Open Virtual Desktop (OVD) Project Inception Report

Created By:
Andrew Cowden
Justin Sieling
Mark Beussink
Edward Byrne

Southern Illinois University Carbondale

Table of Contents:

Project Inception Document Purpose:

The purpose of this project inception document is to allow the members of the team MAJE and those involved currently with the Open Virtual Desktop (OVD) project - Michael Barkdoll and Tessema Mengistu - to gain an understanding of this project's initial business needs and project goals. The information discussed within this report has been gathered through discussions with Michael Barkdoll as well as agreements among the members of the team MAJE. This document holds as a binding agreement between members Andrew Cowden, Justin Sieling, Mark Beussink, Edward Byrne and Michael Barkdoll to complete the Open Virtual Desktop project as defined by the milestone definitions included. It is important to note that this document is not for the purpose of rigorous requirement analysis as that will be outlined within a future project deliverable.

Objective Definition of OVD:

Purpose of Open Virtual Desktop:

Within the Computer Science Department here at Southern Illinois University, it is beneficial to have computer labs and stations for our students and faculty to complete work on their course materials. With the large number of Computing based majors here on campus, it requires a lot of resources to provide the necessary lab equipment to our faculty and students. One of the primary drawbacks to our current computer lab setup is in the high monetary cost of purchasing and maintaining our machines. Rather than have full PCs for each workstation, it would be beneficial if we could utilize computers with less overall hardware cost such as a Thin Clients. In addition to the high price tag of our current computer labs, we also struggle with the maintenance of our machines in having specific software. It can be quite time consuming for our system administrators to ensure that all of our computer stations have the up to date software with the current setup. Due to limited licenses or heavy installation requirements, some stations have the inconvenience currently of not having all of the software programs someone may need. In order to remedy many of these difficulties our department is facing, we have set out to complete the Open Virtual Desktop project as defined below.

Overarching Project Definition:

The Open Virtual Desktop (OVD) project will be implemented as a web application that will allow faculty and students at Southern Illinois University access to virtual desktops. Since OVD will be implemented as a web application, we can remedy the need for the high powered

workstations that we currently require in our computer labs while still remaining user friendly. The user of our application will provide a set of user credentials in order to gain access to a choice of several different environments they can work in. User credentials will be represented by either the user's assigned SIU Dawg tag or a combination of automatically generated passwords for authentication. The environments that can be utilized will be multiple virtual desktops including various Microsoft Windows and Linux distributions chosen based upon the Computer Science Department's needs. The Open Virtual Desktop project allows for users to access these distributions remotely from any computer and be able to interact with it as if they were using any standard lab machine found on SIU campus. Users can also choose to run just a single program as well bypassing the need for an entire virtual desktop. In order to allow our faculty and students to gain a more unique user experience, we have decided to allow additional features not found currently in our labs. This includes the ability to manage and record screen captures of virtual labs, share a desired connection with other users, and to have easy file transfer between the virtual labs. In addition to standard users, we will also implement administration abilities to specific accounts. Admins will be able to see the resource utilization of the virtual desktops that are being used and manage them accordingly such as ending unwanted sessions. Administrators can also see and manage software programs in one central location that can then be made accessible to the users within the virtual desktops. For more advanced functionality, administrators can set up groups of virtual desktops together and simulate a lab environment for use within our courses here at SIU.

External Technologies:

The implementation of the Open Virtual Desktop will involve working with various technologies as briefly defined below. This list may be subject to change as the project continues forward but we have included this overview to allow for a better understanding of the initial milestone definitions included.

- **Angular** will be the primary front end development technology we will use as it allows us to focus on streamlined communication with the .NET core backend while still having a sleek user interface.
- **ASP.NET Core** backend will be the primary development framework used to facilitate connections between the various sub elements of the OVD project.
- **Apache Guacamole** is a clientless remote desktop gateway that will serve as the primary connection and management point for the virtual desktops we create. The Guacamole server will be represented as a tomcat servlet paired with a guac process.
- **Entity Framework** will assist in the implementation by allowing for simple Object Relational Mapping for managing accounts and virtual desktops on the backend.
- **Cloud Monkey** is a CloudStack CLI tool that will be used to integrate the Open Virtual Desktop project onto Michael Barkdoll's CloudStack when deployed.

Project Scope:

What Areas Does this Project Cover:

The Open Virtual Desktop project will cover the development of a web application that will provide users with remote desktop access to virtual desktops hosted by Southern Illinois University. We will provide the implementation to connect to both Windows and Linux based virtual systems that can be utilized by users. In order to better manage users, we will configure the sign on capabilities for both regular users as well as specifically created admin accounts. After the basic system is created allowing users to access basic virtual desktops, we will focus on the additional features such as screen recording, single program running, file transfer, admin group creation, and easy installation of programs onto the system. Once the overarching functionality of connecting to a virtual desktop has been implemented, we will then focus on making OVD work seamlessly on Michael Barkdoll's CloudStack he runs for the Computer Science Department.

