



**SUNGARD EXP**

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Performance Testing MACCESS.exp  
SunGard EXP  
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## Objectives of this presentation

- Introduce and describe a new offering for performance-testing MACCESS.exp
- Illustrate it via a case study with an EXP customer

## Target Audience

- Product Owners
- Business analysts
- QA Managers / Leads / Specialists
- Implementation Managers

- **Business driver: Mitigate migration risks**
  - New EXP architecture (web services, 3-tier infrastructure)
  - New relational database
  - Large converted databases
  - Growing business user community
- **New unknowns**
  - System scalability and capacity
  - User experience
  - Productivity
  - Impact of new Business Activity Monitor
- **Key questions**
  - How do we mitigate these risks prior to go-live?
  - Will our users still be able to get their work done?

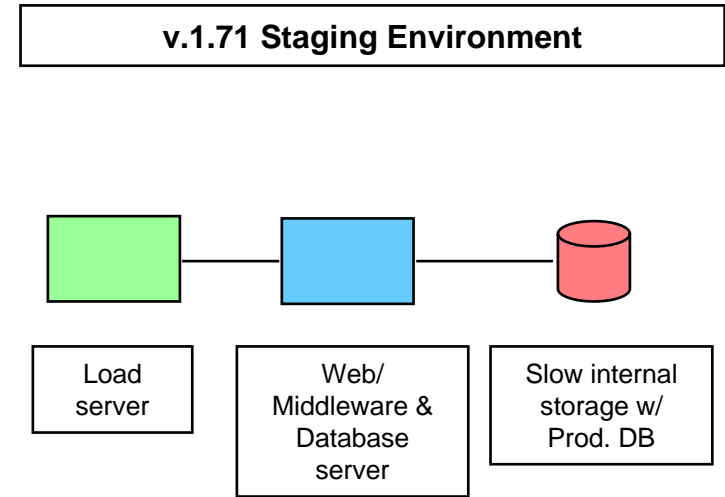
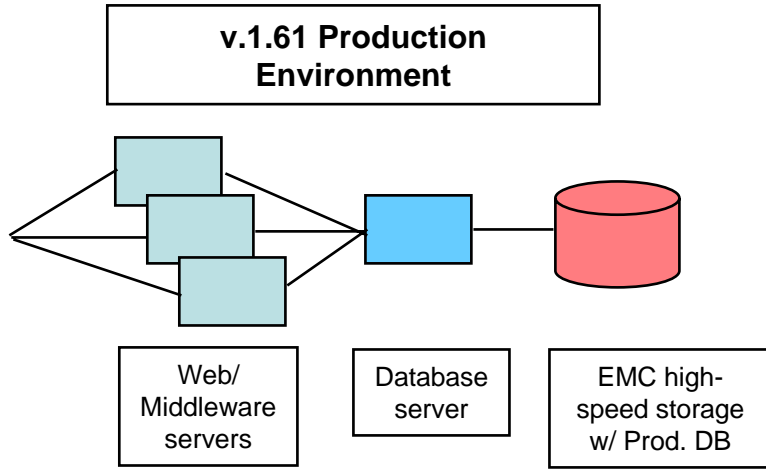
- **Tufts Health Plan**
  - 2<sup>nd</sup> largest HMO in New England
  - 700+ users across 6 departments
  - Peak load of 300 concurrent users generating 6000+ transactions/hr
  - 180GB EXP database
- **Modules implemented**
  - Workflow
  - Customer Service
  - Document Management
- **Migration path**
  - MACESS customer since 1995
  - Migrated from 2.0 to EXP1.61 in Nov'04
  - Upgraded to EXP1.71 in April'05
  - (On 1.73 now)

- **Conduct initial performance test on pre-production environment to:**
  - Gauge application scalability
  - Identify performance bottlenecks
  - Quantify system capacity
- **Conduct second test on scaled-down staging environment to validate that:**
  - Version 1.71 fixes two problem 1.61 transactions
  - THP can accomplish target peak workload
  - No new performance problems have been introduced
- **How:**
  - By simulating peak-hour workload (users & transaction volumes)
  - Testing THP's 10 highest volume processes
  - Using industry-standard Mercury LoadRunner

