Information On Demand
Manage Data Over Its Lifetime

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Jay Bruce
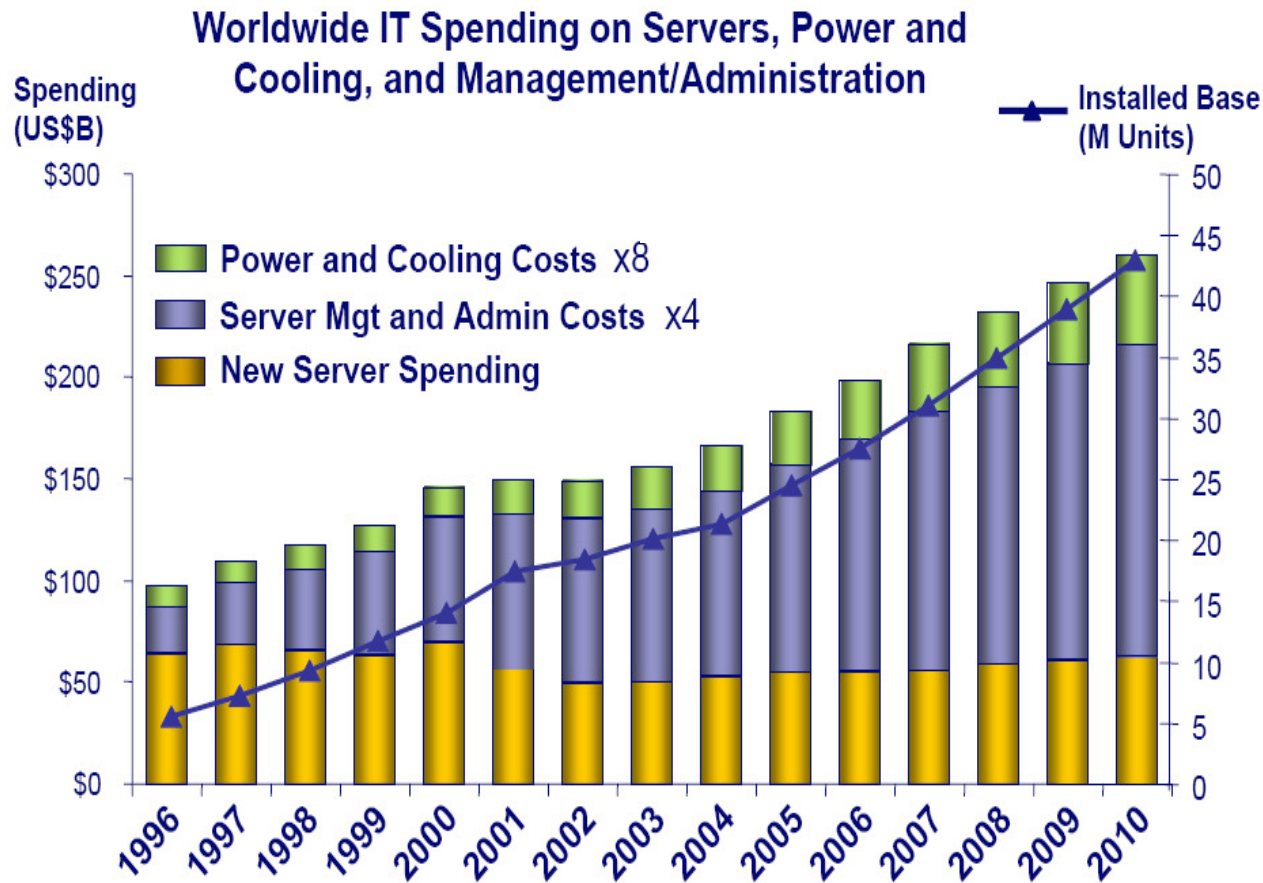**DB2 Tools Architect/Strategist**
jmbruce@us.ibm.com

Twitter: http://twitter.com/racoss
Blog: http://datalifecycle.blogspot.com/
LinkedIn   http://www.linkedin.com/pub/rafael-coss/9/311/268
Facebook http://www.facebook.com/racoss

September 4, 2009

Agenda

- **Tooling Challenge**

- **Naming**
  - DB2 for z/OS tools, Optim, Data Studio, InfoSphere

- **What's Integrated Data Management?**

- **DB2 for z/OS IDM Scenario**

- **Data Governance**

System Management Dominates Cost

Worldwide IT Spending on Servers, Power and Cooling, and Management/Administration

Spending (US$B)

Installed Base (M Units)

Legend:
- Power and Cooling Costs x8
- Server Mgt and Admin Costs x4
- New Server Spending

System management has become the main component of IT costs and is growing rapidly

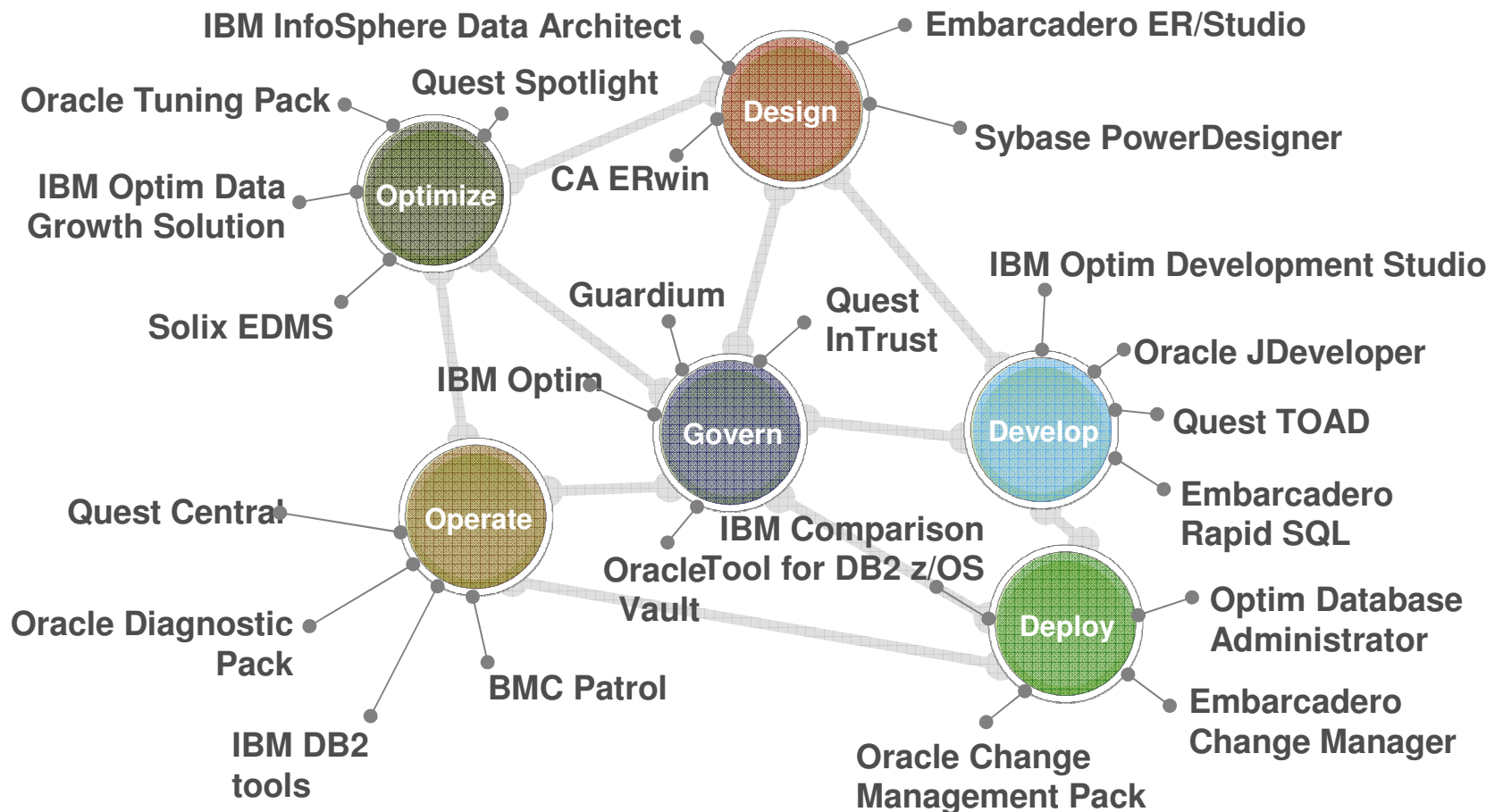Many Servers, Much Capacity, Low Utilization = $140B unutilized server assets

Source: IDC, 2006

Data Life Cycle Pain Points
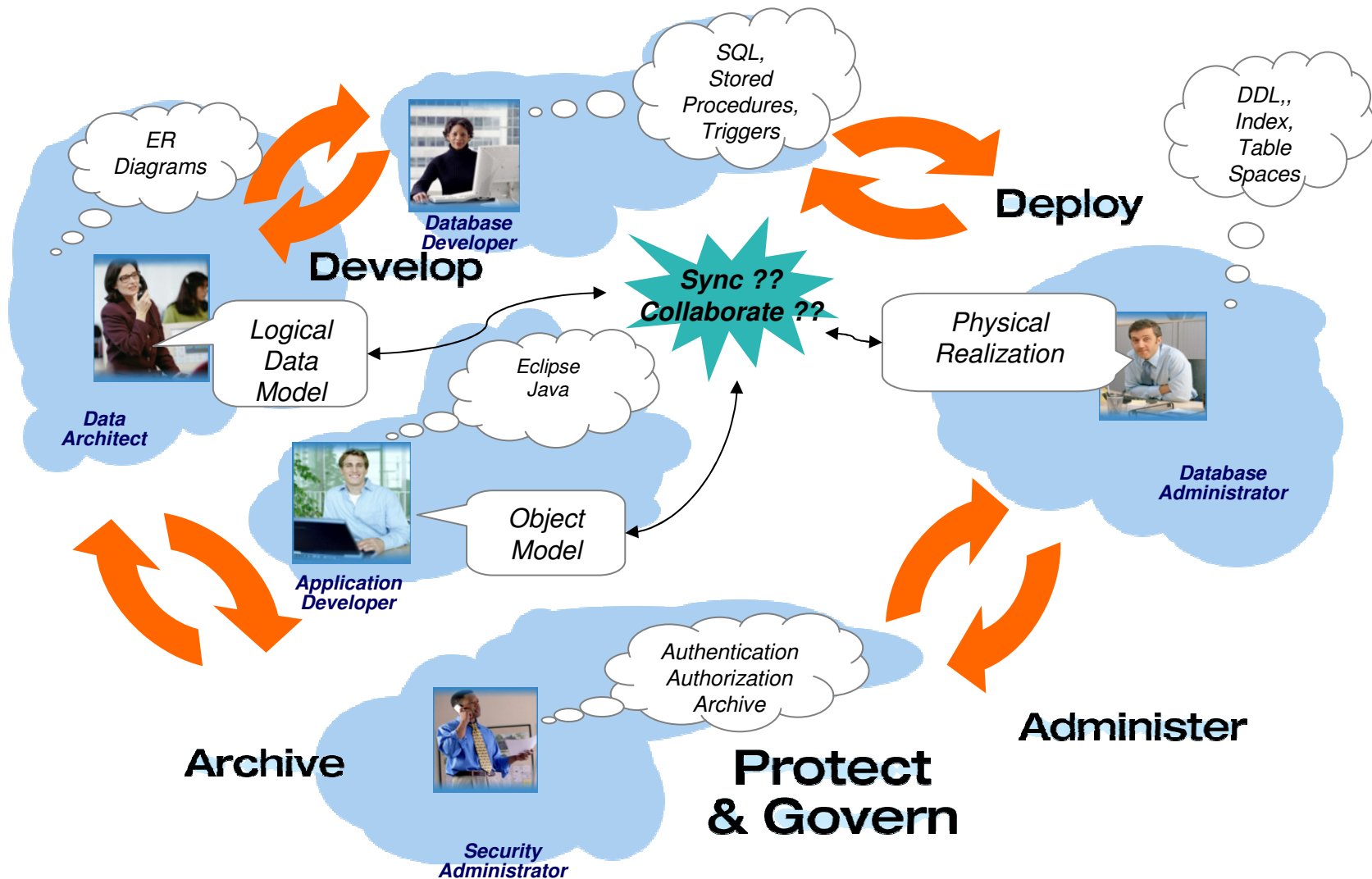
Tool Chaos Consumes IT Spend and Erodes Efficiencies

- **A Collection of Disparate, Single-Purpose Products**

- **Focus on ENTERPRISE efficiencies: independent database**

What Do Businesses Need?
An integrated environment to span today's flexible roles

- **Enable alignment across the lifecycle**
  - Manage by intention
  - Share policies with downstream tasks

- **Improve individual and team productivity**
  - Increase automation
  - Facilitate collaboration
  - Provide context-aware capabilities

- **Optimize performance**
  - Embed best practices into solutions
  - Provide expert advice to increase skills
  - Improve resource utilization

Integrated Data Management
Integral to a complete system for delivering business solutions

Information Management software

Align business and IT to create a trusted information infrastructure
Accelerate use of the unique values of DB2 and Informix

Rational software

Align business and IT for software governance

Design

Govern

Optimize

Develop

Models
Policies
Metadata

Operate

Deploy
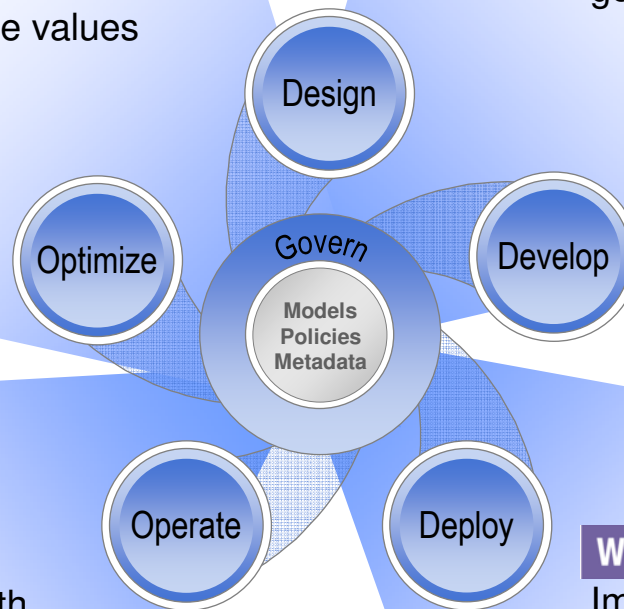
Tivoli. software

Empower administrators with common, holistic views

WebSphere. software

Improve performance, security, and manageability for Java applications

What's in a Name?