What Areas Does this Project Not Cover

In order to help prevent scope creep, it is important to note some of the basic areas that this project will be excluding from its implementation. This project is about allocating and assigning various virtual environments to users and will not involve the creation or altering of existing virtual machines. We do not want to reinvent the wheel so we will make use of existing frameworks and technologies to help us streamline the connection between our HTML5 frontend and the backend allocating the virtual environments. One of the primary areas we can see this is with the Apache Guacamole project which works as a clientless remote desktop gateway to project virtual desktops onto a HTML5 front end.

Project Deliverables:

Below we have listed the primary deliverables that will be included with the Open Virtual Desktop project upon its completion. These will help control the documentation, implementation, and maintenance of the system as a whole.

- Project Inception Report
- Requirement Specification Document
- Project Design Overview
- Project Website
- Source Code for Web Application
- Installation Guides and Scripts
- Testing Suites

Project Assumptions and Constraints:

Assumptions:

- The chosen technologies (Guacamole, .NET Framework, .ect) will continued to be supported throughout the project and will connect together within the designing phase.
- Michael Barkdoll will continue to serve as the primary mentor throughout the completion of this project and will provide guidance on major decisions when applicable.
- All members of team MAJE will be a part of this project throughout its entire lifecycle and contribute to its outcome.

Constraints:

- We will depend on no monetary budget during the development of this project excluding the already purchased Angular training course ($9.95).
- This project has many technical aspects that members of our group have not worked with previously making training a large portion of our time early in the project life cycle.
- We have roughly a semester to complete the entirety of this project so work must be done at an adequate and quality pace.
- School, work, and extracurriculars are still a part of our team members lives and will be a consideration when delegating meeting times and team interactions.

Team Organization and Roles:

Stakeholders / Contact Information

This section of the document describes all of the immediate people involved in the development of the Open Virtual Desktop project. Here I have included the contact information as well for each of the individuals involved within the project. Communication is key to the success of this project, therefore, we are using Slack and Microsoft Teams to help facilitate the sharing of ideas.

Stakeholder Name	Role	Contact Info
Michael Barkdoll	Project Mentor	mbarkdoll@cs.siu.edu
Tessema Mengistu	Project Coordinator	tessema.mengistu@cs.siu.edu
Andrew Cowden	MAJE Full Stack Developer	am.cowden.97@gmail.com
Justin Sieling	MAJE Full Stack Developer Team SCRUM Master	Jmsieling@siu.edu

Mark Beussink	MAJE Full Stack Developer	mrbeussink@gmail.com
Edward Byrne	MAJE Full Stack Developer Team Documentation	byrnee24@gmail.com

Project Management Information:

In order to analyze the progress of our project and ensure that our release cycles remain on track, we have chosen to use a Scrum / Extreme Programming (XP) hybrid. The Scrum portion of our software development methodology plan allows for well defined implementation plans through its regular spring planning and its daily standup meeting. We felt that certain elements from Extreme Programming would benefit our project as well such as its focus on small scale prototypes for each release and its rigorous testing background for improved code quality.

Risk Management Information:

Here we have identified some of the initial risks that have become evident while research this project in its beginning stages. Included with a description of each risk is a possible solution to the overall problem.

- What if we cannot meet with our mentor as he is busy with other work? Michael Barkdoll is serving as the mentor for this project and is a very valuable resource to have. Like everyone, there are times when work piles up and it can be hard to make time for meetings. Since we are all serving as full stack developers and will have learned the foundational technologies within the project, we will be able to be quite self sufficient in the event one of us becomes stuck. Exploring prototypes is also a great way to explore a new problem that may arise and can help us come up with new solutions.

- What if we run out of time for this project? Scrum and XP are focused on quick development cycles allowing us to always have a working product at the end of each release.
- What if it is difficult to learn these new technologies? As with many projects in the field of technology, learning is just as much of a concern as the actual implementation. Since we are completing training videos and reading documentation over winter break, we will have a head start and extra time if needed.
- What if we temporarily / permanently lose a team member? Dealing with the leaving of a team member would make this project more difficult overall. However, we are all full stack developers within this project so any work that is left by the individual leaving can be picked up with a smaller learning curve than usual.

Work Plan:

Major Milestone Definitions

- Training session to learn about the technologies and architecture of the project.
- Create the basic functionality prototype of OVD by allowing test users to get access to a virtual desktop and interact with it.
- Add on SIU account sign-in capabilities and integrate user verification.
- Implement advanced user features such as screen recording, file transfer, group admin creation, single program execution, and connection sharing.
- Create more advanced server management to allow better efficiency while running on the cloud stack.

Project Schedule

Note that this gantt chart is a rough estimate of the overall project time table. These dates may be altered based on sprint planning events or reevaluation of the order of requirements. Each diamond below shows the end of a phase meaning that that milestone will be completed at that time.