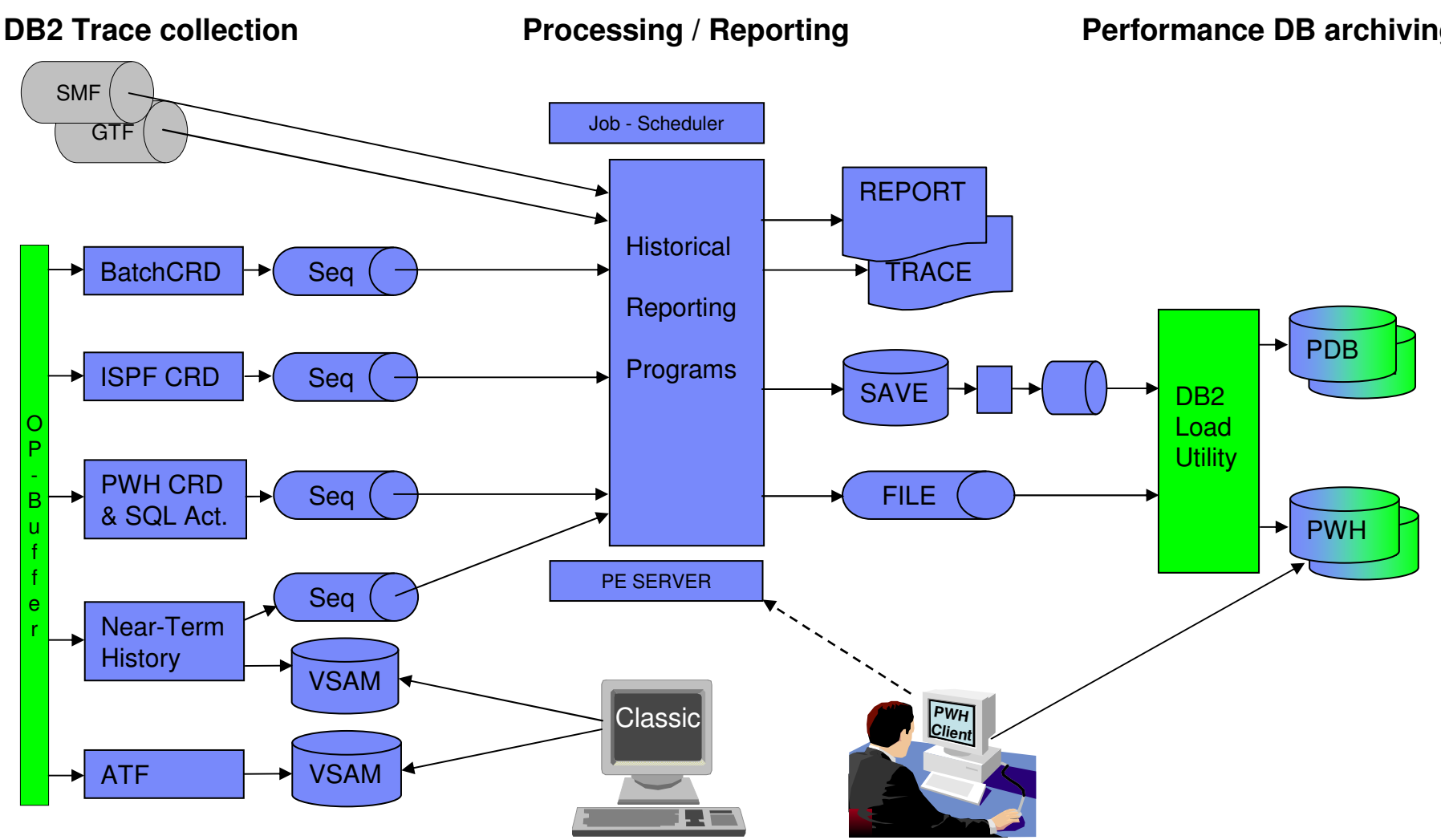
The wide variety of historical processing