- **DB2 and IMS Tools:**
  - z/OS tailored solutions for lowering TCO for DB2 and IMS

- **Data Studio packages:**
  - No charge offerings for improving developer and DBA productivity for DB2 and Informix

- **Optim Solutions:**
  - Managing diverse data across its lifetime

- **InfoSphere Solutions:**
  - Establishing, governing, and delivering trusted information

IBM

Products Renamed Reflect Integrated Data Management Strategy

Prior Product Name	Renamed Products
Rational Data Architect	InfoSphere Data Architect
Data Studio Developer	Optim Development Studio
Data Studio pureQuery Runtime for Linux, UNIX and Windows	Optim pureQuery Runtime for Linux, UNIX, and Windows
Data Studio pureQuery Runtime for z/OS	Optim pureQuery Runtime for z/OS
Data Studio Administrator for DB2 for Linux, UNIX and Windows	Optim Database Administrator for DB2 for Linux, UNIX, and Windows
DB2 Optimization Expert	Optim Query Workload Tuner for DB2 for z/OS

Solutions for Integrated Data Management

DB2 and IMS Tools
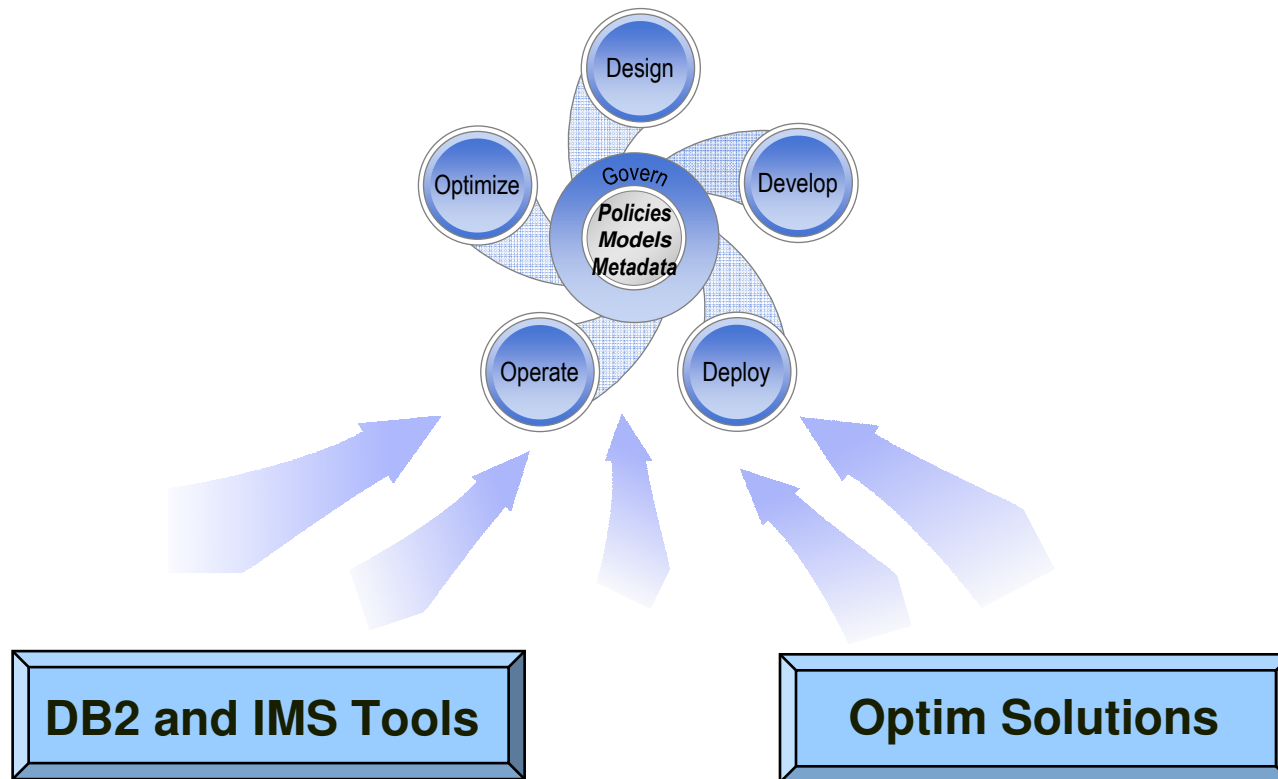
DB2/IMS Backup & Recovery Solution
DB2/IMS Utilities Management Solution
IMS Transaction Management Solution
DB2/IMS Data Governance Solution
DB2/IMS Application Management Solution
DB2/IMS Performance Management Solution

Optim Solutions

Optim Test Data Management
Optim Data Privacy
Optim Data Growh
InfoSphere Data Architect
Optim Development Studio
Optim pureQuery Runtime
Optim Query Tuner
Optim Query Workload Tuner

DB2 for z/OS Tools Portfolio

Application Management
- DB2 Path Checker
- DB2 Bind Manager
- DB2 SQL Performance Analyzer
- DB2 Table Editor
- Optim Data Growth
- Optim Test Data Management
- InfoSphere Data Architect
- Optim Development Studio

Utilities Management
- DB2 Utilities Suite
- DB2 Automation Tool
- DB2 Automation Toolkit SAP Edition
- DB2 Utilities Enhancement Tool
- DB2 High Performance Unload

Business Intelligence
- InfoSphere Design Studio
- IBM DataQuant
- IBM QMF
- DB2 Web Query Tool

Database Administration
- DB2 Administration Tool
- DB2 Object Comparison Tool
- DB2 Administration Toolkit SAP Edition
- DB2 Storage Management Utility
- DB2 Cloning Tool
- Optim Database Administrator

Performance Management
- OMEGAMON XE DB2 Performance Expert
- OMEGAMON XE DB2 Performance Monitor
- DB2 Buffer Pool Analyzer
- DB2 Query Monitor
- DB2 Performance Toolkit SAP Edition
- Optim Query Tuner & Workload Tuner
- Optim Development Studio/pureQuery
- DB2 Performance Expert/Extended Insight

Backup and Recovery
- Application Recovery Tool for IMS and DB2 Databases
- DB2 Archive Log Accelerator
- DB2 Change Accumulation Tool
- DB2 Log Analysis Tool
- DB2 Object Restore Tool
- DB2 Recovery Expert

Data Governance
- DB2 Audit Management Expert
- Data Encryption for DB2 and IMS
- IBM Optim Data Growth
- IBM Optim Data Privacy
- IBM Optim Test Data Management
- IBM Database Encyrption Expert

Information Integration
- InfoSphere Information Server
- InfoSphere Classic Data Event Publisher
- InfoSphere Classic Federation Server
- InfoSphere Classic Replication Server
- InfoSphere DataStage
- InfoSphere Replication Server
- DataMirror

*Available on System z only   *Available on System z & DB2 LUW   *DB2 LUW only

Integrated Data Management Portfolio Strategy

- **Support for parallel development / administration models**
  - z/OS-specific
    - 3270-based user interfaces
    - Generation of JCL for job submission
    - Emphasis on rich z/OS function

  - Cross-platform
    - Web-based and Eclipse-based user interfaces
    - Stored Procedures
    - Emphasis on heterogeneous database support

- **Clients may have a need to support both of these models**

- **Provide cross-platform support and tool integration to simplify development and administration**
  - Common design and development with for LUW and z/OS with InfoSphere Data Architect and Optim Development Studio
  - OM/PE and Query Monitor integration with Optim Query Tuner
  - Common z/OS and LUW UI in plan for Optim Test Data Management, Data Privacy, and Data Growth Solutions
  - Common Extended Insight end-to-end database monitoring leveraging OM/PE in plan
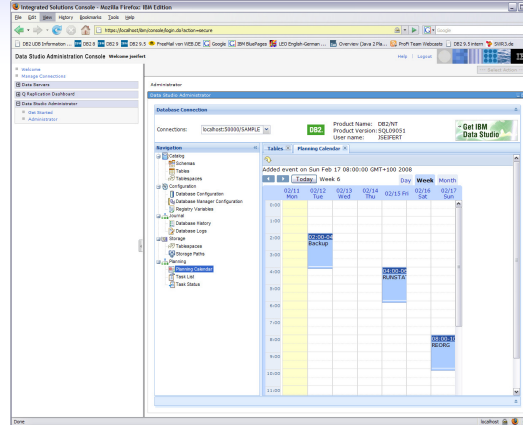 - Continued investigation into integration opportunities
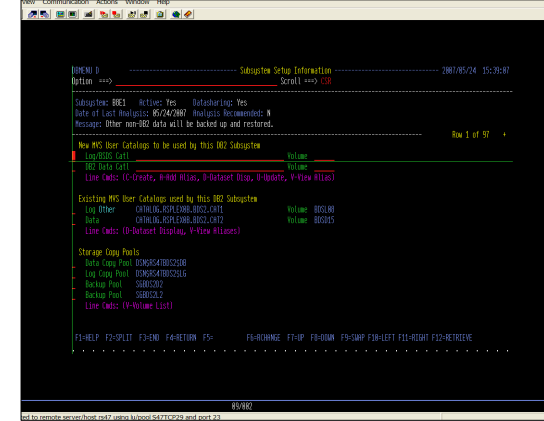
User Interface Directions

Data Studio and Optim   **z/OS Tools**
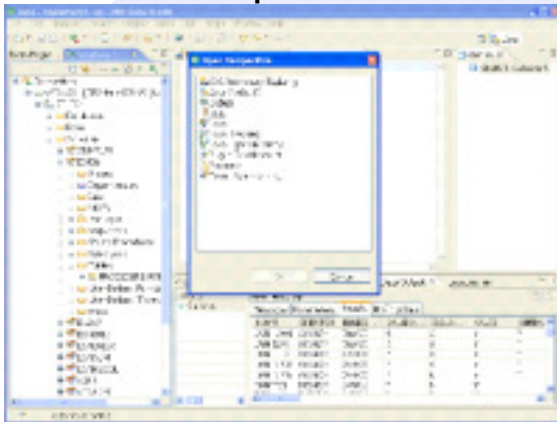
Eclipse UI   Web UI   3270

Develop and Deploy
- Design and Development
- Configuration
- Object Management
- Change Management
- Automation Planning
- Data Governance

Operate
- Monitoring
- Automation Management
- Reporting

z/OS Database Administration
- Rich z/OS function
- Application Management
- Database Administration
- Performance Management
- Data Governance

