

Submit and Approval Phase Results



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Executive Summary

Challenge

IT is under greater pressure to reduce operational costs and demonstrate value in services it delivers. These pressures are often a result of disconnect between what IT provides and perception of what business users are really requesting. Often this perception is a result of services separated by IT silos that are costly, labor intensive, and prone to errors. Also, it is difficult to understand usage and cost of delivered services, aligned to the business perception of service value.

Opportunity

With CA Service Catalog, you can define and manage a top-down-oriented service catalog that provides a complete view of service offerings and exposes them by tenancy and role where, when, and how they are needed. This removes disconnect between what IT provides and the perception of what is delivered. CA Service Catalog thus enables your IT organization to set expectations, to replace costly and labor-intensive manual fulfillment methods, and to manage service costs and consumption.

Benefits

CA Service Catalog helps reduce cost of service delivery with consistent repeatable services that are managed as a portfolio of offerings. Service offerings are defined from a top-down, business perspective to meet the needs of enterprise. You can communicate service offerings in rich, descriptive business language to increase satisfaction and elevate service experience of business and IT users. With CA Service Catalog, entire request lifecycle is managed and automated from service request through approval to fulfillment, accelerating time-to-value.

For large organizations, depending on number of end users and types of catalog items being offered, there could be a high amount of request submission, approval and fulfillment activity per day. CA Service Catalog application needs to be scalable to support large volume of requests.

CA Technologies performed a series of load tests on CA Service Catalog Release 12.8 based on data and inputs received from large enterprises. The results demonstrate that CA Service Catalog Release 12.8 is scalable, enterprise-ready solution for any client who needs to provide self-service capabilities in their enterprise.

The 1-hour test exercised repeatable execution of self-service request life cycle from submission through approval at a rate of 15 requests per minute or 900 requests for an hour. This request life cycle activity was occurring at the same time as 70 concurrent users were refreshing a CA Service Catalog screen, with a total 420 refreshes in 1 hour. The objective of this refresher activity is to generate additional concurrent user load on CA Service Catalog. Other than these multiple 1-hour runs, there were 8-hours and 40-hours run also which resulted in similar performance.

Average transaction success rate during the tests was measured at 100%.

Please note that these results are based on test environment with physical machines and they may not be comparable to virtual environment.

The remainder of this document provides details of the test environment, scenarios, and results.

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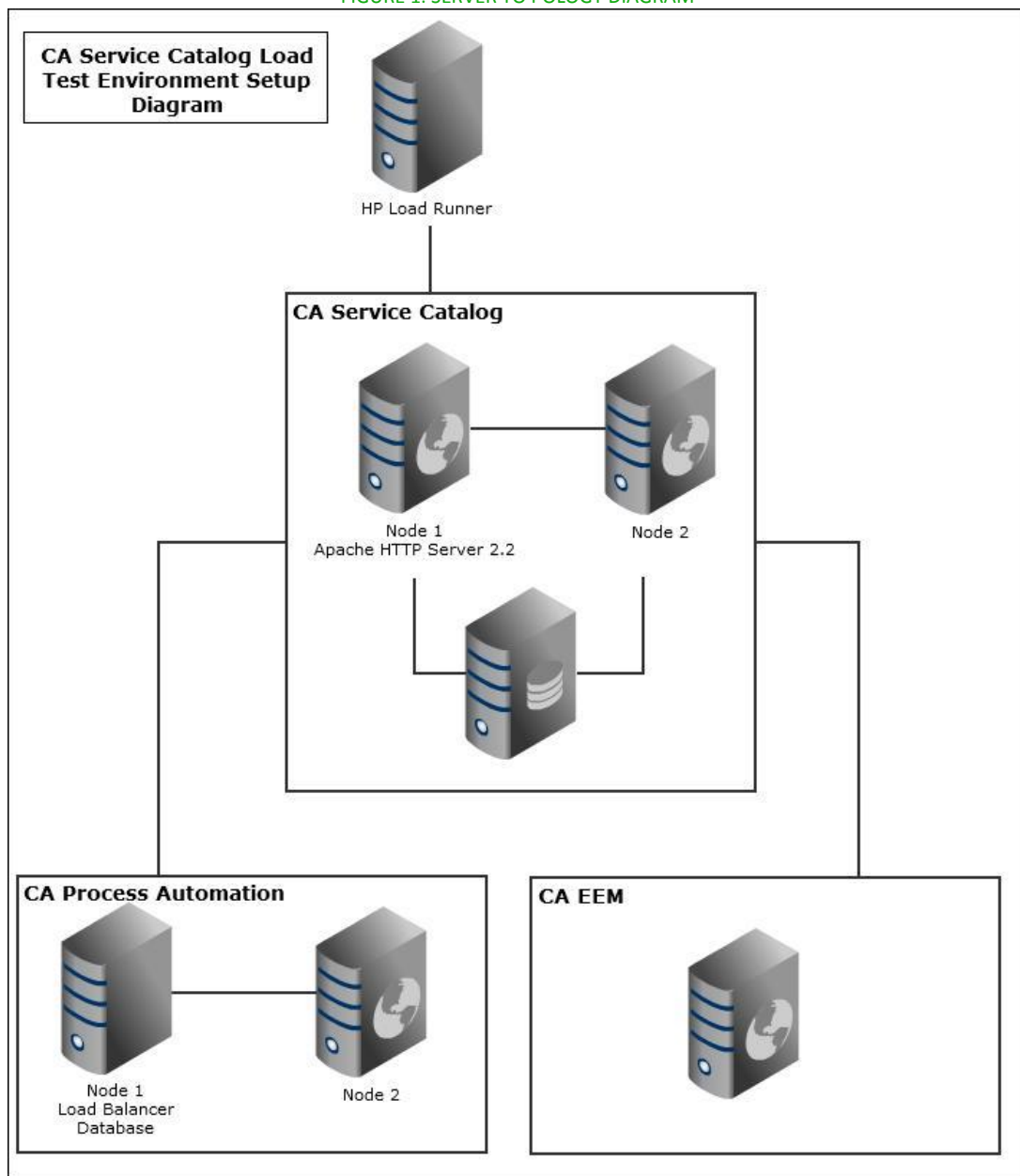
Test Environment