Best view in slide show mode



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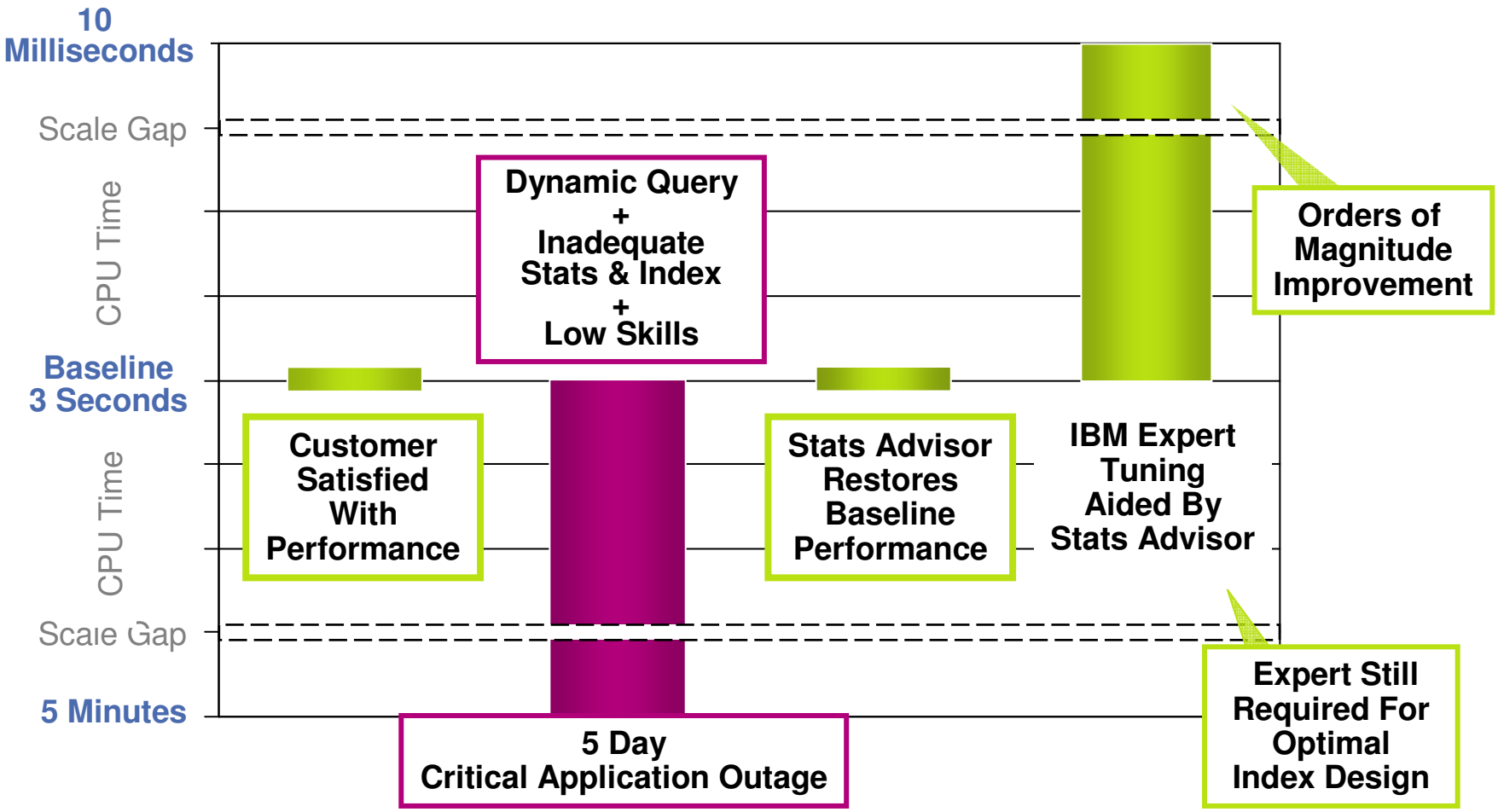
Critical application outage



Critical application outage

Post-mortem Analysis

- It sounds easy but actually was not
  - Inadequate query tuning and physical database design skills
  - Took 3 days to identify the problem query
  - No idea how to investigate the performance problem
- Customer costs
  - Time and money lost due to application outage
  - Loss of confidence in IT team
  - Extensive and costly performance review performed for simple regression
- Lack of expert design rules and methodology
  - Original query performance was suboptimal
  - Good design rules and methodology result in faster, more stable performance