IBM

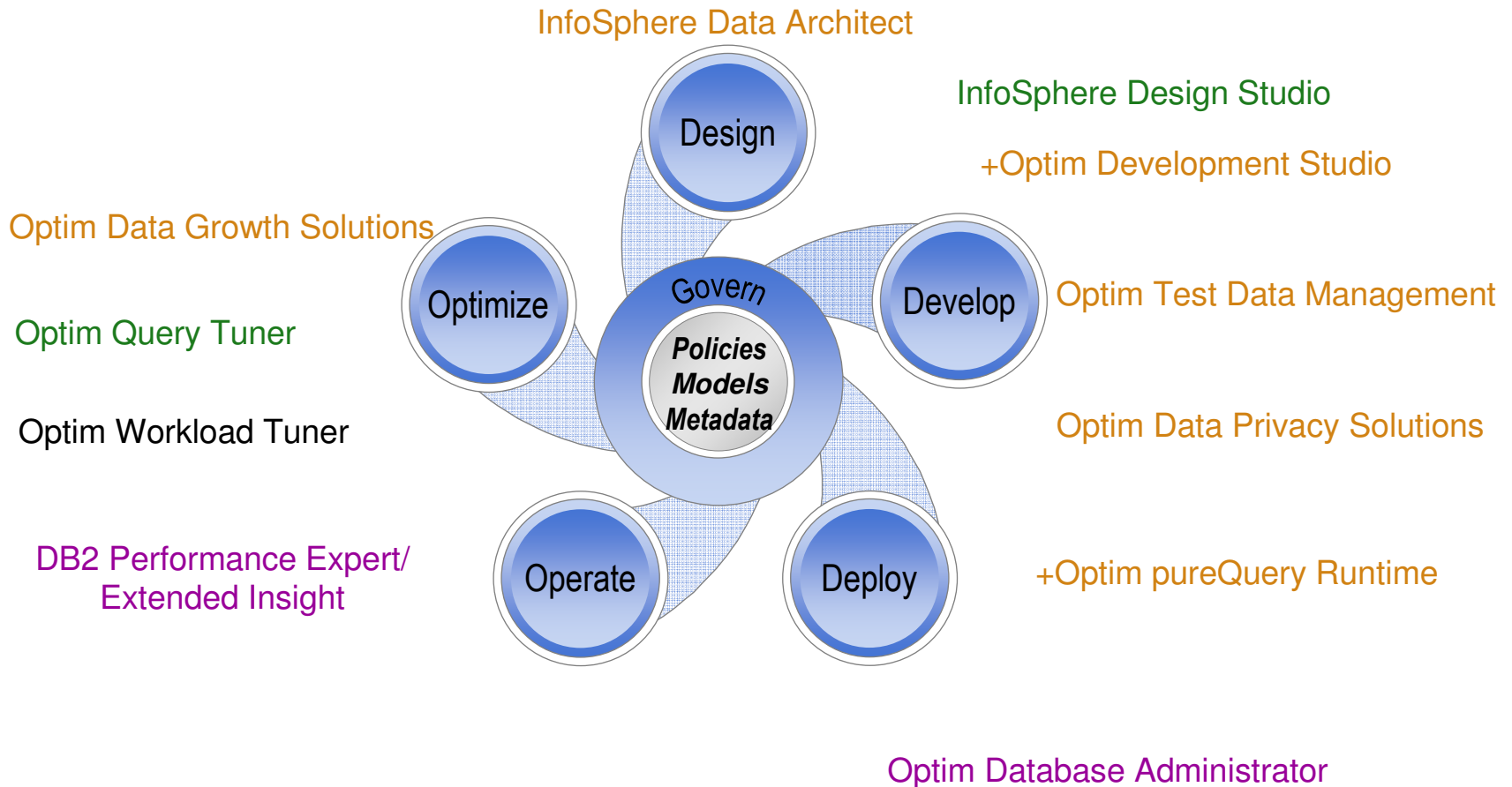# Introducing Integrated Data Management from IBM Optim™

An integrated, modular environment to manage enterprise application data, and optimize data-driven applications, from requirements to retirement
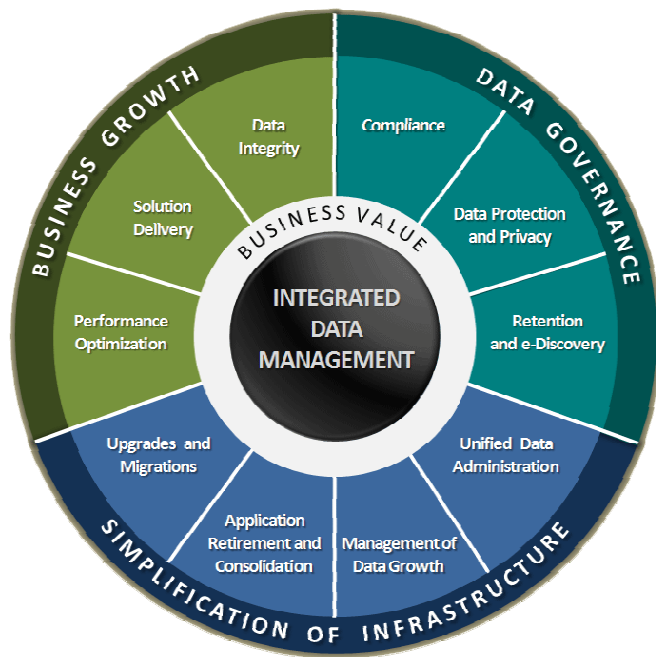
- **Grow the business**
  - Develop business critical applications faster
  - Optimize database and application performance
- **Govern data**
  - Protect sensitive data
  - Retain and discover
  - Comply with regulations
- **Without growing costs**
  - Improve productivity and automation
  - Archive data safely
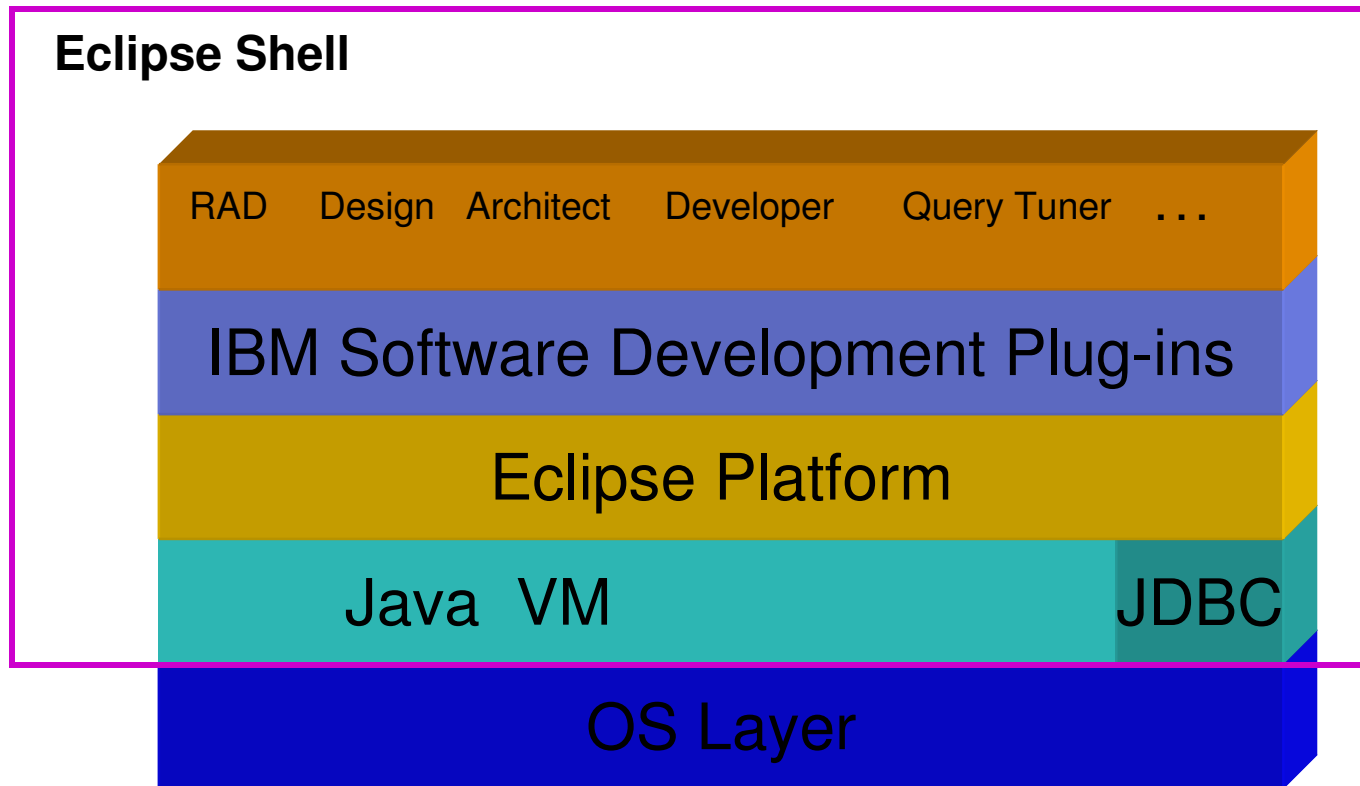 - Facilitate application upgrades, consolidation and retirement

Optim

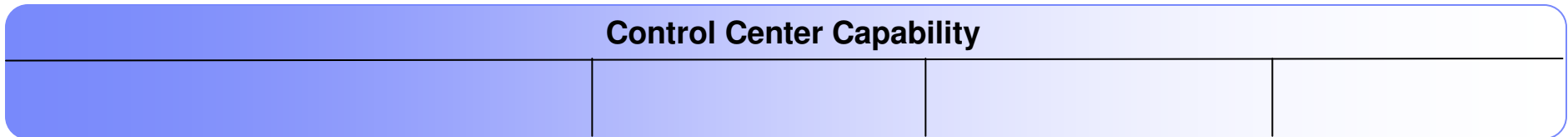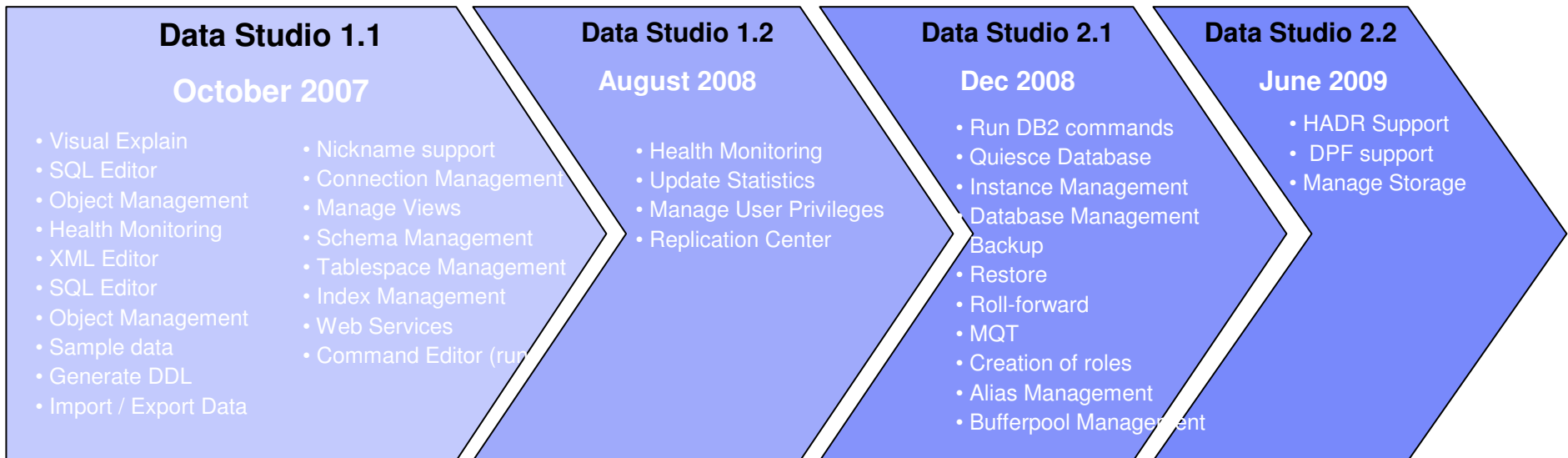### The broadest range of capabilities for managing the value of your data throughout its lifetime

InfoSphere Data Architect

InfoSphere Design Studio

+Optim Development Studio

Optim Data Growth Solutions

Optim Query Tuner

Design

Optim Test Data Management

Optim Workload Tuner

Optimize   Govern   Develop

Policies Models Metadata

Optim Data Privacy Solutions

DB2 Performance Expert/ Extended Insight

Operate   Deploy

+Optim pureQuery Runtime

Optim Database Administrator

*System z only   *Available on System z & DB2 LUW   *DB2 LUW only   +DB2s, IDS, Oracle   *Heterogeneous

How does Eclipse help with integration?

Eclipse Shell

RAD   Design   Architect   Developer   Query Tuner   . . .

