WOPR 11 Experience Report – Intuit – Oct. 24 '08

3 Examples of Reliability Testing

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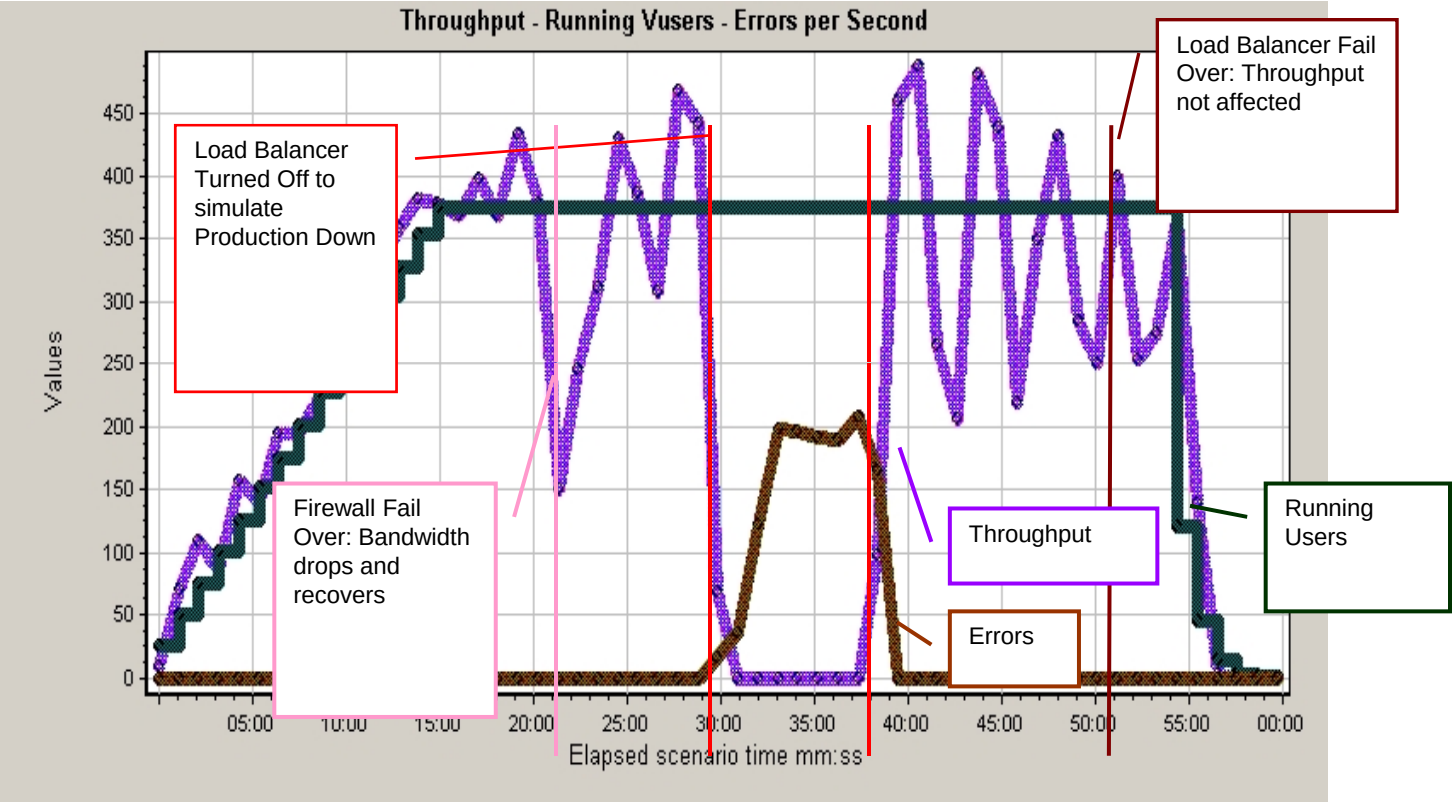
1 – Component Failover Testing

