



Systems Analysis and Design Project

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To Whom It May Concern:

A team consisting of four students of Florida Atlantic University has approached this organization wishing to complete an information systems analysis and design project. The team members are hereby authorized to complete such a study under my auspices.

Sincerely,

José Vazquez
Chief Financial Officer

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0.0 Preliminary Proposal

0.1 Overview of the Firm to Be Analyzed

The organization that this project will analyze is Oceania Cruises, Inc. Oceania has its executive offices located in the Doral area of Miami, FL. Oceania offers cruise vacations to targeted clientele, and it began operations in January 2003. It currently has one ship sailing in Europe, and another ship will come into service in the very near future.

0.2 Project Overview

Oceania is a new organization, created in the early months of 2003. The firm needed to become operational as fast as possible. As a consequence, short-term solutions were employed in many areas of Oceania's information systems. Most of Oceania's systems (e.g. the reservation system) were hosted by an outside firm. Recently, the information systems department has moved most of the previously hosted systems in-house. It is apparent, though, that with Oceania's rapid growth, the organization is outgrowing its current information system infrastructure. This project will analyze a specific need within Oceania's current information system and will then give a detailed recommendation of a solution to the company.

0.3 Team Members

- Paul Crane
- Natalie Foster
- Bradley Korn
- Fidel Mayadeene



1.0 Phase I – Preliminary Study

This section of the study deals with the background work required before any new information system can be planned, analyzed, designed, and implemented. It includes all the information gathered by the team in its initial exposure to the organization and its information system opportunity. Contained in this phase of the report is a detailed description of the company, the information systems needs of the company, a description of the information system opportunity, the stated scope of this project, an analysis of the benefits to be derived from the completion of this project, a preliminary feasibility analysis, a preliminary projection of resources, and a preliminary schedule of project activities.

1.1 Company Description

As its name implies, Oceania Cruises is a provider of cruise vacations. Its target customers are recent retirees with large amounts of disposable income, interested in the finest vacation experiences available. Oceania's one ship, the Regatta, currently sails in Europe, and during the winter season it will cruise the Caribbean, the Panama Canal, and the West Coast of North America.

Incorporated in the Republic of Panama, Oceania was formed in late 2002 through private investments. Frank Del Rio, CEO and President, and Joe Watters, Chairman, head the company. The company's executive offices are located at 8120 NW 53rd Street in the Doral area of Miami, Florida. The company's website is located at www.OceaniaCruises.com.



1.1.1 Operational Structure

Oceania is, at the moment, a small start-up company. Although it required a considerable initial investment, the company still did not have the resources at its disposal to acquire all of the assets it would need to operate, nor was it able to provide for itself all of the internal services it would require. Oceania's two vessels, the Regatta and the Insignia, are leased from CruiseInvest, LLC, with an option for a third ship. The deck and engine crew for each ship, the staff that operates and maintains the ship, is being outsourced, as well as the hotel and resort staff, such as housekeeping, wait staff, bartenders, etc. When the Regatta set sail on July 5, 2003, only about 20 people on board were directly employed by Oceania, with the rest being outsourced employees or contractors.

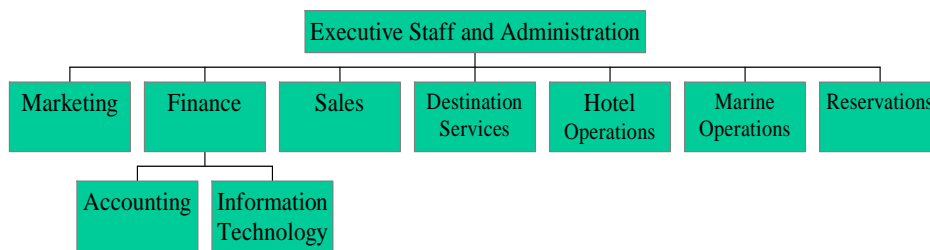
Oceania operates through several functional units, including Executive, Finance, Reservations, Marketing, Sales, Marine Operations, Hotel Operations, and Destination Services. Figure 1.1 below shows the aforementioned departments and their relationship to one another. The executive staff directs the overall strategy of the company. The finance department is responsible for financing the company's capital resources, and it also includes the accounting and information technology departments. The sales department sells the company's services to groups and vacation resellers. Destination services assembles and administers add-on sales packages, such as shore excursion packages and pre and post cruise packages. The reservations department accepts cruise reservations primarily from travel agents, as well as directly from customers. Hotel



operations is responsible for all ship-board operations relating to guest areas, such as housekeeping, wait staff, porters, etc., while marine operations is responsible for the

actual mechanical operation of the ship, including navigation, communications, and maintenance.

Figure 1.1
Functional Departments at Oceania



The marketing

department creates and executes print advertising and direct mailings, as well as maintaining Oceania's presence on the Internet at www.OceaniaCruises.com.

1.1.2 Employment Details

There are approximately seventy-five individuals working for Oceania Cruises at this time, all of who are based out of the executive office in Miami. There are another twenty-five contractors that the company considers as virtual employees, because of the close working relationships they have with Oceania employees.

CFO Jose Vasquez heads the finance department. Controller Rick DeArmas is the head of the accounting department. The IT department has two members, Alfred Alonso, the Director of Information Technology, who was interviewed by the project team members, and the department coordinator, Omar Harvey. Both members of the IT



department are on the go from the moment they get to work to the moment they leave, since they are the only two employees to deal with all technology-related issues.

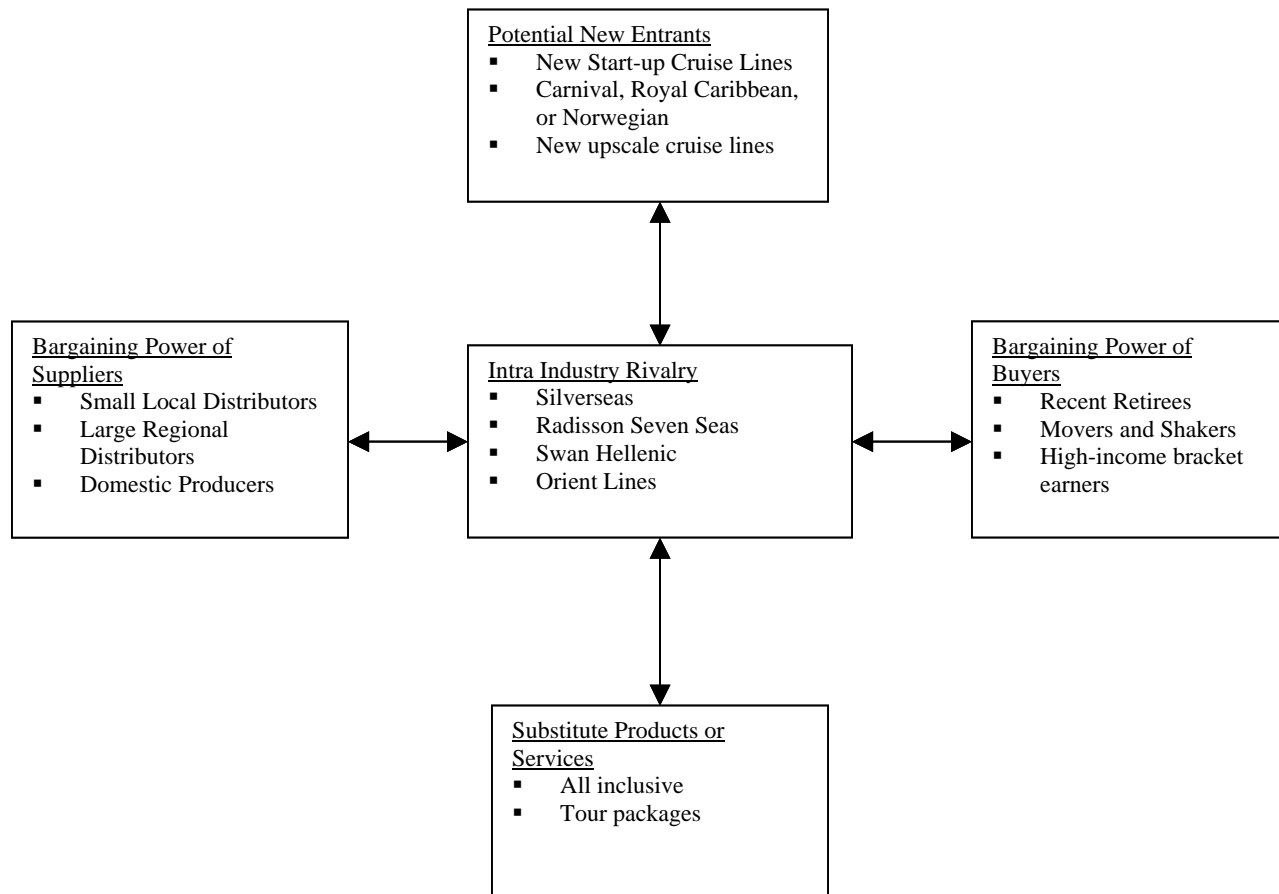
1.1.3 Business Environment of the Firm

Oceania's competitive environment is characterized by rivalry within the cruise industry, specifically rivalry between competitors who target the same market segment. The competitive environment is also affected by the possibility of new entrants into the industry, the availability of substitute products or services, the bargaining power of the firm's suppliers, and the bargaining power of the firm's customers.

