InfoSphere Optim Query Capture and Replay

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THE FILLMORE GROUP
Relational Database Solutions

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Agenda

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- Introduction
- What's at stake? Challenges of lifecycle management
- Realistic testing relieves lifecycle management challenges
- Introducing: IBM InfoSphere Optim Query Capture and Replay
- Example scenarios: IBM InfoSphere Optim Query Capture and Replay
  - Upgrading the DBMS
  - Migrating from Oracle Database to IBM DB2
  - Upgrading the IBM Netezza Data Warehouse Appliance
  - Leveraging IBM InfoSphere Optim Test Data Management
  - Migrating the operating system
  - Extending performance analysis with database tools
- Resources

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Introduction

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- Frank Fillmore, DB2 Gold Consultant, IBM Champion
- IBM Information Management Technical Support and Consulting
  - DB2 for z/OS and LUW
  - IBM DB2 Analytics Accelerator (IDAA)
  - Optim
    - Guardium
    - Test Data Management
  - InfoSphere
    - InfoSphere Warehouse
    - Information Server (e.g. DataStage)
    - IBM InfoSphere Data Replication (IIDR)
    - Federation Server
  - Netezza
- IBM Authorized Training Partner
- IBM Software Reseller

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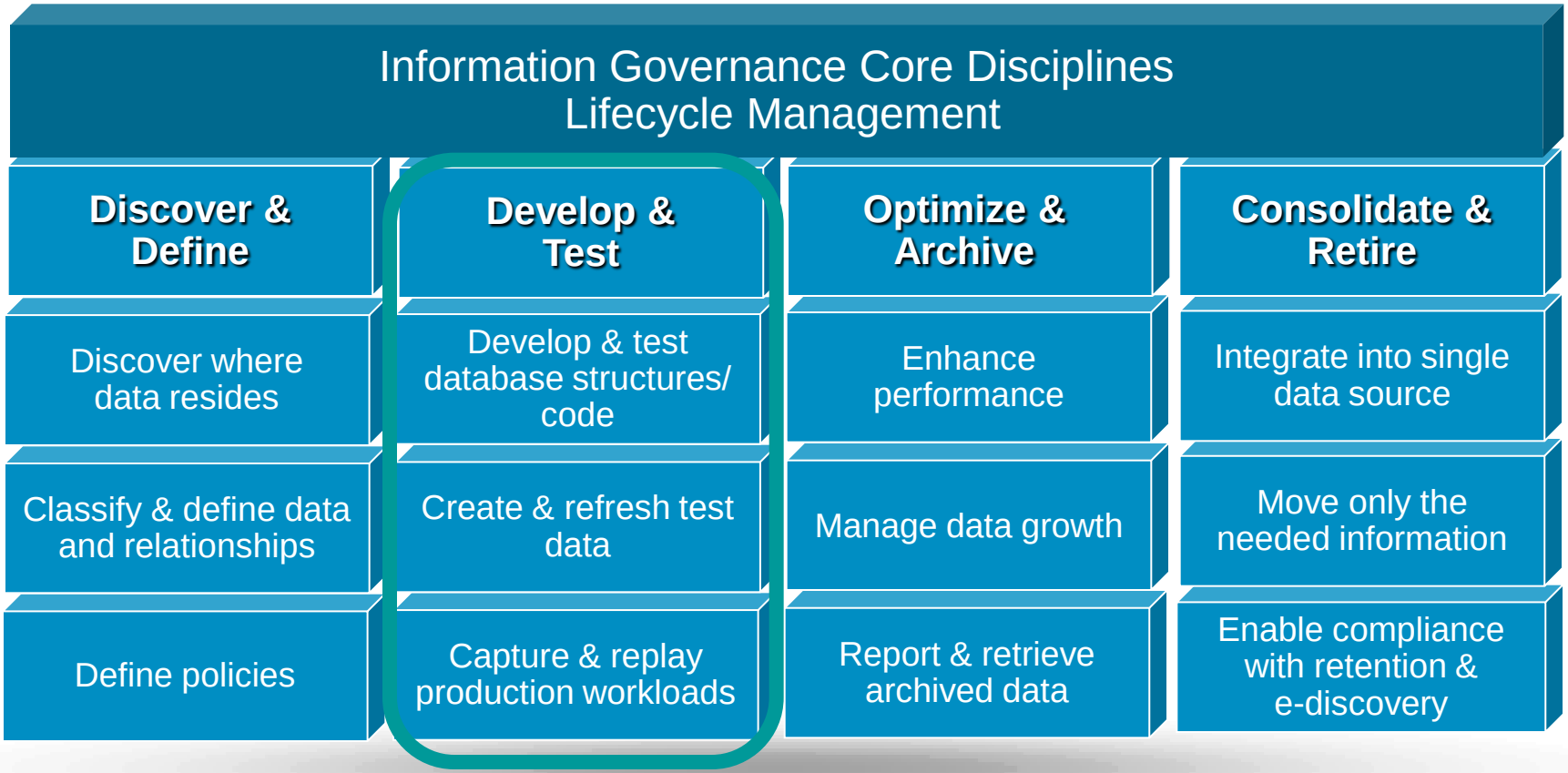
Requirements for managing data across its lifecycle



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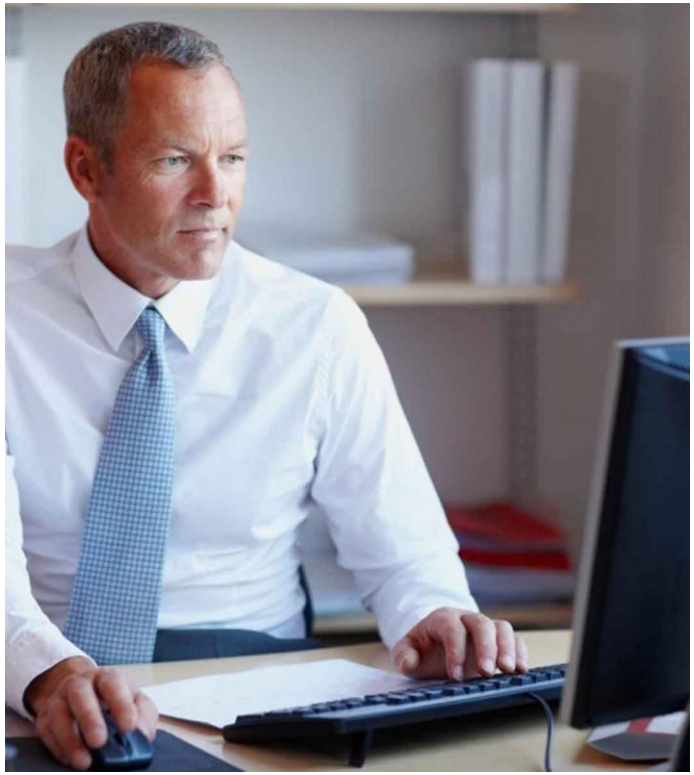
Enterprise changes can cause production problems

- Growth
  - Additional users, data and application tasks
- HW or SW platform changes
  - Patches, platform switch, configurations, parameters, schemas and more
- HW or SW upgrades or migrations
  - OS upgrades, fixpacks
- HW or SW consolidation or retirements
- Application deployment, enhancements or changes