- **Processes tested**
  - Doc-Flo: Create New and Pend
  - Doc-Flo: Draw Pended and Complete
  - Create Service Form: 2 Templates
  - Open/Review Document: 2 Templates
  - ActionGram: Create and Respond
  - Login and idle (to simulate inactive users)
- **1<sup>st</sup> test on pre-production environment**
  - Web/App: 3 2x3Ghz, 4GB memory, Win 2003
  - DB: 4x3Ghz, 4GB memory, Win 2003, SQL
  - Image Server: 1x2.8Ghz, 1GB, Win 2003
  - 312 concurrent users
- **2<sup>nd</sup> test on staging environment**
  - Single web/app/db server with ~ 1/3<sup>rd</sup> the computing power of the production environment
  - 122 concurrent users (~ 40% of the original 312)

- **Test scripts simulate real users**
  - Same workflows performed by business users
  - Include “think-times” so can report realistic “end-to-end times” for completing a process
  - Measure individual “user action” times so can provide drill-down diagnostic data on any slow processes
- **Load scenarios mirror workday**
  - Users ramp up gradually similar to users arriving at their work shifts and logging on
  - Random “pacing” between transactions to simulate workload
  - Appropriate percentage of users “log on and idle” vs. others “doing real work”

# Extrapolating Staging Results



Approximate Compute Power Difference

Servers	v.1.61 Production Servers			v.1.71 Test Server			Compute Power 1.71 v 1.61
	CPUs	Ghz	Total	CPUs*	Ghz	Total	
web/App 1	2	3.2	6.4	-	-	-	
web/App 2	2	3.2	6.4	-	-	-	
web/App 3	2	3.2	6.4	-	-	-	
DB	4	2.8	11.2	3	3.4	10.2	
<b>Total</b>	<b>10</b>		<b>30.4</b>	<b>3</b>		<b>10.2</b>	

# 2<sup>nd</sup> Test Results Summary

## ■ The Good

- Open Folder / Review Document is fixed: Opening a very large customer folder averaged **3.5 seconds**, vs. **2 minutes** in 1.61
- Draw & Pend is improved: Shows no degradation over load range
- Extrapolating results to production environment indicates that target workload can be achieved
- No *new* performance issues observed

## ■ The So-So

- Extrapolated results not as reliable as measured results
- Observed Login/Initialize spikes and significantly slower process (2.5x slower, 160 sec vs 60 sec); likely due to scaled-down test environment
  - THP is *not* seeing this in production

# Supporting Graphs

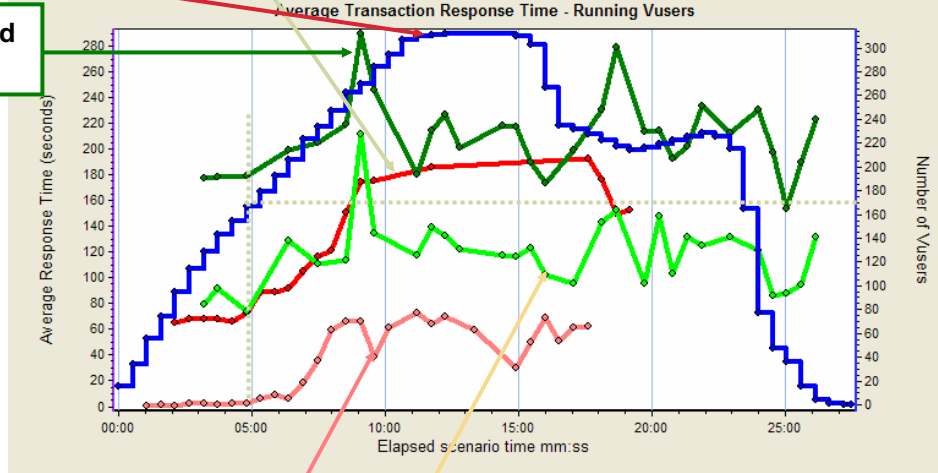
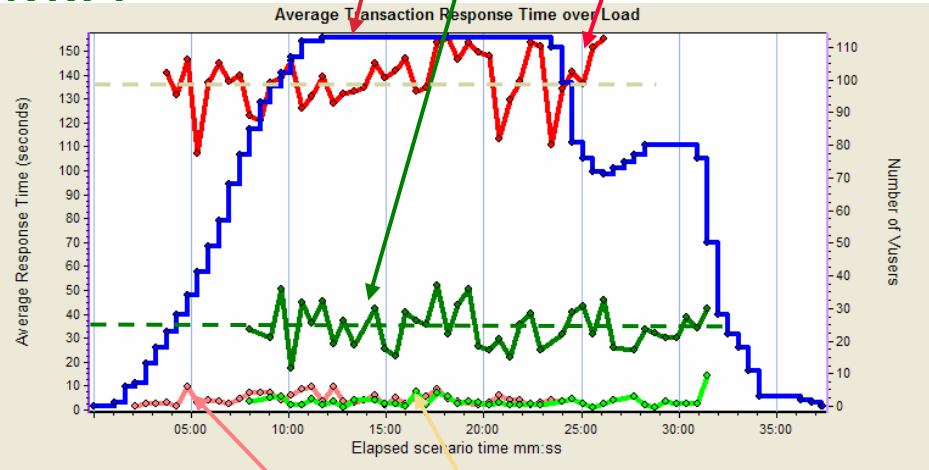
v.1.61

