Systematically Planning an Enterprise Web Application Load Test - V 1.0

Suitability: An internet based enterprise web application where maximum number of concurrent users, geography, device types and scope & scale of business transactions is statistically predictable.

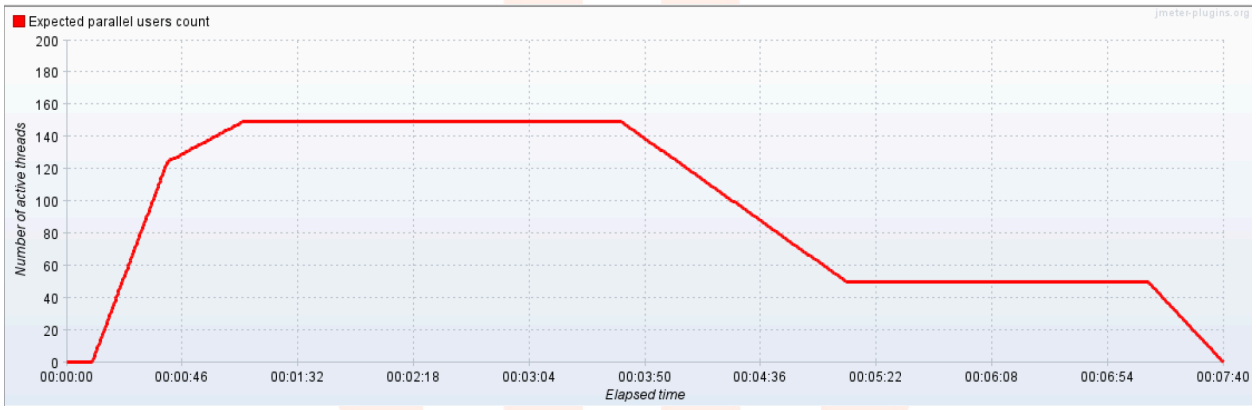

Image courtesy: Apache Jmeter 5.6.3 - [jp@gc - Ultimate Thread Group] - Personal laptop Installation

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First things first....

Below is a paradoxical statement about preparation by Dwight D. Eisenhower

Plans are useless, but planning is indispensable

As a responsible load test planner your key job is to think, visualize, understand, formulate and articulate your planning to different audiences.

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Planning is contextual and aims either to solve a problem or achieve a goal. Planning ahead usually gives a sense of control, offers a good degree of predictability around successes and probable failures.

Let's begin...

/* As a responsible load test planner, one of your key jobs is to summarize the product and the project well and in a timely fashion. */

Executive Summary

Product

- Purpose
- Target Users
- Key Features
- Key benefits
    - For users
    - For enterprise (business)

Testing Project

- Purpose and Objectives
    - Problem to solve (Mission of Testing)
    - Load test strategy
- Stakeholders
    - Impacting and Impacted
- Focus and Scope
    - Long term and short term
- Out of Scope?

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/*Be ready to walk-through, explain or at least give a high level overview of the following. */

/* A quick walkthrough often helps in identifying why, what, where, when and how of possible bottlenecks or latencies*/

Product's Overview

1. Reference to Architecture diagrams) - If any
2. Reference to flow diagrams - If any, e.g. Functional flow, data flow, sequence diagrams etc.
3. Technology stack (Front end, Middleware and back-end)

/*Spend time with ALL relevant and key stakeholders especially with the customers or customer's representatives to thoroughly understand and document negotiable and nonnegotiable requirements. This is usually a highly interactive and iterative process*/

Requirements (Negotiable and Nonnegotiable)

- Users and Transaction Loads
- Service Level Agreements (SLAs)
    - Success and Failure criteria
- KPIs
    - Success and Failure criteria
- Fault Tolerance

/*Performance comes at a cost and almost always there are trade-offs, at least in a practical world. DO Sit with your architects (if available) from enterprise, solutions and application

space, Do talk to your DBAs (if exists), IT team and Product team to get insights into different KPIs that matter*/