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Solution

- Problem Query Identification
  - Snap queries from various sources
  - Monitor performance exceptions
- Problem Query Resolution
  - Design Advisors to recommend stats, index and query design
  - Tuning tools for deep analysis of problem query
    - Query format to present a readable query
    - Annotate rewritten optimized query with statistics
    - Intelligent report for underlying physical design with critical information
    - Visual explain to show the access path choice
    - Visual optimizer hints to implement emergency solution
    - Service SQL to send relevant doc to IBM for diagnosis
- Tuning Application Workloads
  - Automatic collection of application queries
  - Design Advisors for regular health check
  - Monitor application performance exceptions
  - Problem resolution with design advisors and tuning tools

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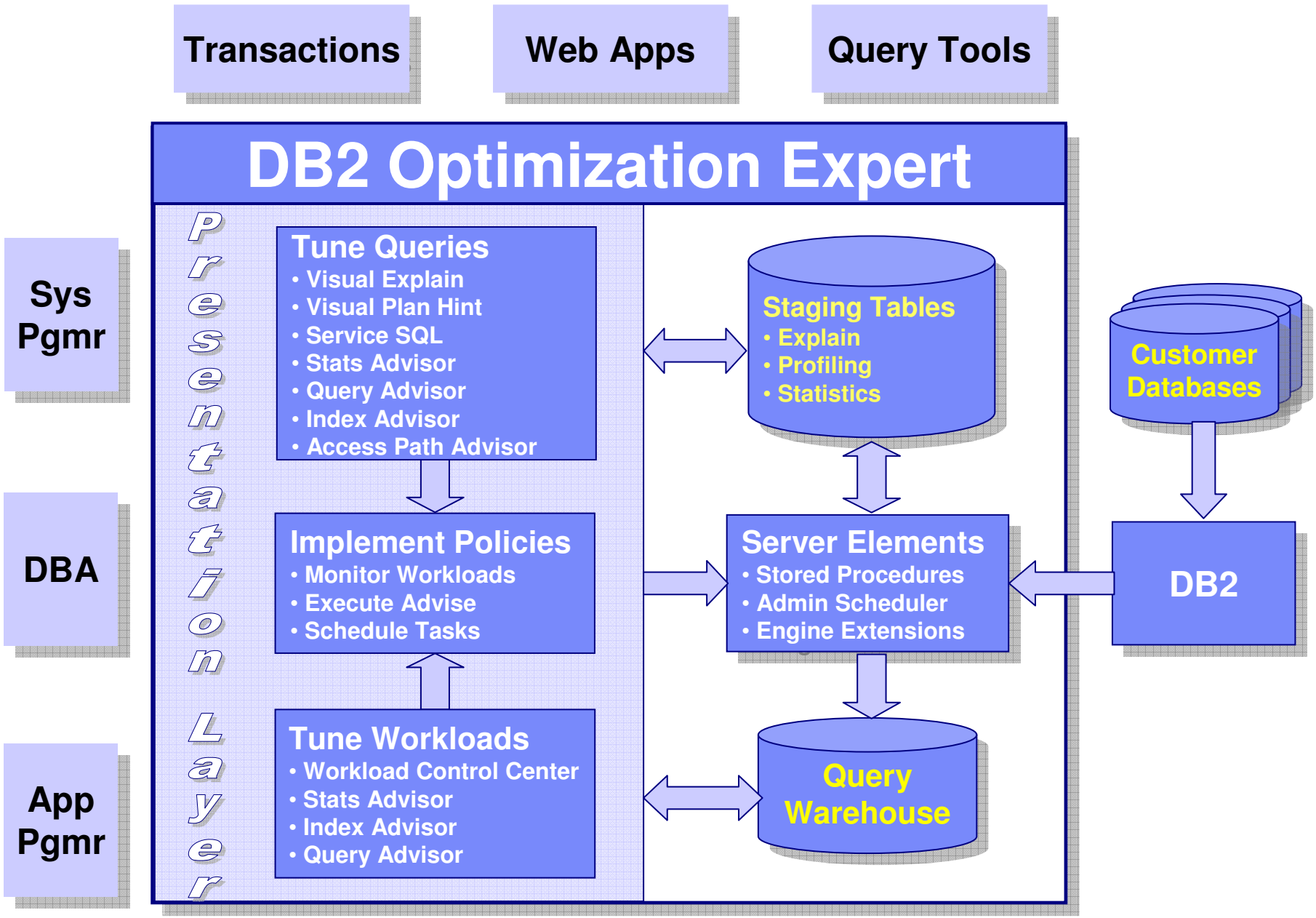