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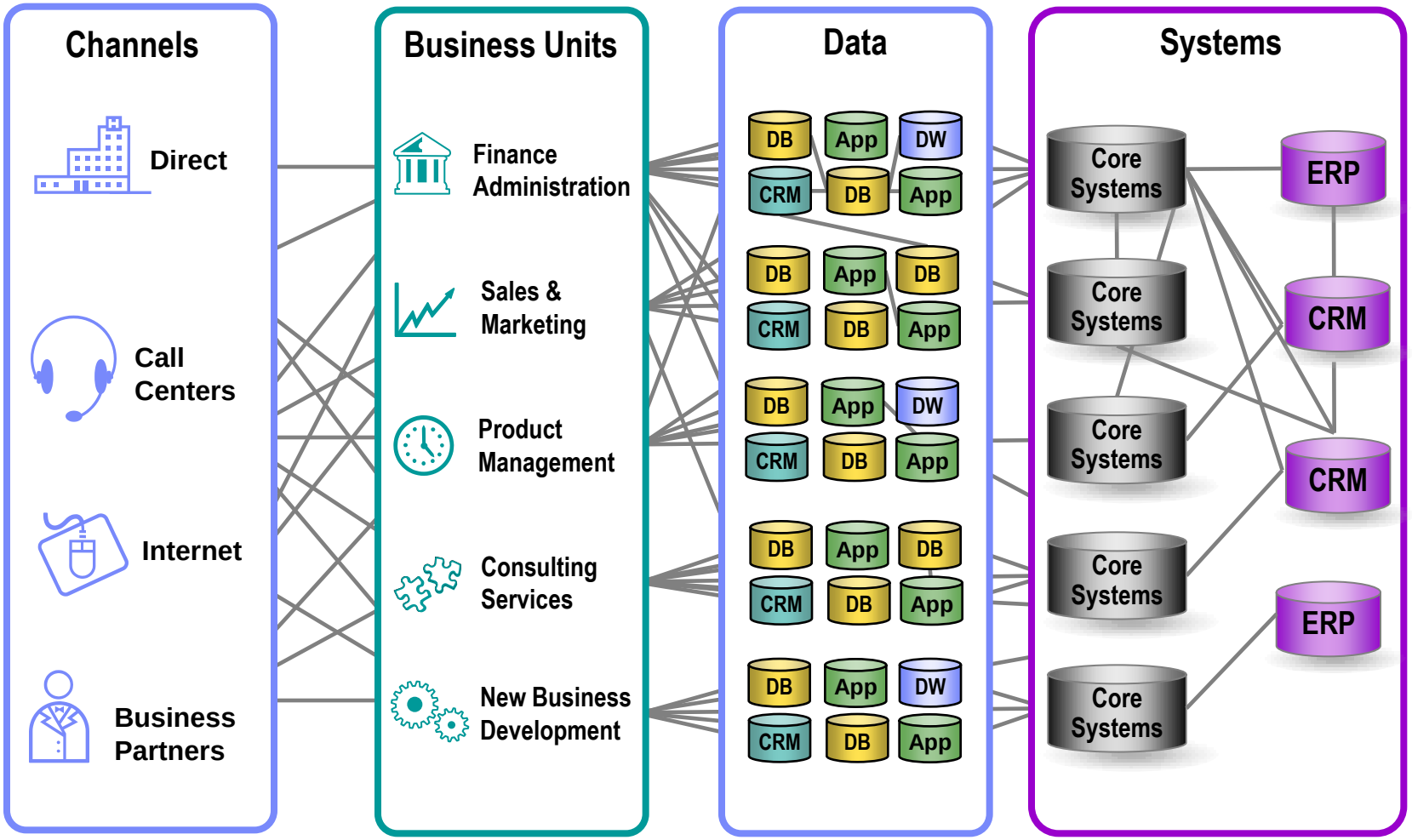
Complexity of enterprise environments continues to grow

Identifying impacts of lifecycle changes is difficult to test



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Consequences of poorly planned enterprise changes

Loss of customer satisfaction

Inability to deliver required functionality; Missed services level agreements; Inability to process transactions

Higher costs

Time consuming process of rolling back changes; Inability to identify the source of the problem; Manual process of modifying test scripts

Delays due to extra testing cycles

No methods for fully testing databases workloads

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Business impact of deployment day disasters
*The *real* cost of production outages*

Loss of customer satisfaction

59%

of Fortune 500 companies experience a minimum of 1.6 hours of downtime/ week according to IT Director[a]

Higher costs

$90,000 - $6.4M USD

Per hour cost of production outage
Information Week[b]

$10,000 USD

Per minute cost of production outage
Gartner report[c]

$2.8M USD

Average cost of production downtime
IBM Global Business Services[d]

Delays due to extra testing cycles

60%

of availability & performance errors result from misconfigurations[e]

a. IT Director: Assessing the Financial Impact of Downtime, August 2009
b. Information Management Magazine: How much does downtime really cost?, April 2010
c. Gartner Report: The Challenges and Approaches of Establishing IT Infrastructure Monitoring SLAs in IT Operations, September 2010
d. IBM Global Business Services: Managing unplanned IT outages, January 2010
e. Costs and Scope of Unplanned Outages

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Mitigate challenges with realistic testing

- ✓ Use **actual production workloads** for testing NOT simulated user scenarios
- ✓ Develop a **broad approach to testing** covering the full data lifecycle
- ✓ **Include database workload record and replay** as part of existing testing procedures

Coordinate analysts, developers, DBAs and testers	Align teams on project plans	Track the impact of data lifecycle events	Assess impact with reports
• Collaborate in context using production workloads	• Which requirements are in the development plan? • Are we including data lifecycle events?	• What databases changes are we making? • Does the test team have realistic test cases built from production workloads?	• Transparency across teams • Analysis of data related changes to understand problems

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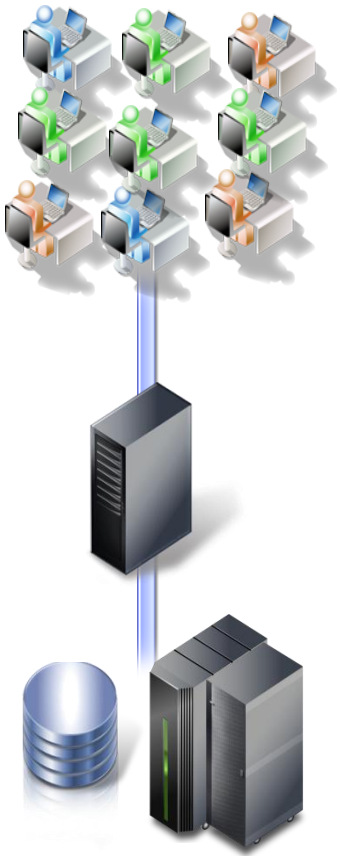
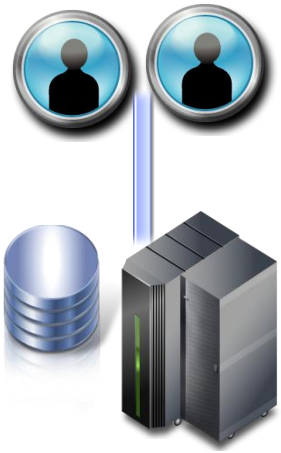
Testing without workload record and replay is costly and inefficient
Difficult to mirror production systems



It is difficult to mirror production workloads in test because:

✓Growing users volumes, applications & data
✓ Limited test scripts
✓Complex systems