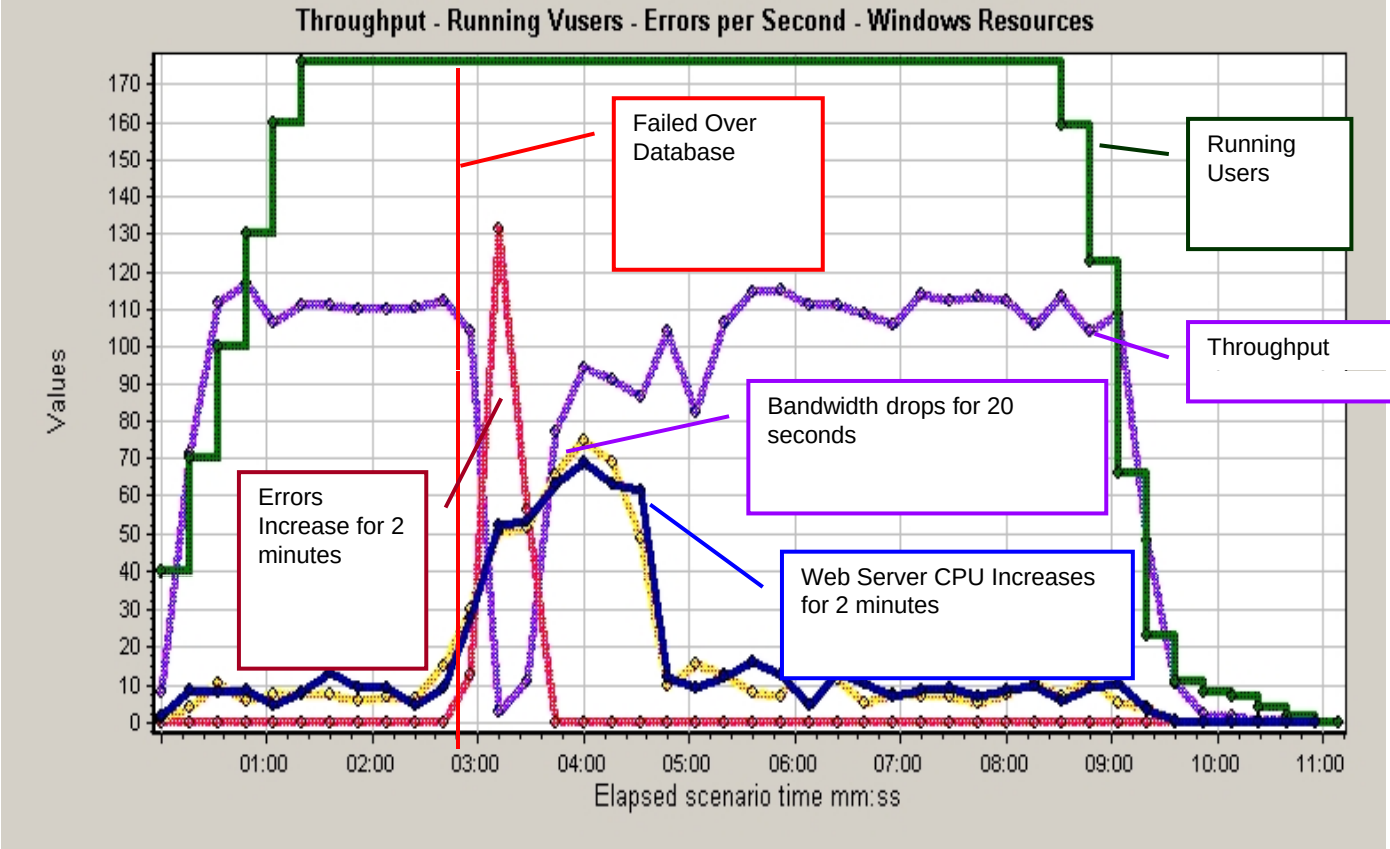
- **Application:**
  - Donor Management system for a national non-profit
  - W2K, SQL Server, vbscript
- **Reliability issue:**
  - Major load-related outage experienced in prior peak season where donation transactions were lost; suspected component failure (web? Db?)
- **Solution:**
  - Add redundant firewall, web/app server, hot-standby DB server
- **Testing focus:**
  - Test fail-over of components
  - Measure recovery time and quantify failed transactions, especially lost donations
- **Result:**
  - Showed that redundant components took up current workload quickly, minimizing failed transactions, lost donations