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Optimization Advisors

- Quick way to identify the cause of performance problem
- Recommended for all users
- Four Advisors
  - Statistics Advisor
  - Index Advisor
  - Query Advisor
  - Access Path Advisor

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SQL Tuning Tools

- Deep-dive into the root cause of the problem
- Recommended for expert users
- DBA Tuning Tools
  - Query Annotation
  - Query Report
  - Visual Explain
  - Visual Plan Hint
  - Service SQL

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DB2 Recovery

- DB2 recovery is perhaps the most complex activity that DBAs participate in
- There are many different potential scenarios
- Recoveries are not an everyday thing
  - most people don't practice recovery enough
  - skills are often not sharp when they are needed

- **There is a need for an Expert type product to assist DBAs in recovery activities**

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DB2 Recovery

- Different types of recovery situations all requiring different recovery solutions
  - Hardware failures
  - Application failures
  - Accidentally dropped objects
  - Application System recovery
  - Disaster recovery
- Different recovery choices
  - Recover to
    - Current, IC, PIT, LRSN, Timestamp (quite time)
  - Recover using
    - IC, active/archive log, storage based backups, intact table spaces
  - Recover related objects

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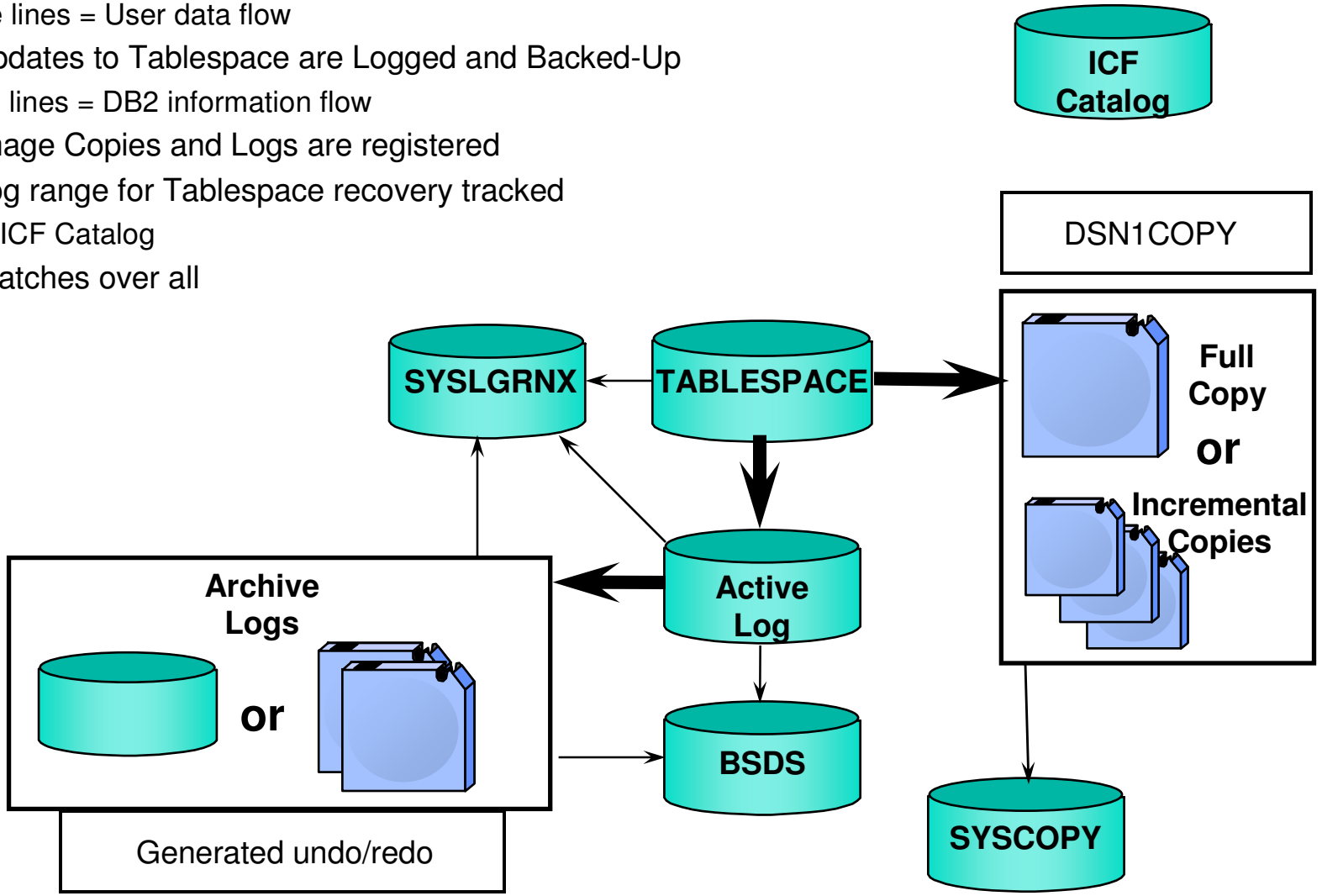
DB2 Recovery Asset Flow

