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| Team PLab: |
| PLab Portal System  Analysis and Design |
| MIS320 Term Project |

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PLab Analysis and Design

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# Executive Summary

Write this last! Only when all other phases are complete. Last part of project.

# Business Case

Describe approach to business case.

## MySystem Description

Brief description of the proposed system

## Rationale and Need for MySystem

Include SWOT Analysis and strategic importance of the system.

## Preliminary Investigation

Show why this system is necessary. Convince management to proceed.

### Problem or Opportunity

What are the users requesting? Show how you would go about fact-finding.

### Scope and Constraints

### Costs and Benefits

### Feasibility

#### Technical

#### Operational

#### Cost

#### Schedule

# System Planning

## Project Deliverables

Describe the project/system outcome.

## Project Scope

Boundaries for the project: what is in and, more importantly, what is out. Refine what was described in preliminary investigation.

## Project Roles

Org chart for the project. Who is involved? What is their role function? Stakeholder or doer?

## Project Plan and Resources

Include WBS and GANTT chart. Provide project plan overview, with resource assignments (programmers, etc). Describe project team needed.

## Project Budget

Provide simple budget. This will get modified as operational costs are factored in.

## Project Risks

Create risk table, and rank order the risks. Include mitigation.

# System Analysis

Provide overall approach to the analysis for MySystem.

## System Requirements

Include approach to using surveys and other methods to determine requirements from stakeholder groups.

## Ongoing System Costs and Benefits (Include in Assignment Three)

Revise budget accordingly

## Data and Process Modeling

Include Context Diagram and DFD here. Make sure you provide an overall summary of these as well (not just the diagrams).

Provide data dictionary and decision tables as needed.

## Object Modeling

Provide an object model for the proposed system. Include use case diagram.

## System Development Approach (Include in Assignment Three)

Buy or build?

Use of cloud services?

Refine budget and project plan accordingly given your decision.

# System Design

Provide approach to design of MySystem. Make sure the project plan is updated as you provide more detail.

