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VENDOR performance TEST requirements

*Trapeze conventional upgrade*

{*Final}*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Project Name | Trapeze Conventional Upgrade | ProjectNumber | PPM/POD | 426 |
| Capital | 181118 |

| REVISION HISTORY | | | |
| --- | --- | --- | --- |
| Date | Author | Version | Change Reference |
| 03Dec2018 | Sherry Matthews | Draft |  |
| 06Dec2018 | Sherry Matthews | 0.1 | Updated to include feedback from Mari-Len Rodriguez and Bing Wu, as well as information on Staging environment provided by Robin Jeong |
| 07Dec2018 | Sherry Matthews | 0.2 | Added information from Robin and Bing, as well as suggestions from review with Mari-Len |
| 10Dec2018 | Sherry Matthews | 0.3 | Updated based review and feedback from BTS Team members |
| 11Dec2018 | Sherry Matthews | 0.4 | Added Staging environment diagram and Load Test requirements specifics. |
| 13Dec2018 | Sherry Matthews | 0.5 | Added OPS-Web tech stack. |
| 17Dec2018 | Sherry Matthews | 0.6 | Incorporated feedback from Bing and Elaine. |
| 02Jan2019 | Sherry Matthews | 0.7 | Updated signatories |
| 10Jan2019 | Mike M. | 0.8 | Added Key Milestones and Dependencies section;  Removed comments;  Baselined for submission to vendors. |

| Document Purpose | The purpose of the Perfomance Test Requirements is to provide a systematic approach to testing that the product, service &/or end results meet the users and stakeholders needs. |
| --- | --- |

| Intended Audience | The audience of the this document is intended to be *the Project Manager, the Vendor Providing Performance Testing, and the Business Team.* |
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# BUSINESS PROBLEM OR OPPORTUNITY

Trapeze Conventional Upgrade is being undertaken to ensure the system is in a state of good repair and fully-supported, with a supported operating system. A part of this upgrade is to enhance and improve the Customer Experience, which involves customer facing applications, accessed via the Internet (WEB).

To ensure good customer experience, performance tests will be conducted on customer facing applications.

Goals:

* Determine behavior and thresholds for peak and maximm capacity
* Determine the system load to the breakpoints
* Determine the consistency of the system for a longer period of time when exposed to heavy load or stress
* Determine application resource consumption and timings
* Confirm or Establish baselines/benchmarks

# TEST SCOPE

|  |  |  |
| --- | --- | --- |
| **Test Type** | **In Scope (√)** | **Out of Scope (√)** |
| **System Tests** | | |
| **Stress and Load Testing** (Volume Capacity – Maximum # of users & transactions) | **√** |  |
| **Load Testing**  (Endurance and stability testing) | **√** |  |
| **Performance Testing** (Response times of queries & reports) | **√** |  |

## meetings and other requirements

1. Vendor available participate in a daily scrum meeting
2. Vendor available for Video Conference when needed
3. Vendor shall maintain an issue list in TransLink’s Kanbanize
4. Vendor shall update test cases
5. Testing to be conducted between the hours of 8:00 AM to 4:00 PM (PST)

# TEST CATALOG

## IN SCOPE FEATURES

|  |  |  |
| --- | --- | --- |
| Test Area Name (Key Features) | Sub Area Name (Component) | Description |
| G3 Feedback Form | * Bus * SkyTrain * SeaBus * West Coast Express * HandyDart * HandyDart Taxi * Web/Technical * Lost Property * Other | The Feedback form provides customers the ability to submit feedback from one of several areas. There is a total of 10 forms to test.  For wire frames of the forms click [here](https://xd.adobe.com/view/b7fb9076-13c8-4e42-6b40-105376ef6072-c1ca/).  Test scripts have been provided in Appendix A. |
| G3 Trip Planner | * Trip Planning * Schedule Lookup * Find my next bus * Find my closest stop | The Trip Planner provides customers with the ability to plan their trips using TransLink transit systems. There are 4 main functions available to customers, and the reponse times need to be tested for each of the areas. Test scripts have been provided in Appendix A. |
| OPS Web | * Sign in * Driver Paddle | The OPS Web provides an interface for operators to sign in and download their daily work requirements (Driver Paddle). Test scripts have been provided in Appendix A. |

## OUT OF SCOPE FEATURES

Only customer facing web applications are in scope, all other Trapeze moduled are not in scope:

* INFO-IVR
* INFO-COM
* INFO-Agent
* FX/BB
* OPS

# test approach

## Test Environment

Performance testing will be conducted in the TransLink staging Environment, prior to go-live.