IBM Software Development Plug-ins

Eclipse Platform

Java VM   JDBC

OS Layer

Basic Database Administration with Data Studio 2.2

Data Studio 1.1

October 2007

- Visual Explain
- SQL Editor
- Object Management
- Health Monitoring
- XML Editor
- SQL Editor
- Object Management
- Sample data
- Generate DDL
- Import / Export Data

- Nickname support
- Connection Management
- Manage Views
- Schema Management
- Tablespace Management
- Index Management
- Web Services
- Command Editor (run

Data Studio 1.2

August 2008

- Health Monitoring
- Update Statistics
- Manage User Privileges
- Replication Center

Data Studio 2.1

Dec 2008

- Run DB2 commands
- Quiesce Database
- Instance Management
  Database Management
  Backup
- Restore
- Roll-forward
- MQT
- Creation of roles
- Alias Management
- Bufferpool Management

Data Studio 2.2

June 2009

- HADR Support
- DPF support
- Manage Storage

Control Center Capability

IBM

Optim Tools

Optim Test Data Management
- Create right-sized test databases
- Fictionalize data
- Streamline refreshes for iteration

Optim Data Growth Manager
- Archive referentially intact subsets
- Restore selected subsets
- Universal access

Query Tuner & Workload
- Query Advisor
- Index Advisor
- Statistic Advisor
- Access Path Advisor
- Visual Plan Hit and Lockdown
- Access plan / Visual Explain

High Performance Unload
- Fast Unload
- Extraction from DB2 full backups
- Repartition feature

InfoSphere Data Architect
- Logical and physical database design
- Enforce enterprise standards for data quality, privacy, and consistency
- Integration with Industry Models
- Generate DDL for various data servers

Development Studio
- pureQuery development
- Static SQL binding for Java and .NET
- Correlate SQL to java source code
- SQL execution statistics
- JDBC batch updating
- SQL replacement and lockdown
- Literal consolidation and replacement
- Privacy visibility

Performance Expert & Extended Insight Feature
- Monitor database performance including end to end database response time
- Alert warning and critical situations based on KPIs
- Analyze performance bottlenecks
- Provide real time & historical data
- WLM monitoring

LUW Only

Database Administrator
- Database Change Management
- Extended Alters
- Advanced Data Migration
- Enhanced Scripting
- Objects Comparison
- Dependency Support
- Model Driven Change

LUW Only

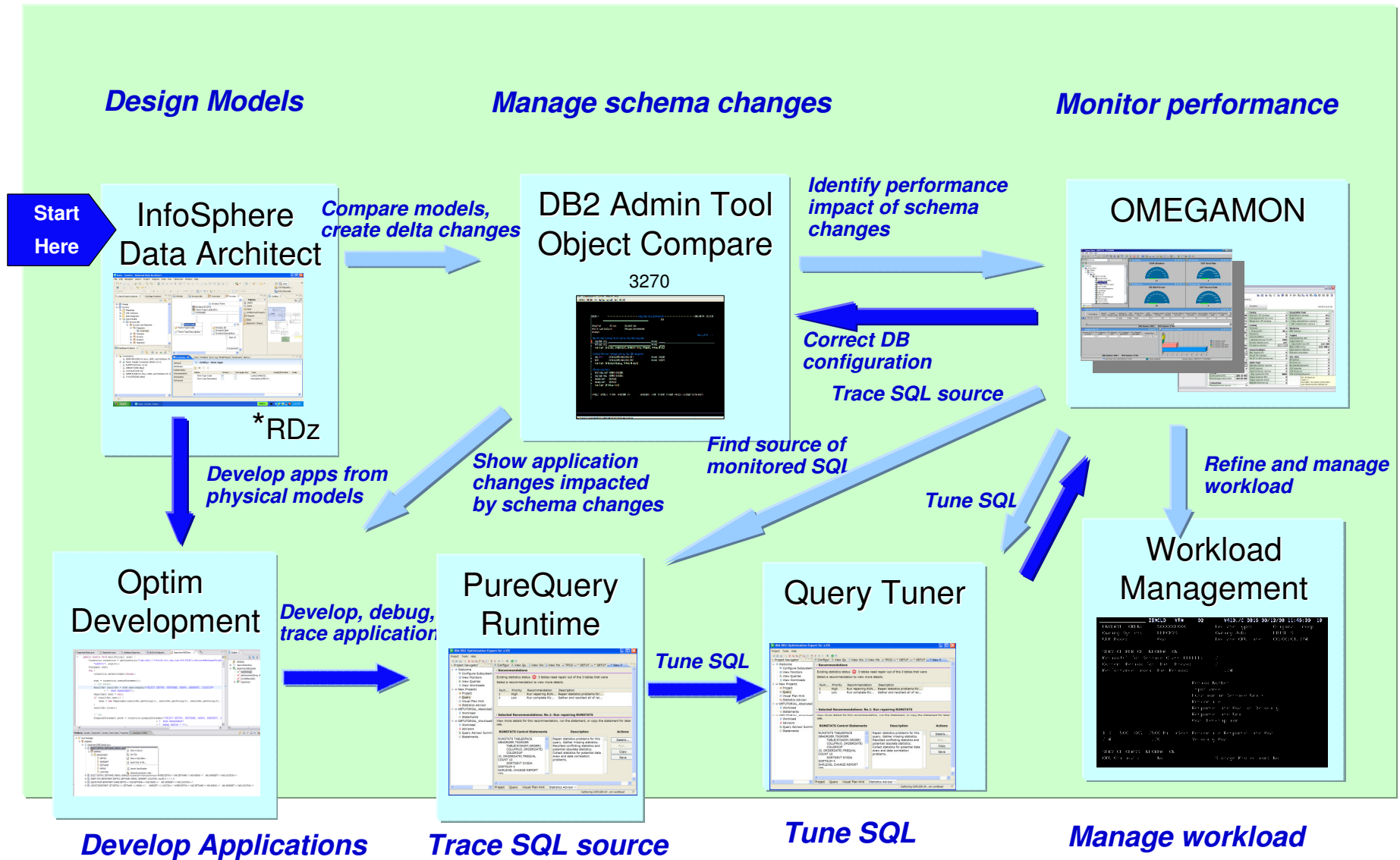## Data Studio 2.2 (Included with DB2 & Informix license)

Data Studio Administration Console
- At-a-Glance Health and Availability
- Problem Determination
- Replication Monitor
- Recommendation
- Limited Historical Information

- ER Diagramming
- Integrated Query Editor
- SQL & Java Routine + Debugger
- XML, XML Schema Editors
- Data Web Services
- Object, Data and Security Management
- Visual Explain
- Export / Import Data
- Generate DDL w/o data preservation

- Basic Database Object Management
- Instance Management
- Database Management
- Schema Management
- Table Management
- Configuration Management
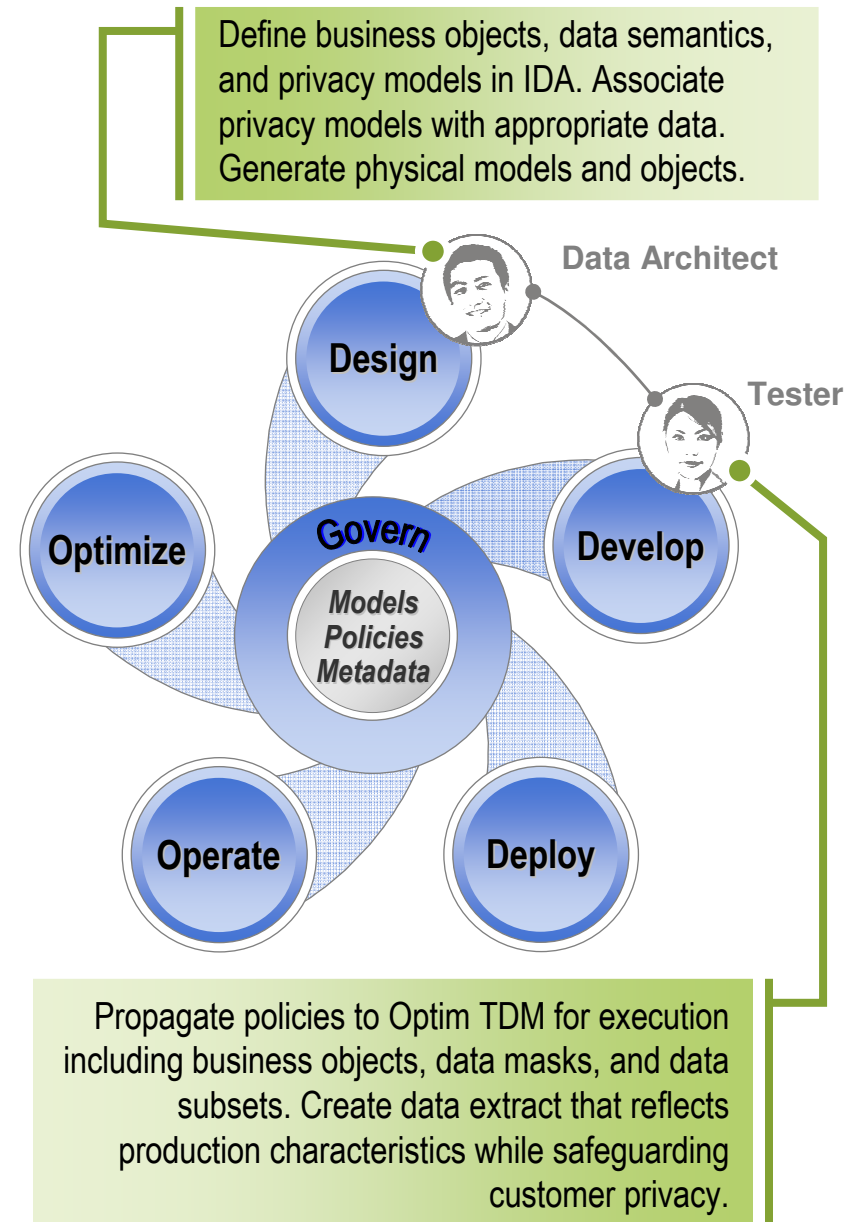- Backup / Restore Database
- Run DB2 Commands

18

DB2 for z/OS IDM Scenario

Design Models

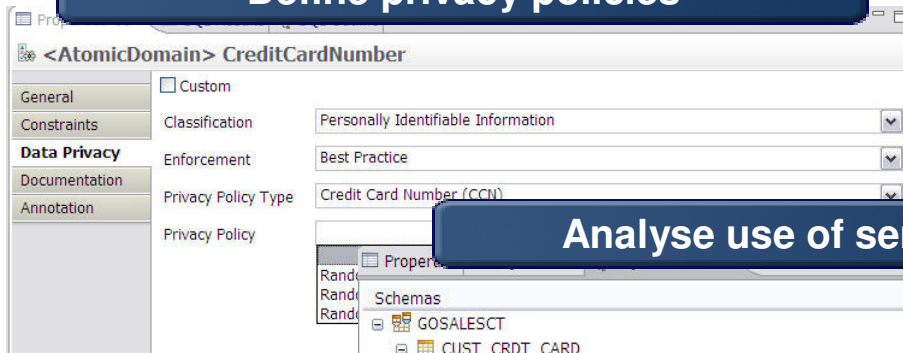**Manage schema changes**

Monitor performance

Start Here

InfoSphere Data Architect

Compare models, create delta changes

DB2 Admin Tool Object Compare

3270

Identify performance impact of schema changes

OMEGAMON

Correct DB configuration

Trace SQL source

*RDz

Develop apps from physical models

Show application changes impacted by schema changes

Find source of monitored SQL

Tune SQL

Refine and manage workload

Optim Development

Develop, debug, trace application

PureQuery Runtime

Tune SQL

Query Tuner

Tune SQL

Workload Management

Develop Applications

Trace SQL source

Tune SQL

Manage workload

InfoSphere Data Architect

- **Great Outdoor company is extending its routes-to-market through partners**
  - Must comply with Payment Card Industry standards – can't use real account numbers or credit card numbers for application development and testing

- **Results:**
  - Provide consistent treatment of credit card numbers
  - Assure application quality with realistic test data
  - Safeguard customer privacy
  - Avoid compliance fines and penalties

Define business objects, data semantics, and privacy models in IDA. Associate privacy models with appropriate data. Generate physical models and objects.

Data Architect

Design

Tester

Optimize

Govern

Develop

Models Policies Metadata

Operate

Deploy

Propagate policies to Optim TDM for execution including business objects, data masks, and data subsets. Create data extract that reflects production characteristics while safeguarding customer privacy.

Aligning Around Data Privacy

Data Architect

Developer

Tester

Define privacy policies

Analyse use of sensitive data
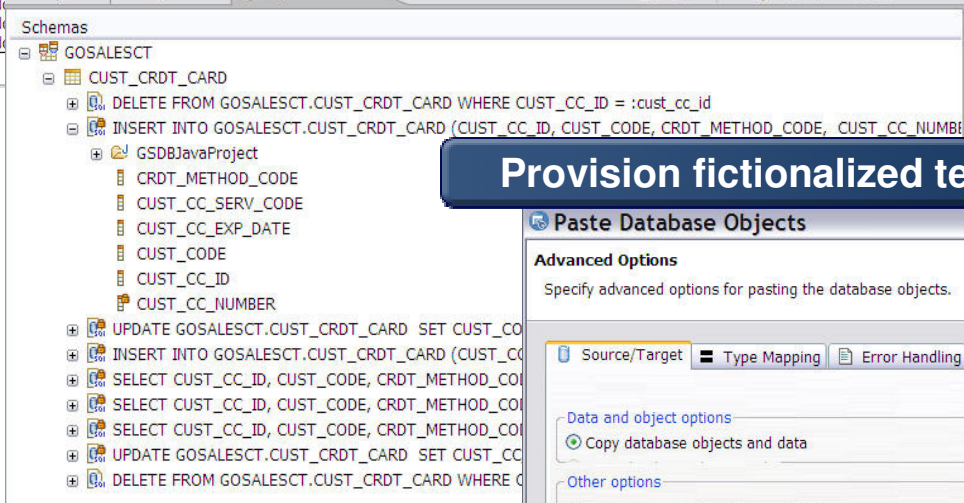
Provision fictionalized test data

Properties

<AtomicDomain> CreditCardNumber

General	☐ Custom
Constraints	Classification	Personally Identifiable Information
Data Privacy	Enforcement	Best Practice
Documentation	Privacy Policy Type	Credit Card Number (CCN)
Annotation	Privacy Policy	

Rand
Rand
Rand

Properties

Schemas

GOSALESCT
CUST_CRDT_CARD
DELETE FROM GOSALESCT.CUST_CRDT_CARD WHERE CUST_CC_ID = :cust_cc_id
INSERT INTO GOSALESCT.CUST_CRDT_CARD (CUST_CC_ID, CUST_CODE, CRDT_METHOD_CODE, CUST_CC_NUMBE
GSDBJavaProject
CRDT_METHOD_CODE
CUST_CC_SERV_CODE
CUST_CC_EXP_DATE
CUST_CODE
CUST_CC_ID
CUST_CC_NUMBER
UPDATE GOSALESCT.CUST_CRDT_CARD SET CUST_CO
INSERT INTO GOSALESCT.CUST_CRDT_CARD (CUST_CO
SELECT CUST_CC_ID, CUST_CODE, CRDT_METHOD_CO
SELECT CUST_CC_ID, CUST_CODE, CRDT_METHOD_CO
SELECT CUST_CC_ID, CUST_CODE, CRDT_METHOD_CO
UPDATE GOSALESCT.CUST_CRDT_CARD SET CUST_CO
DELETE FROM GOSALESCT.CUST_CRDT_CARD WHERE

Paste Database Objects

Advanced Options

Specify advanced options for pasting the database objects.