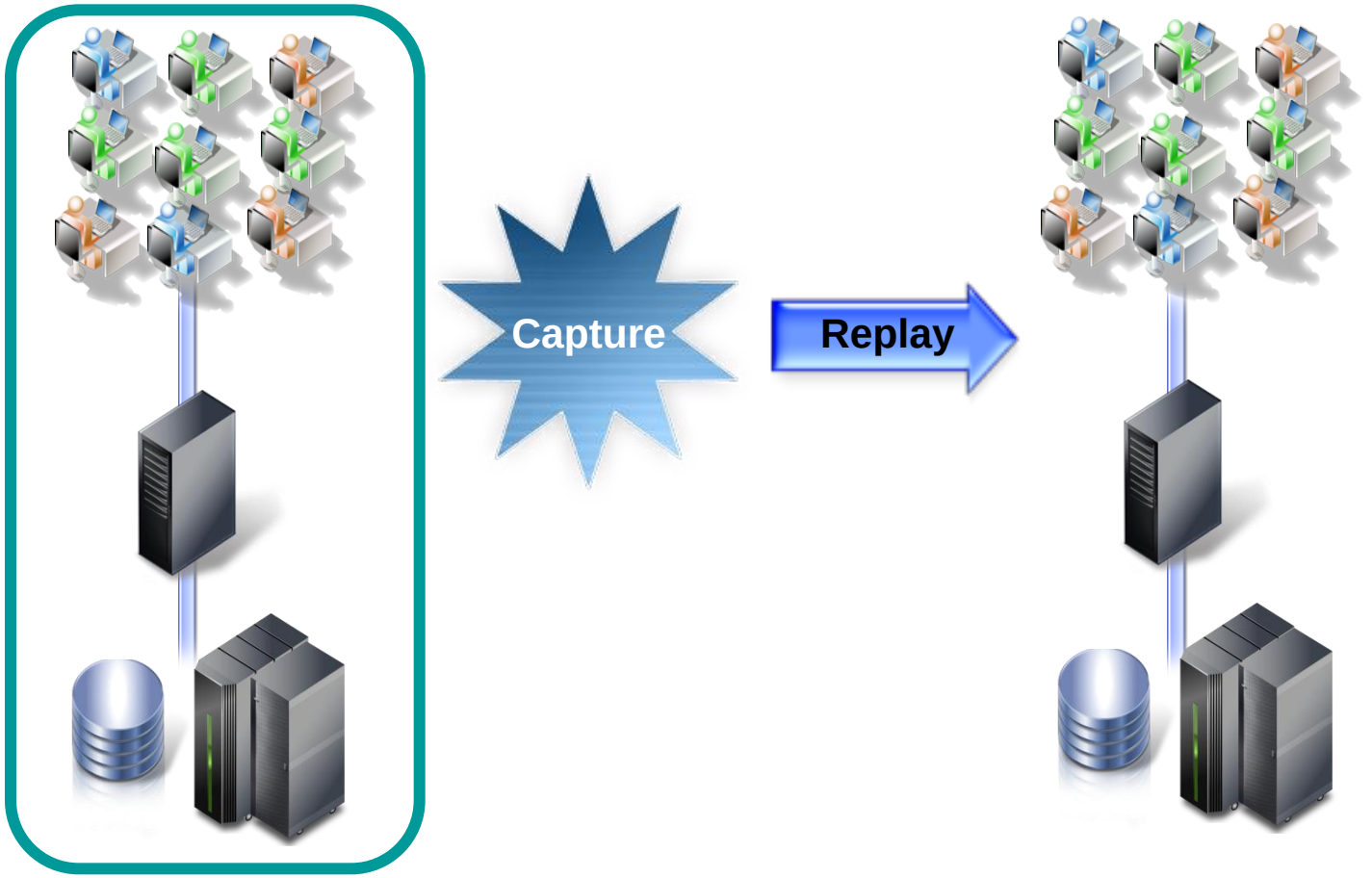


Complex production environment with thousands of users

Simulated environment with fabricated tests

Testing with workload record and replay

Minimize differences between simulated lab conditions and production



Complex production environment with thousands of users

Mirror production environment in test

Capture and replay use cases

- Test existing Production SQL workload on different…
  - Hardware platform (e.g. Oracle Sun – IBM System p)
  - Operating System (e.g. Linux - Unix)
  - Version of the database (e.g. v9 – v10)
  - With different database configuration parameters, indexes
- Test application enhancements
- Heterogeneous database migrations
  - Capture PL/SQL on an Oracle RAC and Replay on DB2
  - Validate PL/SQL compatibility
  - Benchmark performance
- Increase data volumes
- Varying timing and speeds
  - Run on a server with 2x processors and double the speed of execution

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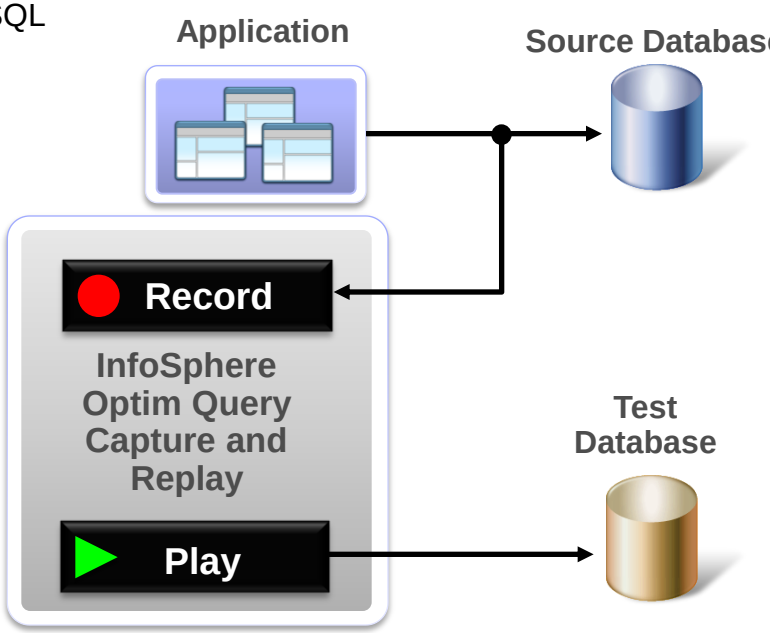
IBM InfoSphere Optim Query Capture and Replay

Record and replay SQL

Capture production workloads and replay them in testing environments



DB2 · Informix · Netezza · MySQL · Microsoft SQL Server · Oracle · Teradata · Sybase

Requirements

- Minimize unexpected production problems
- Shorten testing cycles
- Develop more realistic database testing scenarios

Benefits

- Identify database problems sooner with validation reports and performance tuning
- Use actual production workloads for testing rather than fabricated scenarios
- Extend quality testing efforts to include the data layer

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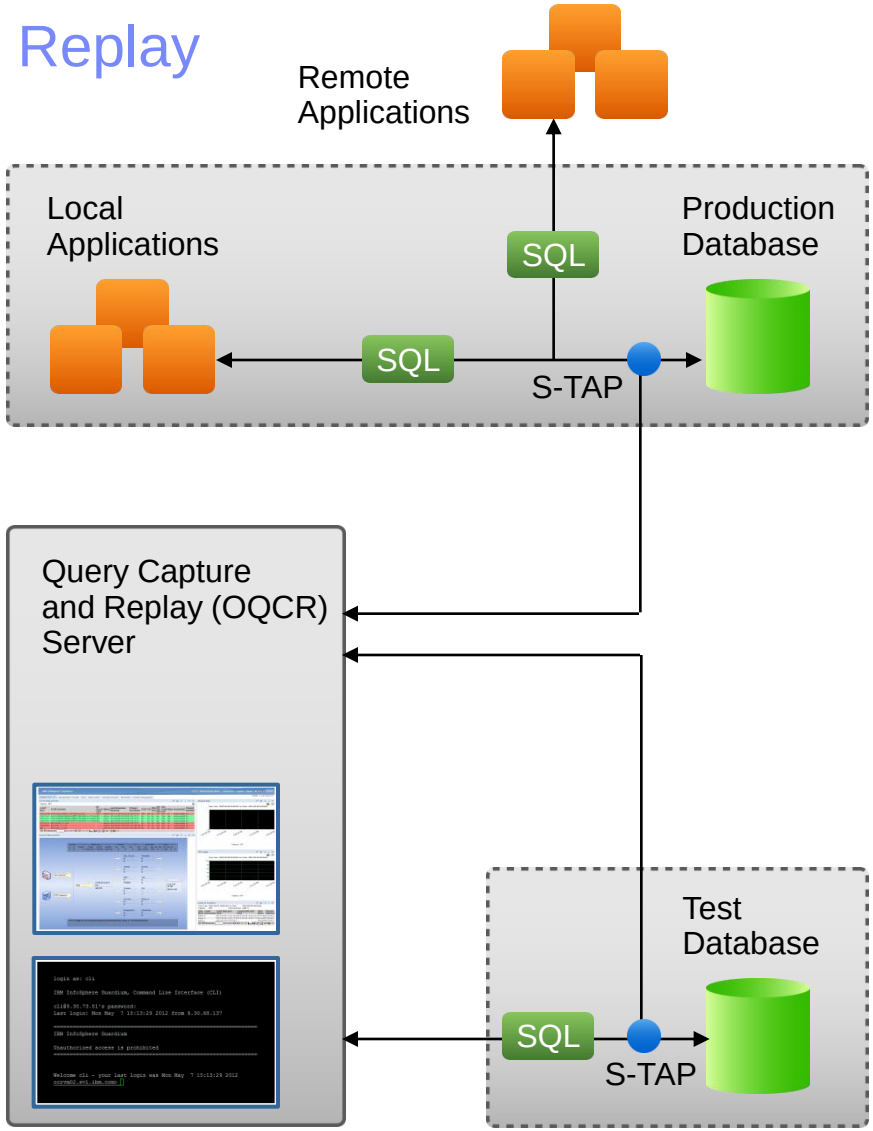
InfoSphere Optim Query Capture and Replay
Architecture Overview

- S-TAP
  - Installed on database server
  - Intercepts database traffic
- OQCR server
  - Software component running in appliance
  - Processes, replays and analyzes workloads
- User interfaces
  - Browser-based
  - Administrative command line interface