Multiple test servers were used for performance test environment. HP LoadRunner 11.0 was used to create and run scripts to exercise the functionality being tested. The system (database) was pre-populated with data obtained from large enterprise customer(s).

Server Topology

The load test environment was configured as cluster setups for CA Service Catalog and integrated products. For simulating a production environment, physical machines were used. Separate database machines were used for CA Service Catalog and CA Process Automation (formerly known as CA IT PAM).

FIGURE 1: SERVER TO POLOGY DIAGRAM



There were total 7 machines in the performance test environment with following configurations:

Server	Software	Machine Configuration
Service Catalog (Primary) Load balancer	CA Service Catalog Release 12.8 Apache HTTP Server 2.2	Dell OPTIPLEX-790 RAM: 8 GB Processor: Intel i3-2120CPU Quad-Core @ 3.30GHz Win 2008 R2 Ent - 64 bit
Service Catalog (Secondary)	CA Service Catalog Release 12.8	Dell OPTIPLEX-790 RAM: 8 GB Processor: Intel i3-2120CPU Quad-Core @ 3.30GHz Win 2008 R2 Ent (SP1) - 64 bit
Database (MDB)	MS SQL Server 2008 R2 (SP1) (X64)	Dell OPTIPLEX-790 RAM: 8 GB Processor: Intel i3-2120CPU Quad-Core @ 3.30GHz Win 2008 R2 Ent - 64 bit
CA PAM Node 1 Load balancer Database	CA PAM R4.0 SP1 Apache HTTP Server 2.2 MS SQL Server 2008 R2 (X64)	Dell OPTIPLEX-790 RAM: 8 GB Processor: Intel i3-2120CPU Quad-Core @ 3.30GHz Win 2008 R2 Ent - 64 bit
CA PAM Node 2	CA PAM R4.0 SP1	Dell OPTIPLEX-760 RAM: 4 GB Processor: Intel E7400CPU Dual-Core @ 2.80 GHz Win 2008 R2 Ent (SP1) - 64 bit
CA EEM	CA EEM R12.0	Dell OPTIPLEX-780 RAM: 4 GB Processor: Intel E7400CPU Dual-Core @ 2.93 GHz Win 2008 R2 Ent - 64 bit
LoadRunner Controller	HP LoadRunner 11.0	Virtual Machine RAM: 4 GB Processor: Intel Xeon E5645CPU @ 2.40 GHz (2 Processors) Win 2008 R2 Ent (SP1) - 64 bit

CA Service Catalog Settings

The following CA Service Catalog configuration settings were adjusted to promote optimal performance.

Item	Setting	Unit
Tomcat threads	800	number
Tomcat connection timeout	1,000,000	milliseconds
Java initial heap size	512	MB
Java maximum heap size	1,025	MB
Max database connection pool size	200	number

Database Settings

No changes were made to the default settings. Transaction log for MS SQL Server was set at Full mode (the default).

CA Process Automation Settings

The following CA Process Automation configuration settings were adjusted for optimal performance

Item	Setting	Unit
Initial Java Heap Size (in MB)	1,024	MB
Maximum Java Heap Size (in MB)	2,048	MB
clientLeasePeriod	100,000	Milliseconds
SupportsFailover	True	-
SupportsLoadBalancing	True	-
reconnectInterval	25	Seconds
DLQMaxResent	10	Times

Transaction volume

As highlighted earlier, the test data was obtained from different large enterprise customers. Following table summarizes the transaction data and counts were captured just before the execution of the first load test:

Record type	Count
No. of Requests	100,000
No. of Services	1,800
No. of Business Units	100
No. of Users	20,000

Test Scenarios

The test scripts simulated submit and approval process of the CA Service Catalog request life cycle. In addition, test scripts simulated additional CA Service Catalog activity of refreshing logged in users' profile. This activity is unrelated to the request life cycle; however, it generates application load.