- Large lines = User data flow
  - Updates to Tablespace are Logged and Backed-Up
- Small lines = DB2 information flow
  - Image Copies and Logs are registered
  - Log range for Tablespace recovery tracked
- MVS ICF Catalog
  - Watches over all



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DB2 Recovery Expert for z/OS

- Provides Expert assist in performing many types of DB2 recoveries
- DB2 Recovery Expert analyzes the requested recovery
  - Providing a selection of possible recovery plans
    - Selects the needed recovery assets and utilities
    - Assists in selecting recovery points
    - Builds required JCL
- Fast replication backup and recovery
    - DB2 BACKUP SYSTEM and RESTORE SYSTEM utilities
    - IBM ESS and Flash/Copy
    - EMC TimeFinder/Snap
    - Hitachi Flash/Copy
    - TimeFinder Core including TimeFinder Mirror or TimeFinder consistency group option

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Recovery Points

- Specifying a recovery point
  - Recover to current
  - Recover to a timestamp
    - Can be selected from
      - Object version
      - Recovery history events
      - Quiet points
  - Recover to an RBA/LRSN
    - Can be selected from
      - Recovery history events
      - Quiet points

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DB2 Recovery Expert for z/OS

- Provides the following benefits
  - Application recovery
  - Drop recovery
  - Single or multiple object recovery
  - Dependency analysis
  - Quiet point analysis
  - Full BACKUP and RESTORE of DB2 data and/or logs for a DB2 via
    - DB2 BACKUP SYSTEM, RESTORE SYSTEM
    - IBM FlashCopy facilities
    - TimeFinder/Mirror and TimeFinder/Snap facilities

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Audit Management Expert

- Collects and correlates information from DB2 resources.
  - Audit Trace Data, **Audit SQL Collector**, Log Analysis data
    - V2.1 no longer needs to alter objects to 'AUDIT ALL' for read/update
    - DB2 Catalog Objects can now be audited for SQL read/update

- Provides a central resource for auditors to produce a coherent view of DB2 access information.

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Audit Management Expert Overview

- Information available to Auditors
  - SELECT, INSERT, UPDATE, and DELETE activity by user or by object
  - **SQL Text and Host Variable value for each statement**
    - **Row count that SQL statement affects**
  - CREATE, ALTER, and DROP operations against an audited object
  - Explicit GRANT and REVOKE operations
  - Utility access to an audited object
  - DB2 commands entered
  - Assignment or modification of an authorization ID
  - Authorization failures

- **Provides auditors with flexible options for examining the data in the audit repository**