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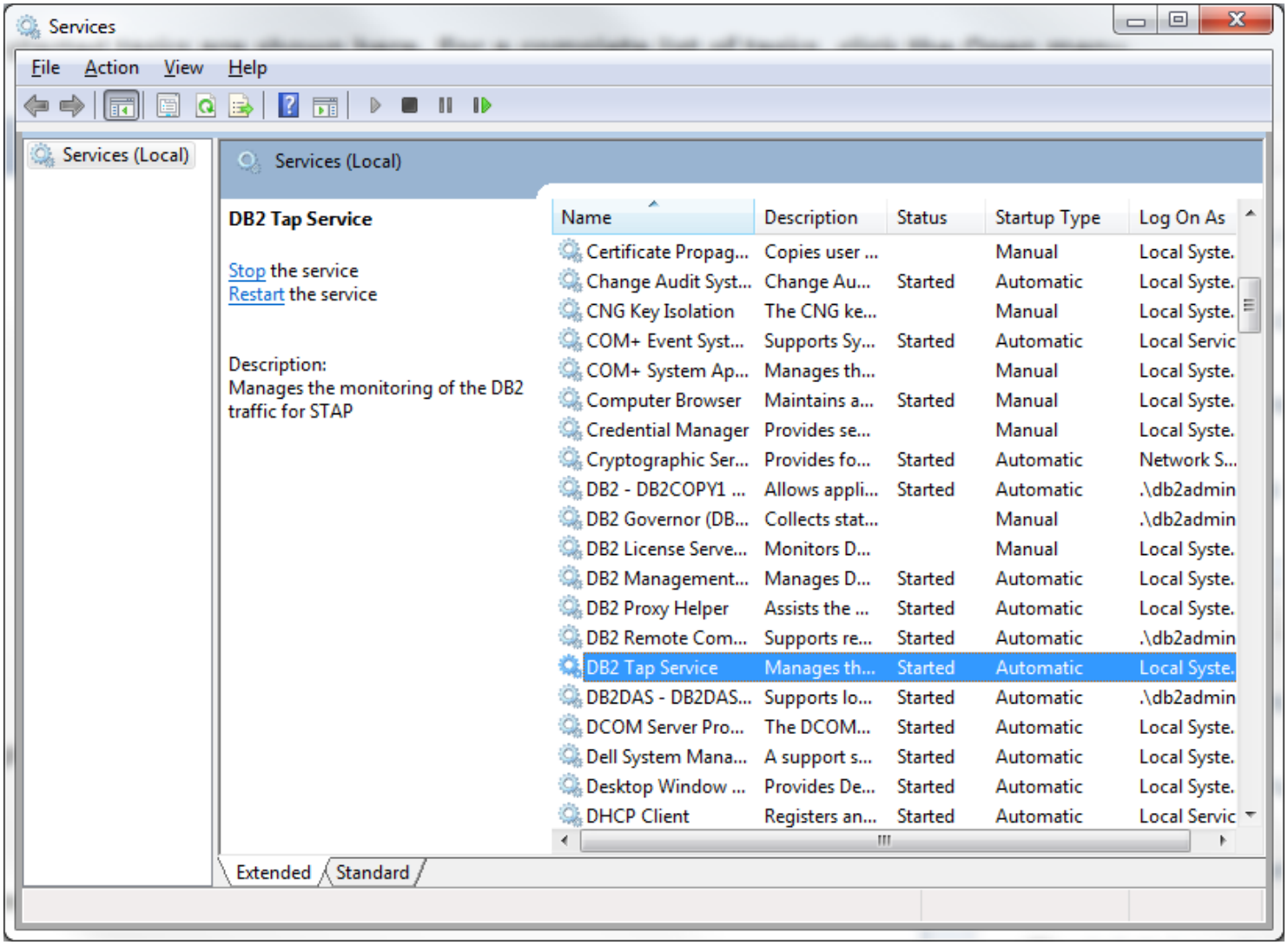
Imbeds a Guardium S-TAP in a database server to gather the SQL as it occurs.



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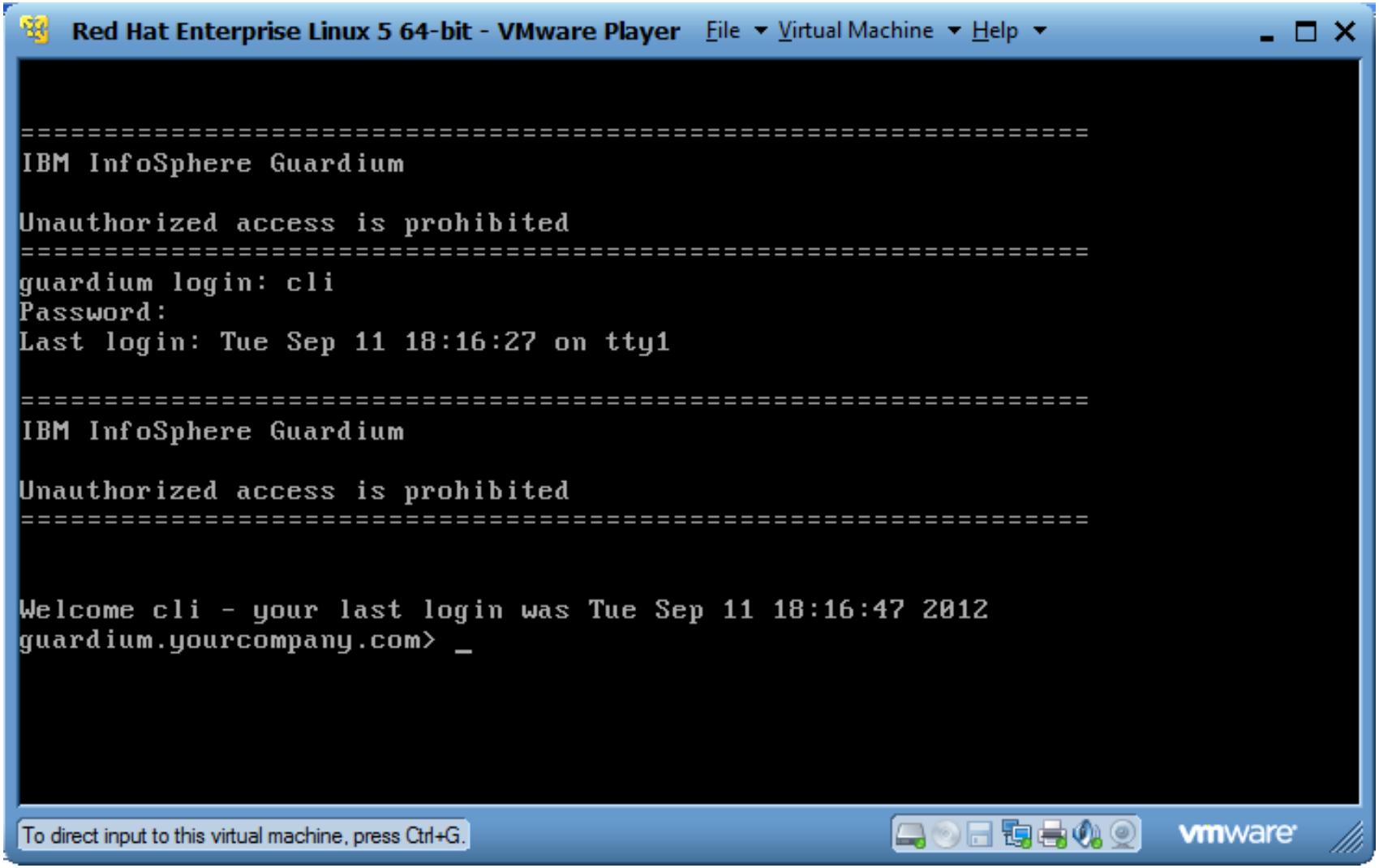
For the *beta*, employed a VMWare image as the QCR Server