Trapeze has provided the following for the G3 Traveler Information product (Trip Planner, Feedback):

* TP6 - is C++,
* G3 (web pages) are based on AngularJS, JavaScript, HTML, CSS.

Trapeze has provided the following for the OPS-Web project (OPS-Web doesn’t use Angular JS):

* TP6 Server shell C++
* OPS-Web are based on JavaScript, HTML, CSS.

Notes:

* Server names to be provided when the Staging Server has been set up

|  |  |
| --- | --- |
| Server Type | Server Name |
| App Server | TRPAPPS### |
| COM Server | TRPCOMAPPS### |
| OPS Server | TRPOPSAPPS### |
| Web Server | TRPPLNAPPS### |

## STAGING environment information

Test Environment Configuration:

|  |  |  |
| --- | --- | --- |
| Test Function | End User Role | Access Link |
| Trip Planner | Public Customer | Add staging link here |
| Feedback | Public Customer | Add staging link here |
| Driver Paddle | Bus Driver | Add OPS-WEB link here |

*Notes*:

* Testing will be conducted by Vendor against TransLink Staging Server. See Appendix A for detailed testing information.
* TransLink’s Staging environment will have:
  + a load balancer installed, with multiple servers, and RD Connection Brocker, as well as a load balance technology call F5, for the G3 Web performance testing.
  + A single server with no load balancing.

***Note***: The Staging environment is intended to be TransLInk’s the pre-prod environment going forward, but since there may be changes two testing runs will be needed, one against the load balanced server and one with no load balancer.

## test recording

TransLink recommends performance tests be recorded in JMeter. (open source, no license needed)

See appendix for further information.

## test reporting

* Vendor will track and report test results based on performance requirements contained in this document. See Appendix A for detailed testing information.

## test deliverables

|  |  |  |  |
| --- | --- | --- | --- |
| Deliverables | Description | Responsibility | Approver(s) |
| Testing requirements | * Test Cases * Expected Test Results (Baselines) | TransLink |  |
| Response to Testing Requirements | * Capability to complete * Strategies and Plan * Dates * Costs | Vendor |  |
| Test Report/Result Analysis | Test results will be provided to TransLink, including any functional defects discovered, and additional cycles inclusive of defect fixes. | Vendor |  |
| Performance Defect Reporting | Defects will be reported and documented in TransLink’s Kanbanize defect list. | Vendor |  |
| Knowledge Transfer | Including all scripts documentation and Knowldege transfer | Vendor |  |

Each load report shall contain the following, at a minimum:

* Description of test parameters and conditions
* For test scenarios, where actor is human: Graphs showing correlation between main business and performance counters, and number of active users (response time, requests/sec, pages/sec)
* For test scenarios, where actor is human: Statistics for the key transactions in the sytem (average, maximum, 90th percentile response time)
* For test scenarios, where actor is sytem: Statistics regarding processing times of different operations
* Error statistics
* Graphs or tables showing hardware resources utilization (i.e. CPU Usage, free RAM)
* Conclusion of performance; how all items conform to the Key Performance Indicators (KPIs)
* List of performance related issues found during the tests (if applicable)

## test acceptance criteria

All test execution will end based on the following exit criteria being met:

1. 100% of the test cases have been executed (unless there is an agreement to drop some test cases) .
2. A report of the test results has been submitted to TransLink.

# TEST SCHEDULE

***Key Dates & Dependencies***

*Dependencies:*

* There is a soft dependency on completion of 1st round of Functional Test, before the Planning and Preparation phase can begin.
* There is a hard dependency on completion Functional Test, before the Execution phase can begin.

*Milestone Dates:*

* Kick off – Feb 11
* Planning & Preparation completion – Mar 7
* Test Execution completion – Apr 11

Other Key Milestones are listed below. Target dates to be confirmed.

* Execution of 1st round complete and results captured
* Defects from 1st round reported and resolved
* Execution of 2nd round complete and results captured
* Defects from 2nd round reported and resolved

# Appendix A: Test Baselines & Test Scripts

## Key Data

Performance Testing also includes:

* Potential bottlenecks:
  + Response time of a problematic scenarios in V13 vs V17 to ensure further degradation is recorded, or improvement in response is recorded.
  + Random testing of standard scenarios to ensure no degradation of performance V13 t0 V17.
* Load Testing:
  + How does the system behave with increasing numbers of concurrent users? (Trip Planner, Feedback form).
* Stress Testing which answers the question:
  + How does an event which causes a drastic increase in traffic over a short period of time, affect the system? I.e. Snow Days.