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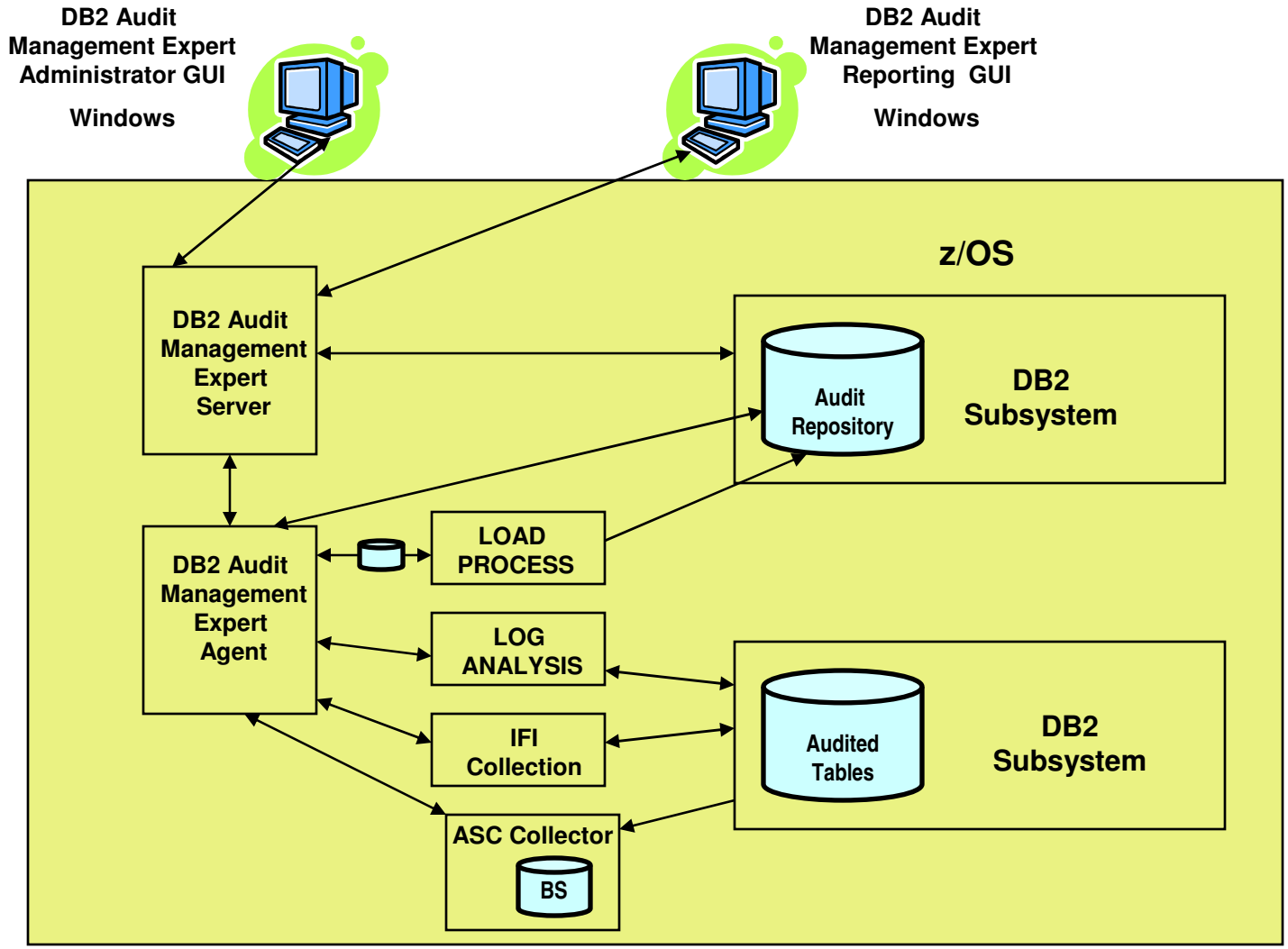
DB2 Audit Management Expert Architecture



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Reporting Facilities

- UI Reporting options enable auditors to view and report on data in a variety of ways
  - Overview – Level 1
    - View all of the subsystems currently being monitored
    - based on summary tables
    - available filters are AUTHID and PLANS
  - Subsystem – Level 2
    - View activity for a selected subsystem
    - based on summary tables
    - available filters are AUTHID and PLANS
  - Detail - Level 3
    - View details for a particular type of activity for a selected subsystem
    - not based on the summary tables
    - 20 possible filters to choose from
  - Graphical or Tabular
- Extensive report filtering
- Batch reporting

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Reporting Facilities

- AME users can view changed data values
  - Log analysis report in DB2 Audit Management Expert
    - Enables user to view logged data changes of audited tables in a DB2 system
    - See the actual data value changes made to the tables
      - Before and after values
    - The **Log Analysis Advisor**
      - accessible from the **Log Analysis** tab in Reporting UI
      - Enables user to input the information needed for log analysis
      - Selection capability allows user to refine the amount of information returned
      - Report created via batch job
      - Report viewed from Reporting UI