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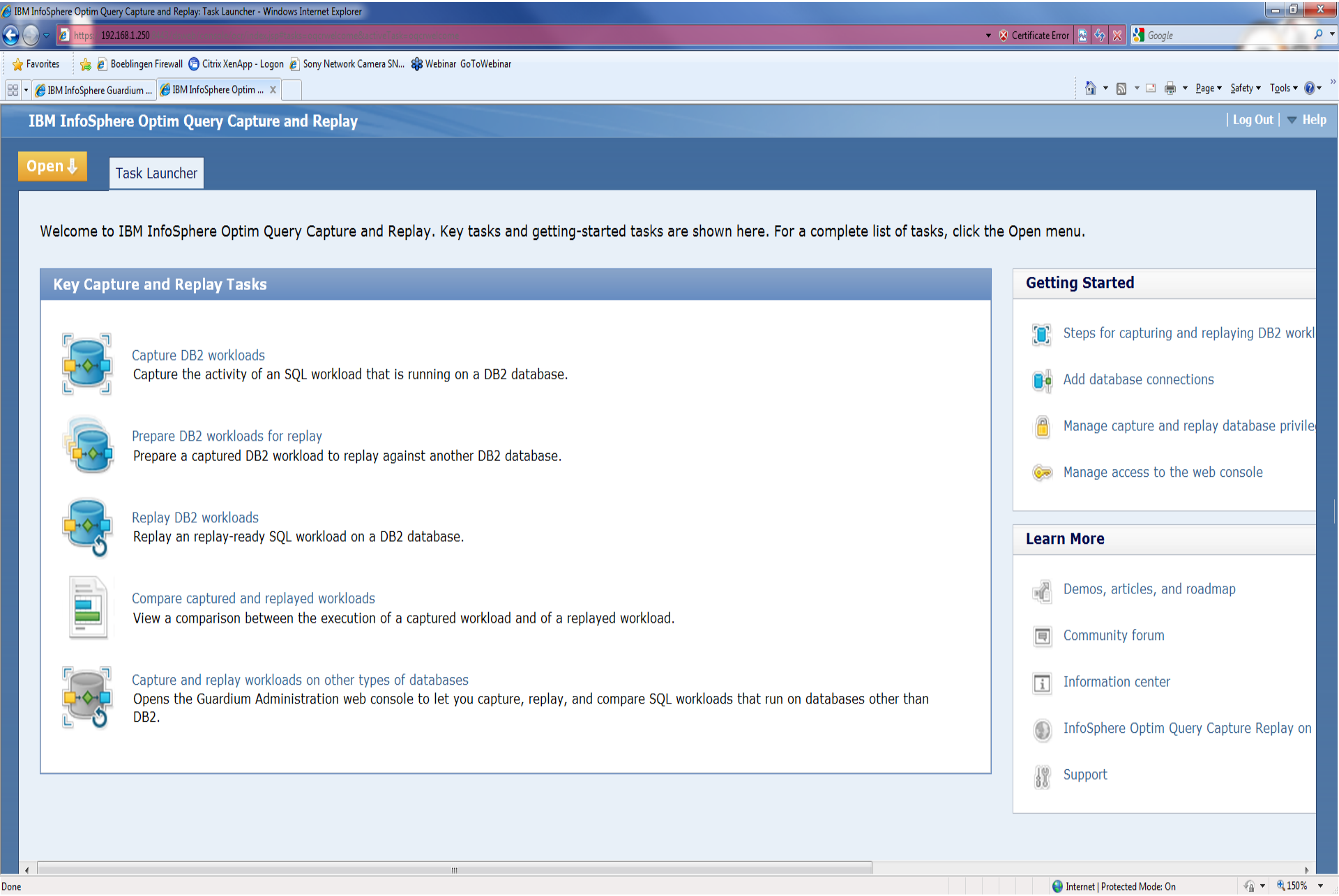
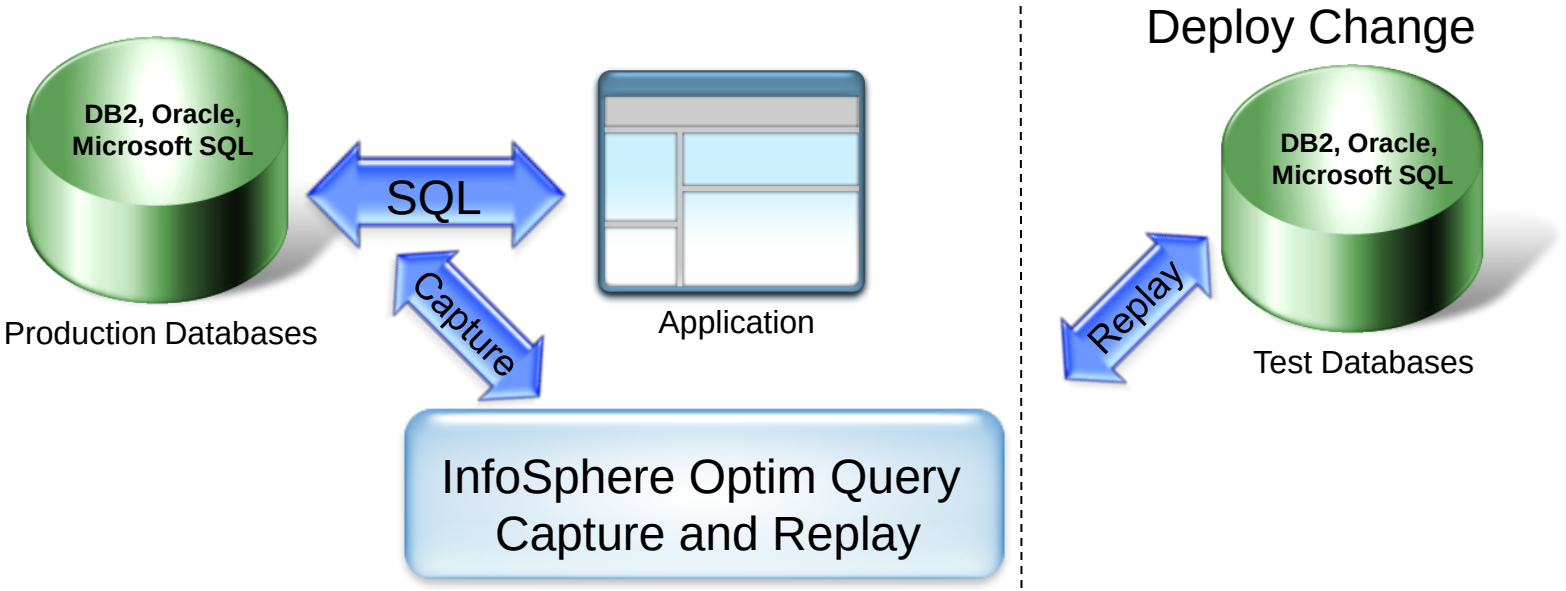

IBM InfoSphere Optim Query Capture and Replay: Task Launcher - Windows Internet Explorer
192.168.1.250
Certificate Error
Google
Favorites
Boeblingen Firewall
Citrix XenApp - Logon
Sony Network Camera SN...
Webinar GoToWebinar
IBM InfoSphere Guardium ...
IBM InfoSphere Optim ...
Page
Safety
Tools
IBM InfoSphere Optim Query Capture and Replay
Log Out
Help
Open
Task Launcher
Welcome to IBM InfoSphere Optim Query Capture and Replay. Key tasks and getting-started tasks are shown here. For a complete list of tasks, click the Open menu.
Key Capture and Replay Tasks
Capture DB2 workloads
Capture the activity of an SQL workload that is running on a DB2 database.
Prepare DB2 workloads for replay
Prepare a captured DB2 workload to replay against another DB2 database.
Replay DB2 workloads
Replay an replay-ready SQL workload on a DB2 database.
Compare captured and replayed workloads
View a comparison between the execution of a captured workload and of a replayed workload.
Capture and replay workloads on other types of databases
Opens the Guardium Administration web console to let you capture, replay, and compare SQL workloads that run on databases other than DB2.
Getting Started
Steps for capturing and replaying DB2 workl
Add database connections
Manage capture and replay database privile
Manage access to the web console
Learn More
Demos, articles, and roadmap
Community forum
Information center
InfoSphere Optim Query Capture Replay on
Support
Done
Internet | Protected Mode: On
150%

IBM InfoSphere Optim Query Capture and Replay
Enable realistic testing using actual production workloads



- ✓ Original application timing
- ✓ Order of execution
- ✓ Transaction boundaries
- ✓ Isolation levels
- ✓ Performance metrics
- ✓ Key SQL & application characteristics

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IBM competitive advantage

- The broadest platform support including Oracle DB, DB2, Informix, Netezza, Teradata, Microsoft SQL Server, Sybase, MySQL
- Negligible performance impact relying on transparent network capture rather than native logging, home grown scripts or other approaches
- Scalable capture/record for any number of users supporting dynamic enterprises of all sizes
- Additional capabilities specific to DB2

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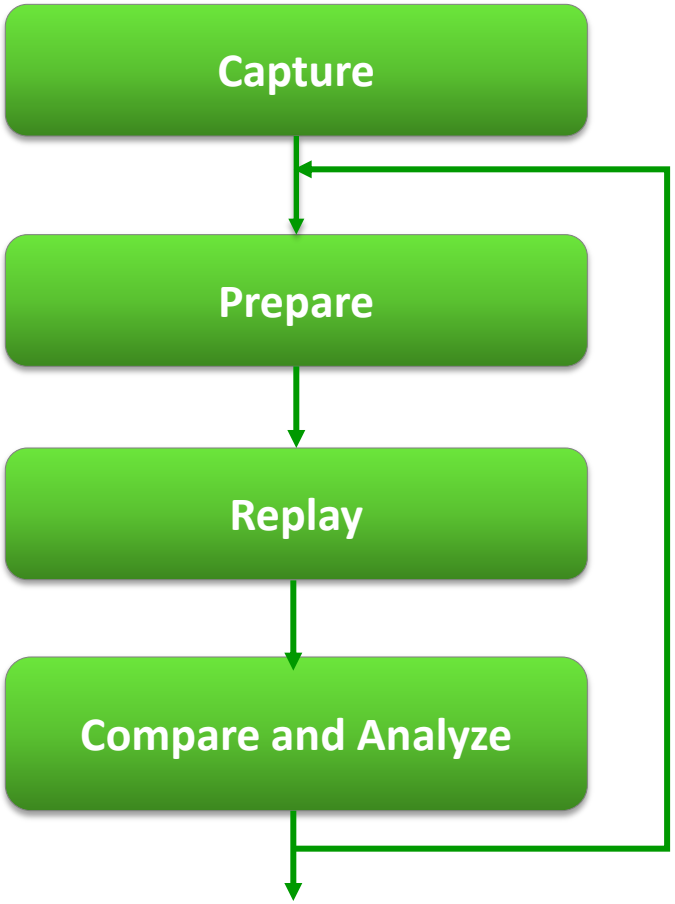
Workflow:
IBM InfoSphere Optim Query Capture and Replay



