Apache Guacamole
Project Definition Document

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VERSION HISTORY

Date	Document Version	Document Revision History	Document Author/Reviser
November 5, 2019	**1.0**	**Initial overview and draft**	**Ben Eickmeier**
November 30, 2019	**1.1**	**Further additions to draft**	**Ben Eickmeier**
December 2, 2019	**1.2**	**Finalize first complete draft**	**Ben Eickmeier**

APPROVALS

Date	Document Version	Approver Name and Title	Approver Signature

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1. PURPOSE

The purpose of this project is to enable better scaling of Apache Guacamole, a current open source project. This project allows users to connect to many different virtual machines over an internet browser.

2. PROBLEM/OPPORTUNITY

Apache Guacamole allows for users to connect to different desktops including Windows, Linux, and the Linux Terminal via a web browser. Currently, when the users connecting to the service exceeds a certain limit, their becomes a delay between the server response and a client's actions. Fixing this would lead to the service of more clients and increased use for the open source application in environments such as classroom and professional settings.

3. PROJECT GOAL

The goal of this project is to increase the scalability of the Apache Guacamole service.

4. PROJECT OBJECTIVES

- Implement database to track connection history of a single user.
- Implement memcached to track and share the connection history data among all users.
- Lay the groundwork for an event-based architecture to provide increased scalability.

5. PROJECT SCOPE

We must configure Apache Guacamole to scale in such a way that a single server running an operating system can handle multiple client, or user, connections with minimal loss to latency or a connection crash. We need only work on the scaling part of the system unless deemed otherwise by the team mentor.

6. KEY STAKEHOLDERS

The major stakeholders of this project include Michael Barkdoll, the Apache Guacamole open source community, and the School of Computing at SIUC.

7. OUTCOMES/SUCCESS CRITERIA

- A server must be able to run multiple operating systems without a drop in performance
- Multiple users must be able to connect to an operating system without a drop in system performance

8. ASSUMPTIONS AND CONSTRAINTS

8.1 Assumptions

- We assume that the Apache Guacamole portion we pull from the docker container is the most up to date version of the software we can access.
- We assume that our server and client setup for testing on our own machines mimic the intended functionality for our mentor.

8.2 Constraints

- We cannot change or update the core of the Apache Guacamole framework.
- The version of Apache Guacamole that we pull from the docker container is quite out of date.

- The project must be completed by May.
- Our mentor's wife is having a baby, so he will be busy with family things and may not always be available.

9. RISKS

Our team may not finish work on the event driven architecture part of the project. We aim to lay the groundwork, but depending on how much time we have left to complete this section, it may not get done.

10. FUNCTIONAL REQUIREMENTS

Name	FR-01 User Connection
Summary	The user can connect to the Guacamole web client
Rational	There is no project if a user cannot connect to the client.
Requirements	We must supply proper documentation to guide a user in how to connect to the web client.

Name	FR-02 Connection processing
Summary	Multiple users should be able to connect and disconnect over several instances of the service without any loss of connection or drop in connection performance, or latency.
Rational	This will increase the scalability of the service and increase its performance overall.
Requirements	We must make use of Memcached in order to aid the Guacamole service in processing multiple connections.

Name	FR-03 Multiple Operating Systems
Summary	The user can create and interact with multiple operating systems within the client with minimal loss in latency or performance.
Rational	This is a core service of Apache Guacamole.
Requirements	We must design our scaling porting of the project to not harm the performance of any individual user over many instances.

11. NON-FUNCTIONAL REQUIREMENTS

Name	NF-01 Supply Documentation
Summary	There should be steps available to follow in order to

	connect and set up the web client for Apache Guacamole as well as create instances of operating systems.
Rational	The user or customer should have a good experience with the product during the setup phase.
Requirements	Written document with steps on how to set up connections.

12. TECHNICAL REQUIREMENTS

Name	TR-01 Language Requirement
Summary	The project will be developed the Java programming language.

Name	TR-02 Distributed Memory Service
Summary	The project will include some distributed memory service to help with scalability like memcasched.

13. USE CASES

Name	UC-01 Multiple user connections
Summary	Many users interacting with a single server via many different web client instances
Rationale	Users will want to work with their operating systems via the web client without issues
Users	Consumer, open source developers
Preconditions	The users are connected to the server via the web client
Basic course of events	1. User connects to Guac server with username and password 2. User creates new operating system instance via web client 3. Different user at different web client connects to server and creates operating system instance 4. Continues until user satisfaction
Postconditions	Multiple users will have their own instances of an operating system on different web clients with minimal loss in performance

14. DATA ELEMENTS

Date: _____

Approved by: _____

Approver Signature: _____

Mentor Name: _____

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