



# Export/Import Operations and Administration System

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# Introduction

We developed a new database application for SriKrishna Logistics®, a company based in Mumbai, India, engaged in the customs clearing and forwarding activities of import and export firms. Such firms deal with various activities ranging from logistics management, inland transportation, Customs duty clearance, etc. Their original system relied on a set of Microsoft Excel spreadsheets, some paper forms, and several other procedures which were either semi-automated or manually done. Our software has been developed to resolve all these problems and also provide new views of data that will help the company to better manage its operations. The GUI is designed to be intuitive and user-friendly. Our application aims to be a one-stop shop for all operations related to import clearance activities in our sponsor's firm. We hope that it will provide a cost-effective substitute to the present system used by our sponsor.



# Objectives

- Capture all of the company's existing system's requirements
- Channelize these in the form of raw data and relevant relationships which encompass all of the sponsor's needs
- Make an outline of the functional requirements based on interactions with the sponsor and the database visualized
- Build an efficient and well-structured relational database
- Develop a user-friendly GUI for all the functions involved
- Reduce redundancy of data input as far as possible
- Integrate different functions through automation
- Improvise and accommodate features based on periodic feedback received from the sponsor.
- Conduct database stress testing to simulate conditions of work environment
- Input live data and run the new system in parallel with the existing system to compare the results.

# System Design Overview

Our software will be used by more than 50 employees at our sponsor's firm. Each of them accesses a centralized PostgreSQL® database hosted on a Red Hat Enterprise Linux® Server through their remote workstations, as is evident in the figure below:

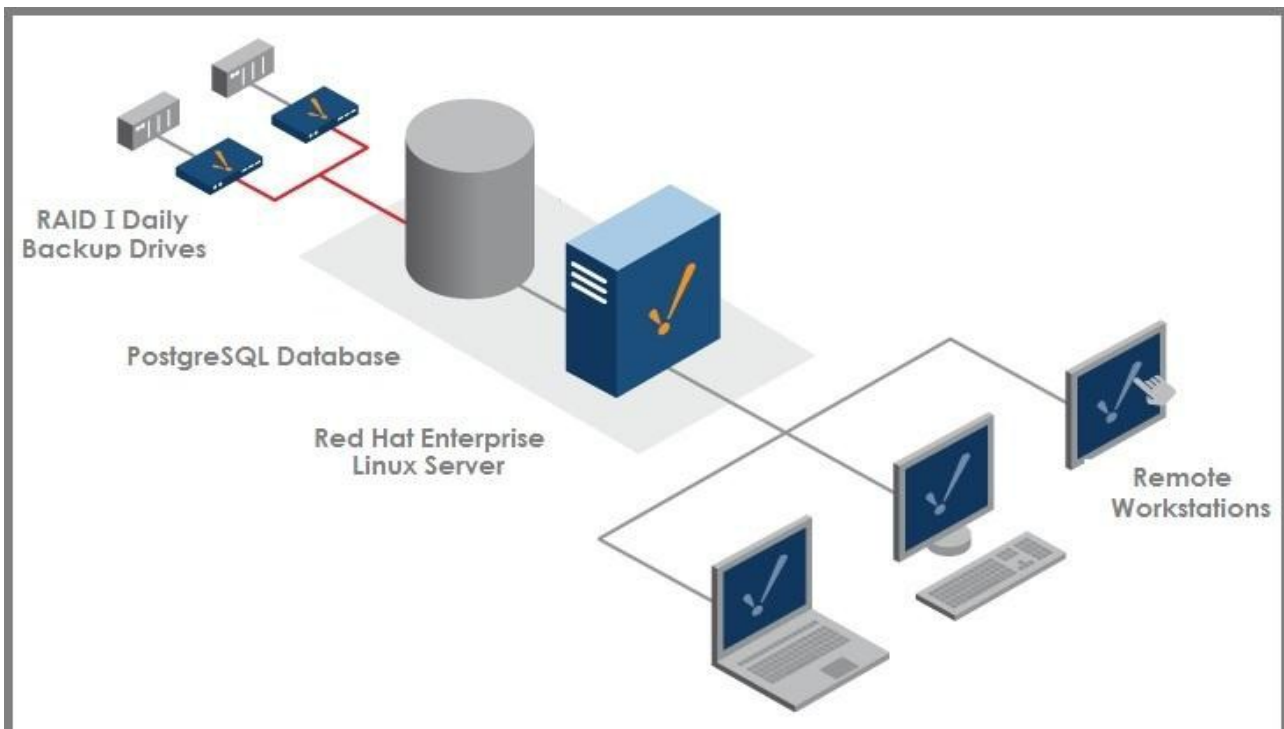


Figure 1– System Design Components

# UI Implementation

It was a very daunting task to export data to Microsoft Excel spreadsheets in a pre-organized format. To do so, Qt provides the ActiveQt framework to seamlessly combine ActiveX and Qt in the form of QAxObject. Additionally, to display certain dynamic reports to keep track of processes/flows from commencement of job to completion, we designed SQL statements at runtime. These were coupled with the Model/View UI architecture provided within Qt in the form of dynamically programmable and customizable widgets.