Bandwidth throughput and error rates under load as primary firewall & load balancer are failed



Color	Graph	Graph's Min.	Graph's Ave.	Graph's Max.
	Throughput	0.0	2343400	4879640
	Running Vusers	0.0	146	375
	Errors per Second	0.0	0.233	2.078

Bandwidth, error rate and web/db cpu under load as primary DB server is failed

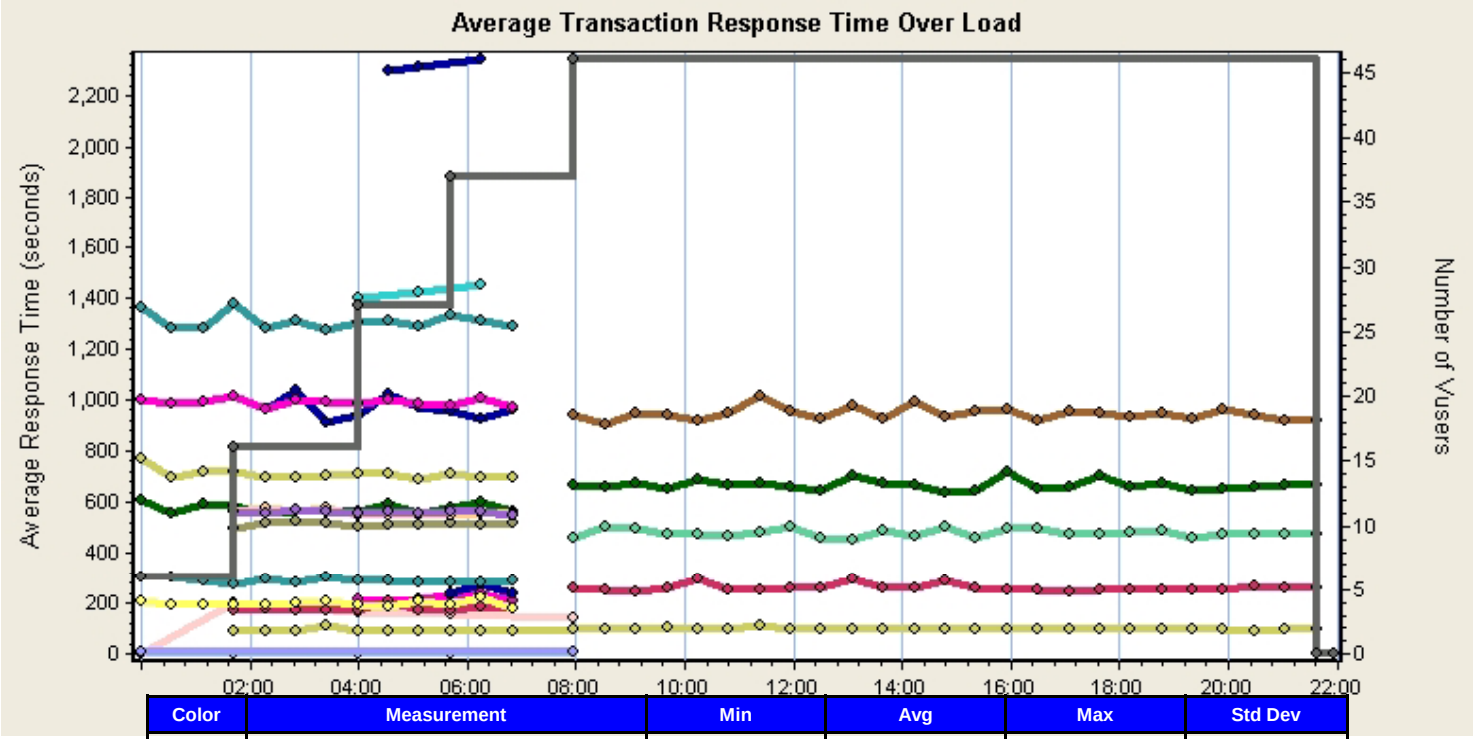


Color	Measurement	Graph's Min.	Graph's Ave.	Graph's Max.
	Throughput	1580	822128	1167149
	Run	0	63	176
	Error	0	0.048	1.313
	% Processor Time (Processor _Total):69.48.142.164	0.066	15	74
	% Processor Time (Processor _Total):69.48.142.165	0.0	15	68

2 – Endurance test to replicate dropped user sessions under load