The details of the performance test scripts are given below. For all scripts, to simulate real time users' behavior, there was a pause (or think time) between user actions. The think time was recorded with the script.

The service used for the test was the predefined Create Email service which is available out of the box.

Requester Scenario

In the requester scenario, a user in the Catalog End User role logs in to CA Service Catalog, selects a service to add to his cart, submits his request for approval, and logs out of CA Service Catalog. This test simulates the catalog entry selection and request submission phases of the CA Service Catalog request life cycle. This script results in average of 900 requests created over a 1-hour time period.

The steps in the script are as follows

- 1 15 requesters log in to CA Service Catalog at an interval of 5 seconds each, ramping up load on the application.
- 2 Each of these 15 users; selects a service from the CA Service Catalog to add to its cart.
- 3 The shopping cart is displayed and user submits the cart.
- 4 The user logs out.

When the user submits the cart, CA Service Catalog causes an associated CA Process Automation process to initiate. The process instance determines the manager of the requester and assigns an approval task to that manager (the approver).

Approver Scenario

The approver scenario tests the condition where a user in the Request Manager user role logs into CA Service Catalog, refreshes his pending actions list until a request for approval appears, selects a request from the displayed list; approves it and logs out of CA Service Catalog. This test simulates the approval phase of the CA Service Catalog request life cycle.

The steps in the script are as follows.

- 1 15 approvers log in to Service Catalog at an interval of 5 seconds.
- 2 These 15 users each look for greater than 0 pending actions else logs out and waits for 90 seconds before they login again.
- 3 Go to pending action page and select a request for approval and open the approval page for the same.
- 4 The approval page displays for the selected request.
- 5 The request is approved.
- 6 The user logs out.

Performance test suite was configured to have a lag of 3 minutes for approver scripts so

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that few requests are placed before approver scripts starts. When approver approves the request, CA Service Catalog causes an associated CA IT PAM process to start which changes the status of the request to Pending Fulfillment.

Refresher Scenario

In the refresher scenario, a user with the Catalog End User role is logged into CA Service Catalog and continually refreshes the User Profile page. This test simulates random CA Service Catalog activity while the primary request life cycle test is being conducted.

The steps in the script are as follows.

- 1 All 70 refreshers are logged in to CA Service Catalog at the rate of 5 users every 10 seconds.
- 2 Each of these 70 refreshers re-load the User Profile page once every 10 minutes
- 3 The user logs out from CA Service Catalog.

This is repeated for the entire duration of the test to have a consistent load of 100 virtual users.

Test Results

Transaction Statistics

Performance test results are obtained as an average of 3 runs (1hour each) and following table represents the same:

Test	# Successful Transactions	# Failed Transactions	Success Rate
Test 1	15,582	0	100.0%
Test 2	15,588	0	100.0%
Test 3	14,582	0	100.0%

Average transaction success rate for 3 tests was 100%. There were 0 failed transactions and no exceptions in the application logs.

Request placed & approved statistics

Test	Requests Placed	Requests Approved	Requests processed per minute
Test 1	900	900	15
Test 2	900	900	15
Test 3	900	900	15

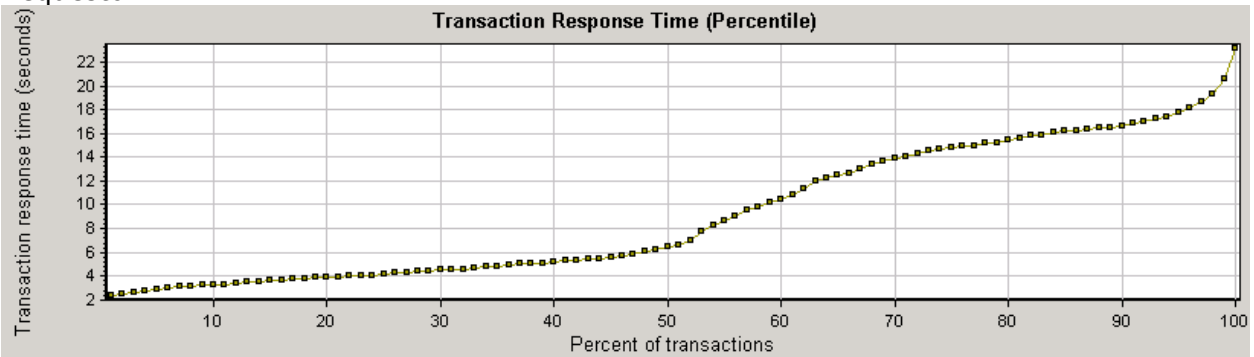
Note: The count of requests placed was controlled and restricted to 15 requests per minute hence the total of 900 requests in 1 hour