**User Load**  
113 vs. 312

**Draw New end-to-end:**  
2:18 vs. 1:58

**Open Folder end-to-end**  
0:35 vs. 3:30

v.1.71



Color	Scale	Measurement	Graph's Minimum	Graph's Average	Graph's Maximum	Graph's Std. Deviation
Red	1	draw_new_end_to_end	65.335	118.967	192.399	45.188
Pink	1	draw_new_work_item	0.495	34.593	72.367	27.996
Green	1	Open_BIG_Provider_Folder	153.181	209.499	289.548	28.635
Light Green	1	RetrieveDocList_Large	73.667	118.775	211.575	26.666
Blue	1	Run	0	178.388	312	98.647

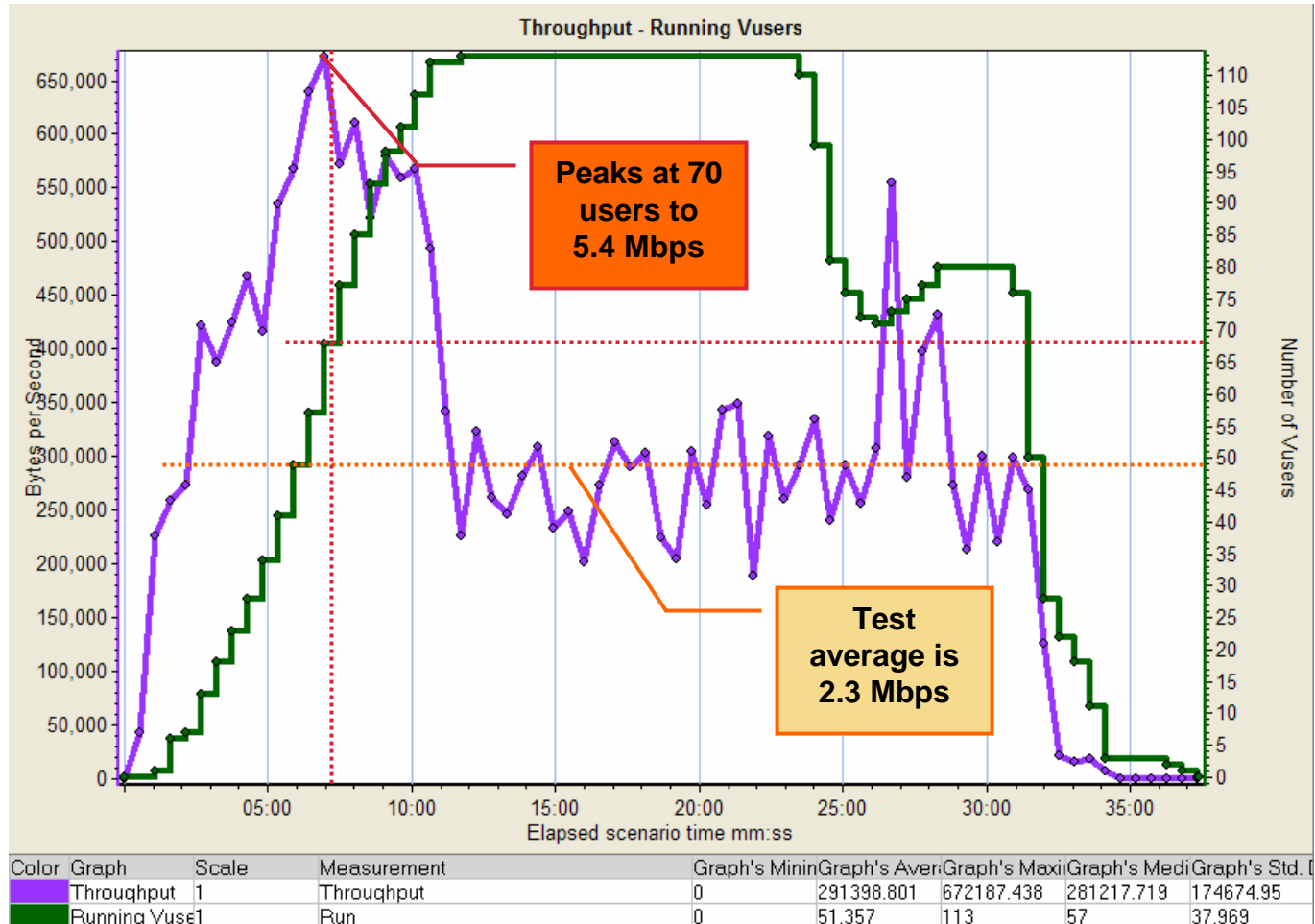
Color	Scale	Measurement	Graph's Minimum	Graph's Average	Graph's Maximum	Graph's Std. Deviation
Red	1	S1_draw_new_end_to_end	107.284	138.024	155.569	11.505
Pink	1	S1_draw_new_work_item	1.536	4.59	9.935	2.26
Green	1	S13_Open_BIG_Provider_Folder	17.397	34.68	52.009	8.371
Light Green	1	S13_RetrieveDocList_Large	1.031	3.492	14.484	2.345
Blue	1	Run	0	51.357	113	37.969