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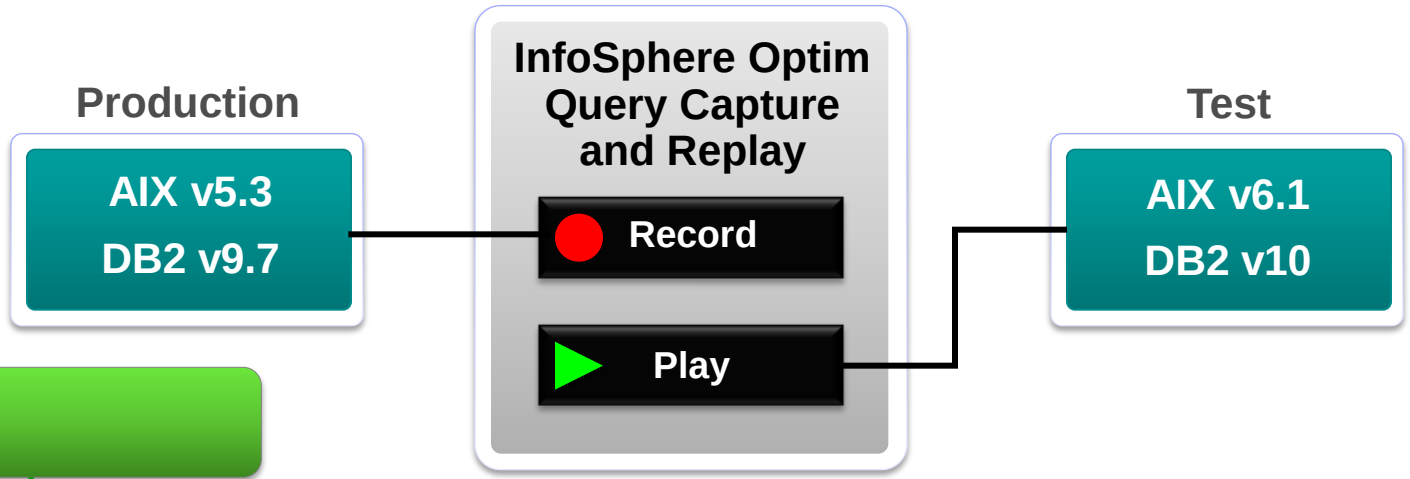
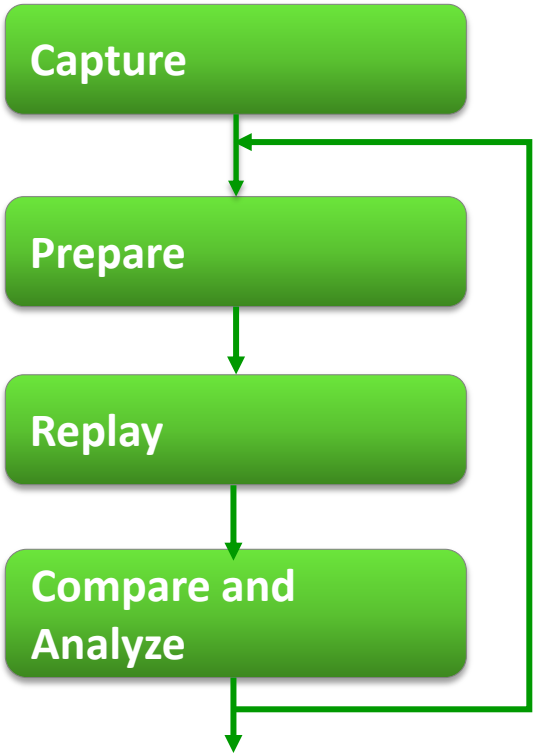
Example:
Upgrading the database from DB2 v9.7 to DB2 v10





- Record DB2 v9.7 production activity during a specific time period
- Prepare test data on the DB2 v10 test system
- Replay the production activity on DB2 v10 test system
- Compare DB2 v9.7 production capture to DB2 v10 replay
- Analyze results

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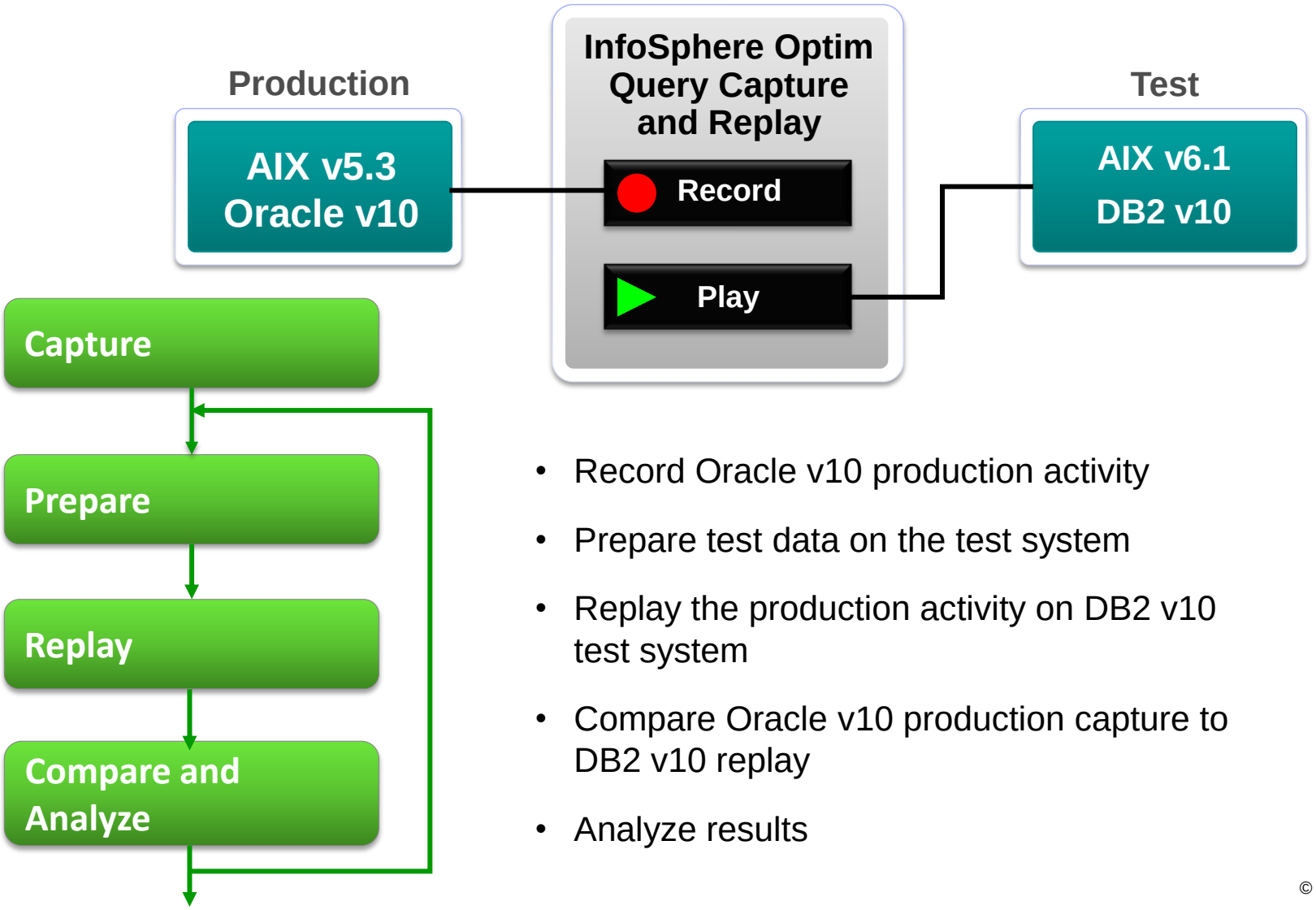
Example:
Migration from Oracle DB to DB2



- Record Oracle v10 production activity
- Prepare test data on the test system
- Replay the production activity on DB2 v10 test system
- Compare Oracle v10 production capture to DB2 v10 replay
- Analyze results

