Performance Testing

• What is performance testing?
• Why is performance testing necessary?
• Performance Testing Methodology
• EPM Performance Testing
What is Performance Testing

● The primary goal of Performance Testing is to help ensure that the technology and processes that comprise the system/application will support the day to day, and peak business functions

● Performance testing is **NOT** Quality or Functional testing
  ● We don’t care about the math!
Why Performance Test

- Increased risk/consequences of poor performance
  - Web applications often business critical
  - Stakeholder expectations continue to increase
  - Negative effect on number of visitors, revenues, customer satisfaction, brand
- How will the system perform under…
  - Normal/Realistic production conditions?
  - Extreme production conditions? (i.e. Holiday, Monthly Close)
- What is the maximum number of users that can be supported?
- How to set performance expectations for end users?
- How is performance affected by the concurrent execution of various business processes or different user roles?
Why Performance Test

- Web applications are becoming more complex
- What performance bottlenecks can we identify and correct prior to system rollout?
- How will system hardware / infrastructure perform under load?
- How scalable is the system?
- What is the best-case performance of the system (baseline testing)?
- What performance issues arise after prolonged continuous use (duration testing)?
- At what point does the system become unacceptable for the end users (threshold testing)?
Performance Test Tool Architecture

Controller

Simulates Users

Load Generator

Commands

Load Generator

Load

Application Server

Database Server

Monitoring

NeoLoad Solution

Web infrastructure

Test Infrastructure
Methodology - Initiation

• What kind of resources are needed?
  • Performance Manager and Architect
  • Subject Matter Experts and Developers
  • System, Network and DB Administrators

• Development of the testing Charter
  • Set the Goals and Objectives
  • Define Deliverables
  • Define Roles & Responsibilities
  • Set Scope & Timelines
Common Resources - Major Roles & Responsibilities

Functional and Performance Test Leads
- Development and implementation of system test strategies.
- Manage test resources, timeframes and deliverables.
- Coordinate delivery of all test results.
- Facilitate communication with all testing and QA stakeholders.

Automated Performance Test Specialists
- Execution of enterprise performance test strategies.
- Develop and maintain automated performance test scripts.
- Work with technical SME’s to identify common transactions and metrics.
- Log and track performance defects.
- Work with development team to resolve performance defects.

Automated Functional Test Specialists
- Execution of enterprise functional test strategy.
- Develop and maintain automated functional test scripts.
- Work with business SME’s to identify common transactions and metrics.
- Log and track functional defects.
- Work with Development Team to resolve functional defects.

Test Methodology Lead
- Ensure the implementation of enterprise best-practice QA standards across all system development efforts.
- Provide samples and templates of all QA-related documents.
- Provide ‘executive dashboard’ views of QA progress across all system development efforts.
- Act as change control coordinator and manage release strategy for development efforts.
Common Resources - Supporting Roles & Responsibilities

Manual Functional Testers
- Functional test case development and maintenance.
- Log and track functional defects.
- Work with Development Team to resolve functional defects.

Subject Matter Experts (business and technical)
- Provide expertise on business and technical requirements, system usage patterns, common transactions and service level agreements.
- Provide walkthroughs of the applications under test.
- Verify and signoff on all test scenarios prior to execution.

Technical Analysts (Developers, network support, server admins, DBA’s etc.)
- Work with centralized QA team to analyze and troubleshoot functional and performance defects.
- Provide support during major performance tests.

Test Management Specialist
- Maintain Test Management database (containing all test results, scripts, data and analysis) across all enterprise testing efforts.
- Maintain test case and test script standards.
- Track and report on defect status and resolution progress across all projects.
Methodology – Types of Performance Tests

- **Smoke**: This initial round of testing will uncover minor system tuning issues and finalize the configuration of the test environment. This test cycle allows for a clean baseline test, followed by a more efficient round of testing scenarios.

- **Baseline**: Determine base-level performance of the application running a single user per process on an isolated test environment. These transaction times will become the standard to which all later tests are compared to in order to determine the system performance under load.

- **Load**: Determines the average amount of time to execute a business transaction under average load conditions. This is your customers’ average experience of a business transaction. (Run a report, Execute a search, etc…)}
Methodology - Planning

- Gather system performance requirements
  - Acquire system training
  - Develop automation process flows
  - Define and map test data requirements
  - Define the schedule and priority
- Development of the Testing strategy
  - Define the defect management process
  - Define metrics and reporting requirements
  - Define business processes to be scripted
  - Define testing types and scenarios to be executed
  - Finalize script and test execution schedules
Methodology – Types of Performance Tests

- **Stress**: Determines the average amount of time to execute a business transaction under peak activity. This test should mimic peak production load levels as well as peak activity time.