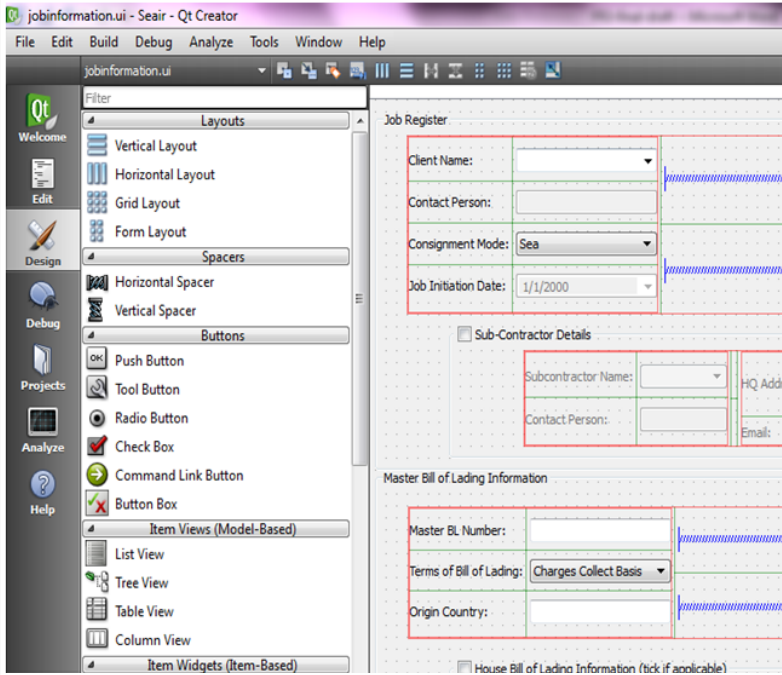


Figure 2 - Qt Designer in action

# Database Implementation



## PostgreSQL

- Relational Database Management System (RDBMS)
- PostgreSQL License - public domain

## Red Hat Enterprise Linux Server

- Running on Amazon Web Services



## pgAdmin

- Development platform for PostgreSQL.

# Software Implementation



## Qt Creator

- Cross-platform, C++ integrated development environment
- Easily integrates with PostgreSQL

## Qt Designer

- Easily port rough sketches
- Customizable widgets and dialogs



# Testing and Evaluation



## Application Testing and Monitoring Solutions

### AppPerfect

- Software used for Database Stress Testing

### Simulate Actual Deployment Scenario

- Concurrent access by 45 users over a period of 3 minutes, each performing real-time operations.

### Evaluating Test Results

- All hits successfully returned
- Response time commendable
- Indicative of scope to increase users