## User Interface Design

Show screens and describe approach

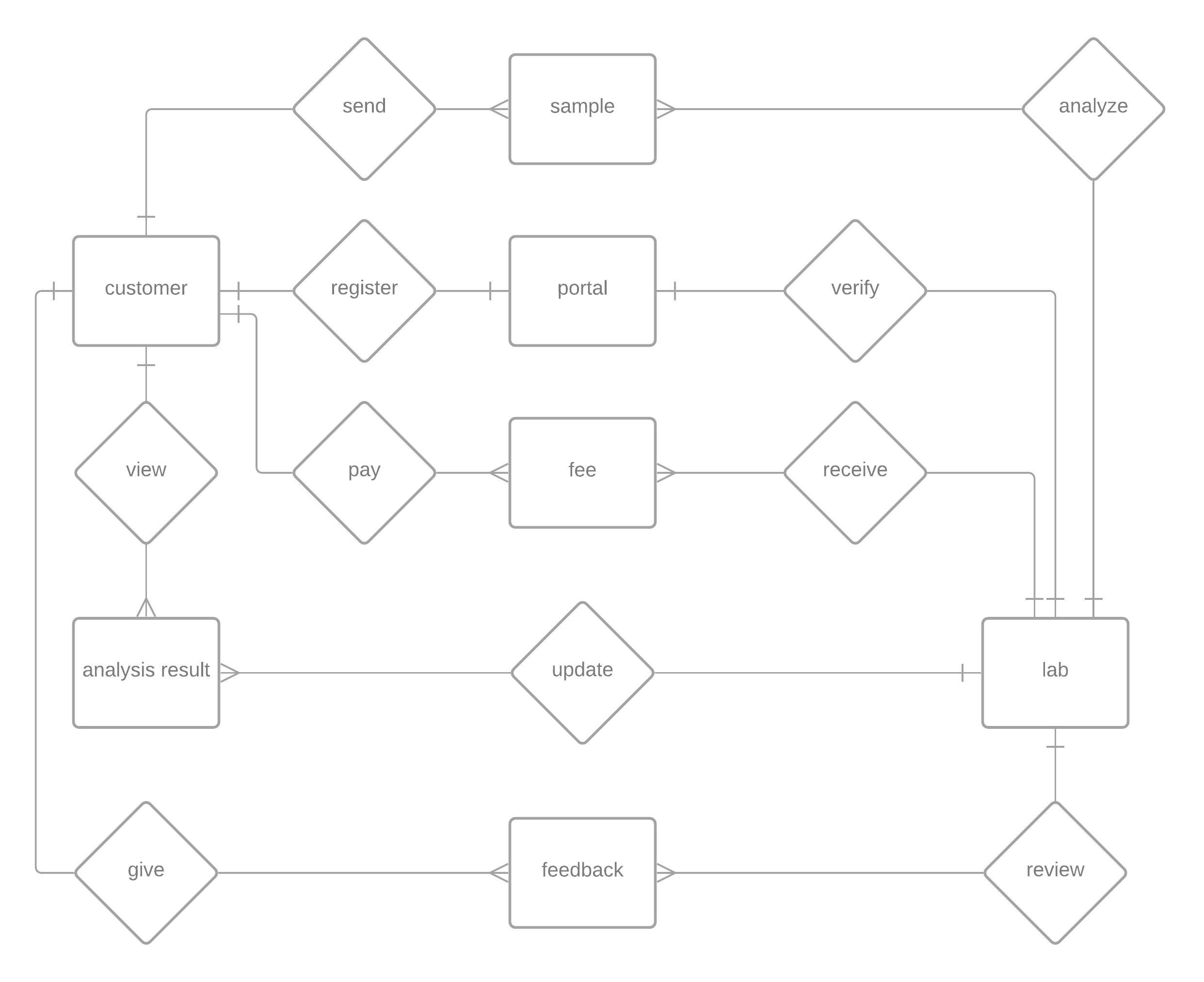
## Reports

Show sample output reports (screen output is fine)