Within the cruise industry, Oceania competes directly with cruise lines such as Silversea, Radisson Seven Seas, Swan Hellenic, and Orient Lines. Each of these firms targets the same market segment, and they thus form the nucleus of Oceania's competitive environment. It is also possible that new cruise lines may try to enter the market, or that one of the larger cruise lines already in existence might try to launch a high-end cruise line of its own. Oceania's competitive environment is also affected by the availability of substitute products, such as all-inclusive resort packages and tour packages. The bargaining power of the suppliers of Oceania, such as the firms that supply Oceania with fuel, foodstuffs, and contract employment, as well as the bargaining power of the customers of Oceania, who may opt to do business with Oceania's competitors or choose to purchase any of the substitute products available, both contribute to Oceania's competitive environment.



Figure 1.2 Model of Oceania Cruises' Competitive Environment



1.2 Information Needs of the Organization

The information needs of Oceania have far surpassed the ability of their current information system. Oceania has wide ranging information needs to remain profitable in the competitive market of which they are a part. Each functional area of the organization has individual information needs. Currently all information storage is being done using Microsoft Access databases stored on individual workstations. Obviously this practice creates a host of problems including: no provisions for multiple users to access the data at once, data redundancy and integrity issues, limited reporting ability, and the inability to



perform centralized backups. Oceania is in need of a centralized information system that brings together all the disparate parts of its business information under one umbrella.

1.3 Information System Opportunity

The primary income stream of Oceania is via credit card sales. These sales are generated through the reservation system, NVS, when customers initially book their cruises and pay a deposit, when customers pay the balance due on their cruise purchase, and when customers make purchases on the ships of consumable, gifts, shore excursions, and alcoholic beverages. The credit card processing system, InterCept, sends its data regarding such purchases, along with data concerning credits for refunds and cancellations, to the company. The reservation system, NVS, generates a separate data store showing the amount of ticket revenue that should have been generated. Currently, these two data stores are manually queried through a Microsoft Access database file to verify consistency, highlighting and addressing any discrepancies that may arise, as well as allowing the accounting department to determine how much funding the credit card banks should remit to the company. Currently, too much time is being spent manually comparing the supposed credit card receipts with the actual credit card receipts, and it is very difficult and laborious to determine the amount of cash the credit card banks owe the company.

The specific opportunity that our team will address is the need to get the information contained in NVS into a centralized enterprise database, as well as providing access to that information to all the functional groups at Oceania. However, the project



team will focus primarily on the accounting and finance departments, as well as the marketing and sales departments. In addition, the system aims to reduce the number of labor-hours spent manually extracting, integrating, and comparing data from NVS and InterCept.

1.4 Importance of the Opportunity

The need for an organized and efficient information technology base is imperative to the livelihood of any organization. This point is magnified at Oceania because of the firm's nature as a start-up company. In order for Oceania to compete with other firms in the cruise industry, technology must be exploited to its fullest. A new system for Oceania must address this, as well as issues of data organization and integrity, centralized access to that data, streamlined business processes, and scalability for future growth.

Much of Oceania's business data is currently scattered across many desktop workstations and is stored in small database files. This mission-critical information should be centralized to enforce data integrity rules and eliminate data redundancy. The data must be organized to allow easy querying and reporting.

Since all of this data resides on individual desktops, a user must be physically sitting at a workstation where the data is located in order to access it. Moving this data into a centralized database will allow users to access to it from any workstation on the corporate network, whether physically located on the network or connected to it through a VPN.



Because data is so scattered across many workstations, many of the business processes dealing with that data are wholly manual, or a hodge-podge of manual and automated functions. A new system must allow Oceania to streamline its processes, eliminating manual functions, increasing accuracy, and providing easy access to automated functions.

As Oceania has already experienced tremendous growth in its first several months of operation, any system implemented must be capable of scaling with the company's growth. As Oceania grows its capacity for information must also grow.

1.5 Anticipated Benefits of the New System

The proposed system will have benefits realized immediately, as well as benefits that arise in the long-term.

1.5.1 Immediate Benefits

The proposed system provides many benefits, immediate and long-term. Much of Oceania's current information is stored in individual Microsoft Access databases. Information is downloaded from external locations and manually entered into Access databases, costing the company time and money. These databases are scattered throughout the organization on workstations, and the number of separate databases is increasing rapidly. This is of great concern as it leads to data duplication issues, and in many instances, data integrity issues. With its projected growth, Oceania cannot continue to store data in this manner. Storing the data in a central database would eliminate data



duplication, reduce data-entry error, and significantly reduce the possibility of out-dated information.

Information security is paramount in any organization. Competition is steep, and unauthorized use of vital information is of utmost concern. Oceania is extremely vulnerable in its present state. End-users are providing information security measures at the local workstation level. This leaves the company open to the individual employee's interpretation of "security" and the possibility of information leakage. The present hodgepodge of databases is not conducive to secure, safe data. Building a central authentication entry point for information access will allow Information Services to easily track and restrict information by department and or individual.

Measures for protection against information loss are also a problem for Oceania. For instance, the controller is personally responsible for his own information backup, which he stores on CDRW and slips in his briefcase at the close of the business day. If he is out of the office for any reason and information is compromised, the continuity of finance and accounting could be impeded. Again, central administration would eradicate this issue.

1.5.2 Long-term Benefits

Long-term benefits include central administration and management of databases and automated information download and processing. This would allow easy expansion of centrally, logically stored data and easy, incremental additions to databases. Currently all expansion and additions to local databases are done manually by the individual



employee. Information is extracted from many locations, leaving room for human error. Automation would all but eliminate this issue. In addition, data duplication would also be reduced with central database management.

A well thought out data model and reporting structure would also benefit the organization. This would open the door for remote access of information internally and externally, an absolute necessity. In this age of information, quick, easy access would serve several purposes. It would allow additional individuals external, automated access to invoices and other information, potentially reducing the need for additional customer service staff and thereby, increasing profits over time. If necessary, employees at all levels could potentially work from home or other locations, increasing productivity.

Even more importantly management would be better able to effectively use data in making strategic decisions regarding competitive and corporate competencies and weaknesses, strengths and opportunities.

The opportunity will enable the company to achieve improved profitability by being more efficient and across the company in both providing more accurate information and a better use of time management for the users' involved in the transition. Currently, management has little to no monitoring control methods to guide and develop the structure of the organization. This will increase management's ability to make educated strategic and tactical plans for the organization's future.



1.6 Statement of Scope

General Project Information

Project Name:	Oceania Cruises, Inc.
Sponsor:	Rick de Armas
Project Managers:	Paul Crane Natalie Foster Bradley Korn Fidel Mayadeene

Problem/Opportunity Statement:

There is currently too much time spent on completing manual data importing and conversion processes in the current system. A means to automate the process in order to free man-hours for more important tasks needs to be found. In addition, an easy, user-friendly interface must be provided.

Project Goals:

- Create a user-friendly, easy access interface for reconciliation of financial data.
- Automate the process of database integration and reconciliation.
- Increase security and centralize administration of data.
- Allow multiple functional groups to access data.

Project Objectives:

The project objective is to reduce human error, increase security, centralize data administration, allow easy access to data, and increase productivity for



Oceania, especially accuracy levels in the area of Accounting and reconciliation of their credit card sales. Another objective is to provide other departments, such as Marketing and Sales, with the wealth of data concerning purchases that accounting currently handles. The analysts also seek to improve customer service and improve daily management activities by increasing access to Oceania's sales and inventory data as well as forecasting information.

Project Description:

This project will focus on the need Oceania has to centralize its mission-critical business information. The project team will analyze processes and systems and current business needs through a series of interview with key employees of Accounting, IT, Sales, and Marketing to develop a viable solution. We will hold Joint Application Design sessions to foster rapid development of a system tailored to meet the organizations needs. We will create a list of all the requirements and constraints that the new system involves. We will code, test, install, and re-evaluate the system that improves and controls the current Oceania's system.

This project will provide Oceania Cruises with a user interface that provides easy access and minimize the steps and labor hours needed to integrate and maintain databases. The new system will increase the overall efficiency for all departments. The system will support display and



reporting. The system will provide decision support to managers. A new front-end application will be constructed to foster easy access to and display of information, reducing labor-hours needed to maintain the current manual movement and reconciliation of data. A new back-end system will be implemented to automate the database integration process, again reducing man-hours. Many of the functional groups of Oceania will be affected. Marketing will have a vast array of customer data at its fingertips that will assist in directing the marketing plan. Finance will have added tools to assist in locating the funds to carry out the company's operations. Sales will have an added tool available to help track sales trends. And lastly, Information Technology will have a centralized repository for the company's business information.

Project Constraints:

The budget for the project is \$100,000 for developing and implementing the new system.