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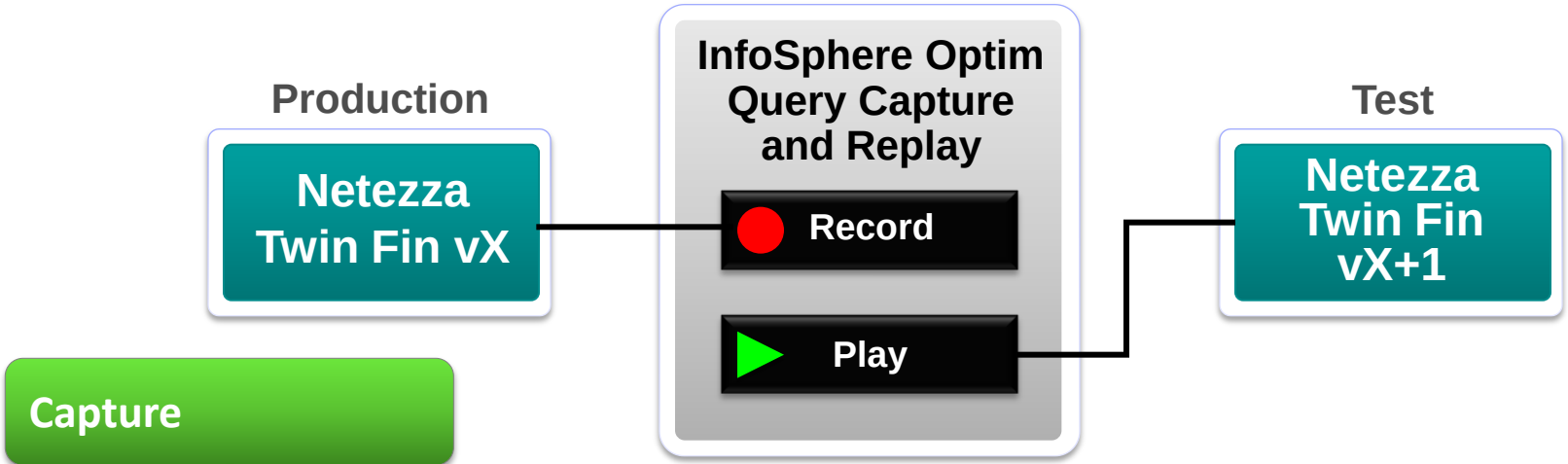
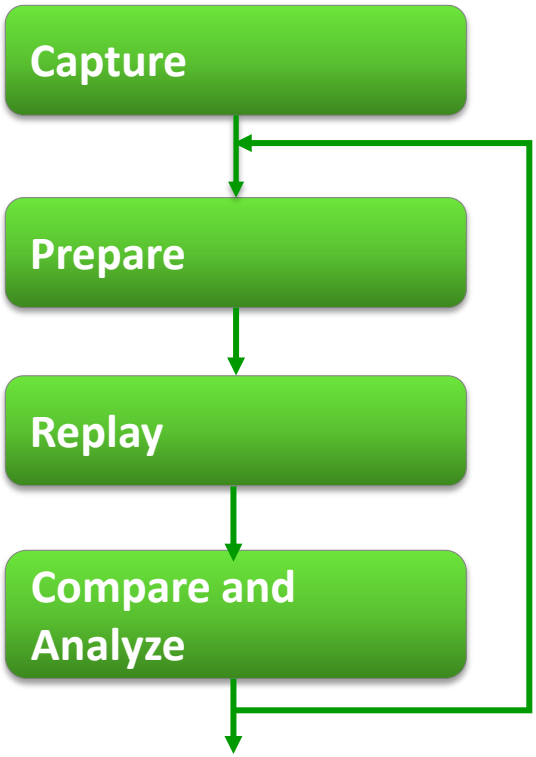
Example:
Upgrading IBM Netezza Twin Fin





- Capture Netezza Twin Fin vX production activity
- Prepare test data on the test system
- Replay the production activity on Netezza Twin Fin vX+1 test system
- Compare capture and replay
- Analyze results

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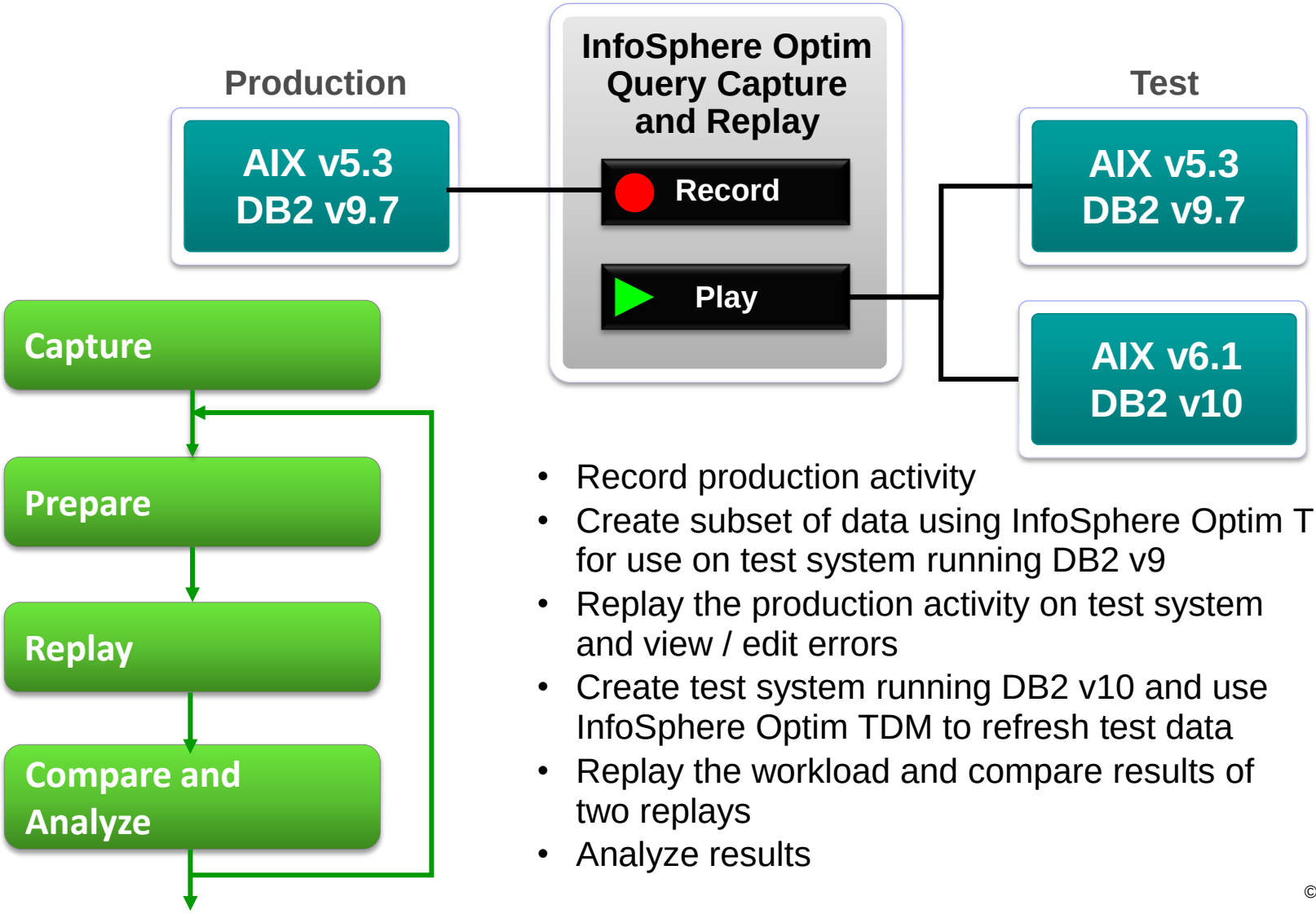
Example:
Leveraging InfoSphere Optim Test Data Management



- Record production activity
- Create subset of data using InfoSphere Optim TDM for use on test system running DB2 v9
- Replay the production activity on test system and view / edit errors
- Create test system running DB2 v10 and use InfoSphere Optim TDM to refresh test data
- Replay the workload and compare results of two replays
- Analyze results