Source/Target | Type Mapping | Error Handling

Data and object options
◉ Copy database objects and data

Other options
☑ Copy dependent database objects
☑ Copy contained database objects
☐ Overwrite if objects exist
☐ Use quoted identifiers
☐ Generate tablespace names

Restore Defaults

< Back | Next > | Finish | Cancel

- **Define policies once and reuse**
- **Flow definitions to team members**
- **Drive consistent practices around privacy**

InfoSphere Data Architect - Key Features

A collaborative, data design solution to discover, model, relate, and standardize diverse data assets

- **Comprehensive and powerful data modeling for diverse databases**
  - Integration design

- **Enterprise standards and governance**

- **Lifecycle integration**
  - Rational
  - Optim
  - InfoSphere
  - IBM Industry Models
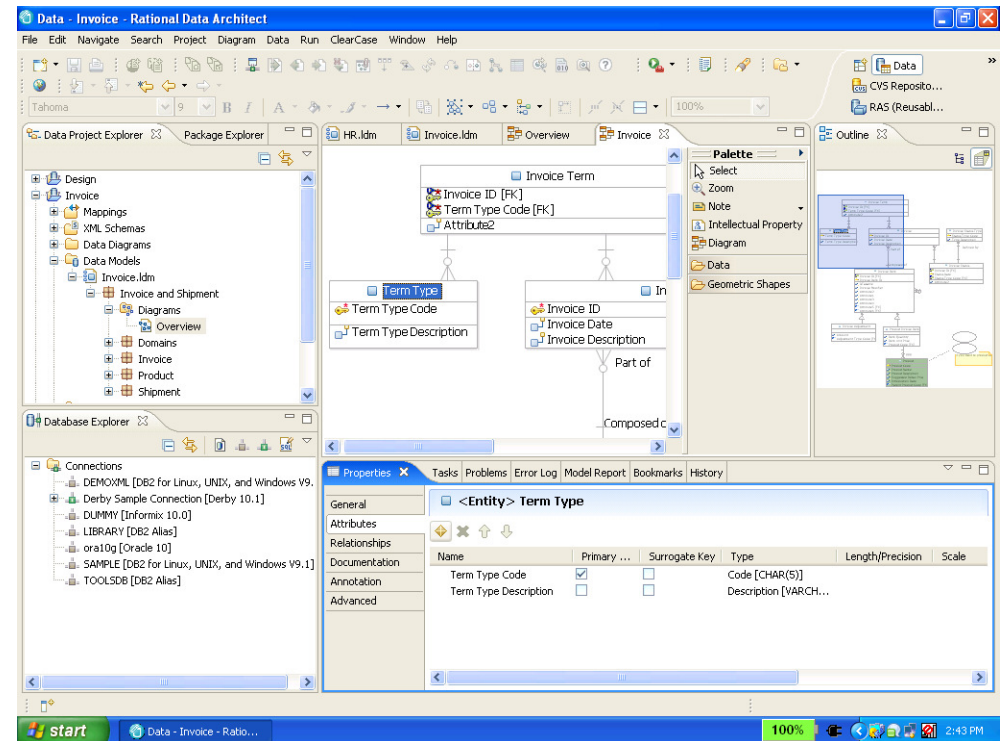
Defining and Enforcing Standards
Increased Quality and Governance

- **Naming**
  - Words, acronyms, and patterns

- **Meaning**
  - Glossary

- **Values**
  - Domain values or ranges

- **Transformation**
  - Logical to physical

- **Privileges**
  - Users, groups, roles

- **Privacy**
  - Data masking

- **Traceability**
  - Auditability

> *"InfoSphere Data Architect helped us to **semantically integrate all our critical data sources and to design a business information model within two weeks**. Previously, this process would have taken more than two and one-half months."*
>
> *Large telecommunications company*

Define the Privacy Model

InfoSphere Data Architect

Define the domain

Associate the domain with the column or attribute

Pre-defined masking options for common cases

Associate column with privacy policy

Select column

Share Connection with Others

InfoSphere Data Architect

Select a connection

Specify connection properties

Associate with model

Data Source Explorer

Properties

Connection Parameters

Enter a user name.

Connection identification
☑ Use default naming convention
Connection Name: GSDB1

Local | Connection Configurations | JD
Select a connection configuration:
☐ Configuration Repository GSDB2
  GSDBConnection

Test Connection

Data Privacy Modeling
Associate this connection with a physical data model of the same structure that uses domain data types with data privacy information.

Physical data model: \GOSALES\GOSALESCT.dbm   Browse...
☑ Always open the model when a connection is established

Configuration Repositories
  Configuration Re
    GSDBConnect
Database Connectio
  BIRT Classic Mod
  Derby Sample C
  GSDB (DB2 for Li
  GSDB2 (DB2 for
  GSDBTEST (DB2
  SAMPLE (DB2 for
  TOOLSDB [DB2 A
Unsupported

< Back | Next > | Finish | Cancel

Analyze Use of Sensitive Data in Applications
Optim Development Studio

See queries accessing sensitive data

Properties | SQL Results | SQL Outline ✕

Schemas

GOSALESCT
- CUST_CRD
  - DELETE
  - INSERT
    - GSD
    - CRD
    - CUS
    - CUS
    - CUS
    - CUS
    - CUS
  - UPDATE
  - INSERT
  - SELECT
  - SELECT
  - SELECT
  - PDATE
  - ETE

Filter to see use of sensitive data

Filter

Filter

Database object filter

Database object name:

Filter for SQL statement types

☐ SELECT ☐ INSERT ☐ UPDATE ☐ DELETE ☐

☑ SQL containing columns marked as private

Filter for text

☐ Use pattern to filter SQL text:

(.*Wl... *ABC.?)(Example: match all SQ

...tern ○ Hide

Restore Defaults | OK | Cancel

Filter

Source Code Analysis Filter

Select the elements to display in the view:

- ☐ Code that assigns column values
- ☑ Code that prints column values to the console
- ☐ Code that retrieves column values from the database
- ☐ Code that updates column values in the database

Filter Description

Shows al... ...ments that print values, including those that print column values.

OK | Cancel

Icon identifies sensitive access

View only SQL accessing sensitive data

Filter SQL by action

Help Developers or Testers Provision Test Data

Select the source data

Optim Development Studio

Invoke the paste wizard

Select the copy means

Data Source Explorer

- BIRT Classic Models Sample Database
- DEMOMVS
- Derby Sample Connection
- GSDB (DB2 for Linux, UNIX, a...
  - Change Management
  - Instance
  - GSDB
    - Storage Diagrams
    - Buffer Pools
    - Groups
    - Partition Groups
    - Remote Servers
    - Roles
    - Schemas
      - DB2OE
      - GOSALES
      - GOSALESCT
        - Aliases
        - Dependencies
        - Global Variables
        - Modules
        - MQTs
        - Nicknames
        - Packages
        - PL/SQL Package
        - Sequences
        - Stored Procedu
        - Tables
          - CUST_COUN
          - CUST_CRDT_CARD

Context menu:
- Data
- Drop
- Add to Overview
- Generate DDL...
- Update Statistics
- Analyze Impact...
- Compare With
- Generate pureQu
- Find reference in
- Visualize Topolog
- Value Distribution
- Copy
- Paste...
- Refresh
- High Performance
- Export Table...
- Import Table...
- Load...
- Reorg Table...
- Reorg Index...
- Set Integrity...
- Alter

Data Source Explorer

- GSDBTEST (DB2 for Linux, UNIX, and Windows V9.7)
  - Change Management
  - Instance
  - GSDBTEST
    - Storage Diagrams
    - Buffer Pools
    - Groups
    - Partition Groups
    - Remote Servers
    - Roles
    - Schemas
      - GOSALESCT
      - NULLID
      - SQLJ
      - SYSCAT
      - SYSFUN
      - SYSIBM
      - SYSIBM
      - SYSIBM
      - SYSIBM
      - SYSPRO
      - SYSPUB
      - SYSSTA
      - SYSTO
    - Table Spac
    - Users
- NEWGSDB (DB2 f...
  - Change Mana
  - Instance
  - NEWGSDB

Context menu:
- Drop
- Add to Overview Diagram
- Generate DDL...
- Find Invalid Packages...
- Update Statistics
- Analyze Impact...
- Analyze Model
- Compare With
- Find reference in SQL Outline
- Visualize Topology Diagram
- Copy
- Paste...
- Refresh   F5
- Alter

Paste Database Objects

Paste Options

Select the option for pasting the database objects.

○ Paste directly into target

◉ Paste with a test data subset and optional privacy masking

  ⬆ Upgrade

○ Paste by using change management

[< Back] [Next >] [Finish] [Cancel]