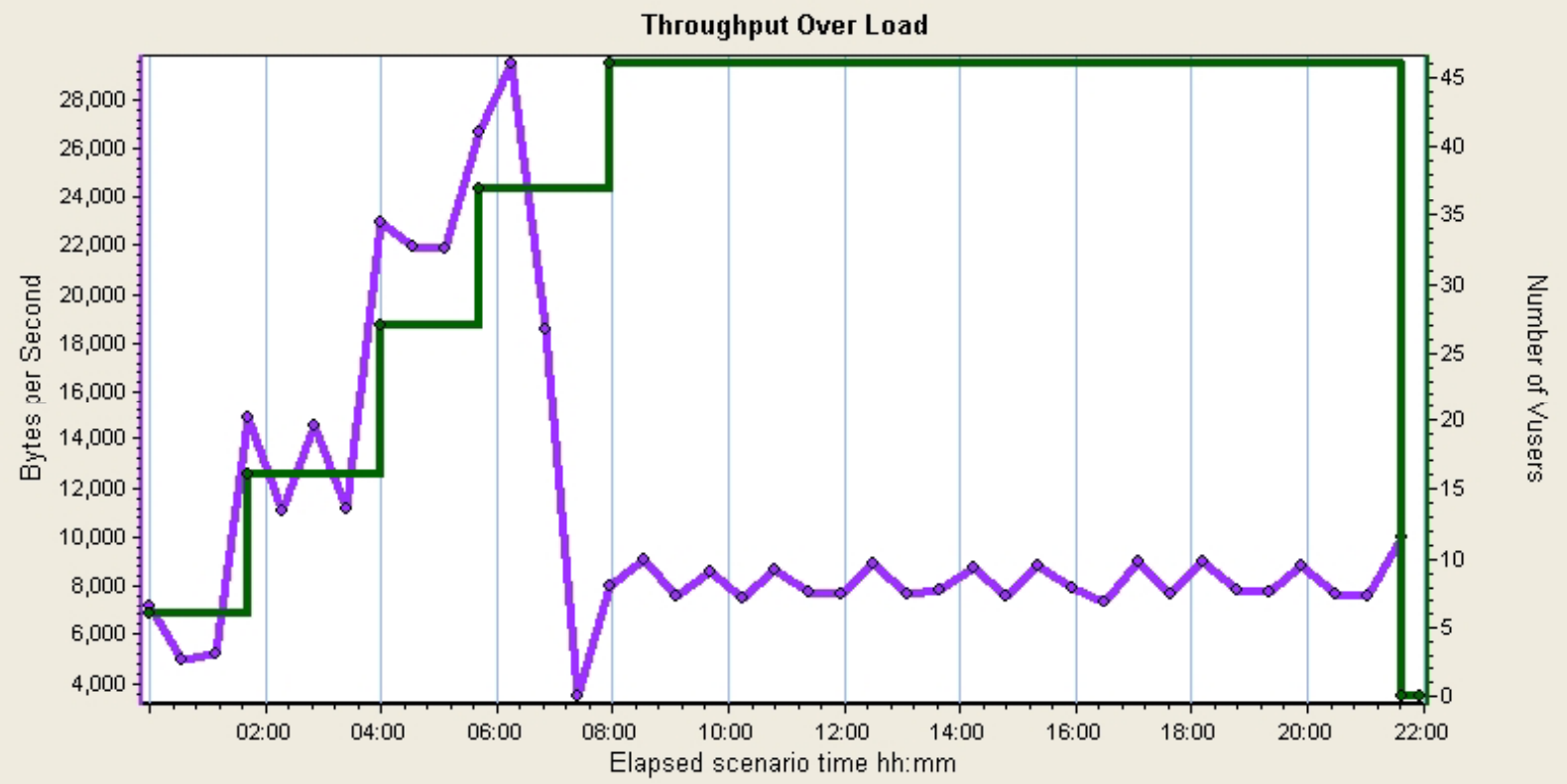
- **Application:**
  - Malpractice insurance case management system
  - COM & ASP.NET, W2K3, SQL Server 2005
- **Reliability issue:**
  - User session state dropped and users sent back to login page during peak usage period, losing transactional updates in the middle of complex workflows
- **Testing focus:**
  - Replicate peak load based on statistical analysis of peak-period web logs
  - Run log over 24-hour period while monitoring throughput and system resources
- **Resolution:**
  - Used event log to ID .NET framework critical update that triggered the outage; removed it, retested, and pushed into production