Percentile Chart

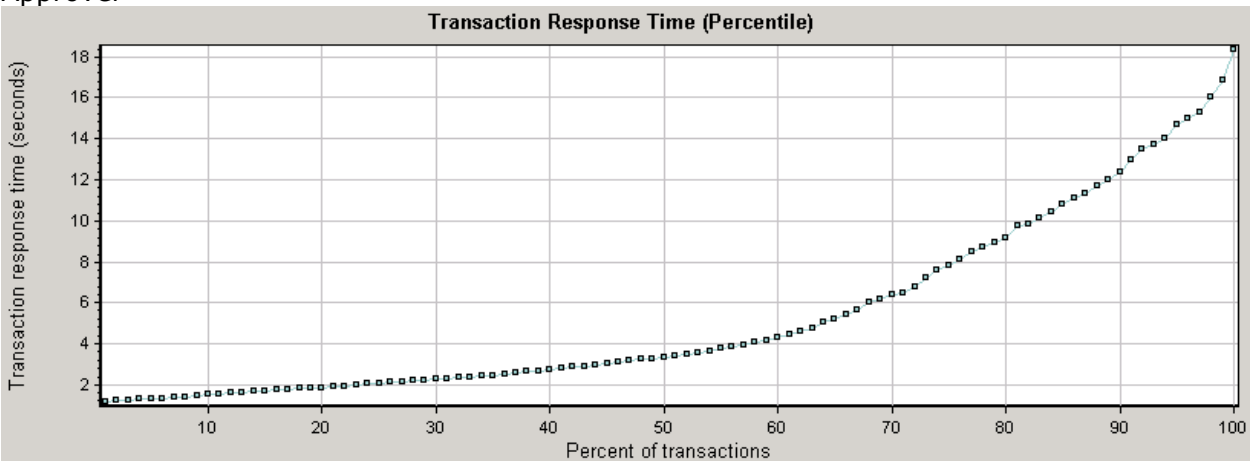
Percentile chart shows the transaction times sorted in an ascending order. The X-axis shows the percentiles and y-axis shows response time for transactions in seconds for respective percentile. An intersection of percentile and response time conveys the response time taken for that percentile of users.