Specify Test Data Generation Detail

Specify data only or objects too
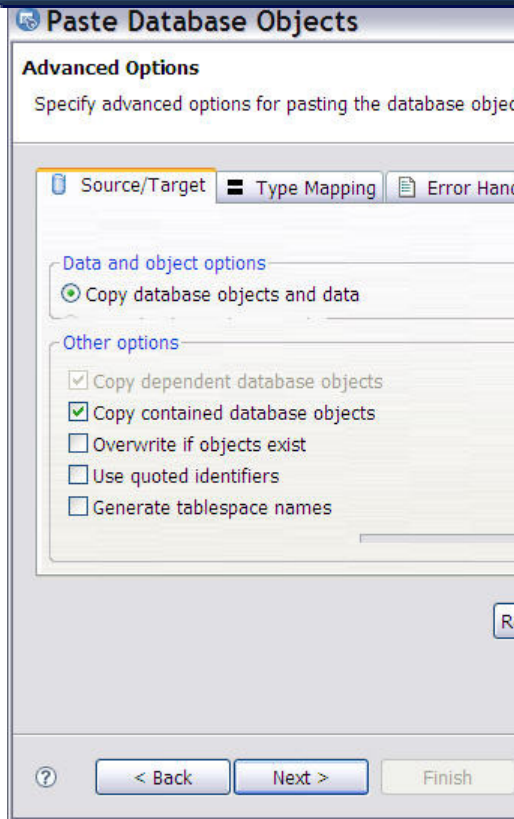
Specify type mapping
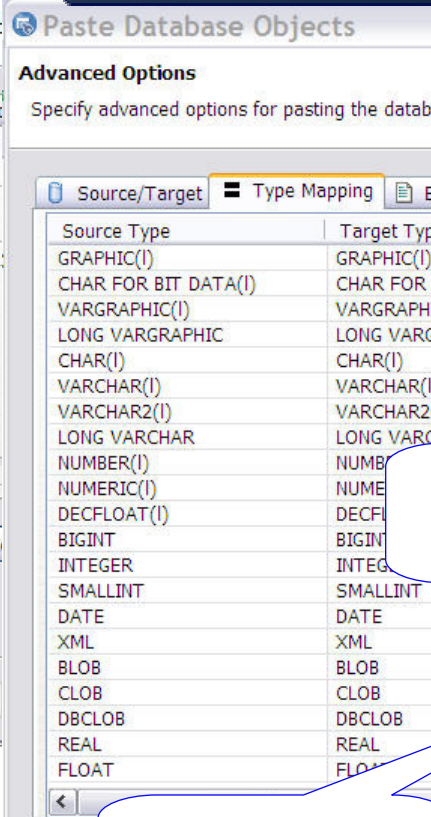
Specify copy scope
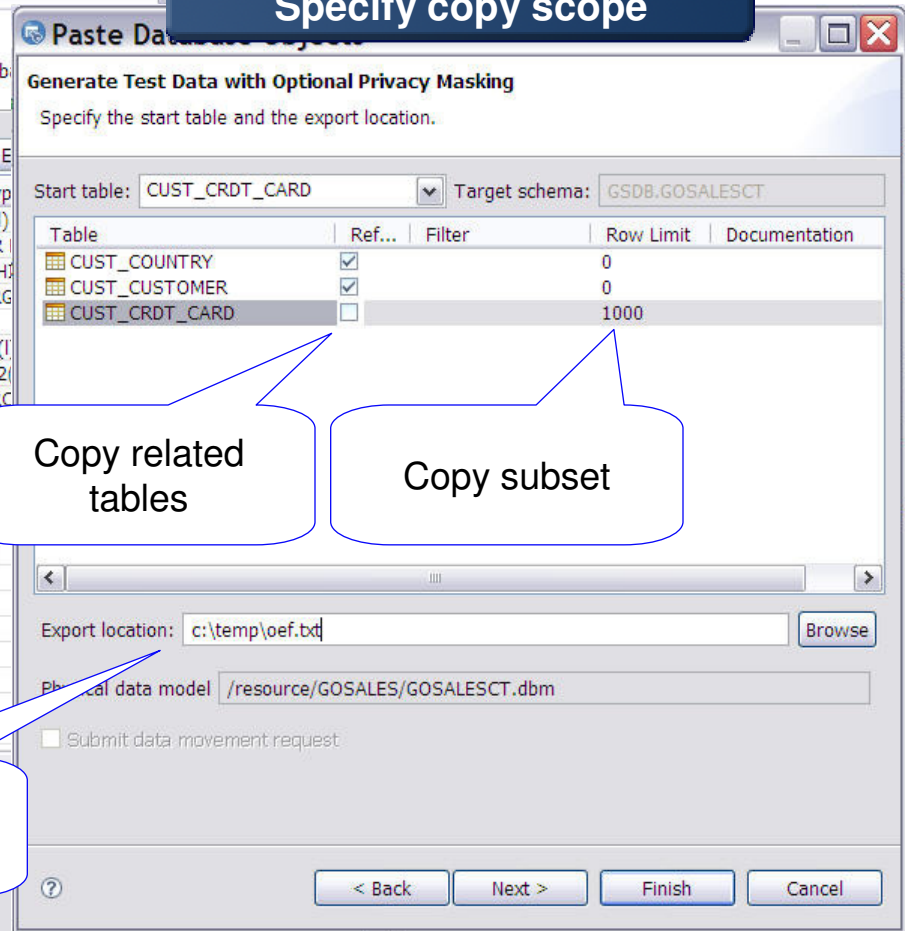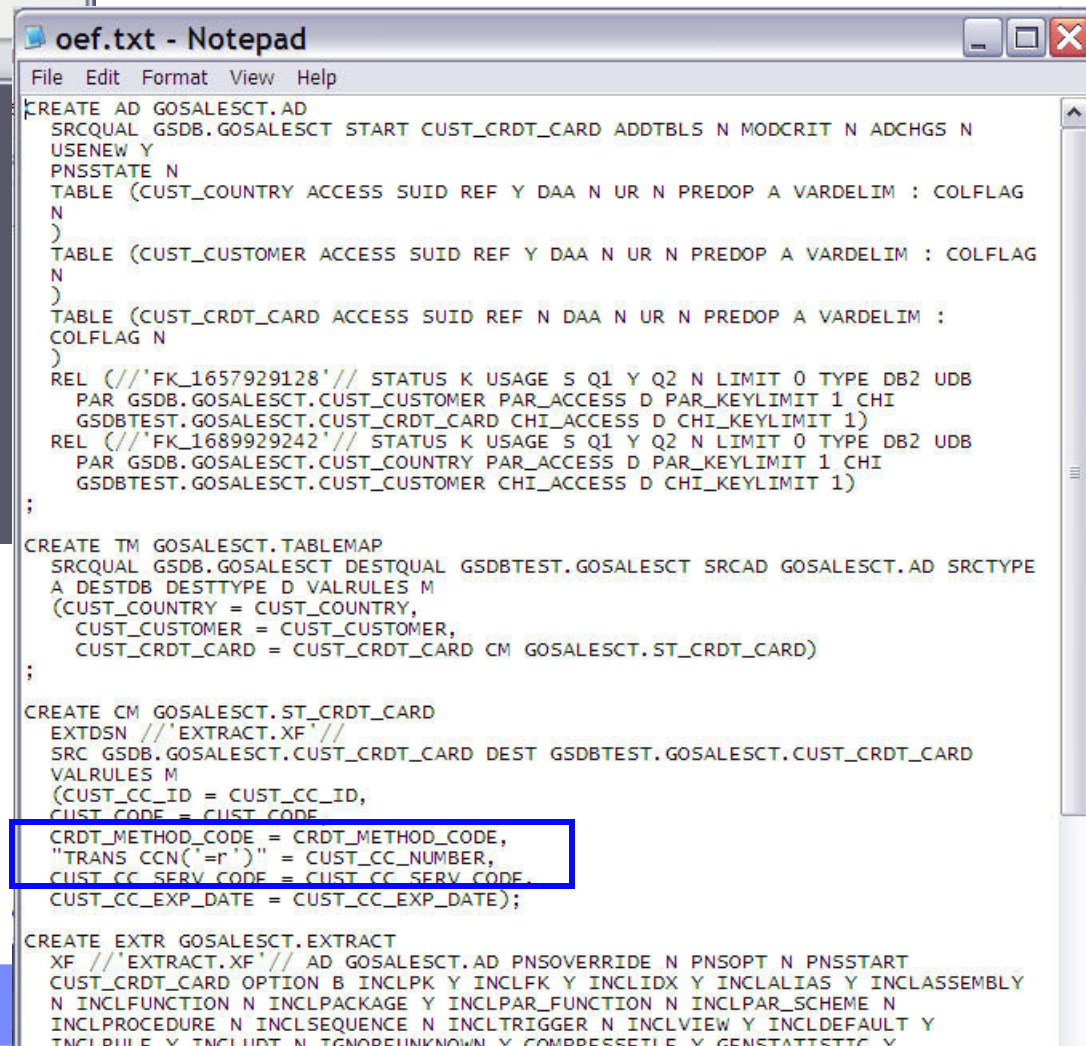
Copy related tables

Copy subset

Specify export file location

Import and Run the Extract Specification

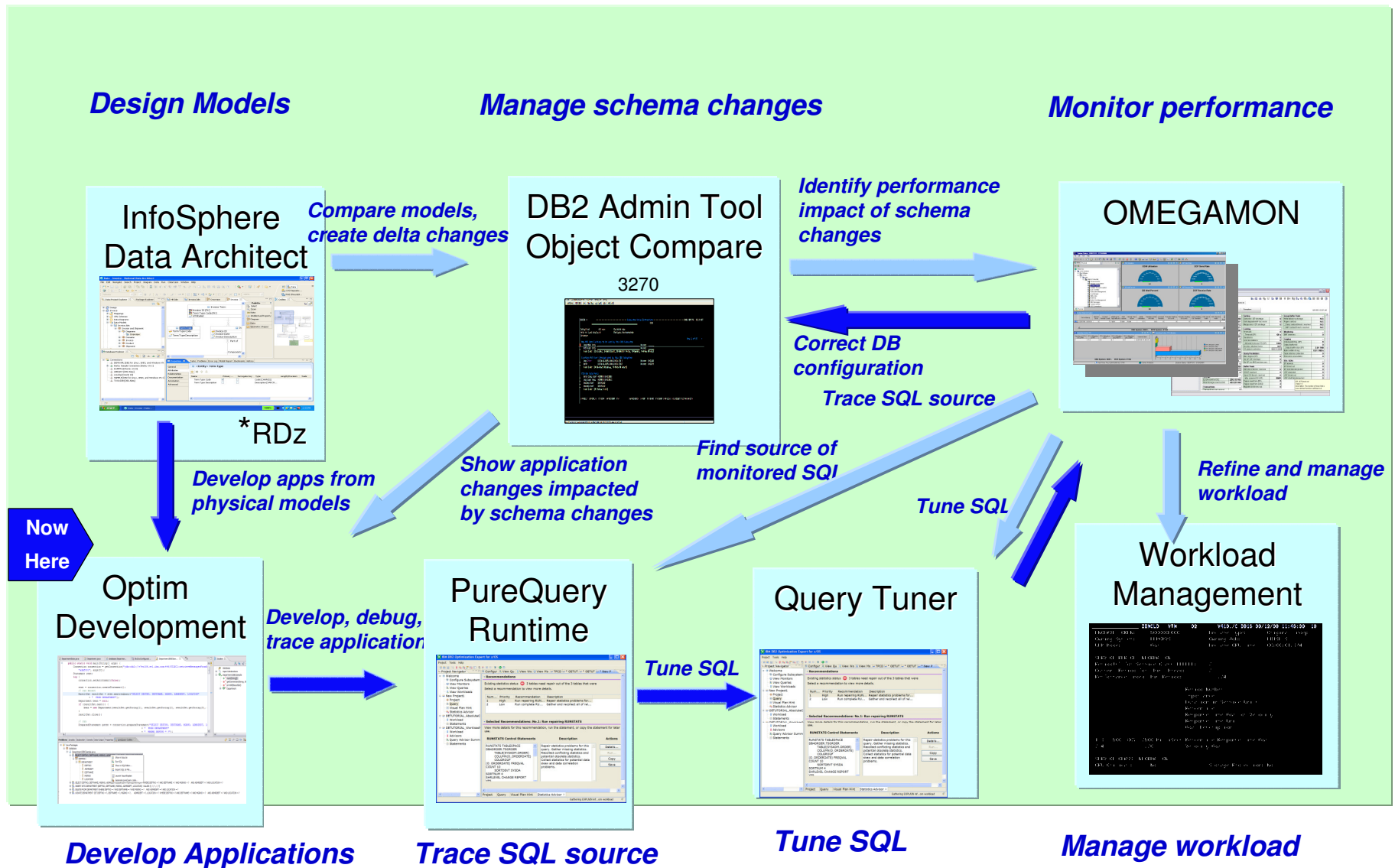*Optim Test Data Management*

Optim Test Data Management Solution

Streamline building test databases to improve application quality, cut IT costs and accelerate solution delivery

- **Accelerate time to market**
  - Create "right sized" test databases
  - Extract referentially intact subsets
  - Edit test data to create error and boundary conditions
  - Compare baseline data against test results to pinpoint and resolve application defects faster
  - Easily refresh, reset and maintain test environments
- **Cut storage costs**
  - Reduce storage requirements by using smaller subsets for testing
- **Enable compliance**
  - De-identify or mask data

Production or Clone

Extract

Optim

Dev

QA

Test

DB2 for z/OS IDM Scenario

Design Models

Manage schema changes

Monitor performance

InfoSphere Data Architect

Compare models, create delta changes

DB2 Admin Tool Object Compare

3270

Identify performance impact of schema changes

OMEGAMON

Correct DB configuration

Trace SQL source

*RDz

Develop apps from physical models

Show application changes impacted by schema changes

Find source of monitored SQI

Refine and manage workload

Now Here

Optim Development

Develop, debug, trace application

PureQuery Runtime

Tune SQL

Query Tuner

Tune SQL

Workload Management

Tune SQL

Develop Applications

Trace SQL source

Tune SQL

Manage workload

IBM

Integrated Solutions for Diverse Problems

- **Convert to static SQL execution**

- **Improve query design**

- **Improve statistics quality**

- **Improve database design**

- **Manage data growth**

- **Optim pureQuery Runtime and Optim Development Studio**

- **Optim Query Workload Tuner**

- **Optim Query Workload Tuner**

- **Optim Query Workload Tuner and InfoSphere Data Architect** HAH6

- **Optim Data Growth Solutions**

HAH6   Maybe insert DB2 Object Compare here
HollyAHayes, 8/18/2009

Optim pureQuery Runtime and Development Studio

**Optimize database access
without impacting applications**

- **Facilitate analysis**
  - Capture SQL, application and performance metadata from any Java application for analysis

- **Enable emergency fixes**
  - Replace SQL without changing the application

- **Lock down performance and SQL**

Enterprise Claims Management and Property and Liability applications
- *Measured 3X developer productivity improvement*
- *Reduced development time for data access components by 50-75%*
- ***Reduced the overall application CPU consumption on z/OS by 18-22%***

Improve Performance, Security, and Manageability
Get Static SQL for DB2 without Changing Your Code

- **Make response time predictable with locked in SQL access pre-execution path**

- **Limit user access and reduce SQL injection**
  - Grant execute privileges on query packages vs. access privileges on tables

- **Accelerate problem resolution**
  - Trace SQL execution to a specific package and the originating source

- **Improve impact analysis and capacity planning**
  - Visualize application SQL and correlation metadata

- **Increase system capacity and drive dow** Pragmatic Solutions, Inc.