Endurance test shows 1-hour processing gap 7 hours into the test



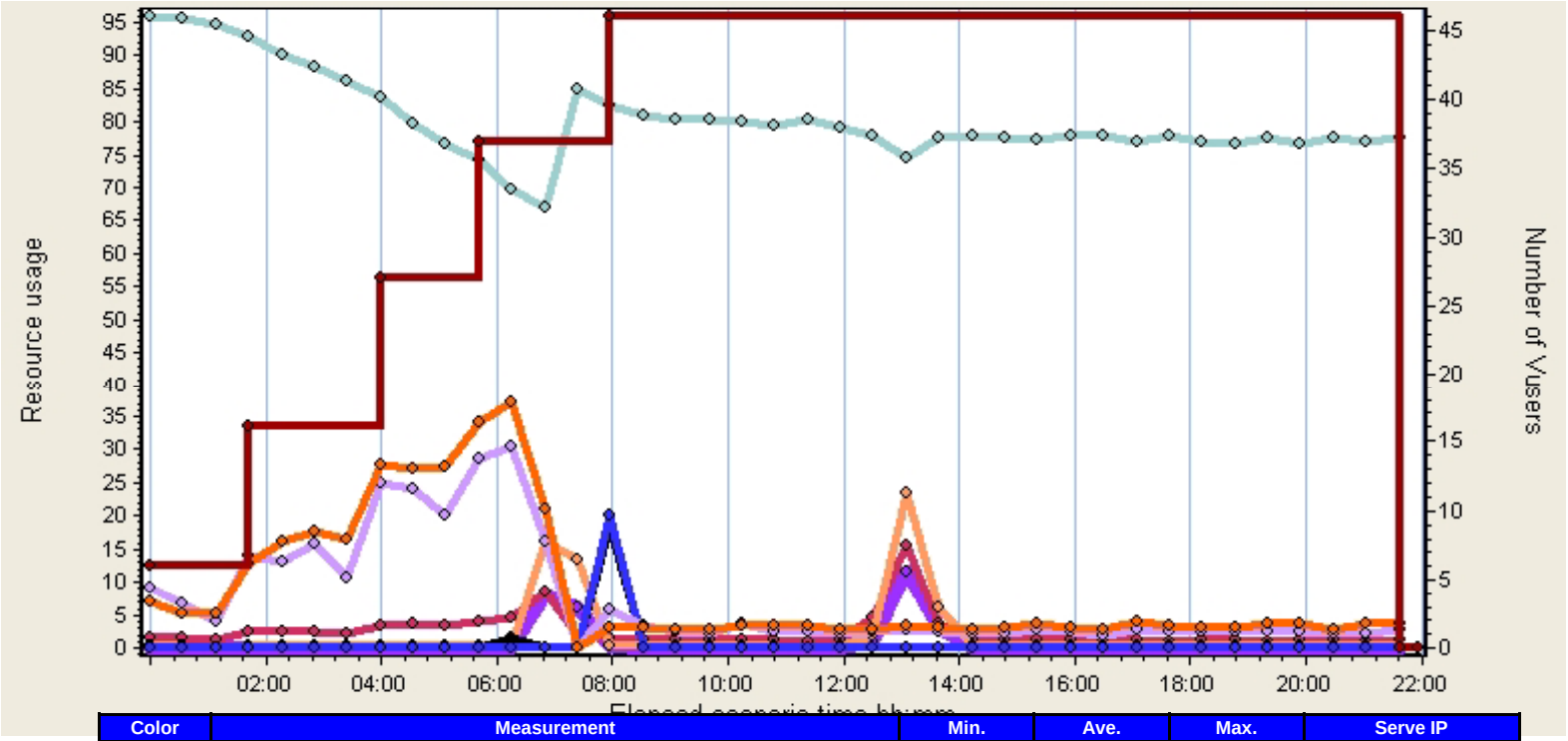
Color	Measurement	Min	Avg	Max	Std Dev
	caseCreation_End_to_End	2,294.2	2,314.1	2,338.1	18.2
	caseUpd_End_to_End	1,399.7	1,427.1	1,452.7	21.6
	addPhysician_End_to_End	1,273.6	1,311.0	1,384.1	32.5
	caseInq_End_to_End	966.2	993.0	1,018.6	13.9
	advSrch_End_to_End	912.9	968.6	1,038.7	39.1
	physInquiry_End_to_End	903.9	946.8	1,016.8	24.8

