Project Portal:

Task 2

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Contents

**2** [**System Integration and Modeling/Methodology 1**](#_Toc412448810)

[**2.1 System Model 1**](#_Toc412448811)

[**2.1.1 Client-Side 1**](#_Toc412448812)

[**2.1.2 Server-Side 2**](#_Toc412448813)

[**2.1.3 Back-end 3**](#_Toc412448814)

[**2.2 Technologies and Components 4**](#_Toc412448815)

[**2.2.1 Software 4**](#_Toc412448816)

[**2.2.2 Hardware 5**](#_Toc412448817)

[**References 6**](#_Toc412448818)

[**Appendix A A-1**](#_Toc412448819)

[**Appendix B B-1**](#_Toc412448820)

Chapter 2

# System Integration and Modeling/Methodology

## 2.1 System Model

Project Portal is using a design based off of the client-server model. This model specifically describes the interactions between a client computer and a server. The model Project Portal will be using has essentially three different areas that work together to make the application run. I will refer to these areas as client-side, server-side, and back-end.

### 2.1.1 Client-Side

The first area is the “client-side”, which is the technical way to refer to the user’s local machine that they will be using to access the application. Within the local machine, the user will be using a web browser as the main tool to connect to my application. The web application begins when the user enters the address into the web browser. The web browser then sends a request to the web server for the data required to display the application to the user. The web browser will then receive the data from the server which will contain instructions on how to display the graphical user interface as well as scripts that need to be processed from the user’s machine. Client-side scripts are written in some type of scripting language like JavaScript and interact directly with the page’s HTML elements like text boxes, buttons, list-boxes and tables. HTML and CSS (cascading style sheets) are also used in the client. In order for client-side code to work, the client’s internet browser must support these languages.

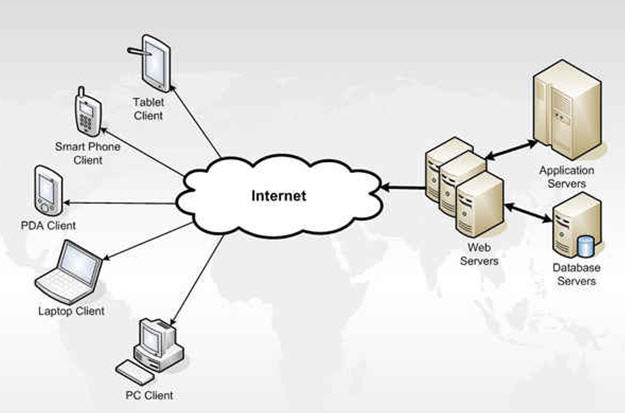


Figure 2.1 - Simple Web Application Model Diagram from techrepublic.com.

There are many advantages to client-side scripting including faster response times, a more interactive application, and less overhead on the web server. Client-side code is ideal for when the page elements need to be changed without the need to contact the database. A good example would be to dynamically show and hide elements based on user inputs. One of the most common examples is input validation. [1] Project Portal is designed to work with the Google Chrome, Microsoft Internet Explorer, and Mozilla Firefox Browsers. Each of the browsers may display certain elements of the web application differently, however the overall look and feel of the web application will be preserved.

### 2.1.2 Server-Side

The second area is the web server area. A web server is a computer remotely located at a companies chosen location that is specifically designed to handle requests from client. The requests can be for either data to be sent back to the client or data to be processed by the server. Server-side processing is used to interact with permanent storage like databases or files. The server can also render pages to the client and process user input. Server-side processing happens when a page is first requested and when pages are posted back to the server. Examples of server-side processing are user validation, saving and retrieving data, and navigating to other pages. [1] Project Portal will use Microsoft Internet Information Services (IIS) as the web server. The IIS web server will host all of the server-side code and do all the server side processing.

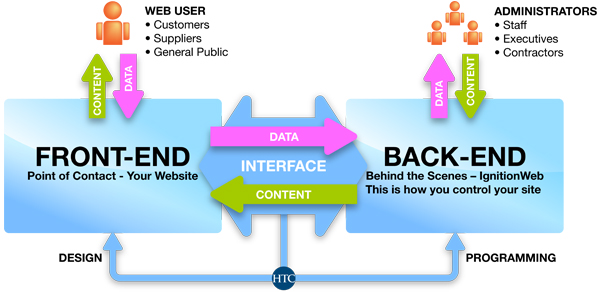


Figure 2.2 - Example Front-end Vs Back-end Diagram from 3nytechnology.com

### 2.1.3 Back-end

The third area is the back-end. This area is typically comprised of database and file servers that are not directly accessed by the user, but support the web server. The database servers store user data as well as data required for the web application’s operation. The file server is used as a repository to store and retrieve any files that may be needed by the user or the web application. Project Portal will use a virtual server running an Oracle database. For the file server, Project Portal will use a Microsoft Windows Server 2012 R2. The file server will be used to handle the files from the file browser page. In addition to database and file servers, Project Portal will use a Microsoft Exchange Server for mail, calendar, and contacts services as well as and ArcGIS server for published map services. The exchange server will handle and return the calendar data to the calendar page of the web application. All of these servers already exist within the DNR ecosystem.



Figure 2.3 - ArcGIS Diagram from ESRI

## 2.2 Technologies and Components

Project Portal weaves together many different technologies in order to create the final product. These technologies and components come from both the software and hardware groups.

### 2.2.1 Software

Hypertext Transfer Protocol (HTTP) is used to create connections between the client and the server as well as describe how the data will be transmitted. HTTP is an application-level protocol for distributed, collaborative, hypermedia information systems. It is a generic, stateless, protocol which can be used for many tasks beyond its use for hypertext, such as name servers and distributed object management systems, through extension of its request methods, error codes and headers. [2] Project Portal relies on this technology for communication between the user’s computer and the web server.

The ESRI ArcGIS API is used to display a map as well as the related layers for the map in Project Portal. ArcGIS is a geographic information system (GIS) for working with maps and geographic information. It is used for: creating and using maps; compiling geographic data; analyzing mapped information; sharing and discovering geographic information; using maps and geographic information in a range of applications; and managing geographic information in a database. [3]

DevExpress offers feature-complete UI controls, enterprise-ready reporting systems, IDE productivity tools and business application frameworks for Visual Studio. Our technologies help you build your best, see complex software with greater clarity, increase your productivity and create stunning touch-enabled applications for Windows, Web and next generation Mobile platforms - without limits or compromise. [4] DevExpress UI controls are used to make the calendar object as well as the file browsing object.

### 2.2.2 Hardware



Figure 2.4 – Windows Server 2012 Logo from Microsoft

The web server will be using Microsoft’s IIS server that is built into Windows Server 2012 R2. Internet Information Services (IIS) for Windows® Server is a flexible, secure and manageable Web server for hosting anything on the Web. From media streaming to web applications, IIS’s scalable and open architecture is ready to handle the most demanding tasks. [5]

# References

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For project code please see:

https://github.com/YukonJack777/CSCE470-Capstone/tree/master/projectsuite