Test 1

Requestor

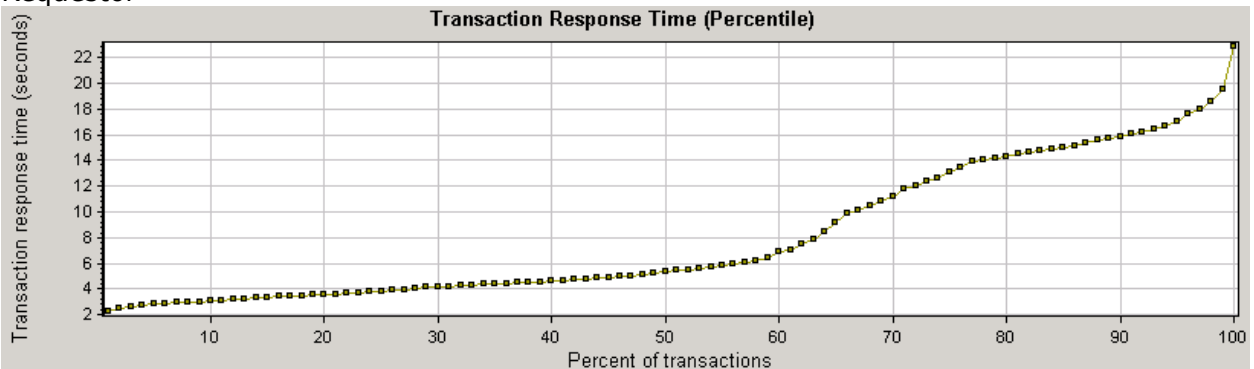


Approver

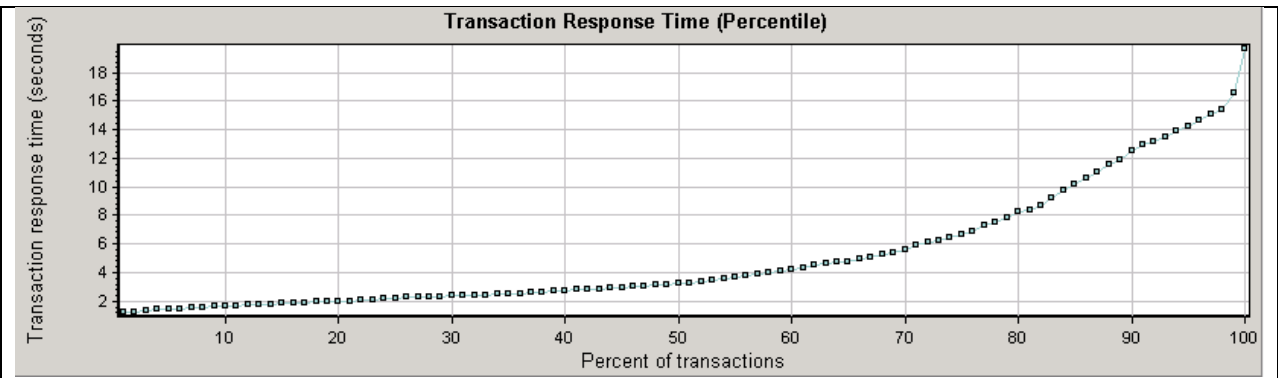


Test 2

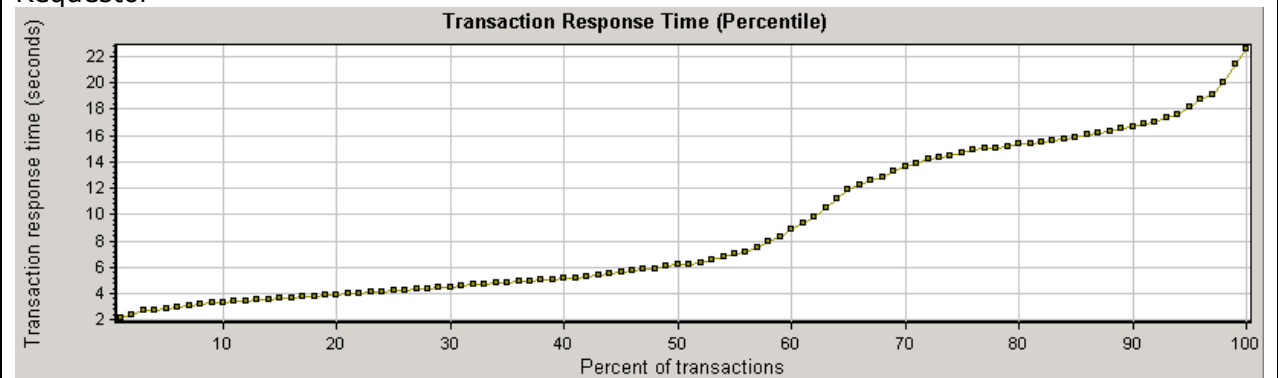
Requestor



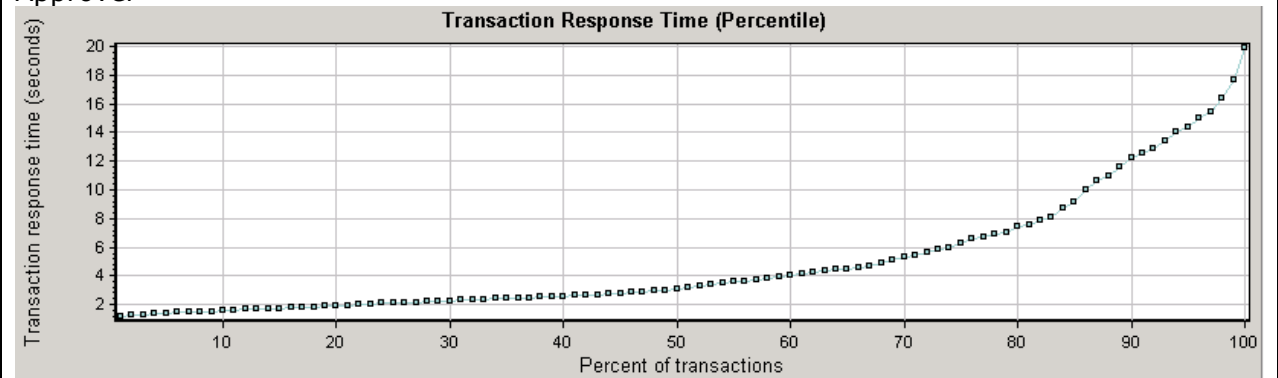
Approver



Test 3
Requestor



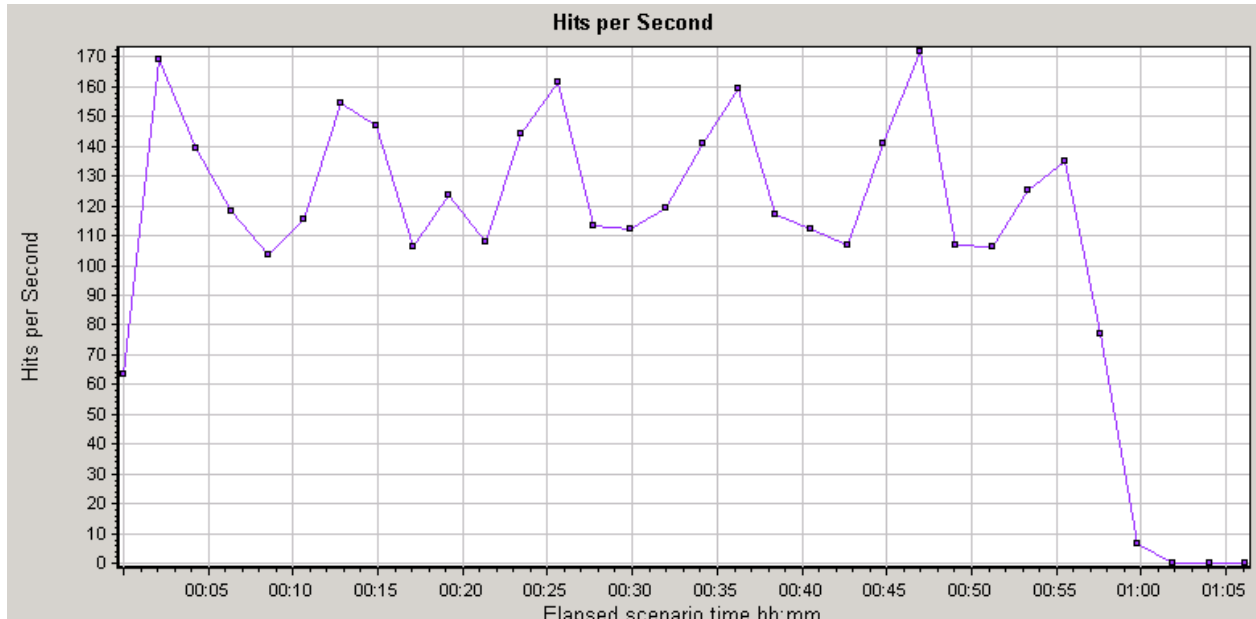
Approver