Bandwidth drops to zero outage point, recovering only slightly thereafter



Color	Measurement	Min	Avg	Max
	Throughput (Bytes/Sec)	3,476	10,743	29,450
	Throughput (Mbps)	0.03	0.09	0.24
	Load (vusers)	0		46

System resource monitors shows web server CPU falling to zero at outage point (orange line)

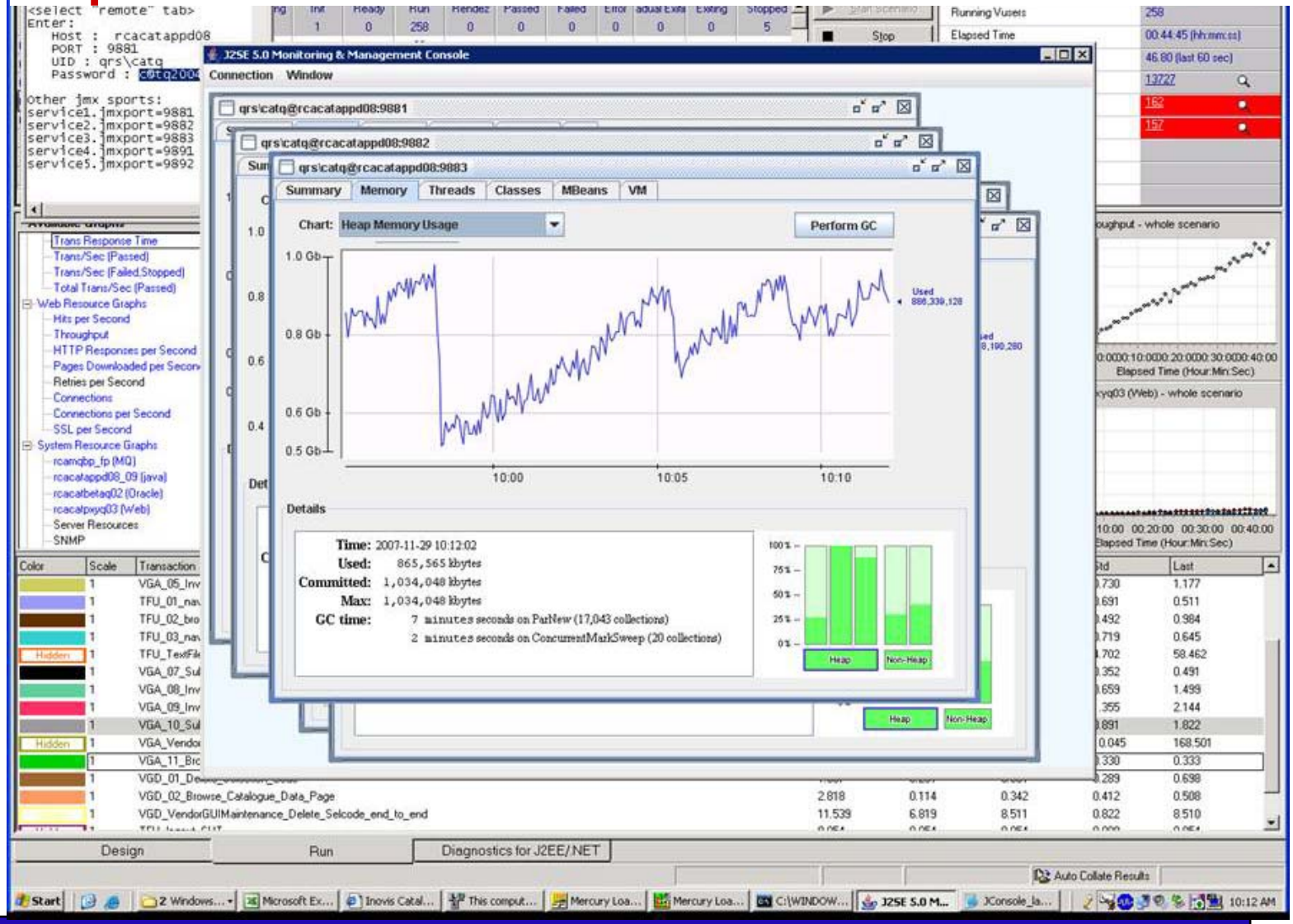


Color	Measurement	Min.	Ave.	Max.	Serve IP
	% Disk Time (PhysicalDisk _Total)	0.7	8.5	117.1	10.130.39.10
	% Processor Time (Processor _Total)	1.013	2.4	15.4	10.130.39.10
	Available MBytes (Memory)	669	804	959	10.130.39.10
	Avg. Disk Queue Length (PhysicalDisk _Total)	0.02	0.17	2.3	10.130.39.10
	Lock Wait Time (ms) (MSSQL$RMFPROD|Locks _Total)	0.0	0.5	18.6	10.130.39.10
	Number of Deadlocks/sec (MSSQL$RMFPROD|Locks _Total)	0.0	0.0	0.002	10.130.39.10
	SQL Compilations/sec (MSSQL$RMFPROD|SQL Statistics)	0.0	0.7	3.1	10.130.39.10
	SQL Re-Compilations/sec (MSSQL$RMFPROD|SQL Statistics)	0.0	0.09	0.4	10.130.39.10
	Load (vusers)	0		46	

3 – JVM Heap Utilization Analysis

- **Application:**
  - National B2B retailer-supplier messaging system
  - Complex Java, Oracle, WebSphere MQ; Windows, AIX, mainframe
  - Re-architecture and redevelopment of middleware tier using JFS IDE
- **Reliability issue:**
  - Severe user performance degradation under increasing load
- **Testing focus:**
  - Monitor jvm heap utilization as is load increased (using Jconsole)
- **Resolution:**
  - Uncovered and reduced JFS (Java Server Faces) default “Viewstate queue depth” to eliminate heap space depletion which was triggering cpu-grabbing garbage collection “sweeps”

JVM heap space profile shows sharp GC sweeps of decreasing “depth”as load ramps, until 1 GB heap is depleted



JVM heap space profile showing steady-state heap usage between 200 and 300 MB on all app servers after fix applied