**Draw New work item**  
0:05 vs. 0:35

**Retrieve Doc List**  
0:05 vs. 1:58

# Bandwidth Utilization

- EXP is most bandwidth-intensive during initialization
- Bandwidth peaks in the middle of the login period



# Target Workload Achieved

Business Process	Target Workload (Trncls/pk hr)	v.1.71		v.1.61	
		Actual (Run 4)	Extra-polated	Actual (w/o OF)	Actual (w/ OF)
1. Doc-Flo - Draw New & Pend	2086	69%	206%	149%	38%
2. Doc-Flo - Draw Pended & Complete	421	125%	372%	299%	174%
3. Create Service Form - Member	764	101%	301%	522%	223%
4. Create Service Form - Provider	536	116%	346%	593%	230%
6. Review Member Document	573	86%	256%	276%	114%
7. Review Provider Document	429	75%	224%	248%	116%
8. Create + Respond ActionGram	209	16%	49%	295%	152%
12. Login	937	27%	81%	128%	112%

Color Key: Requirement Achieved Not Achieved

Login workload low due to reduced number of users logging in (21 vs 42) to fit reduced-power test environment

ActionGram workload low due to data issue (work items in wrong state), not performance problem

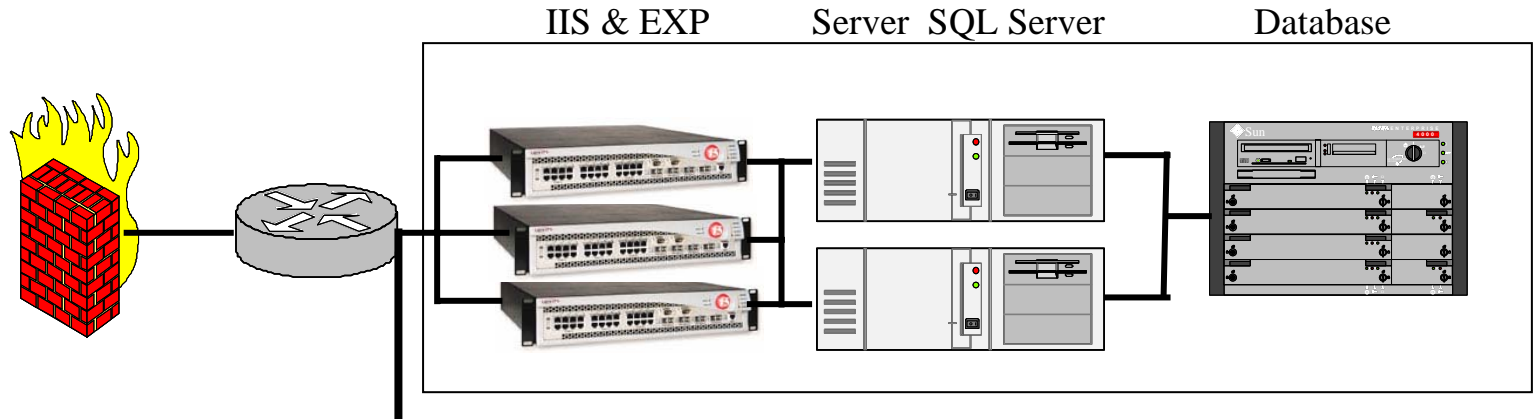
Measured workload, extrapolated (x3) to production environment, achieved by all but 2 processes