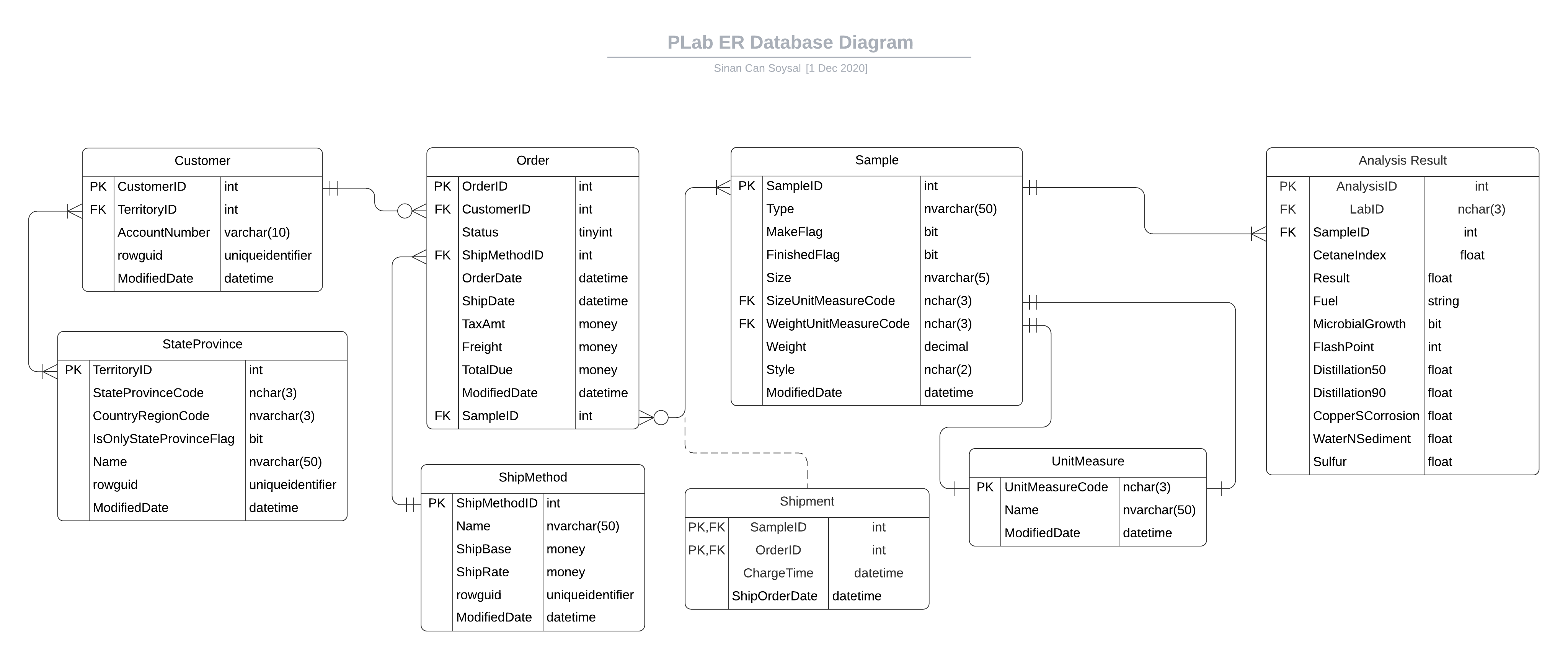
## Security and Control

## Data Design

1. Customer can register to portal
2. Customer can pay for analysis
3. Customer can send samples for analysis
4. Customer can send feedback
5. Customer can view analysis results
6. Laboratory can verify/deny register request
7. Laboratory can receive payment
8. Laboratory can receive samples
9. Laboratory can review feedback
10. Laboratory can analyze samples
11. Laboratory can update analysis results

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*figure 6.4.1: ERD Diagram*

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*figure 6.4.2: Database Design Model*

# System Architecture

## Architecture Design

This portal will provide a bridge between customer and PLab Laboratories. The client must be able to see the results of a sent sample easily. Client logs into the PLab Portal in order to reach analysis results. One client can have multiple samples sent at the same time and the system must be able to handle all of them without malfunctioning. Laboratories across the country can update analyzed sample results throughout this portal. After analysis result uploaded, client can view it’s analysis reports visually.

There are 3 main packages of this comprised system:

1. User Interface
2. Data Storage
3. Business Services

User interface will provide user interaction to the system. User interface must be able to support login, create sample requests, generate graphical representation of an analysis result, view results and send feedback to the system.

Data storage must provide reliable and secure data storage for the system. Client details, sample details, shipment details, fees, analysis results must be safely stored in the data storage. Business management and clients can reach needed data at any time from anywhere.

Business services contains the details of billing system, reading/updating data from database and managing client-business interactions.

Proposed system shall integrate with existing legacy system.

Our application works with large amounts of data provided by the labs around the country. In this situation, data will be accessed frequently by laboratories and clients. In order to accomplish this we must architect our application as a data-oriented system. The main reason of this architecture is to achieve integrality of data.

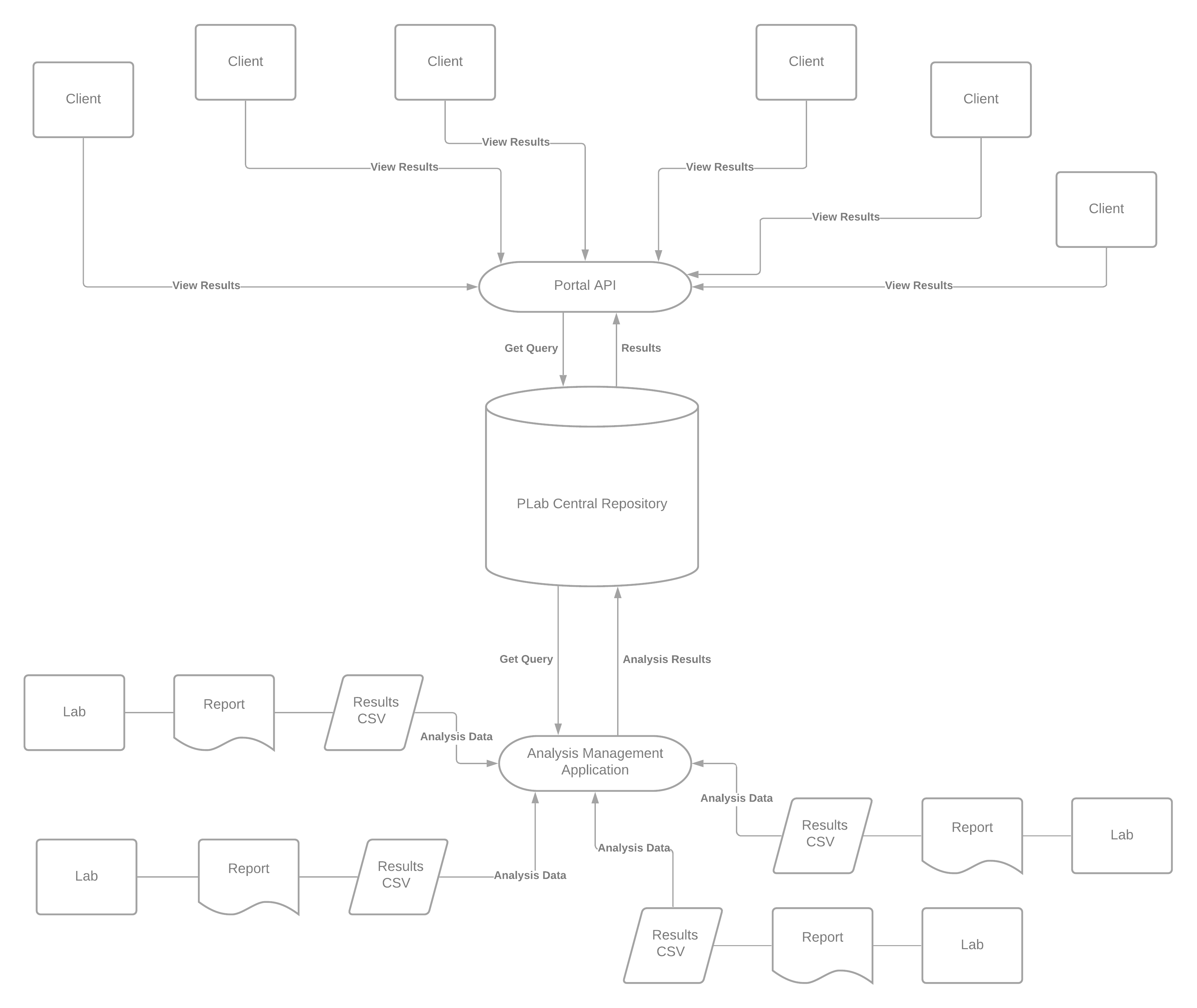
A centralized data repository will store all of the analysis results and it will be accessed through client side and business side API s. API’s will create queries according to the user’s needs.