Business Benefits:

- Intangible: Improved management decision-making
- Intangible: Increased data security
- Intangible: Improved customer satisfaction and loyalty
- Tangible: Easy access to data for multiple departments
- Tangible: User-friendly interface



Estimated Project Duration:

3 months

1.7 Statement of Work

Oceania Cruises
Statement of Work

Date: September 23, 2003

Project Name:	Oceania Cruises, Inc.
Project Managers:	Bradley Korn Fidel Mayadeene Natalie Foster Paul Crane

Customer:	Oceania Cruises
Project Sponsor:	Ricardo F. de Armas

Project Start/End (projected):	9/2/2003 – 12/2/2003
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Estimates of Staff Resource (labor-months)

Programmers:	1.0
Jr. Analysts:	1.5
Sr. Analysts:	0.3
Supervisors:	0.1
Consultants:	0.0

Total:	3.0
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Project Description:

Goal(s) of the Project

This project will provide Oceania Cruises with a user interface that provides easy access and minimize the steps and labor hours needed to



integrate and maintain databases. The new system will increase the overall efficiency for all departments.

Objectives

The project objective is to reduce human error and increase productivity for Oceania, especially accuracy levels in the area of Accounting and reconciliation of their credit card sales, as well as to increase the amount of information available to other departments, such as Marketing and Sales. The analysts also seek to improve customer service and improve daily management activities by increasing access to Oceania's sales and inventory data as well as forecasting information. This project will focus on the need Oceania has to centralize its mission-critical business information. The project team will gather all information that needs to be stored in this database and then produce a normalized and optimized data model.

Description of Work by Phase

The following tasks and deliverables reflect the current understanding of the project:

In the Systems Analysis phase: In order to understand the needs of the organization, the group will evaluate the current system and processes in place conduct interviews with key Oceania employees who currently who use and administer the system and will utilize and administer the new



system. The specifications for the new system will be created based on the needs of the users and administrators.

In the Systems Design phase: To ensure rapid design we will utilize Joint Application Design sessions. After meeting with key individuals from all departments, we will create a list of all the requirements and constraints required by the new system.

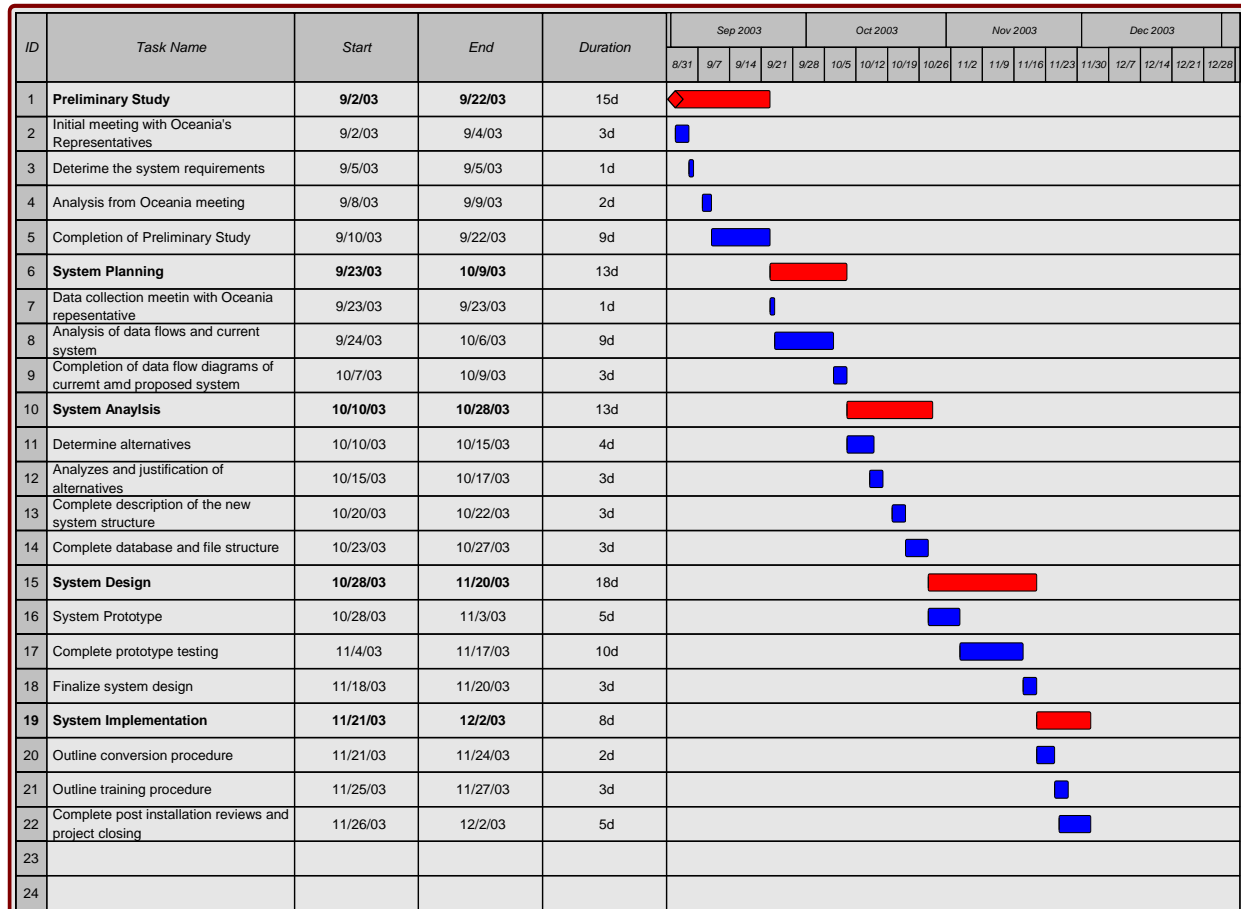
In the Systems Implementation phase: We will code, test, install, and re-evaluate to ensure that the system that improves control over the current system.



1.8 Preliminary Schedule of Activities

Below is a tentative schedule of project activities, although this listing may change as the systems analysis proceeds.

Figure 1.3 Preliminary Schedule of Activities



1.9 Preliminary Projection of Resources

The project is budgeted at \$100,000. This includes expenses related to hardware acquisition, software acquisition, man-hours for completing system analysis and design, and training of employees. A new server will be required, as well as an enterprise database software solution. No additional network hardware will be necessary as the



current infrastructure is capable of handling the expected traffic load. The preliminary projection of time to be spent on systems analysis and design is three (3) labor-months. Training of employees will require approximately two (2) weeks.

Figure 1.4 Project Resource Budget

Hardware	Application Server – Dell PowerEdge 1750 Includes Windows Server 2003 Enterprise with SQL Server and 25 Client Access Licenses	\$7,000	
	Data store – Dell PowerVault 221S	\$5,000	
	Equipment Subtotal		\$12,000
Labor	Development Hours	\$80,000	
	Training Hours	\$8,000	
	Labor Subtotal		\$88,000
	Total Budget		\$100,000

1.10 Preliminary Feasibility Analysis

The preliminary feasibility analysis includes analyses of legal/contractual, technical, operational, and economic feasibility.

1.10.1 Legal Feasibility

Legal feasibility of this project is favorable for Oceania. There will be contractual obligations for access to external databases such as Net Ledger and the use of licensed software, e.g., SQL and Crystal 9.0. However, there are no potentially unordinary, limiting, or harmful nondisclosure infringements, antitrust legislations, or financial reporting standards which present themselves immediately.



1.10.2 Technical Feasibility

The organization is technically challenged. The current IT infrastructure is “non-existent”, according to controller, Rick de Armas. The Information Services department currently consists of two employees, a network engineer, who is the department director, Alfred Alonso, and a department coordinator, Omar Harvey. The network engineer previously owned and operated an information technology consulting company. He previously worked as a consultant for Oceania Cruises and is now full-time staff. This will work to the company’s benefit as the department lead, although a new addition to the permanent staff, already understands the organization’s needs and limitations, and is also adept in data modeling and has the programming skill necessary to take on a project of this magnitude and importance. However, he cannot do it alone. Currently, there is no staff programmer and no outside firm contracted to provide programming services. The hiring process has been initiated.

Currently the organization runs Windows XP Professional at the client level and Windows 2000 Server on its back-end, which serves approximately seventy-five (75) end-users. This configuration provides LAN access security and file level control. The network already supports VPN access, and additional servers will be needed for data warehousing. When purchasing new equipment, scalability should also be considered.

1.10.3 Operational Feasibility

The proposed system is operationally feasible. The project will meet organizational objectives as mentioned in benefits section above:



- It will allow easy, secure, authenticated access to data from one point
- It will allow central database management, significantly reducing data duplication and redundancy
- It will allow more effective use of manpower, reducing cost of operations
- It will allow more effective, accurate use of data by functional areas and top management
- It will allow employees more flexibility of location.

The major operational limitation that arises is the learning curve that may crop up during training periods. Existing employees may have difficulty acclimating themselves to the use of a new system. However, the new system will make it easier to train new employees and reduce the learning curve for the new employee as well.

1.10.4 Economic Feasibility

Oceania is a start-up organization, and economically, this project promises to be very costly. There are many intangible benefits:

- As a small organization, Oceania's current state may have worked well, but the company has out-grown its current data-handling methods. This IT transformation is needed to gain market perspective and competitive advantage. It is best to start now, and not wait until the situation is so large it adversely affects the organization from the top down.



- Building a sound IT infrastructure will increase employee confidence in the services they provide, which will show in their communication to internal and external customers. Potentially, this will also increase profit over time.
- In the long-term, the organization stands to save thousands, if not millions of dollars in wages, taxes, and services. This is a reduction in operating costs that will allow the organization to include additional value-added services, or pass savings directly on to customers, both creating a competitive inroad and, therefore increasing the bottom line.