- **Threshold**: Determines at what load level response time becomes unacceptable and to pinpoint system component breaking points. Load levels will be continually ramped until these thresholds are met. Transaction timings will be continuously measured as the load is increased.

- **Duration**: Duration testing will determine the ability of the system to perform under longer periods of normal load conditions. Here we are checking for common system issues that may not be evident in shorter “spike” type testing such as the threshold testing (i.e. – memory leaks).

- **Failover**: For system nodes that employ redundancy and load balancing, failover testing analyzes the theoretical failover procedure, and tests and measures the overall failover process and its effects on the end-user.
Methodology - Preparation

• Prepare Performance Testing Environment
  • Install and prepare performance testing environment
    • Controllers
    • Generators
    • Monitors
  • Is the system/application to be tested ready?
    • Is development complete?
    • Has code been frozen
    • Is functional and User Acceptance testing complete?
      • Need the system to be free of major functional defects before you can performance test
Methodology - Preparation

- Develop Automated Scripts and Scenarios
  - Record and modify automated business processes
  - Debug the script (session id, cookies)
  - Parameterization (Users, Datasets)
  - User paths, randomized
  - Create and setup testing scenarios
    - What is the goal of the scenario?
      - Average, Peak, Threshold, Duration, Failover
    - How many users?
      - Concurrency (active in the system)
      - Script break down (how many users running a script)
    - What is the ramp up?
      - Users behavior, Think times and pacing, rendezvous points
Methodology – Preparation: Risk Assessment

A Risk Assessment is first step to building a successful performance test is to identify the key areas of focus.

• Where do greatest risks lie?
• Where to focus efforts?
• What skill sets / resources are required?
• How to prioritize risks?
• What mitigation tactics will be employed?

Technical Risk by Rating

- Master Batch Schedule Optimization
- Individual Batch Optimization
- PeopleSoft ERP Performance
- Month-End Close Optimization
- Infomatica Performance
- ERP Journal Edit & Post
- Portal Performance
- Month-End Close Optimization
- Teradata Performance
- PeopleSoft nVision Reporting
- Web Tier Performance
- Hyperion Disk Capacity
- SuperGlue
- Hyperion Performance
- Hyperion Disk Capacity

Technical Risk by Category

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batch: Data Movement</td>
<td>39.1%</td>
</tr>
<tr>
<td>Batch: Data Volumes</td>
<td>15.4%</td>
</tr>
<tr>
<td>Technology-Specific</td>
<td>23.1%</td>
</tr>
<tr>
<td>On-Line Performance</td>
<td>12.8%</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>9.5%</td>
</tr>
</tbody>
</table>

Online

- Low
- High

Batch

- Low
- Medium
- High

Scalability

- Low
- Medium
- High

Recommended Resource Requirements

<table>
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<tr>
<th>System</th>
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<tbody>
<tr>
<td>PeopleSoft ERP</td>
</tr>
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<td>PeopleSoft Portal</td>
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<td>PeopleSoft nVision Reports</td>
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<tr>
<td>Informatica</td>
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<td>Hyperion Performance Suite</td>
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Coverage Req’s by System

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<td>Siebel</td>
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Recommended Resource Requirements

- Performance Manager
- Technical Architect
- On-Line Performance Lead
- Batch Performance Lead
- Data Movement Specialist
- Automated Script Developer
- Batch Engineer
## Technology-Specific Risk Analysis