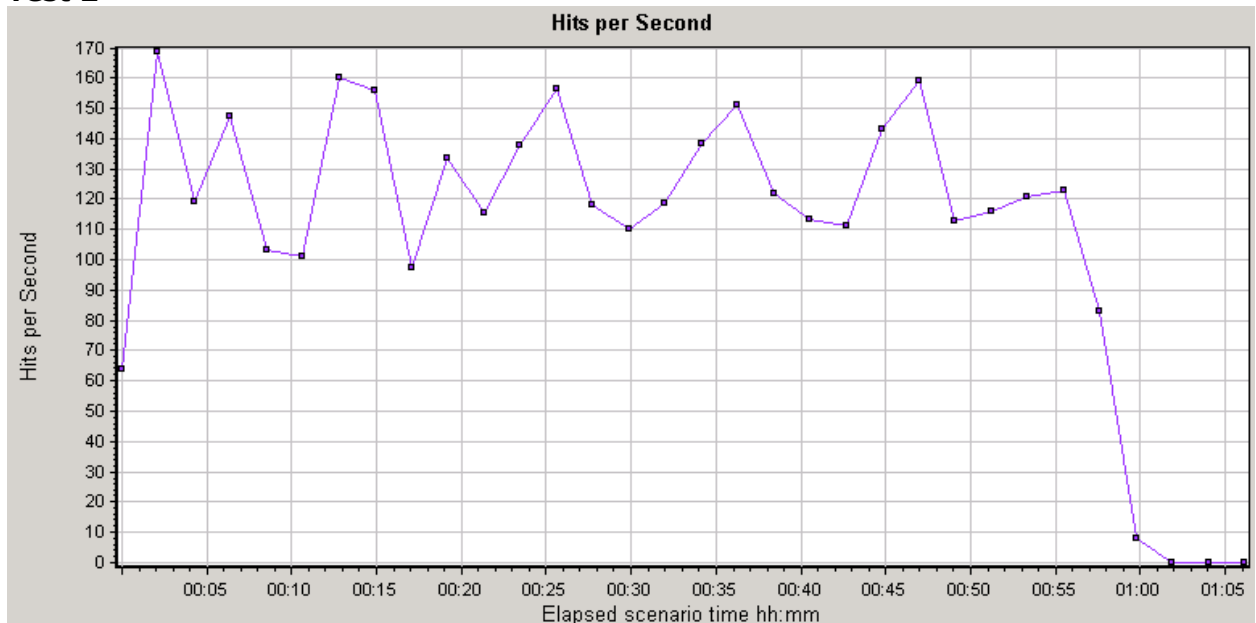
Hits/Second

The chart below show the number of transactions included in all scripts over time. The graph displays number of transactions taking place over time. Average transactions per second means the total number of transactions divided by total time of test.