2.0 Phase II – Systems Planning

This section of the study deals with the systems planning phase of the system design life cycle. It includes all the information gathered by the team during the first stages of the planning of the new system. Contained in this phase of the report is a description of the data collection methodology, a detailed description of the present system, a listing of the objectives for the proposed system, and a detailed description of the proposed system.

2.1 Data Collection Methodology

The data for this study was collected primarily through interviews conducted with Oceania's Controller, Rick de Armas. Mr. De Armas detailed the company's current information systems' capacity and the capacity he hopes to achieve in the near future. He outlined the flow of data in the current system, as well as the data flow he'd like to see in the new system. He also reviewed some of the options he and his staff have been exploring.

The following are the questions asked of Mr. de Armas:

1. What is the company's current data capacity with regards to the deposits database?
2. Where do the data originate?
3. How are the data used in the business?
4. How do the data flow between processes?



5. What would you like this new system to accomplish, in terms of volume and productivity?
6. What functional areas would be affected by this new system?
7. What options have you already explored with respect to the deposits database?

2.2 Justification of the Data Collection Methodology

As the officer responsible for the accounting of every dollar spent in the Oceania organization, Mr. DeArmas is the most qualified individual in the company to review the information needs of the finance and accounting departments. Coupled with that, he is also the employee who completes many of the manual tasks that this proposed system would automate. It is Mr. DeArmas who currently retrieves the data from the reservations system, NVS, and creates a “deposits database” from it. He then retrieves the data from the credit card processing system, InterCept, and loads that data into the previously created deposits database. He then runs simple queries against the data to produce the necessary reports.

2.3 Description of the Present System

The current system is conglomeration of manually completed operations and automated functions. These procedures are completed on a daily basis to allow the NVS reservations system to be properly updated regarding cancellations and refunds, as well as to allow the accounting department to determine how much funding the credit card banks should be paying Oceania.



The routine progresses as follows. Each day a particular file of data is produced by the NVS application. This file includes booking number, deposits amount, balance due, authorization number, credit card number, sail date, reservation number, sale amount, date of sale, customer name, customer address, customer phone number, number of passengers, state room number, and tour number. All of the data in this file is not used in the completion of the operations in the current system. The only data necessary is that regarding payments made for past and future sailings. A data-stripping application, Monarch, is run, which extracts authorization number, credit card number, sail date, reservation number, sale amount, and date of sale from the NVS file. This stripped-out data is then saved as a Microsoft Access database, referred to as a “deposits database.”

Next, two data files are produced, also on a daily basis, by InterCept, the credit card processing application. The first file is known as the “settled” file, which contains data regarding charges that have been sent to the credit card issuing banks for payment. The file includes: authorization number, and the amount of charge for each processed credit card. The second file is known as the “refunds” file, which contains data regarding credits that have been issued to customer accounts. This data file includes, authorization number and the amount of credit issued to an account. These comma-separated value (CSV)-formatted files are merged and are then manually imported into the previously created deposits database.

Several queries are then run against the data in the deposits database to produce reports. These include a query that determines which bookings have been cancelled and



refunded, one that determines how much has been settled by specific sailing, and one that determines how much should be paid to Oceania by the credit card banks.

These reports are then used to make manual entries into NVS regarding cancelled bookings and any miscellaneous refunds. Also, they are used to determine the amount of funding Oceania can ask the credit card banks to pay, in excess of any amounts being held in escrow.



2.3.1 Data Flow Diagrams of the Present System

Figure 2.1 Context-Level DFD of the Present System

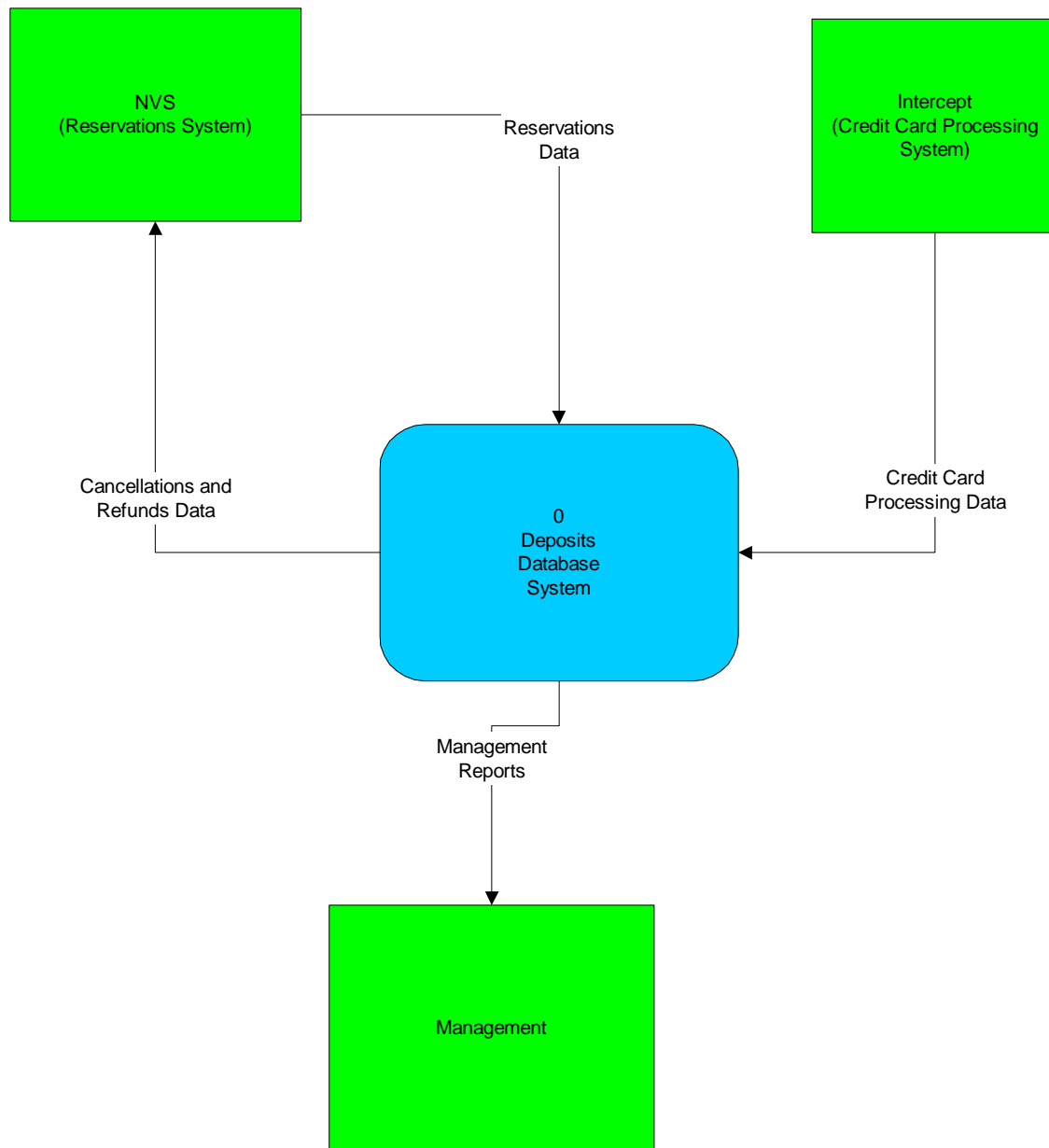
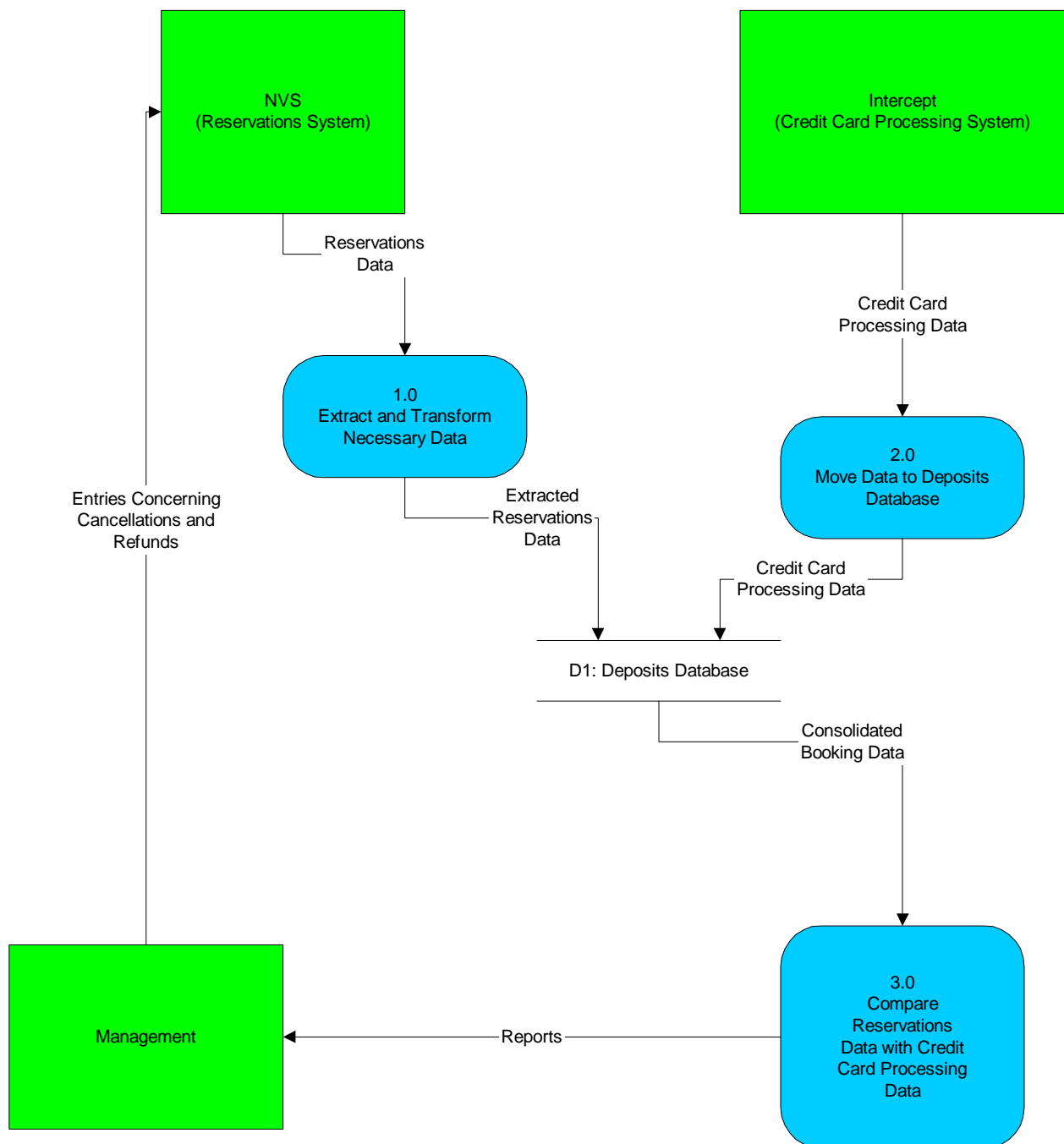