| Performance Scenario ID | Scenario Name | Scenario Details | Actual Results |
| --- | --- | --- | --- |
| 1 | Test Clients: | Response Time: Average and Peak  \*\*\*\* First Paint (all components loaded for the initial screen) < 2 seconds  Page completion time: Average and Peak, Page completion  Errors with error type  Requests: Average and Peak per second or per minute  Total Bandwidth |  |
| 2 | Web Server | CPU Usage  Memory Usage  Disk I/O  Page Read/Write per sec  Bytes rec/sent per sec |  |
| 3 | DB Server | CPU Usage  Memory Usage  Network Throughput  Connections  Transactions per sec  Read/Write latencies |  |
| 4 | Load Balancer | CPU Usage  Memory Usage  Network Throughput |  |

## Load, Stress and Scalability Testing

* Project **must** understand the average and maximum loads on the current Trapeze system by identifying the average # of concurrent users (named or unnamed) per module, and their average session durations so that there can be a baseline established for the upgraded system.
* Project **should** provide a high-level performance test knowledge and/or strategy to enable operations to continue to track performance to accommodate future growth in load and usage.
* Upgraded Trapeze System **must** be able to meet the performance baselines (or be granted exceptions) and accommodate incremental / organic growth in load at least for the next 5 years.

*Note*: There are no current baselines for load and stress testing

| Performance Scenario ID | Scenario Name | Scenario Details |
| --- | --- | --- |
| 1 | Trip Planner: Load and Stress  (All the test scenarios required to be done on single server and load balance servers) | **Conditions:**   * Historical Peak: Max. 625 users traffic per hour (per server), increase number of users per hour by 625 for each additional server, to a maximum 16 servers (current total number of servers in Production). * Failure: Incremental concurrent users to failure (100🡪500🡪1000🡪2000🡪3000🡪4000🡪etc.) * Drastic increase in traffic over 10 mintues: from 500 to 5000  I.e.Snow Day * Expected Traffic increase: 10% per year for max. of 5 years * Load test: Load 5,000 (to be confirmed) concurrent users for 24 hours. (*Assumption:* will have a load balancer for both internal client apps (InfoAgent/FX/Blockbuster/COM/OPS) and for the G3 Web a load balance technology called ‘F5’ that is new to our Trapeze environment as we currently use CISCO ACE.)   **Steps:**   1. Enter www.translink.staging into browser 2. Select Schedules and Maps 3. Select Trip Planner |
| 2 | Feedback Form: Load and Stress | **Conditions:**   * Historical Peak: Max. 1000 users/hr. * Via COM-web   Incremental concurrent users to failure   * Via COM-web   (25🡪50🡪100🡪200🡪300🡪500🡪1000, etc.)   * Drastic increase in traffic over 10 minutes: from 25 to 500 I.e Snow Day or Problem with Skytrain * Expected Traffic increase: 10% per year for max. of 5 years * Load test: Load 500? concurrent users for 24 hours. * Security test –Simulate DDOS attack.   **Steps:**   * Enter www.translink.staging into browser * Scroll down to bottom of page * Under Stay Connected, select Send Feedback |

## Trip Planner

G3-Trip Planner:

| Performance Scenario ID | Scenario Name | Scenario Details | |
| --- | --- | --- | --- |
| 1 | Trip Planner | Run Trip Plan “Marine and Capilano” (pick West Vancouver when presented with choices) to “Georgia and Burrard” arrive 6:00 AM on Sunday Date.  Steps:   1. Enter www.translink.staging into browser 2. Enter data selection per table below 3. Click on Plan MY Trip button  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Departing From** | **Going To** | **Arriving/Departing** | **Time** | **Date** | **Options** | **Expected Results** | | Marine and Capilano | Georgia and Burrard | Arriving | 6:00 AM | Sunday Date |  | **Cannot match parameters:**  Time out at 20 seconds and error message is displayed | | Granville and Davie | Waterfront Station | Arriving | 5:00 PM | Today’s Date | Allow more transfers | **Too many possibly itinerary layouts:**  Time out maximum 30 seconds and error message displayed | | Granville and Davie | Waterfront Station | Arriving | 5:00 PM | Today’s Date | Accept defaults | **Default Parameter Set used:**  Response within 12 seconds | | Lonsdale and 29 | Steveston Village | Arriving | 12:00 PM | Today’s Date | Accept defaults | **Involves multiple transportation types:**  Response within 12 seconds | | 22nd Street Station | 29th Avenue Station | Arriving | 12:00 PM | Today’s Date | Accept defaults | **Vanilla trip:** Response within 5 seconds  **Rerun data set:** Response within 1 second  **Re-run data set, but select “View Detail”:** Response within 2 seconds | | ***Burrard and Robson*** | ***Hamilton and Pender*** | Arriving | 12:00 PM | Today’s Date | Requires Wheelchair Accessible | **Wheelchair accessible with many layout possibilities:**  Response within 20 seconds | | ***Newton Exchange*** | ***Coquitlam Central Station*** | Arriving | 12:00 PM | Today’s Date | Allow More Transfers | **Involves four or more legs, with allow more transfers:**  Response within 13 seconds | | ***Newton Exchange*** | ***Coquitlam Central Station*** | Arriving | 12:00 PM | Today’s Date | Accept default | **Involves four legs:**  Response within 10 seconds | | ***Waterfront Station*** | ***Scott Exchange*** | Arriving | 12:00 PM | Today’s Date | * Get Lines and Stops for Origin only * De-select All * Re-select 014EAST | Response under 1 second  Subsequent runs should be under 1 second | | |
| 2 | Schedule Lookup | Look up the schedule for the 116 bus route plan.  Steps:   1. Enter www.translink.staging into browser 2. Click on the Schedules and Maps menu 3. Click on Bus and then Bus Schedules menu item 4. Enter “***116”*** in Bus Schedule Lookup field 5. Leave the default values for the date and time fields 6. Click on Get Schedule button | **Expected Results:** under 1 second |
| 3 | Next bus | Look up the next stop for a bus stop # 52707  Steps:   1. Enter www.translink.staging into browser 2. Click on the Schedules and Maps menu 3. Click on the Next Bus menu item 4. Enter ***52707*** in the I want the next bus at field. 5. Click on the Find My Next Bus button | **Expected Results:** under 1 second |
| ~~4~~ | Find Nearby Stops | Look up the next bus without using the bus stop number  Steps:   1. Enter www.translink.staging into browser 2. Click on the Schedules and Maps menu 3. Click on the Next Bus menu item 4. Enter ***“Marine Way and Boundary”***  in the I Want to Find the Closes Stop To field 5. Select ***“MARINE WAY @ BOUNDARY RD, VANCOUVER”*** from the drop down. 6. Click on Find My Stop button | **Expected Results:** under 1 second |

## Feedback form:

G3 – Feedback: Actual Results from Vendor

| Performance Scenario ID | Scenario Name | Scenario Details | Expected Results |
| --- | --- | --- | --- |
| 1 | G3: Feedback Form submission | User fills in the feedback form and then submits  Steps:   1. Enter www.translink.staging into browser 2. Scroll down to bottom of page and under Stay Connected, select Send Feedback 3. Fill in the Feedback Form    1. Select What feedback is about, for each feedback type: Bus, Skytrain, HandyDart    2. Fill in fields (They will be different depending on feedback topic) 4. Click on Submit button   See wire frames of forms [here](https://xd.adobe.com/view/b7fb9076-13c8-4e42-6b40-105376ef6072-c1ca/). | Less than one second for each type of feedback |

## OPS web

| Performance Scenario ID | Scenario Name | Scenario Details | Expected Results |
| --- | --- | --- | --- |
| 1 | Driver Paddle | User signs in  Steps:   1. Enter [http://tropst01:9053/hiwire?.a=opLogin](%20http:/tropst01:9053/hiwire?.a=opLogin) into into browser 2. Enter Badge Number: 1609 Pin: 1609 3. Click on Login button | Less than 2 seconds |
| 2 | Driver Paddle | User opens the Paddle  Steps:   1. Enter [http://tropst01:9053/hiwire?.a=opLogin](%20http:/tropst01:9053/hiwire?.a=opLogin) into into browser 2. Enter Badge Number: 1609 Pin: 1609 3. Click on Login button 4. Select Assignment Calendar from Daily Assignments menu 5. Select June from month drop down 6. Select 2018 frm year drop down 7. Click on search button 8. Click on a paddle icon in the calendar | Less than 24 seconds |

# required approvals

## RECOMMENDATION FOR APPROVAL

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| |  | | --- | |  |  |  |  | | --- | --- | | Bing Wu |  | | Assistant Manager, Software QA | Date | |
| |  | | --- | |  |  |  |  | | --- | --- | | Elaine Chung |  | | Functional Analyst - Trapeze | Date | |
| |  | | --- | |  |  |  |  | | --- | --- | | Robin Jeong |  | | Technical Lead - Trapeze | Date | |

## APPROVAL

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| |  | | --- | |  |  |  |  | | --- | --- | | Mike Marzbani |  | | PMO, Project Manager | Date | |