Users, Scenarios and Workload Models

- ☐ Number of users to simulate load causing concurrency
  - ☐ Normal load, Average load, Peak load, Spike load
- ☐ Scenarios
  - ☐ Apply F.I.B.L.O.T.S
  - ☐ Apply 80/20 principle
    - ☐ Gather information from Product / Business team
    - ☐ Use user journey analytics from production
  - ☐ Similar products and competitor analysis

Test Data Management

- ☐ Synthetic (Hand-crafted or Tools generated) yet Domain specific
- ☐ Production replica (PII obfuscated or totally removed)
- ☐ Provided by product / business or analytics teams
- ☐ Files or Databases or Dynamically created
- ☐ Formats (Input, Output)
- ☐ Refresh rate

Measurements and KPIs (Key Performance Indicators)

KPIs - Relevant to IT/System teams

- CPU
- Memory
- Database
- Network I/O

KPIs - Relevant to Business

- User Experience
- Conversion Rate
- Page Views
- Click Through Rates

KPIs - Relevant to User Experience

- Response Time
    - Percentiles
    - Standard Deviation
- Transactions per Hour (TPHs)
- Errors and Error Rate

Test Environment (Advocacy and Provisioning)

For example:

Server Name	Server and Type	OS	Memory	CPU	Space
LTE-01	Database | On-Prem	Windows Server	16 GB	8 Core	1 TB

Risks, Assumptions and Dependencies

- ☐ Identify and explicitly document key risks (Probability of occurrence and Impact) that you think you may run into.
- ☐ Explicitly articulate what are your key assumptions.
    - ☐ Validate those with relevant stakeholders for their safesness and unsafeness

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ACI Matrix

- ☐ Who is accountable for load testing?
- ☐ Who will be consulted?
- ☐ Who will be informed?

Load Test Design and Scripting

Depending upon the load test approach, design your load tests and turn those into low code or no code or hybrid scripts. Your load test approach should be a fine tuned combination of workload modeling and target throughput. This approach is driven by domain, users and user scenarios.

Test Execution Readiness Assessment (Entry criteria)

- Usually the entry criteria looks like...
    - Requirements are *almost* well defined, well documented, reviewed and good to go from business
    - Load injector tool is identified and a POC is done to assess degree of suitability, support and cost effectiveness
    - Scope and timelines are negotiated
    - A test environment (as agreed upon based on optimal specifications, cost and relevance) is ready
    - Application is functionally sane and stable
    - Monitoring tools in place
    - Tester is ready with a load testing attitude, essential literacy and education

Baselining and Benchmarking

- Before going for a full scale load test it is critical to run tiny load tests for a single user.
- Gradually but systematically ramp-up the users and transactions load (per designed profile and distribution) and monitor the performance per KPIs.
- Evaluate the results from baselining and benchmarking
- Get a consensus. Revisit, refine and re-establish the test requirements, environment or KPIs or both.
- Repeat.

Load Test Execution and Reporting

- Once baselining and benchmarking is done, go for a full scale load test per testing scope.
- Report the results and log anomalies.

KPI for Tester

Ability to identify, configure, run tests that find bottlenecks as quickly, cheaply and early in the load testing life cycle.

Resources

A useful, interesting and external reference for load test plan templates:

Performance Test Plan Document Template | Non Functional Test | (perfmatrix.com)

How to Write a Test Plan for Load Testing - Flood

Final Note

This load test planning guide is more suitable for load testing beginners.

The aim of the documentation is to give them a perspective of overall load testing planning in a context.

This planning guide should benefit especially those who attended my workshop because they can relate to the context.

Apache JMeter scripting, Workload modeling details, Test execution methods and Reporting are not part of this planning guide.

If you received this copy and you're not one of the attendees, still feel free to use it as you deem fit.

For any feedback, critique or questions, please write to testanalyst@live.com.

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