Figure 2.2 Level-0 DFD of the Present System



2.3.2 Function Statements Describing the Present System

Process **1.0** – Extract and Transform Necessary Data

Trigger: NVS file updated after reservations department closes

Inputs: Plain text NVS file including booking number, deposits amount, balance due, authorization number, credit card number, sail date, reservation number, sale amount, date of sale, customer name, customer address, customer phone number, number of passengers, state room number, and tour number.

Process Description: A file is produced by the NVS including information regarding each newly created, pending, and past reservations. All of the data in this file is not necessary to the completion of the operations in the current system. The only data necessary is that regarding payments made for past and future sailings. A data-stripping application, Monarch, is run manually, which extracts the pertinent data from the NVS file. This stripped-out data is then saved as a Microsoft Access database, referred to as a “deposits database.”

Output: Microsoft Access “deposits database” file including authorization number, credit card number, sail date, reservation number, sale amount, and date of sale.

Volume\Frequency: This daily process includes previously processed reservations for future sail dates, including reservations created during the present day. On average, Oceania processes 130 new reservations per day.



Process **2.0** – Move Data to Deposits Database

Trigger: Two credit card processing data files are received from InterCept, the credit card processing system.

Input: (1) The “settled” CSV file containing data regarding charges that have been sent to credit card issuing banks for processing. This file contains authorization number, and the amount of charge for each processed credit card. (2) The “refund” CSV file including data regarding credits issued to customer accounts. This data file includes, authorization number and the amount of credit issued to an account.

Process Description: Two data files are produced by InterCept, the credit card processing application. The first file is known as the “settled” file, which contains data regarding charges that have been sent to the credit card issuing banks for payment. The second file is known as the “refunds” file, which contains data regarding credits that have been issued to customer accounts. These files are in a comma-separated value (CSV) format and are then manually imported into the previously created deposits database.

Output: Merged “settled” and “refund” CSV data file

Volume\Frequency: This process is performed on a daily basis and includes all previously processed credit card info for future sail dates. The size of this file fluctuates based on reservation volume and sailing activities.



Process **3.0** – Compare Reservation with Credit Card Processing Data

Trigger: Merged credit card processing data file is manually moved to the completed Microsoft Access “deposits database”

Process Description: Several queries for reports are manually run against the merged credit card processing data and extracted NVS information, which now comprise the deposits database. These reports are then used to make manual entries into NVS regarding cancelled bookings and any miscellaneous refunds. Also, they are used to determine the amount of funding Oceania can ask the credit card banks to pay, in excess of any amounts being held in escrow.

Output: The result is two reports indicating which bookings have been cancelled and refunded. The first indicates the amount of settled funds by specific sailing. The second indicates the amount of funds that should be paid to Oceania by the credit card banks.

Volume\Frequency: This process is performed daily. This process produces files on all previously processed credit card information for future sale dates. Therefore, the size of the files fluctuates based on reservation and sailing activities.



2.4 Objectives of the Proposed System

The new system's primary objective will be to automate the currently labor intensive system of manual operations and automated functions. Files must be manually converted and exported into a desktop database system. Reports must be manually generated in order for accounting department employees to complete routine procedures that can be automated. The proposed system aims to eliminate these manual functions, with the necessary reports available on-line.

Another objective is to centralize the data currently used in the present system. Presently, the only employee able to view these reports is the person logged-on to the workstation on which the deposits database resides. The proposed system intends to allow any authorized user to view the reports created by the system, on any workstation on the corporate network. This will give the proper employee the ability to make entries into the NVS system regarding cancelled bookings and miscellaneous refunds, as well as giving the proper employee access to the information regarding the funds credit card banks owe the company.

2.5 Description of the Proposed System

The flow of data will remain largely the same in the proposed system. The improvements will come from the shift from manual data extraction and comparison to automatic completion of these functions.



The procedure progresses as follows. On a daily basis, the data from the NVS file is extracted from the NVS file via a system process, or business logic unit. This data is then added and/or updated to an enterprise database (a Microsoft SQL Server database).

Next, the two InterCept files, the settled and the refunds files, are processed via a business logic unit, and the data is added and/or updated to the enterprise database.

The business rules that are currently used in the Access database will also be built into the enterprise database. The data comparison will occur as data is added and/or updated.

The queries previously run manually in Access will become part of the on-line report-viewing system. This will include a report for viewing cancelled bookings and refunds, used to make entries into the NVS system. There will be a report for viewing charges made for sailings that have occurred, and a report stating how much funds Oceania should ask the credit card banks to remit, in excess of the escrow amounts.