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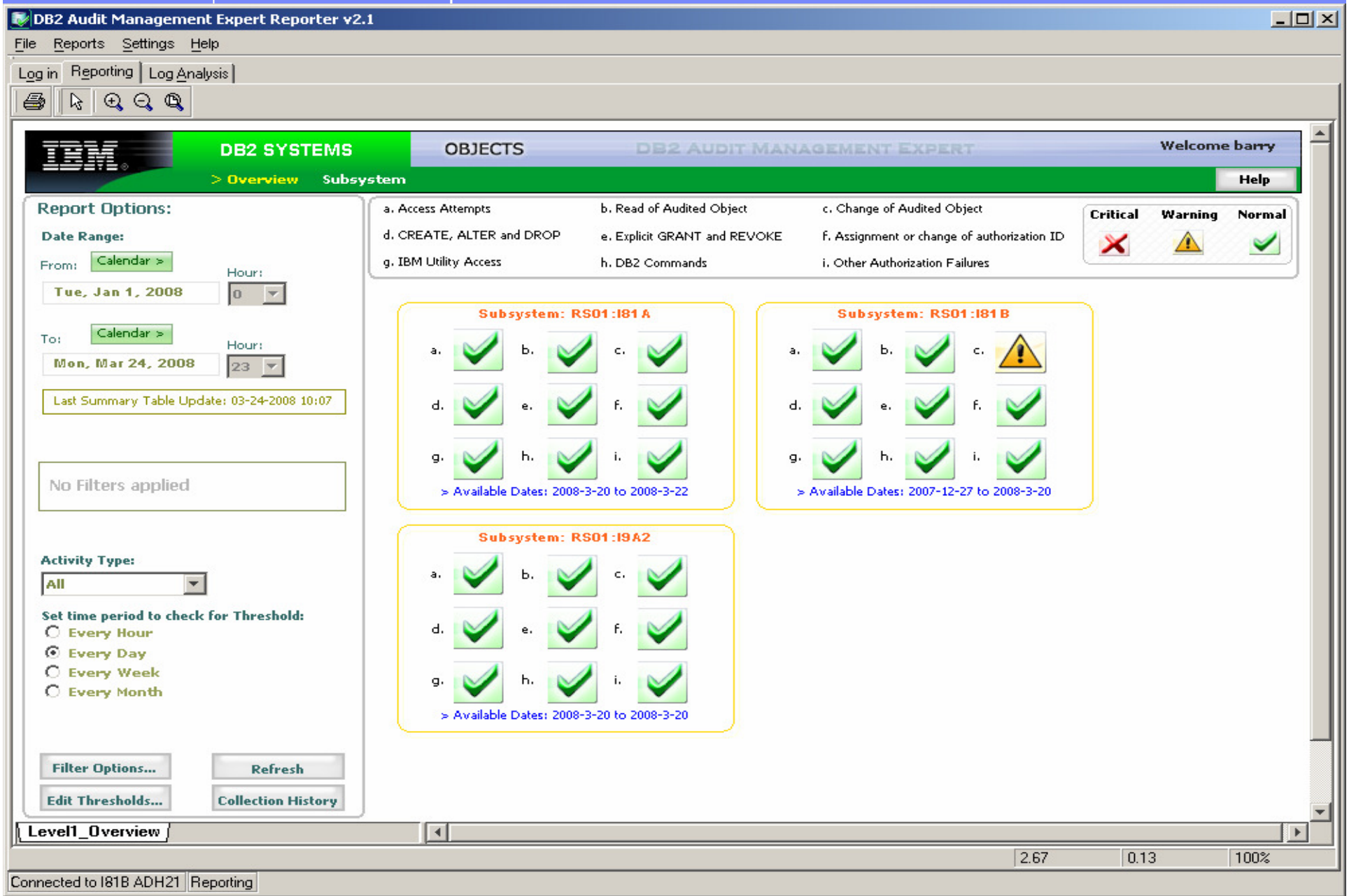

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- Extreme integration for end-to-end and cross system monitoring
- Immediate notifications, near term history and long term trending

2. DB2 Optimization Expert for z/OS

- Expert Advise for regular health checks
- Drill down tools to quickly resolve access path related problems

3. DB2 Recovery Expert for z/OS

- Eliminates recovery problems before they occur
- Cost based, automated recovery plans

4. DB2 Audit Management Expert for z/OS

- Separates auditing from DBA role
- Simplified drill down reporting targeted to auditing

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