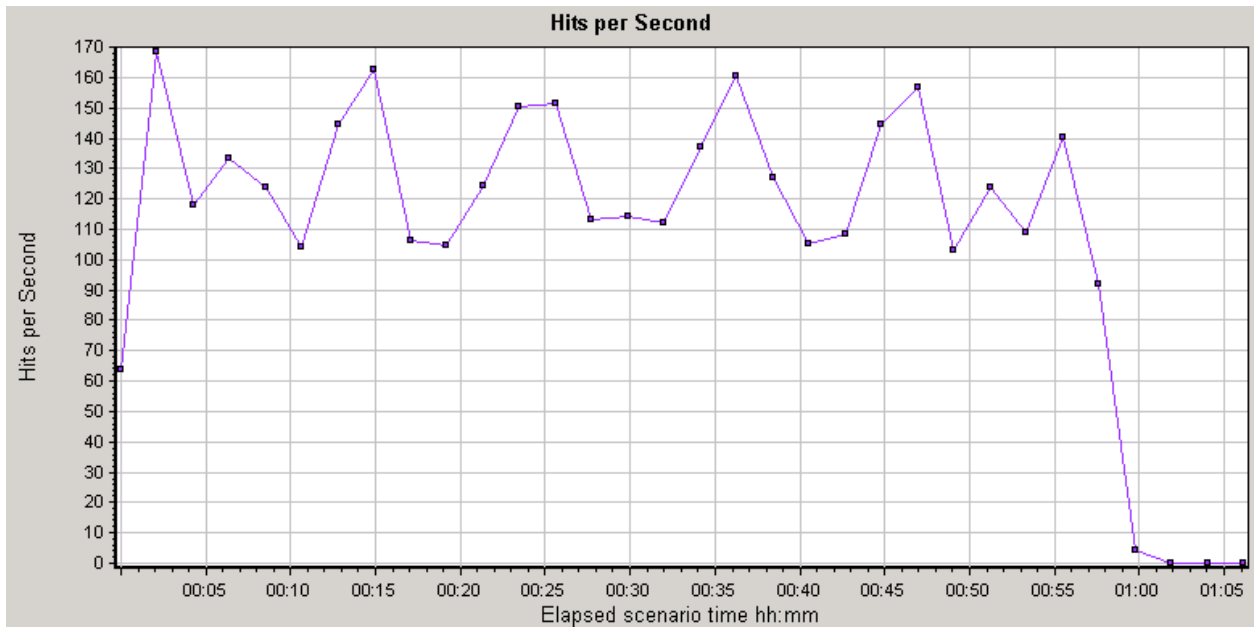
Test 1



Test 2



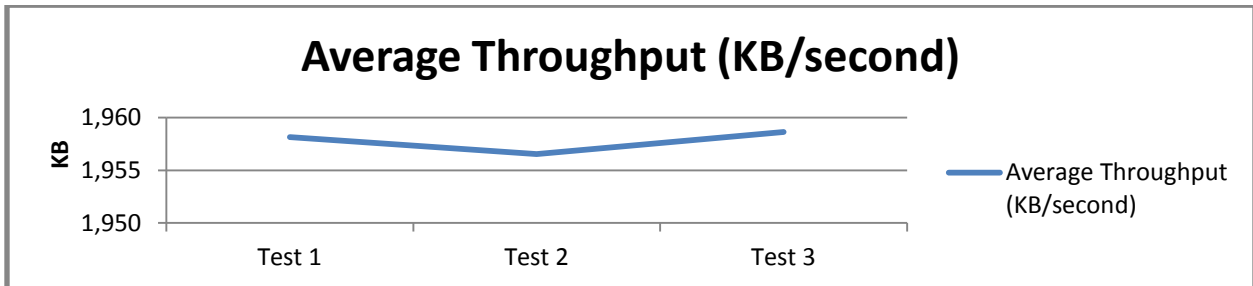
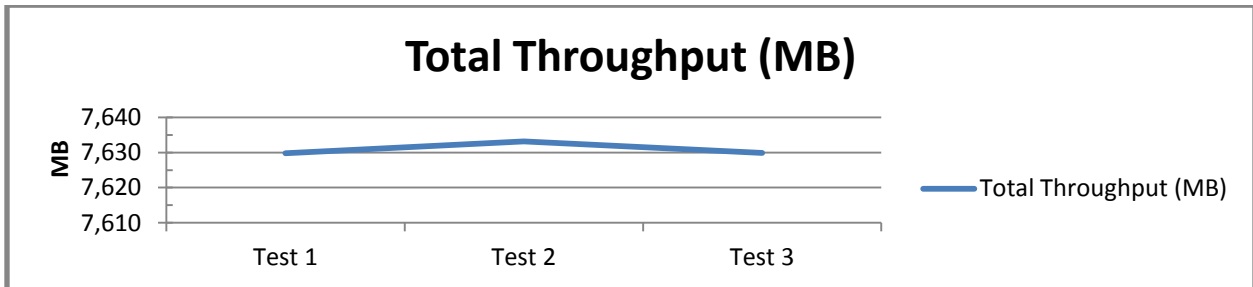
Test 3



Throughput Rate

The charts below show the throughput from all scripts over time for the test. The high values of the throughput* are indicators that application is scalable to handle large volume of data transactions.

During load testing of CA Service Catalog r12.7 average throughput* was recorded as 640.20 KB/sec as compared to average throughput of 119.64 KB/sec during previous load test conducted for CA Service Catalog r12.5.