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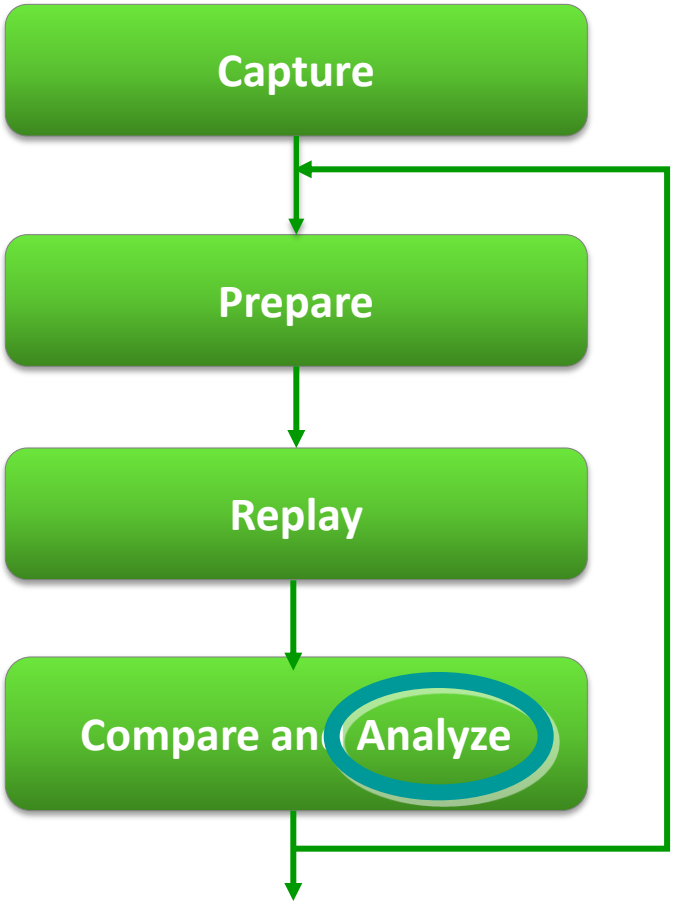
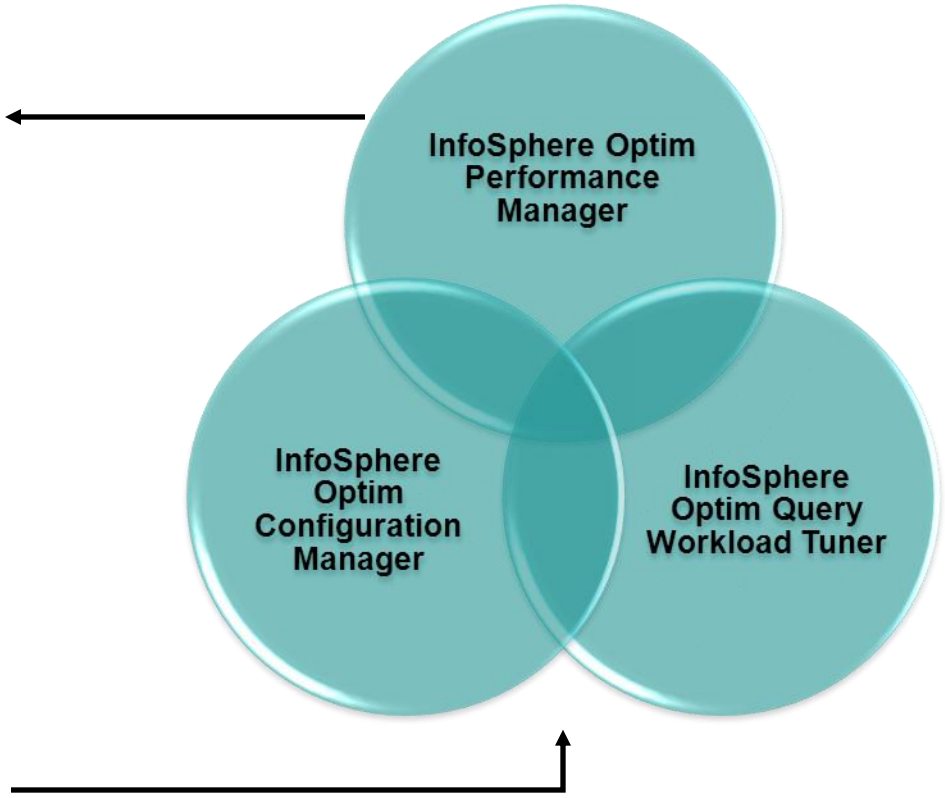
Extending performance analysis with database tools





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IBM InfoSphere Optim Query Capture and Replay

Fully assess change impact before production deployment

Improve customer satisfaction

Anticipate and correct potential problems sooner

Reduce cost of change

Establish consistent database testing processes

Meet SLAs

Ensure well tuned, high performing workloads before deployment

Capture
Capture production workloads and execute them in nonproduction environments to establish baseline characteristics

Replay
Apply change and replay the captured workload in nonproduction environments, then compare with baseline

Report and analyze
Identify and explore errors and performance issues, correct them before production deployment

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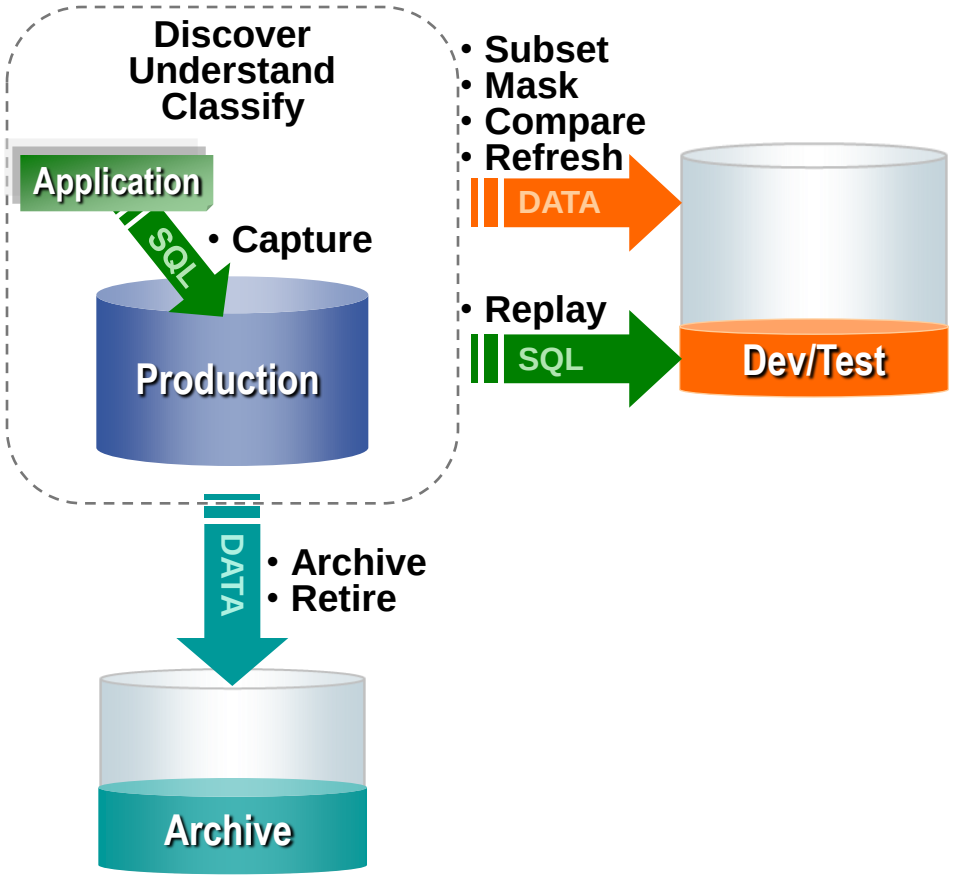
IBM InfoSphere Optim Solutions for Data Lifecycle Governance



Discover

- Accelerate data management projects and reduce risk by understanding complex data relationships within & across systems

Manage Test Data

- Reduce cost, reduce risk and speed application delivery efficiency by maintaining secure, right sized test environments

Capture and Replay

- Improve customer satisfaction, reduce the cost of change and meet SLAs by creating realistic database testing scenarios

Archive

- Reduce hardware, software, storage & maintenance costs enterprise applications
- Improve application performance & streamline back-ups and upgrades
- Support data retention regulations & safely retire legacy/redundant applications

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Accelerate QCR time to value

- The Fillmore Group Quickstart for InfoSphere Optim Query Capture and Replay
- Pricing Validation:
  - Sold by the Processor Value Unit (PVU)
  - For a quote, email Kim May: kim.may@thefillmoregroup.com

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Technical validation

- QCR Proof of Technology
  - Date: Tuesday, November 6, 2012
  - Location: IBM Technical Exploration Center
    McLean, VA USA
  - Time: 10:00 a.m. – 3:00 p.m. EST

To register, email Kim May:
kim.may@thefillmoregroup.com

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Resources

- The Fillmore Group Blog
http://www.thefillmoregroup.com/blog/?p=811
- QCR website
http://www-01.ibm.com/software/data/optim/query-capture-replay/
- QCR Announcement Letter
http://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/3/897/ENUS212-013/index.html&lang=en&request_locale=en
- Kim May, Vice President Business Development
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