- **v.1.71 displays very good scalability**
  - Significant improvement over 1.61
  - Two key problem transactions substantially improved
- **Business impact**
  - Low risk that users will encounter performance problems
  - High probability that users will be able to achieve peak workloads
- **Remaining optimization candidates**
  - Login/Initialize process remains resource-intensive
    - Shows similar spikes as observed in v.1.61 – needs to be investigated further

- **Performance Assessment of *your* implementation**
  - Identify and test *your* key business processes
  - On *your* environment, with *your* data
- **Low cost, low intrusion**
  - Short duration project, performed via remote access
  - Usage of LoadRunner and load server for the engagement
  - You provide target volume info, small sysadmin support, we do the rest
- **Delivered by Mentora Group**
  - Experts in performance testing since 1997
  - Knowledgeable in EXP
  - Engineering support from SunGard



# Load Test Architecture

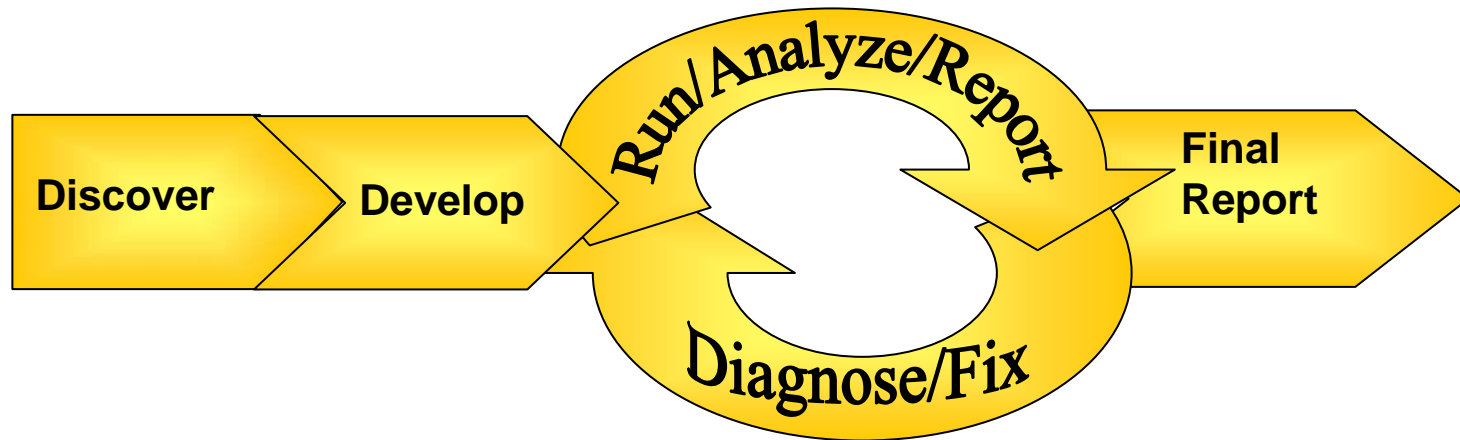


## MACCESS EXP

- MACCESS EXP Client
- LoadRunner

Shippable Load Test Server

# 5-Steps of Performance Testing



## Discover

- Select processes
- Define workflows
- Define transaction volumes
- Approve Test Plan

## Develop

- Connect load server
- Develop scripts
- Configure resource monitors
- Run shakedown tests

## Run/Fix

- Run tests, analyze results
- Diagnose, fix
- Re-run

## Report

- Analyze final results
- Prepare report
- Develop conclusions
- Present to stakeholders

- Independent verification of performance
- Ensure that your peak workload can be accomplished with no productivity impact
- Low intrusion
- Short duration (2 to 3 weeks)
- Low cost – LoadRunner usage license bundled in
- Go-live confidently when your application is



**THANK YOU!**

**Questions?**

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