**Advantages of this architecture:**

1. Data integrity
2. Backup and restore features ( this is the most important feature because our clients’ must reach their data whenever they want and wherever they want)
3. Decreases overflow of data between software components

**Disadvantages:**

1. The system is open to malfunction
2. Malfunctions will highly affect the clients



*figure 7.1.1: Architecture Design*

The system shall support up to 2000 simultaneous connections to central repository at any given time.

The system shall provide users to view older results with no more than 5 second latency.

The system must finish its transactions within 2 minutes.

According to these and previously evaluated requirements document:

The selected architecture design must support the sizing and timing requirements through client-server architecture. The client part is implemented on PCs and ensured to use minimal disk and memory.

**The architecture supports quality requirements:**

1. Linux, Windows, Mac OS support
2. User interface shall be designed for easy use
3. System must be available 24/7

## Software and Hardware Specification

To successfully accomplish the requirements of the project, some modern technologies have been suggested for the better service and security by having an online portal an an online sample registration system. This document contains all the software and hardware technology that has been proposed for the new system.

**Software Specifications:**

Application will be controlled by:

1. Python & ZingChart as front-end solution
2. PostgreSQL as database solution
3. GoLang as backend solution

Python is a rich programming language in terms of it’s data visualization libraries. User interface must be beautiful and simple at the same; ZingChart comes into play for the visuals of the portal. ZingChart is a free and powerful python library specifically developed for data visualization.

PostgreSQL is a free and open-source relational database which will get it’s job done in a fast and secure way.

GoLang is a programming language designed by Google. Go routines are GoLang’s most important future so far which allows concurrency in web based solutions.

**Hardware Specifications:**

We will support this project’s hardware by installing our own server rather than a subscription for cloud services.

**Dell PowerEdge R710 6B LFF Server**

R710 will be the main server for “PLab Analysis Laboratories” system. R710 will help us to operate efficiently and lower TCO with enhanced virtualization capabilities, improved energy efficiency, and innovative system management tools. It provides railings for easy installation and removing operations. Also it supports RAID operation with 12TB of storage. It’s CPU donated with 12-core Xeon processor and 12Mb of cache. The main unit manufactured by Dell, and the case is designed to allow accessing to hard disk drives easily. The server has got 2 power supply units for continuous working even if one of the power supply mulfunctions.