Note:

- *Displays the amount of throughput (in bytes) on the Web server during the load test. Throughput represents the amount of data that the Vusers received from the server at any given second. This graph helps you to evaluate the amount of load Vusers generate, in terms of server throughput.*

Response Times

Custom Response Times

The charts below show average response times for custom timers used for various user actions in performance test scripts. This is average time taken for a virtual user to perform specified action:

Custom timers are used for these scripts with user interaction steps and following is list of same:

Requestor

- LoadLoginPage
- LoginSubmit
- SelectEmailFolder
- SelectCreateEmailAcc
- SelectItemCheckout
- SaveSubmitCart
- LogoutSubmit

Approver

- LoadLoginPage
- LoginSubmit
- GotPendingRequestsPage
- OpenRequest
- ClickApproveRequest
- SaveRequest
- LogoutSubmit

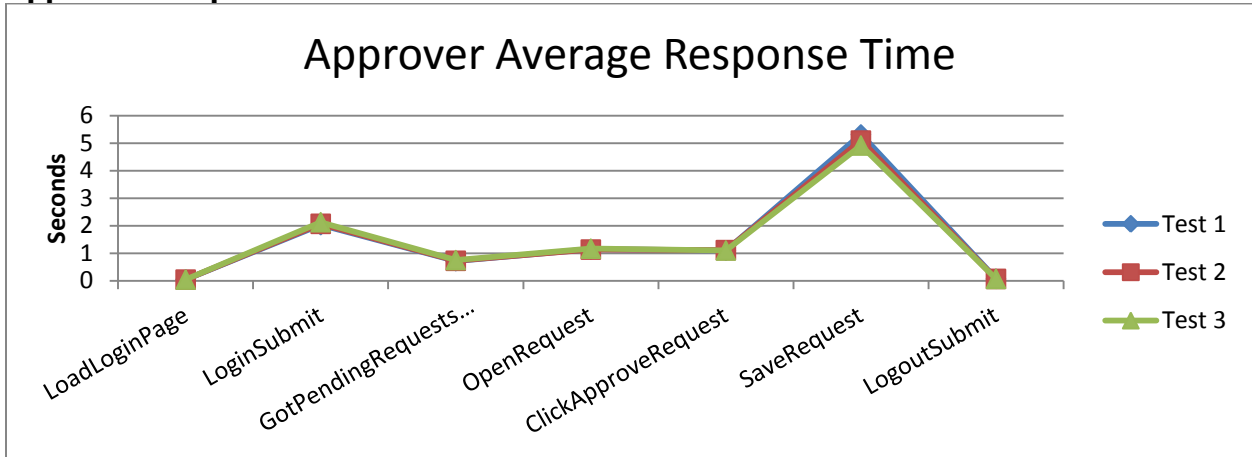
Refresher

- LoadLoginHome
- LoginSubmit
- ViewUserProfile
- DoneViewing
- Logout

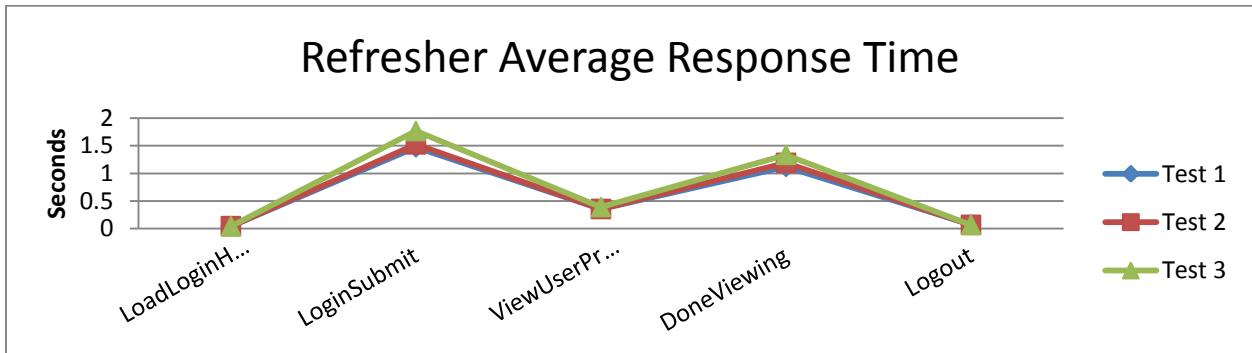
Requestor Script



Approver Script



Refresher Script



Conclusion

Load testing of CA Service Catalog Release 12.8 was successfully conducted covering 3 scenarios (requester, approval and refresher) at 100VU (Virtual User) load at a test environment primed with a predefined record volume. During these load tests average transaction success rate of 100% was recorded.

These load tests results provide reliable supporting facts that CA Service Catalog Release 12.8 can be used for providing the enterprise with a self-service request capability that meets the high standards of reliability and availability that large enterprises require.