> *"The ability to use static SQL with pureQuery is huge. Recently, I worked with a client who could **reduce CPU usage by 7 percent thanks to this one feature.**"*
> *- David Buelke*

Database Access and pureQuery
Many On-ramps for New and Existing Applications

Java | **Java Persistence Architecture** | **spring source** | **HIBERNATE** | **iBATIS** | **Web services** | **Microsoft .NET**

pureQuery
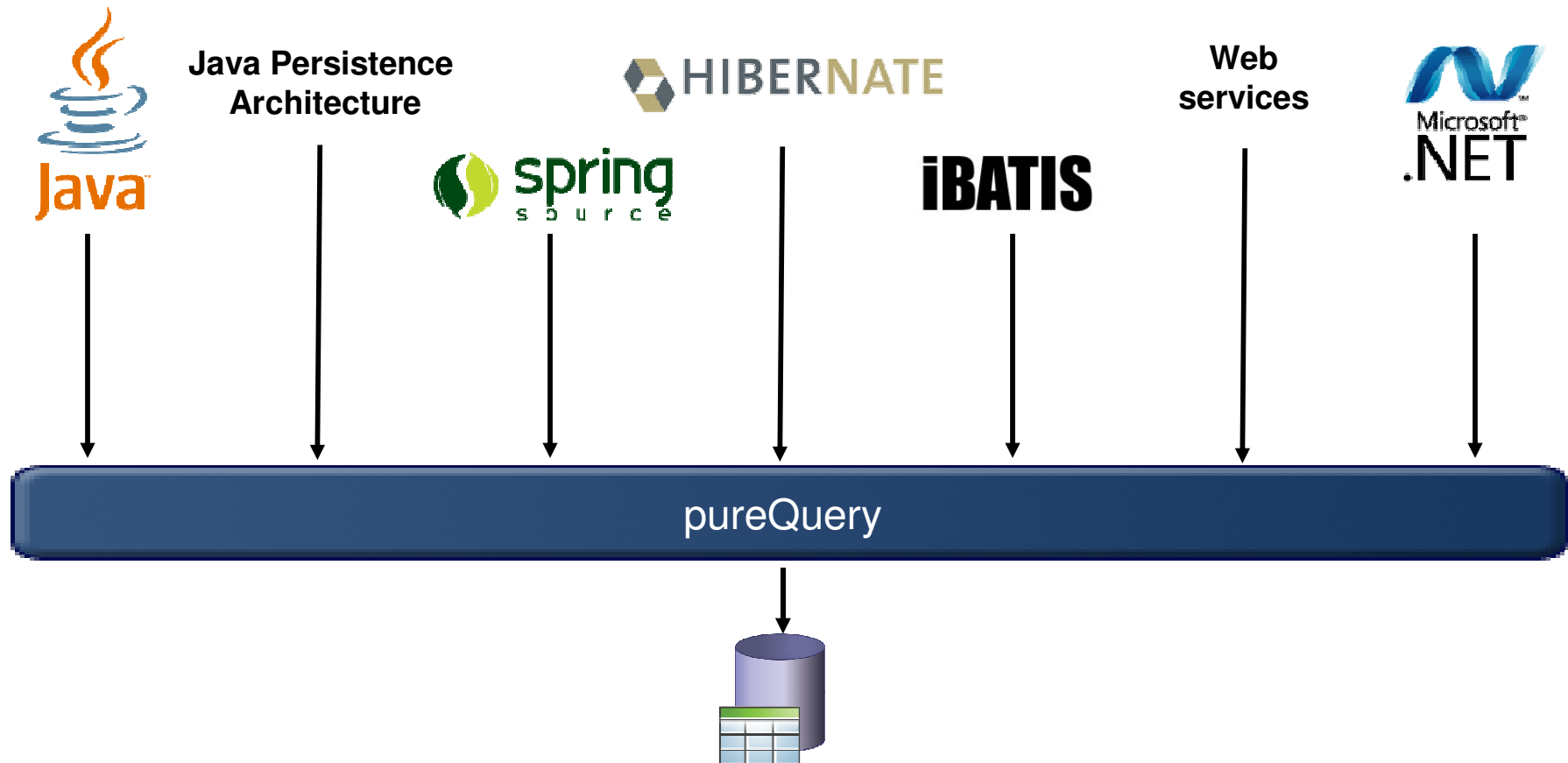
DB2, Informix, and Oracle now…more coming

More Visibility, Productivity, and Control of Application SQL

- **Capture**
  - Capture performance and application metadata

  HIBERNATE **iBATIS**

  spring source **Java Persistence Architecture**

- **Optimize**
  - Visualize hotspots
  - Review access plan and statistics
  - Trace SQL to source
  - Replace SQL
  - Analyze impact of changes

- **Deploy**
  - Lock down SQL to approved set
  - Lock down performance with static execution

Monitor → Capture → Review → Optimize → Restrict → Configure → Bind → Execute

DB2 for z/OS IDM Scenario

Design Models

Manage schema changes

Monitor performance

InfoSphere
Data Architect

*Compare models,
create delta changes*

DB2 Admin Tool
Object Compare

3270

*Identify performance
impact of schema
changes*

OMEGAMON

*Correct DB
configuration*

Trace SQL source

*RDz

*Develop apps from
physical models*

*Show application
changes impacted
by schema changes*

*Find source of
monitored SQL*

*Refine and manage
workload*

Optim
Development

*Develop, debug,
trace application*

PureQuery
Runtime

**Now
Here**

Query Tuner

Tune SQL

Workload
Management

Tune SQL

Tune SQL

Develop Applications

Trace SQL source

Tune SQL

Manage workload

IBM Optim Query Workload Tuner

Optimize performance and reduce costs

- **Optimize performance**
  - Identify high cost SQL and workloads
  - Improve query design
  - Improve statistics quality
  - Create indexes to reduce scans
  - Influence access path selection

- **Reduce costs**
  - Simplify analysis for DBAs
  - Improve statistics collection
  - Increase system capacity
  - Reduce impact of sluggish response times
  - Fit workload into maintenance window

Comprehensive Approach to Optimization

DB2 dynamic statement cache   **Optim Development Studio**

DB2 Catalog   **DB2 Profile Monitor**   **QMF**

Omegamon XE for DB2   **DB2 Query Monitor**
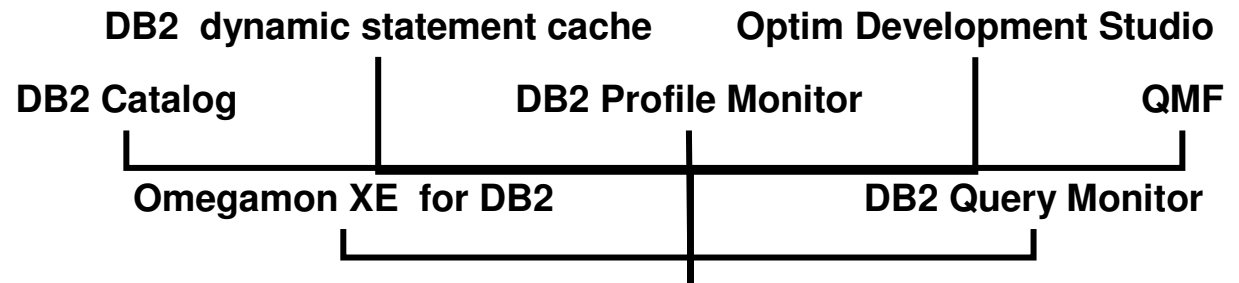
- **Define or select workloads**

- **Execute advisors**

- **Visualize results**
  – Query plan and costs

- **Drill into advice**
  • Query design
  • Statistics collection
  • Index design

- **Validate results**
  – Compare access plans

DB2 for z/OS IDM Scenario

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IBM Tivoli OMEGAMON® XE for DB2 PE / PM

Product at a Glance

- Tremendous reporting infrastructure
- Sysplex and Data Sharing wide monitoring and bottleneck analysis of specific workload elements and objects
- Early detection of out-of-line situation with the automated capability to take actions
- Easy to use monitoring and tracing functions for application and system environment
- Full V9 exploitation; VNEXT underway

News

- Improved SAP Monitoring 6.40
- Monitoring of DB2 Connect
- Improved Accounting (DB2 V8 ACCUMAC)
- Granular IFCID 225 Information (Virtual Storage Monitoring)
- Improved distributed application support
- Seamless navigation between DB2, IMS, zOS, and CICS

Benefits

- Highly flexible reporting and Performance Warehouse
- Rule-of-Thumb and expert analysis with dedicated recommendations
- Fully integrated Real-time monitoring
- DB2 Connect monitoring correlated with host DBAT thread information
- Expert buffer pool analysis with What-if simulation capability

Includes Buffer Pool Analyzer

- BPAs goal is, to save you memory and CPU resources by optimizing DB2s Buffer Pools
- Two major functions to achieve this:
  - **Change size of BPs to make most out of available real memory**
  - **Group objects in BPs according to characteristic (called Object Placement) and define BP thresholds accordingly**
- Allows you to test changes before you apply them to system (simulation)

DB2 for z/OS IDM Scenario

Design Models

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Now Here

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Refine and manage workload

Optim
Development

Develop, debug, trace application

PureQuery
Runtime

Tune SQL

Query Tuner

Tune SQL

Workload
Management

Develop Applications

Trace SQL source

Tune SQL

Manage workload

Why is Database Change Management Difficult?

- Dependencies?

- Impacts?

- Side effects?

Table
Changing the data type of a primary key column

Dependencies — Impacts — Effects

Foreign Key

Views MQTs — Packages — UDF

Child Table
A column in this table is affected as well as the foreign key

Child Table
A column in this table is affected as well as the foreign key

Procedure
Procedure needs a rebind, might be impacted

Data — Permissions
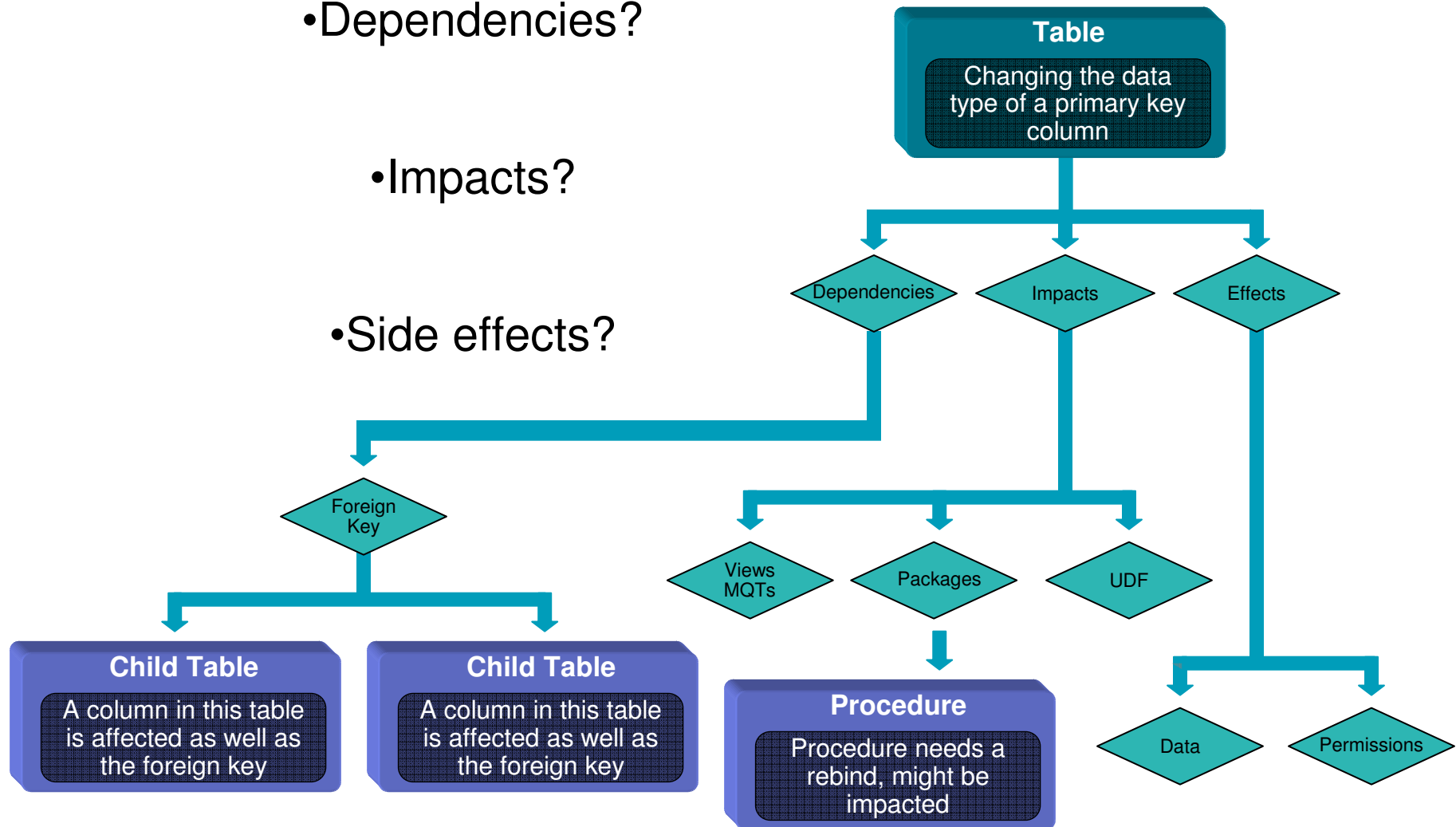
IBM DB2 Administration Tool & Object Compare

Improve DBA productivity and reduce application outages by automating and simplifying complex DB2 structural changes.