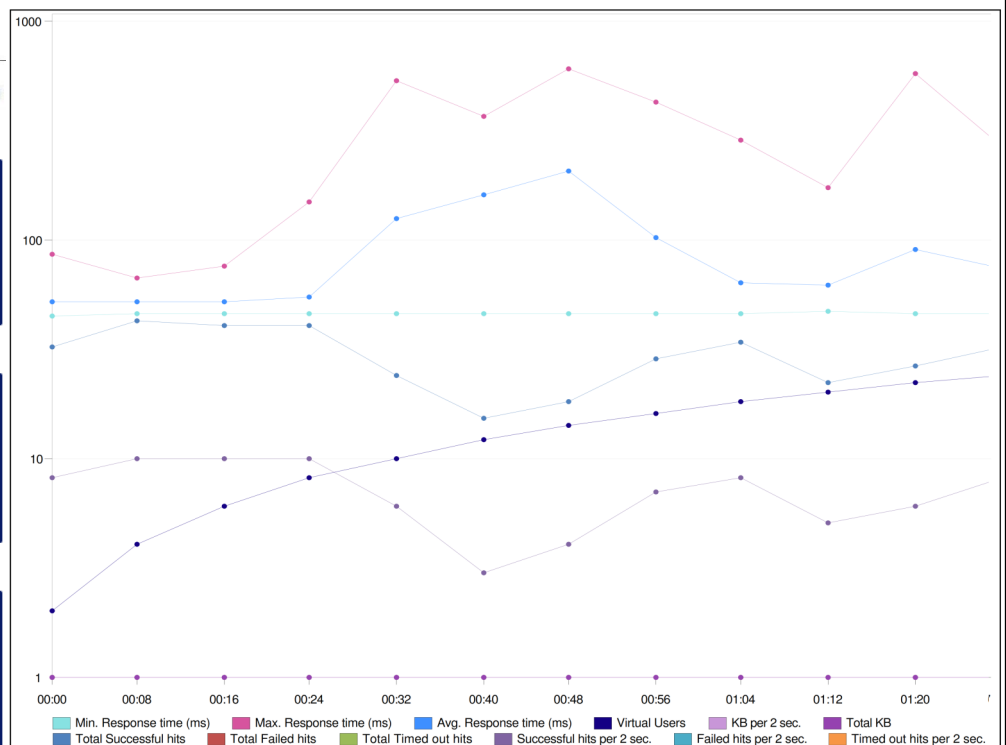


Figure 3 - DB Stress Test Results

# User Interface Explained

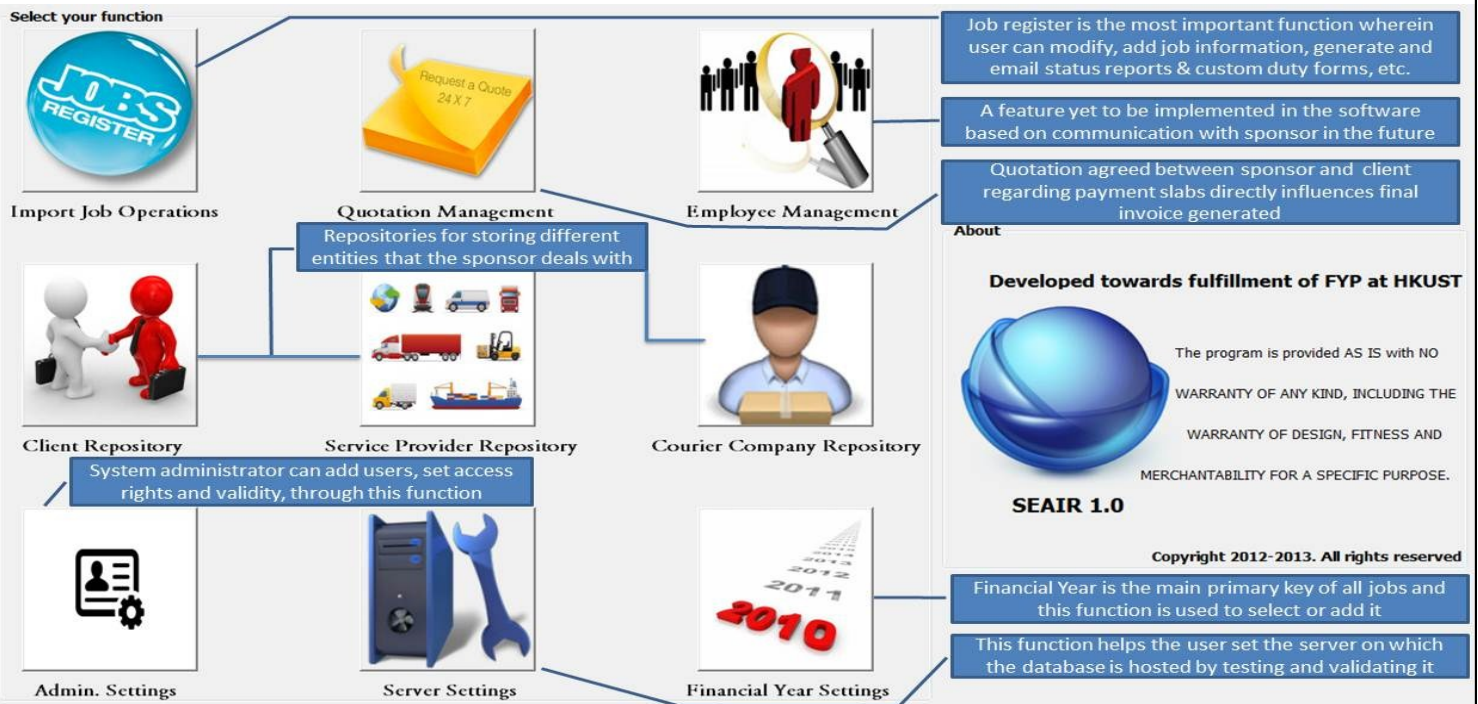


Figure 4 - Main Menu GUI

## Comparison with the existing system

### Existing System

Each new job is entered in a MS Excel Sheet as a new row. All the information related to that job is filled in against each column horizontally.