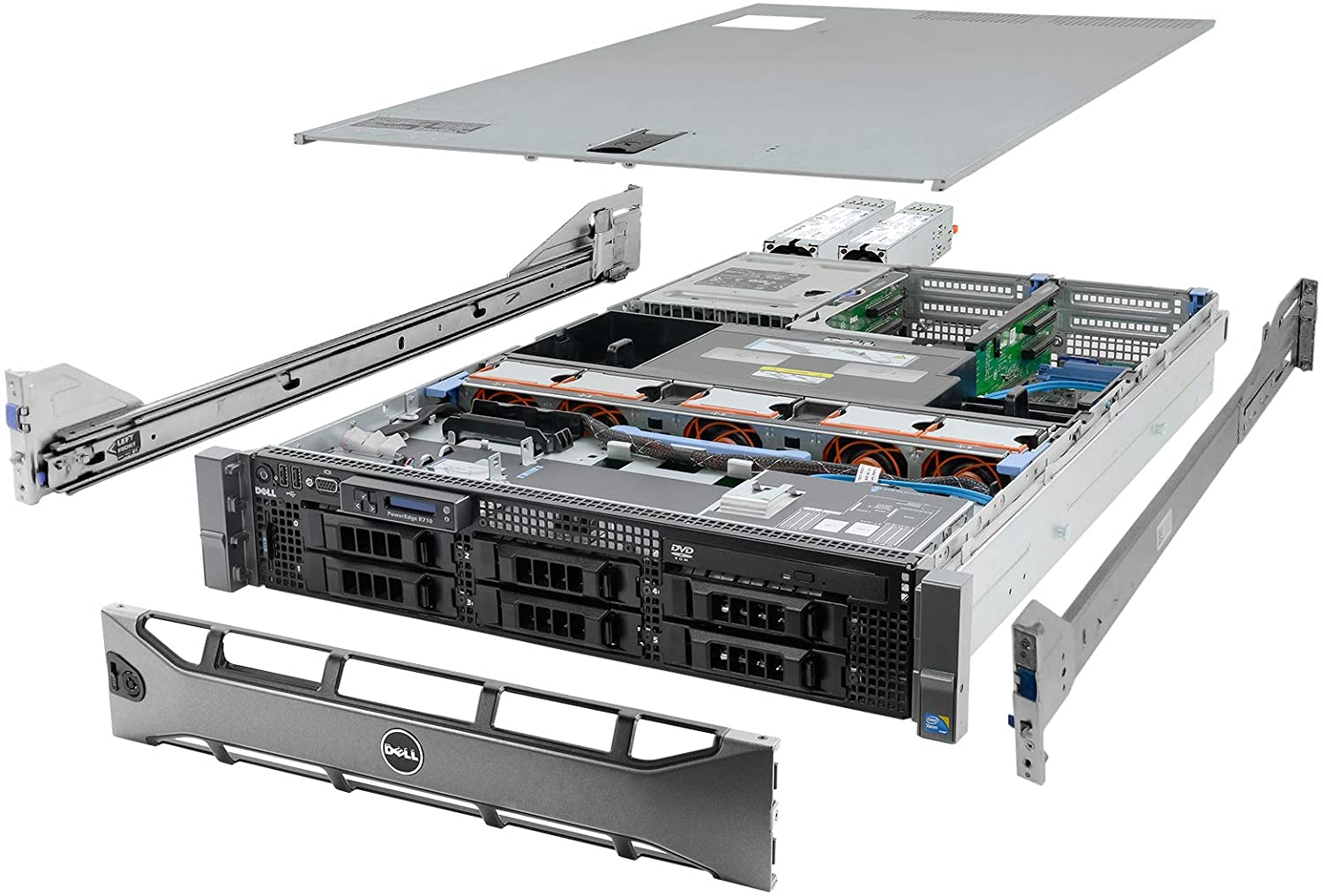


Figure 7.2.1: Dell PowerEdge R710 6B LFF Server

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| Hardware: | Price: |
| System: Dell PowerEdge R710 6B LFF Server   * **Processors:** 2x 2.83GHz X5670 12-Cores Total * **Memory:** 144GB RAM * **Hard Drives:** 6x 2TB 3.5" HDD * **RAID:** H700 w/ 512MB * **Optical Drive:** DVD-ROM * **Power Supplies:** 2x PSU * **Bezel:** Yes * **Rails:** Yes * **Operating System:** None | $ 729.99 |

**Additional Hardware for Network:**

Every laboratory has its own central computer so, we won’t be buying new computing hardware to the existing laboratories instead we will deploy a new software to existing computers. A communication link will be needed between all the laboratories and the PLab’s central repository. The link will be provided by our existing ISP and the whole communication structure will be called as ‘Chiral Network’.

# System Implementation

Provide implementation plan, add to project plan.

Include coding approaches.

Update budget as necessary.