2.5.1 Data Flow Diagram of the Proposed System

Figure 2.3 Level-0 DFD of the Proposed System

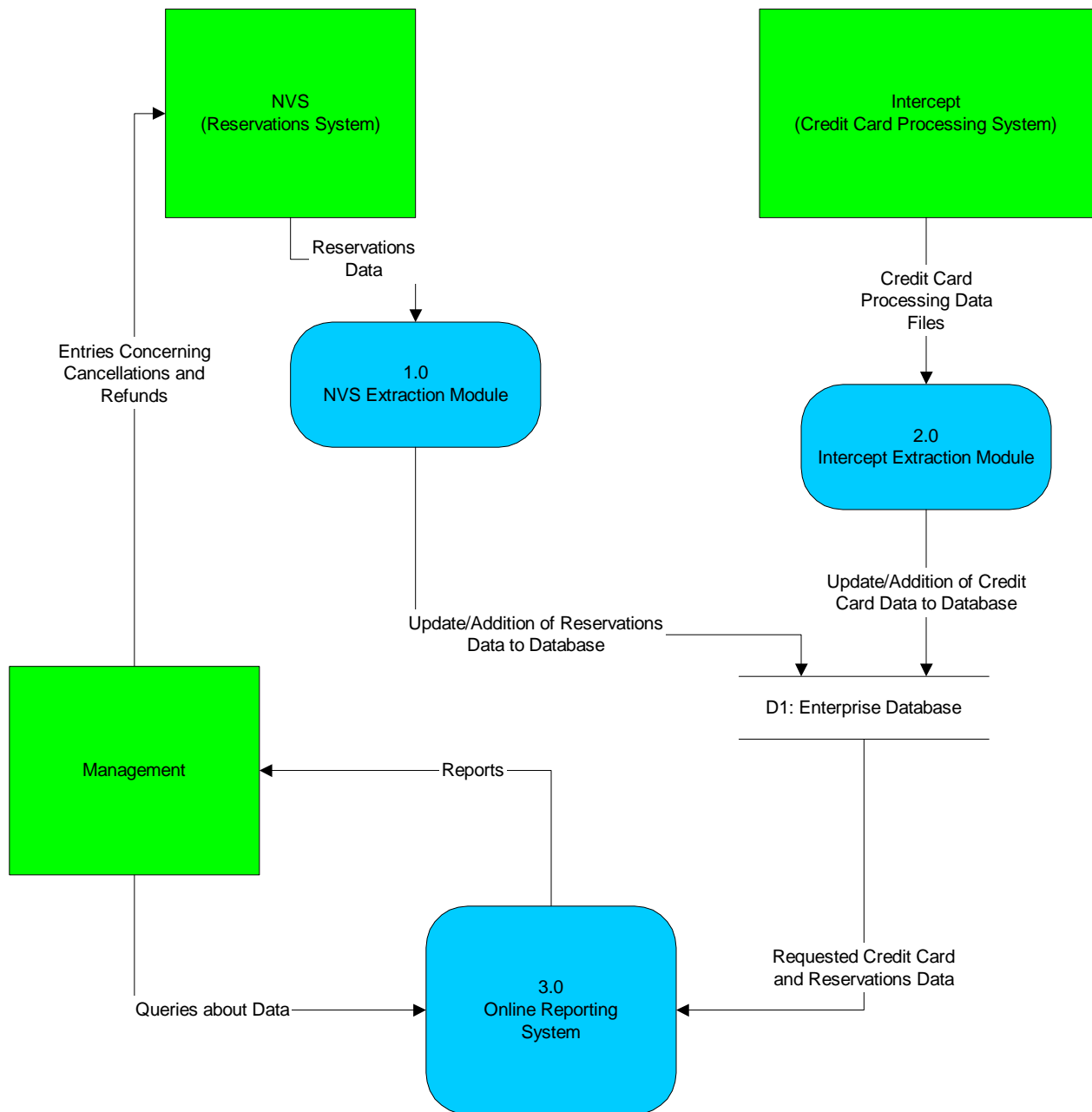


Figure 2.4 Level-1 DFD of Process 1.0 for the Proposed System

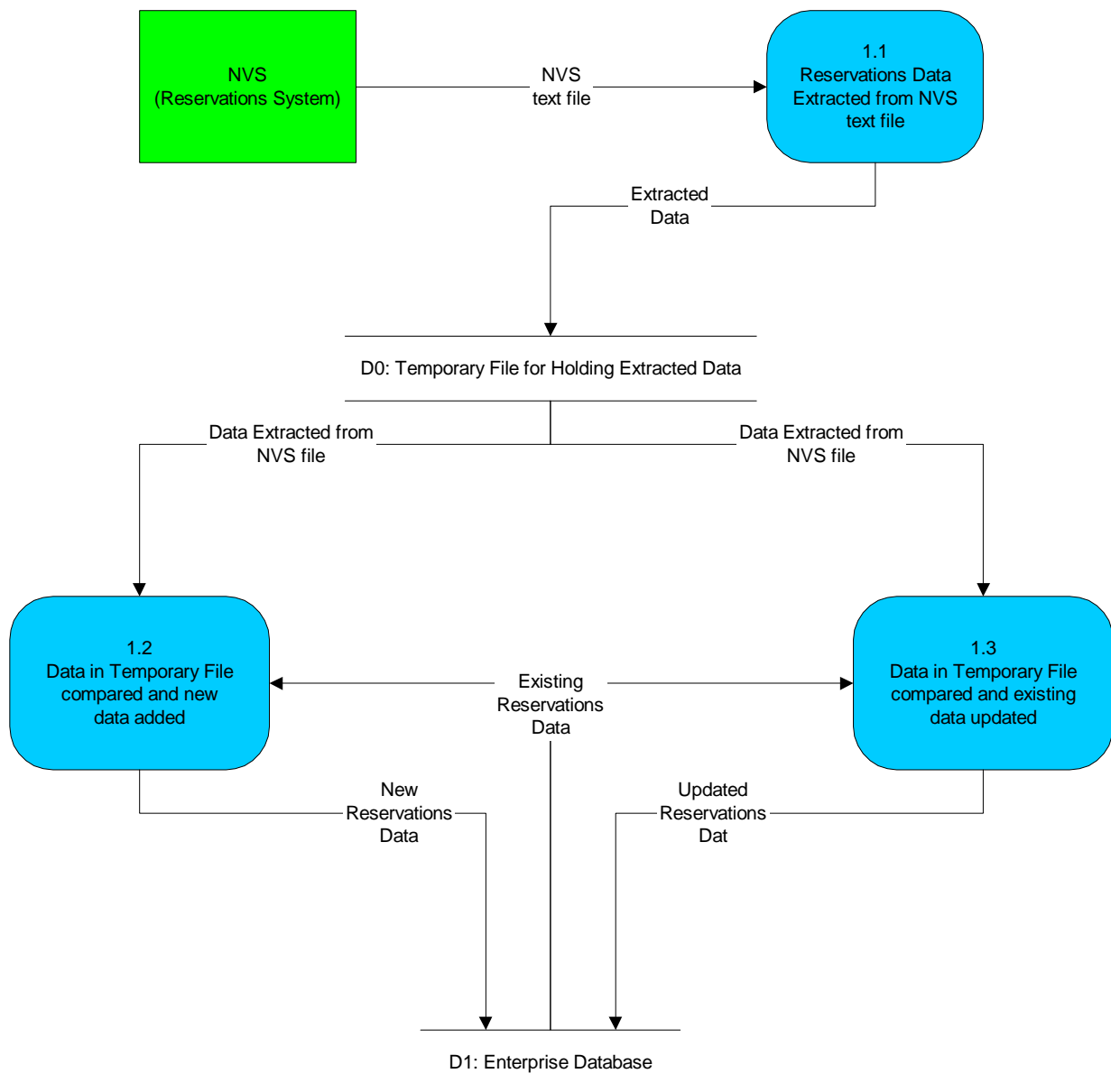
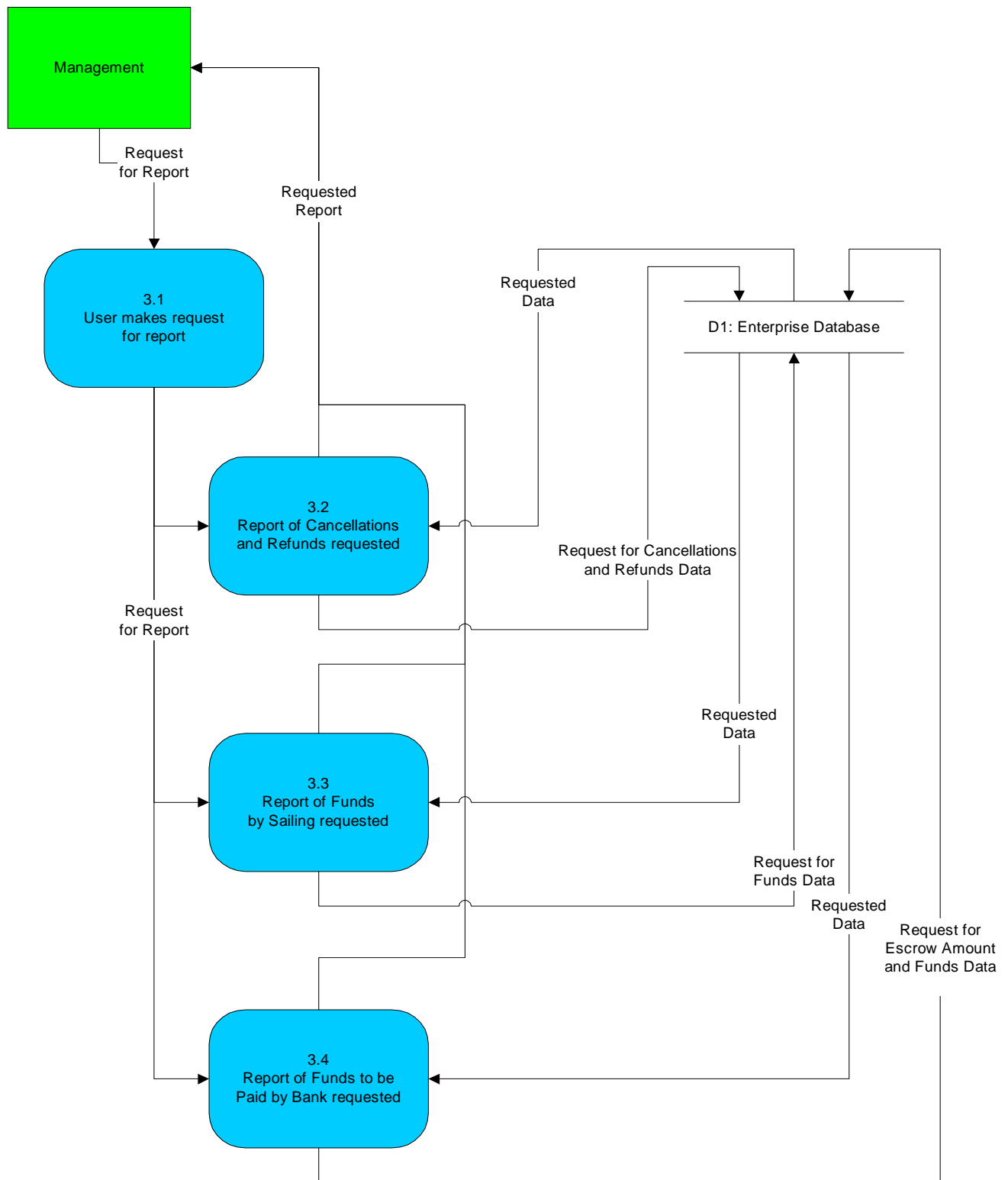


Figure 2.5 Level-1 DFD of Process 3.0 for the Proposed System



2.5.2 Function Statements Describing the Proposed System

Process **1.0** – NVS Extraction Module

Trigger: NVS file updated after reservations department closes

Inputs: Plain text NVS file including booking number, deposits amount, balance due, authorization number, credit card number, sail date, reservation number, sale amount, date of sale, customer name, customer address, customer phone number, number of passengers, state room number, and tour number.