1	Date	Seair Job no	SUB-CONTRACTOR	YEAR	TYPE OF B/E	AIR/SEA	CONSIGNEE (IMPORTER)	ACCOUNT	CONSIGNOR (SUPPLIER)	PORT OF CLEARANCE	MAWB NO / BL NO	CONSIGNMENT DESCRIPTION	NO. OF PACKAGES	UOM	W
476	9-Feb-13	474	SKL	2012-13	H	SEA	NITCO LIMITED	SEAIR	MINERALS S.A	N/SHEVA	13E01013	FRIT	38	PLT	3
477	9-Feb-13	475	SKL	2012-13	H	SEA	NITCO LIMITED	SEAIR	LAMBERT SPA	N/SHEVA	BILNAV/10152	CARBOCEL MB 2C	1	PLT	1
478	12-Feb-13	476	SKL	2012-13	W	AIR	INTERNATIONAL PACKAGING	SEAIR	ARENA COMET	AIR CARGO	1110697685	SPARE PARTS	1	PKG	1
479	12-Feb-13	477	SKL	2012-13	W	AIR	INTERNATIONAL PACKAGING	SEAIR	WAJAX INDUSTRIAL	AIR CARGO	4237971382	SPARE PARTS	1	PKG	1
480	13-Feb-13	478	SKL	2012-13	W	SEA	INTERNATIONAL PACKAGING	SEAIR	MONTALVO	N/SHEVA	EX-15727	SPARE PARTS	1	PLT	1
481	13-Feb-13	479	SKL	2012-13	H	SEA	TROPICAL PARADISE	SEAIR	CV BALIBAHU	N/SHEVA	APL007820336	WOODEN GAZEBO	203	PKG	1
482	14-Feb-13	480	SKL	2012-13	H	SEA	NITCO LIMITED	SEAIR	COLOROBBA	N/SHEVA	VLCINAV/02922	COLOR	4	BULTOS	1
483	14-Feb-13	481	SKL	2012-13	H	SEA	ASIAN PRELAM INDUSTRIES	SEAIR	FIBRIS S.A	N/SHEVA	SUDUAGDYPI	SOFTWARE	2150	SHEETS	1
484	15-Feb-13	482	SKL	2012-13	H	AIR	NITCO LIMITED	SEAIR	INTESA	N/SHEVA	07412655580	SPARE PARTS	1	PKG	1
485	15-Feb-13	483	SKL	2012-13	H	SEA	KVB PROCESSORS PVT LTD	DINESH	ELDORADO	N/SHEVA	GOSUAPA1278	ZINC DROSS SHELF	32	PLT	4

### Review:

- The job register is slightly difficult to comprehend
- Data is not well-compartmentalized, making the system prone to errors.
- Columns, at times, are left empty as data is available at different times in the process.

### Seair Software (Our System)

Jobs are added by clicking on "Add new Job No." in the job register dialog. This leads to the main window consisting of different tabs separated according to the data input type.

**Dialog**

Filters: Job Number, Consignment Mode, Date of Creation, Shipper Name (Consignor), Client

Job Number	Consignment Mode	Date of Creation	Shipper Name (Consignor)	Client
1224	Sea	1/29/2013	Client E	sister con.
13 167	Air	2/15/2013	Client B	sister con.
12 166	Air	12/12/2013	Client A	sister con.
11 165	Air	1/19/2013	Client C	sister con.
10 160	Air	1/19/2013	Client E	sister con.
9 155	Air	1/19/2013	Client C	sister con.
8 150	Air	1/19/2013	Client A	sister con.
7 145	Sea	1/19/2013	Client E	sister con.
6 140	Sea	4/20/2011	Client C	sister con.

Buttons: Modify, Add New Job No., Close

**Main Window**

Tabs: Job Register, Customs Duty Form, Shipping Company Requisition Form, Container Dispatch, Daily Status Reports, Billing Data, Documents Out Dispatch, Documents Upload

**Job Register**

Client Name: Client C  
 Contact Person: person C  
 Consignment Mode: Air  
 Job Inhibitor Order: 12/02/2013  
 Date of Effective Delivery: 18/02/2013

**Sub-Contractor Details**

Subcontractor Name: Client B  
 Contact Person: person B  
 Email: client\_b@gmail.com

**Master Bill of Lading Information**

Master B. Number: \_\_\_\_\_  
 Master B. Date: 2/18/2013  
 Terms of Bill of Lading: \_\_\_\_\_  
 Shipper Name: \_\_\_\_\_  
 Origin Country: \_\_\_\_\_  
 Shipping Company Name: \_\_\_\_\_  
 Type of Service: \_\_\_\_\_

## Features of our software

Generate Time Cycle for summarizing jobs

Generate and email Custom Duty Requisition Form with Duty Calculator

Generate and email Status Reports to Clients

Powerful sort and filter functionalities for all repositories

Ability to upload documents against each job

Set different access rights for employees

## Conclusion

We aspired to develop a database application to support the business needs (operational and administrative) of our sponsor and we have largely met our initial objectives. Our software resolves problems of data redundancies found in semi-automated or manually conducted practices of using MS Excel spreadsheets and paper forms. It also provides new views of data that help the company to better manage its operations. Our sponsor's feedback is encouraging and they aim to shift to our system within 2-3 months.