<table>
<thead>
<tr>
<th>Performance Test Risks</th>
<th>Risk Level</th>
<th>Risk Mitigation Tactics</th>
<th>Mitigation Effort</th>
<th>Primary Resource Requirements</th>
<th>Supporting Resource Req’s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PeopleSoft EPM Allocations and Consolidations:</strong></td>
<td>4</td>
<td>Benchmarking of Allocations and Consolidations under production conditions including batch impact analysis.</td>
<td>3</td>
<td>Technical Architect</td>
<td>Allocations SME (15%), EPM Technical Architect (20%)</td>
</tr>
<tr>
<td>Process is batch intensive with some on-line activity. Need to measure PeopleSoft-specific performance impacts under production conditions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Informatica:</strong> Need to tune/optimize Informatica processing (memory, cache performance, etc.). Informatica processing varies from 250 Rows/sec. to 10,000 Rows/sec. Staging table space requirements and optimal configuration must also be included in test coverage.</td>
<td>3</td>
<td>Detailed performance monitoring and analysis of Informatica processing under production conditions.</td>
<td>4</td>
<td>Technical Architect</td>
<td>Informatica Technical Architect (25%), Informatica DBA (10%)</td>
</tr>
<tr>
<td><strong>Teradata:</strong> Teradata performance must be optimized under production conditions (with expected data volumes, background batch processing, production data movement processes, etc.).</td>
<td>3</td>
<td>Specific performance tuning cycles for Teradata under production conditions.</td>
<td>3</td>
<td>Technical Architect</td>
<td>Teradata Technical Architect (25%)</td>
</tr>
<tr>
<td><strong>PeopleSoft nVision Reporting:</strong> Ad-hoc nVision queries and process scheduling can be difficult to optimize and must be included in performance test coverage.</td>
<td>2</td>
<td>Performance test coverage of major nVision queries and process scheduling.</td>
<td>2</td>
<td>Technical Architect</td>
<td>PeopleSoft Admin (10%), nVision Architect (15%)</td>
</tr>
<tr>
<td><strong>Kalido:</strong> Past issues with the Kalido data repository (batch process push to IBO) require continued coverage throughout 2.2 performance testing cycles.</td>
<td>1</td>
<td>Detailed performance monitoring and analysis of Kalido processing under production conditions.</td>
<td>1</td>
<td>Technical Architect</td>
<td>Kalido Technical Architect (25%)</td>
</tr>
</tbody>
</table>

**Risk Score:** 13  **Mitigation Score:** 13
### Volume & Stress Risk Assessment: Finance

#### Performance Test Risks

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<tbody>
<tr>
<td>2</td>
<td>Workflow decomposition, monitoring and optimization of all Financial Consolidation batch processes. In addition, the development teams will be verifying that the actual consolidations meet the needed business timelines.</td>
</tr>
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</table>

- **Consolidations:** There are several internal application batch processes which will occur as part of the financial close cycle that pose some risk to the overall month-end closing. While this cannot be tested via automated tools, some performance analysis is recommended to understand performance and duration of batch cycles. The consolidations team is going to rely on the interfaces developed by the planning team to get data into the system. This adds a dependency to those streams that slightly raises the risk posture.

- **Planning:** Again there is significant batch activity, mostly weekly and monthly processes. 38 FSPEC'S for GL3. The interfaces from/to SAP and EDW are the ones of biggest risk. Overall the risk to the business is low and the performance risk is more on the impact to other processes that may be executing with the batch schedule at the same time.

- **Dispute Resolution:** At the time of the risk assessment there was not much detail available about what performance risks the new dispute resolution process might introduce. All that is known is that it will occur within SAP and would create some new transactions within that application.

#### Mitigation Tactics

- **Risk Mitigation Tactics:** Workflow decomposition, monitoring and optimization of all Financial Planning batch processes.

- **Primary Resource Requirements:** Performance Batch Engineer, Hyperion Technical Architect

- **Prereq’s/Notes:** Regulatory risk is high not necessarily the business risk.

#### Risk Score: 8  Mitigation Score: 9
Methodology - Execution

- Clearly communicate test execution schedule
- Assign and Align all resources needed
- Execute test scenario
  - Active monitoring (OS, DB, CPU, Memory, Errors)
  - Track errors (application logs)
- Identify and log any errors or defects
- Analyze and Distribute results
- Modify scripts accordingly if needed
- Tune and Optimize system/application
- Project Wrap-up: Results, Analysis & Recommendation Delivery
Performance Testing – Best Practices

- Plan for multiple types of performance test cycles (smoke tests, load, threshold, duration, failover, etc.)
- Budget for time to fix and optimize the system after uncovering performance issues.
- Develop isolated performance test environment that matches production as closely as possible.
- Proactively involve resources from business, development team, support groups. Create open communication, sense of teamwork with all parties involved.
- Formalize the final sign-off on performance testing with both business and technical sponsors.
What happens when many locations are submitting financials?

How long does it take to submit data?

How long will a report take in a given location?

What happens when many locations are submitting financials?

How long does the consolidation process take?
Identify Performance Weaknesses

Transaction Response Time by Activity

- Login to FDM
- Import a Data File to FDM
- Validate the File in FDM
- Export from FDM to Hyperion Financial Management
- Check the Export
- Logout

Graphs illustrating response times for different activities.
Measure Performance By Location

Summerized Key FDM Transaction Response Time by Location

- Melbourne, Australia
- Nanikon, Switzerland
- Changzhou, China
- Giessen, Germany
- Columbus, Ohio
- Tampa, Florida

- Logoff
- Check
- Export
- Validate
- Data Import
- Login - Upstream

Seconds range from 0.00 to 160.00 seconds.
Thank You!

Questions?
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