Process Description: A file is produced by the NVS including information regarding each newly created, pending, and past reservations. All of the data in this file is not necessary to the completion of the operations in the current system. The only data necessary is that regarding payments made for past and future sailings. A system module, to be architected, runs; this module will extract the pertinent data from the NVS file and add/update it to the enterprise database.

Output: Necessary data including authorization number, credit card number, sail date, reservation number, sale amount, and date of sale, which are then updated/added to the enterprise database.

Volume\Frequency: This daily process includes previously processed reservations for future sail dates, including reservations created during the present day. On average, Oceania processes 130 new reservations per day. In this new system, scalability to compensate for increased volume will not be an issue.



Process 1.1 – Reservations Data Extracted from NVS text file

Trigger: NVS file updated after reservations department closes

Inputs: Plain text NVS file including booking number, deposits amount, balance due, authorization number, credit card number, sail date, reservation number, sale amount, date of sale, customer name, customer address, customer phone number, number of passengers, state room number, and tour number.

Process Description: A file is produced by the NVS including information regarding each newly created, pending, and past reservations. A system module, to be architected, runs; this module extracts the data from the NVS text file and moves it to a temporary file.

Output: Temporary data file containing the data from the NVS system.

Volume\Frequency: This daily process includes previously processed reservations for future sail dates, including reservations created during the present day. On average, Oceania processes 130 new reservations per day.

Process 1.2 – Data in Temporary File compared and new data added

Trigger: Temporary file containing extracted data exists.

Inputs: Data extracted from the NVS file including booking number, deposits amount, balance due, authorization number, credit card number, sail date, reservation number, sale amount, date of sale, customer name, customer address, customer phone number, number



of passengers, state room number, and tour number. Also, the existing reservations data in the enterprise database.

Process Description: The reservations data that exists in the enterprise database is compared with the reservations data in the temporary file.

Output: Data that is new is then added to the enterprise database.

Volume\Frequency: This process will occur on a daily basis. As the amount of data produced by the NVS system increases, the longer this process will take to complete.

Process 1.3 – Data in Temporary File compared and existing data updated

Trigger: Temporary file containing extracted data exists.

Inputs: Data extracted from the NVS file including booking number, deposits amount, balance due, authorization number, credit card number, sail date, reservation number, sale amount, date of sale, customer name, customer address, customer phone number, number of passengers, state room number, and tour number. Also, the existing reservations data in the enterprise database.

Process Description: The reservations data that exists in the enterprise database is compared with the reservations data in the temporary file.

Output: Data that currently exists in the enterprise database is then updated.

Volume\Frequency: This process will occur on a daily basis. As the amount of data produced by the NVS system increases, the longer this process will take to complete.



Process **2.0** – InterCept Extraction Module

Trigger: Two credit card processing data files are received from InterCept, the credit card processing system.

Input: (1) The “settled” CSV file containing data regarding charges that have been sent to credit card issuing banks for processing. This file contains authorization number, and the amount of charge for each processed credit card. (2) The “refund” CSV file including data regarding credits issued to customer accounts. This data file includes, authorization number and the amount of credit issued to an account.

Process Description: Two data files are produced by InterCept, the credit card processing application. The first file is known as the “settled” file, which contains data regarding charges that have been sent to the credit card issuing banks for payment. The second file is known as the “refunds” file, which contains data regarding credits that have been issued to customer accounts. These files are in a comma-separated value (CSV) format. A system module, to be architected, runs; this module will move the data directly from the two files and add/update it to the enterprise database.

Output: Credit card processing data is transferred from CSV files into the enterprise database.

Volume\Frequency: This process is performed on a daily. The size of this file fluctuates based on reservation volume and sailing activities. In this new system, scalability to compensate for increased volume will not be an issue.



Process **3.0** – Online Reporting System

Trigger: Management requests a report of reservations and/or credit card processing data.

Input: The request for a report.

Process Description: Several queries for reports are manually run against the merged credit card processing data and extracted NVS information, which now comprise the deposits database. These reports are then used to make manual entries into NVS regarding cancelled bookings and any miscellaneous refunds. Also, they are used to determine the amount of funding Oceania can ask the credit card banks to pay, in excess of any amounts being held in escrow.

Output: The result is one of three reports. The first report is that of settled credit card charges and refunds, listed by sailing. The second lists credit card cancellations and refunds, for the purpose of making entries into the NVS system. In the future, a module will be written that will automate the process of making the manual entries of cancellations and refunds into NVS. The third report indicates the amount of funds that should be paid to Oceania by the credit card banks.

Volume\Frequency: This process can now be run many times each day, since the data that the reports depend on is no longer bound to one user's workstation. As Oceania's volume increases, this new reporting system will scale to the new level of demand.



Process 3.1 – User makes request for report

Trigger: Management requests a report of reservations and/or credit card processing data.

Input: The request for a report.

Process Description: An authorized user makes a request for a specific report, either the report of cancellations and refunds, the report of funds by sailing, or the report of funds to be paid by the bank.

Output: The requested report process is initiated.

Volume\Frequency: This process can now be run many times each day, since the data that the reports depend on is no longer bound to one user's workstation.

Process 3.2 – Report of Cancellations and Refunds requested

Trigger: A user requests the report of cancellations and refunds.

Input: The request for the report of cancellations and refunds, and the date range of the data to be retrieved.

Process Description: Data concerning all cancellations and refunds that occurred during a specified data range is requested from the enterprise database. The data is then compiled into a report format.

Output: The report of cancellations and refunds.

Volume\Frequency: This process can now be run many times each day, since the data that the report depends on is no longer bound to one user's workstation.



Process 3.3 – Report of Funds by Sailing requested

Trigger: A user requests the report of funds by sailing.

Input: The request for the report of funds by sailing, and the specific sailing for which the funds is to be retrieved.

Process Description: All sales and refunds data concerning the specified sailing is gathered from the database and then compiled into a report format.

Output: The report of funds by sailing.

Volume\Frequency: This process can now be run many times each day, since the data that the report depends on is no longer bound to one user's workstation.

Process 3.4 – Report of Funds to be paid by Bank requested

Trigger: A user requests the report of funds to be paid by bank.

Input: The request for the report of funds to be paid by bank.

Process Description: All sales and refunds data concerning sailings that have just occurred are gathered from the database. These amounts are then compared with the current amount being held in escrow by the bank, also in the enterprise database. The information is then compiled into report format.

Output: The report of funds to be paid by bank.

Volume\Frequency: This process can now be run many times each day, since the data



3.0 Phase III – Systems Analysis

3.1 System Alternatives

Oceania possesses several options to obtain the needed information system. Keeping in mind the previously discussed objectives and goals of the new system, these options include the following alternatives.

3.1.1 Alternative A – Outsourcing

The first alternative identified by the project team is to outsource the entire systems opportunity to a consulting firm specializing in custom software. Outsourcing is the practice of turning over the responsibility of some or the entire project to an outside firm. Possible firms include EDS (Electronic Data Systems). This company employs expertise in the development of such software and hardware. EDS is a leader in system development services, combining creativity with proven methods and deep technical expertise to craft the solutions you need to enhance productivity. EDS has been rated in the top 10 percent of the industry. Their real-world solutions make even the most complex systems simple.

Advantages:

- Oceania would have the luxury of just providing the necessary inputs, and taking the output.
- This option may be more cost effective in the future.
- Oceania would not have to deal with the overall development process, and would not have to dedicate the human capital or time.



- The consulting firm would likely take responsibility for the technical support of the system.

3.1.2 Alternative B – In-House Development

The second alternative identified by the project team is to develop the entire system in-house. In house development entails the information technology department at Oceania developing the system (including the group's input). It is a hybrid of different solutions, including the purchase of some hardware and software, as well as in-house development of software components.

Advantages:

- This option will provide Oceania with the greatest amount of control over the development process.
- This option allows Oceania to specifically tailor the system directly to their individual needs.
- The overall short-term cost would be less expensive for the firm.
- Oceania possesses the capability to develop the system in house.

3.1.3 Alternative C – Turnkey Software Package

The third alternative identified by the project team is to implement a turnkey software package. A software package that has already been established in the market, such as Great Plains, could be integrated into the Oceania system. This alternative offers a range of options to the company, from a package with broad-based market appeal, like Great Plains, to a package aimed at Oceania's market niche.



Advantages:

- Flexibility concerning what may be necessary to the company's requirements.
- The package could provide for all levels of the organization's current system and be adaptable to any size organization, which would support Oceania's future growth
- The software is generally tested, proven, and can be implemented in a short period of time.
- The package helps to minimize the workload placed on Oceania in the implementation process.

3.2 Justification for Selected Alternative

After preparing the previous section of this study, it became apparent that the option of developing in-house is the most practical alternative. It was chosen because in-house development provides the best overall opportunities for the organization. The system would not be composed from scratch; the system would be compiled from elements of Oceania's existing framework.

This strategy is best applicable because the system has highly specialized requirements. There is a lower risk of system integration issues if done in-house. System integration refers to the process of combining software, legacy systems, and new software modules. It helps in building technical and functional skills within the organization. In-house development provides the project team with better control over how the system



looks and how it functions. Another issue is security; there is less possibility of compromising confidential information if done in-house.