- **Manages changes while**
  - Preserving data, privileges, all dependent objects, and application binding

- **Synchronizes, copies, clones, or merges database schema from the source to the target**
  - Migration from physical data models, live database connections, or from scripts

- **Documents changes for collaboration and audit**

IBM Data Governance Software

| Optim Data Growth Solution

Optim TDM | → | *Information Lifecycle Mgmt*
• **Data Retention**
• **Data Retirement** | | *Data Security*
• **Prevent Access**
• **Restrict Access**
• **Monitor Access** | ← | DB2 9.5

pureQuery |

Data Governance

| DB2 Audit Management Expert

Tivoli Compliance InSight Manager | → | *Audit*
• **Audit Access**
• **Audit Privileges**
• **Audit Users** | | *Data Privacy*
• **Mask Data**
• **Encrypt Data** | ← | Optim Data Privacy

Data Encryption for DB2 & IMS |

InfoSphere Data Architect and Foundation Tools

HAH5   Needs to be updated for z/OS
HollyAHayes, 8/18/2009

Challenge: Data Growth

- **Mergers & acquisitions**
- **Organic business growth**
  - eCommerce
  - ERP/CRM
- **The digital revolution**
- **Records retention**
  - Basel II
  - SOX
  - Euro-SOX
- **Data multiplier effect**
  - Ex. 2 TB production data translates into 12 TB storage

2 TB Backup

2 TB QA

2 TB Production

2 TB DR

2 TB Training

2 TB Dev
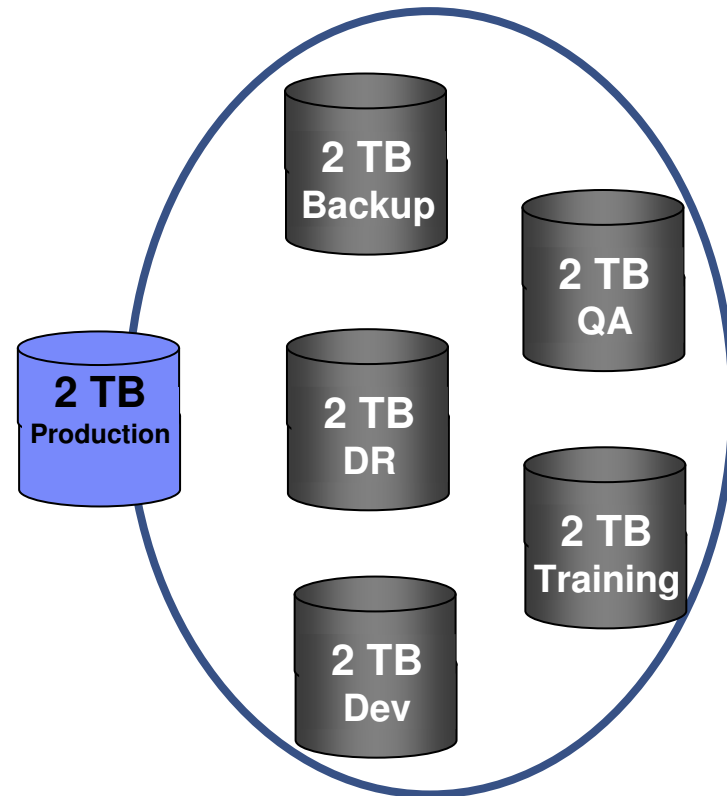
FORRESTER

*Forrester estimates that **85% of data stored in databases is inactive***

Noel Yuhanna, Forrester Research,
Database Archiving Remains An Important Part Of Enterprise DBMS Strategy, 8/13/07

IBM Optim Data Growth Solution

Improve enterprise application performance while driving down costs and complying with regulations
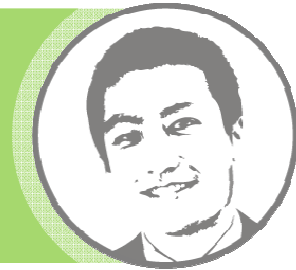
- **Extract**
  - Identify business objects
  - Leverage application templates and data models
  - Span multiple related applications, databases and platforms

- **Store**
  - Store immutable business objects independent of infrastructure
  - Support any hardware device or platform

- **Comply**
  - Access via interface of your choice
  - Restore precisely what is needed
  - Retain and retire

TD
Bank Financial Group

Reduced batch processing runtime for Payroll by 25%. Realized a cost savings of 50% and reduction in runtime for database utilities. Reduced database storage needs by 30% (from approximately 325 GB to 225 GB).

Integrated Data Management
An integrated environment to span today's flexible roles

- **Enable alignment across the lifecycle**
  - Manage by intention
  - Share policies with downstream tasks

- **Improve individual and team productivity**
  - Increase automation
  - Facilitate collaboration
  - Provide context-aware capabilities

- **Optimize performance**
  - Embed best practices into solutions
  - Provide expert advice to increase skills
  - Improve resource utilization

IBM Integrated Data Management
Grow the business, without growing costs
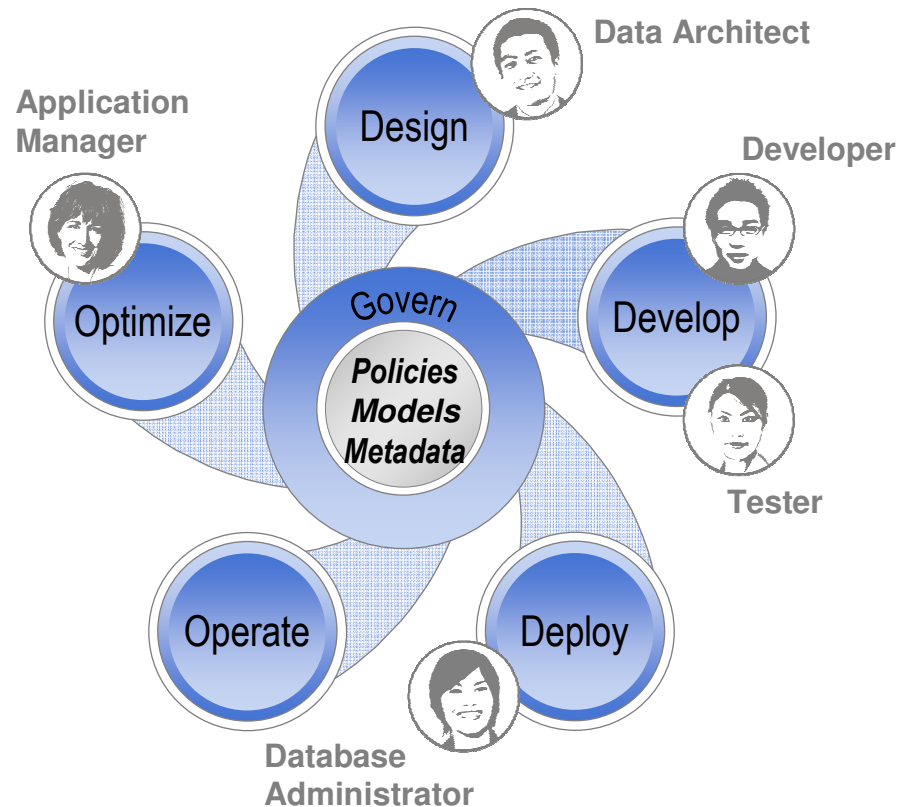
Data Architect

Application Manager

Design

Developer

Optimize

Govern

Policies Models Metadata

Develop

Tester

Operate

Deploy

Database Administrator

- **Grow the business**
  - Develop business critical applications faster
  - Optimize database and application performance
- **Govern data**
  - Protect sensitive data
  - Retain and discover
  - Comply with regulations
- **Without growing costs**
  - Improve productivity and automation
  - Archive data safely
  - Facilitate application upgrades, consolidation and retirement

Dúvidas?

Obrigado

Thank You

- **Por favor, entre em contato**
- **Rafael Coss**
  - rcoss@us.ibm.com
  - **Twitter: http://twitter.com/racoss**
  - **Blog: http://datalifecycle.blogspot.com/**
  - **LinkedIn   http://www.linkedin.com/pub/rafael-coss/9/311/268**
  - **Facebook http://www.facebook.com/racoss**
- **Jay Bruce**
  - jmbruce@us.ibm.com

Other Resources

Optim Community and Resources

- **Integrated Data Management community space on developerWorks – your portal to:**
  - Forums & blogs (PLEASE subscribe to Integrated Data Management Experts blog – lots of news comes through here)
  - Downloads
  - Technical articles, tutorials, product documentation
  - News and events
  - Videos (ChannelDB2 and youtube)
  - Online Demos (developerWorks and marketing)
  - Technical training
  - Easy url: ibm.com/developerworks/spaces/optim
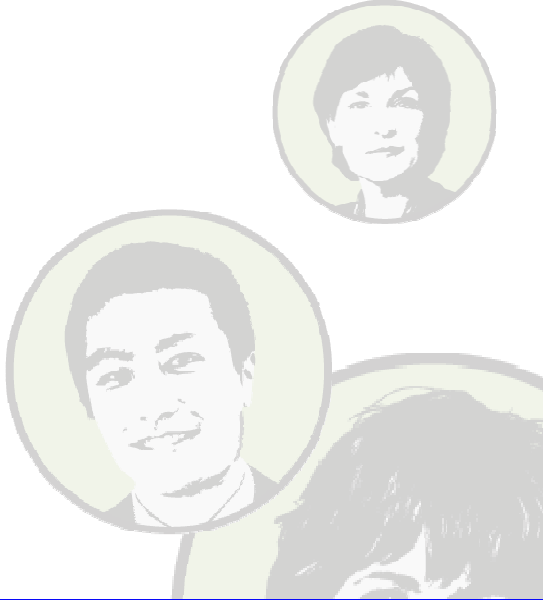
- **Optim Fan Facebook page**
  - Log into Facebook and search on IBM Optim

- **Optim family page on developerWorks**
  - ibm.com/developerworks/data/products/optim/

Kathy Zeidenstein sends out a weekly update with links to new articles, blogs, announcements, etc. Send her a note if you're interested.

krzeide@us.ibm.com

Integrated Data Management Community Space

Integrated Data Management Community Space (more)

why you should care, for performance, manageability, and security reasons.

Be sure to check out the results of this performance study that compares static SQL using pureQuery with JDBC, EJB2 and OpenJPA.

You can get better performance using pureQuery for dynamic access as well. The WebSphere Customer Center team migrated from EJB 2 to pureQuery and got great results.

Latest news: Performance results using pureQuery with .NET applications

Where we'll be

· IOD NA (October 25-20): Be there!
· IDUG EMEA (October 5-9): Curt Cotner goes to Rome.
· Baltimore Washington DB2 Users Group (September 9): For z/OS customers - Tom Howell on planning for upgrades and migrations and Data Privacy.

Learn More!

· Basics of Data Studio Environment: Online course basics of IBM Data Studio Developer. NO CHARGE if you enroll in 2008.
· Preparing for Stored Procedure Certification, Tutorial Series: Prep for Exam 735
· Developing Database Applications with IBM Data Studio and pureQuery: Three-day intensive course offered by InferData.
· Using InfoSphere Data Architect: 2-day course.

Channel DB2 videos

· How to Set Up, Configure, and Use IBM DB2 Performance Expert's Performance Warehouse
· DB2 Performance Expert Extended Insight Feature: Torsten walks you through the new capabilities for monitoring Java apps accessing DB2.
· NEW! Data Studio 2.2 Video: 5 short parts for those with short attention spans.
· DB2 Performance Expert System Overview: Nathan walks you through the cool stuff in the PE dashboard.
· Build an eforms solution with pureXML: Uses Data Studio to build the Web service.
· pureQuery explained: Rafael explains how pureQuery is different than other data access approaches.
· Sonali demonstrates Optim Development Studio 2.2: Oracle support and copy/paste are demo'd.
· NEW! Optim Query Tuning solution for Java developers: Tony Leung demonstrates the integration of Optim Development Studio and Optim Query Tuner.

Webcasts & podcasts

· Integrated Data Management Solutions for Performance Optimization: You're going to be hearing a lot about integrated data management. Learn about an integrated solution to improving performance and manageability.
· Data Studio for z/OS: From requirements to retirement, managing your data environment
· Improve data security with Rational Data Architect V7.5
· Monitoring and managing change for database administration
· Podcast: Curt Cotner with YL&A (Cocktail Hour)
· Podcast: Enhancing Java environments with pureQuery: Wow! You'll learn a lot in about the time it takes you to get to the grocery store.
· Use pureQuery to improve QoS for WebSphere&DB2 apps
· Accelerating Solutions Delivery: No matter what your development methodology, it's always better to do faster and with better quality.
· NEW! Replay of Data Studio becomes Optim: What it means for you: First in IDM Virtual tech briefing series. Good overview of the major

leading-edge integrated data management capabilities, making it easier to manage data-centric tasks across the lifecycle spanning design, development, deployment, management, optimization, and governance. This space will serve as a central hub of information and conversation about Integrated Data Management products, technologies, and best practices.

Objective: To share experiences with IBM Data Studio users.

Audience: Data Architects Database Administrators Data Stewards Database developers Java developers

Group type: Public

Date created: 19 Sep 2007

▸ Show member list

Optim Fan Facebook page

Corporation

Blog (ibm.com/developerworks/mydeveloperworks/blogs/idm/)

developerWorks > My developerWorks > Connect

My developerWorks: Blogs

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Managing the data lifecycle

Blog Authors: IBM_Optim DataStudio KRZ RafaelCoss gopalv Anson_Forum
vijayrb@us.ibm.com hollyann

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Understanding SQL Replacement with pureQuery's Cli...   ⭐ 2

IBM_Optim | 7 Aug | 🏷Tags: purequery client_optimization bireley | Comments (0)

Hi, I'm the lead architect for Optim pureQuery Runtime, and I want to start using this blog to help address questions that I get from people as they learn about or use pureQuery capabilities. In this first blog, I'll discuss the new SQL replacement capability.

By using client optimization, an administrator can modify the SQL from a captured application. The enhanced tooling to support this capability is described in Sonali's article, What's new and cool in Optim Development Studio 2.2. The intended usage of this feature is to let a DBA make a change to an SQL statement without the need to edit and recompile an application. This could be useful, for example, in late night or weekend emergencies when an application can't easily be changed. It is also useful in cases where a third party application embeds or generates sub-optimal SQL and a change to the application is not possible without contacting the vendor. In any of these cases, you should aim to change the application directly at the first practical opportunity to use the improved SQL.

When I talk about this capability to people, there are two questions that frequently come up:

- What is the extent of the change I can make to the SQL?
- Isn't there a security risk to allow editing of the SQL? How can we control access?