The implementation of the proposed information system is a critical step in the future success of Oceania. Because it's a start-up organization, the company is not capable of the outlay of capital that would be required to completely outsource the development to another firm, or the outlay that would be required to purchase a software package to fulfill Oceania's needs. This, more than any other factor, has mandated that in-house development be the chosen path in the development of this new system. In order for Oceania to stay competitive with the other firms in its industry, and to ensure the continued financing of its operations, the project team must recommend that Oceania move forward with the development process in-house.

Figure 3.1 System Alternatives Weighted Comparison

Criteria	Weight	Alternative A		Alternative B		Alternative C	
		Rating	Score	Rating	Score	Rating	Score
Requirements							
On-line data entry	10	5	50	3	30	3	30
Reporting facility	20	4	80	4	80	3	60
Customization	20	2	40	5	100	2	40
	50		170		210		130
Constraints							
Development cost	20	2	40	3	60	1	20
Implementation cost	15	1	15	2	30	1	15
Time to Operation	10	2	20	1	10	5	50
Ease of Training	5	2	10	5	25	3	15
	50		85		125		100
TOTAL	100		255		335		230



3.3 System Summary for End Users with Sample Screen Shots

This section presents a user guide written for the employees who will use the system on a regular basis.

Login: This page allows you access to the Oceania database.

Enter the credentials supplied by your supervisor. It is imperative that you keep this information personal, as your login id will be used to track your use of the system. Enter your username in the field labeled 'USERNAME' and your password in the field labeled PASSWORD. Click SUBMIT to enter the database. If the credentials entered do not match any of those in the Oceania database, your logon request will be rejected. After the third failed attempt your account will be locked and you will need to contact your system administrator to unlock your account and attempt again.

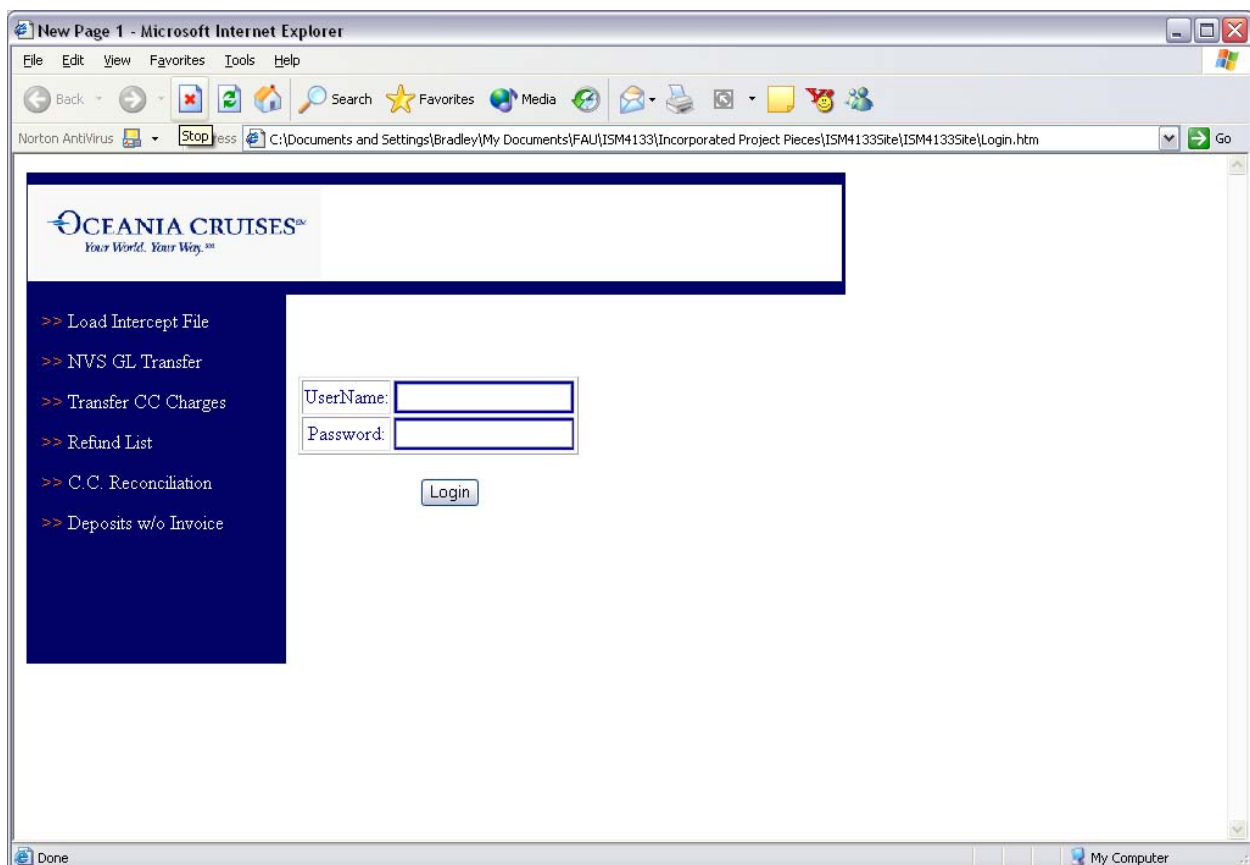


Figure 3.2 Login page



InterCept: This page is used to load the current InterCept file

Click BROWSE and select the InterCept file showing the current date. As indicated on the page, intercept file are located in the following path: \\OCMIA009\Intercept. Once the file is located, double click on it. The pathname will be populated in the field labeled SELECT THE FILE TO UPLOAD. Verify the selected filename and click UPLOAD to complete upload of the new file to the database.

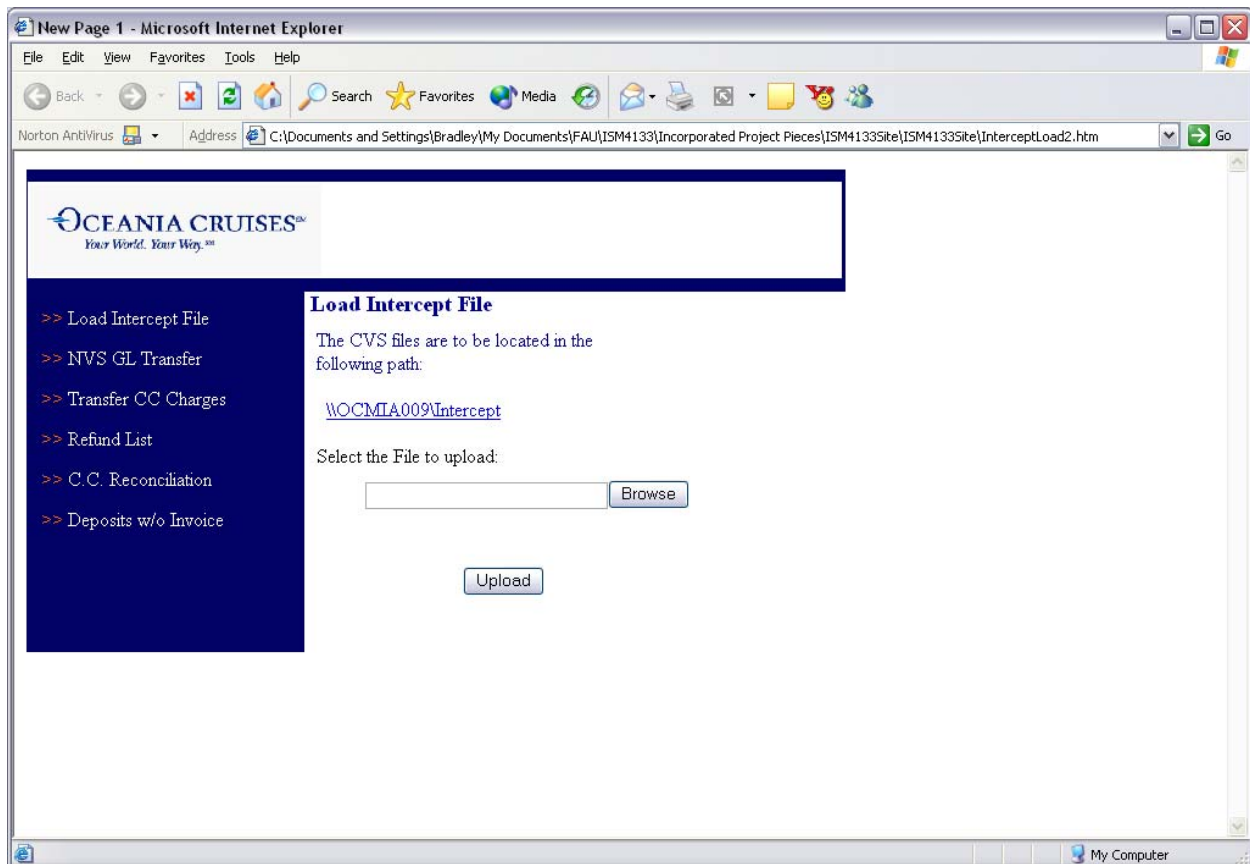


Figure 3.3 InterCept page

InterCept Credit Card Reconciliation: Once the file is uploaded you will be able to search the database for reconciliation records by date.

Enter the begin date in the field labeled START DATE and the end date in the field labeled END DATE. Your entry should be in the following format mm/dd/yyyy. Click SUMBIT to send your request to the database.



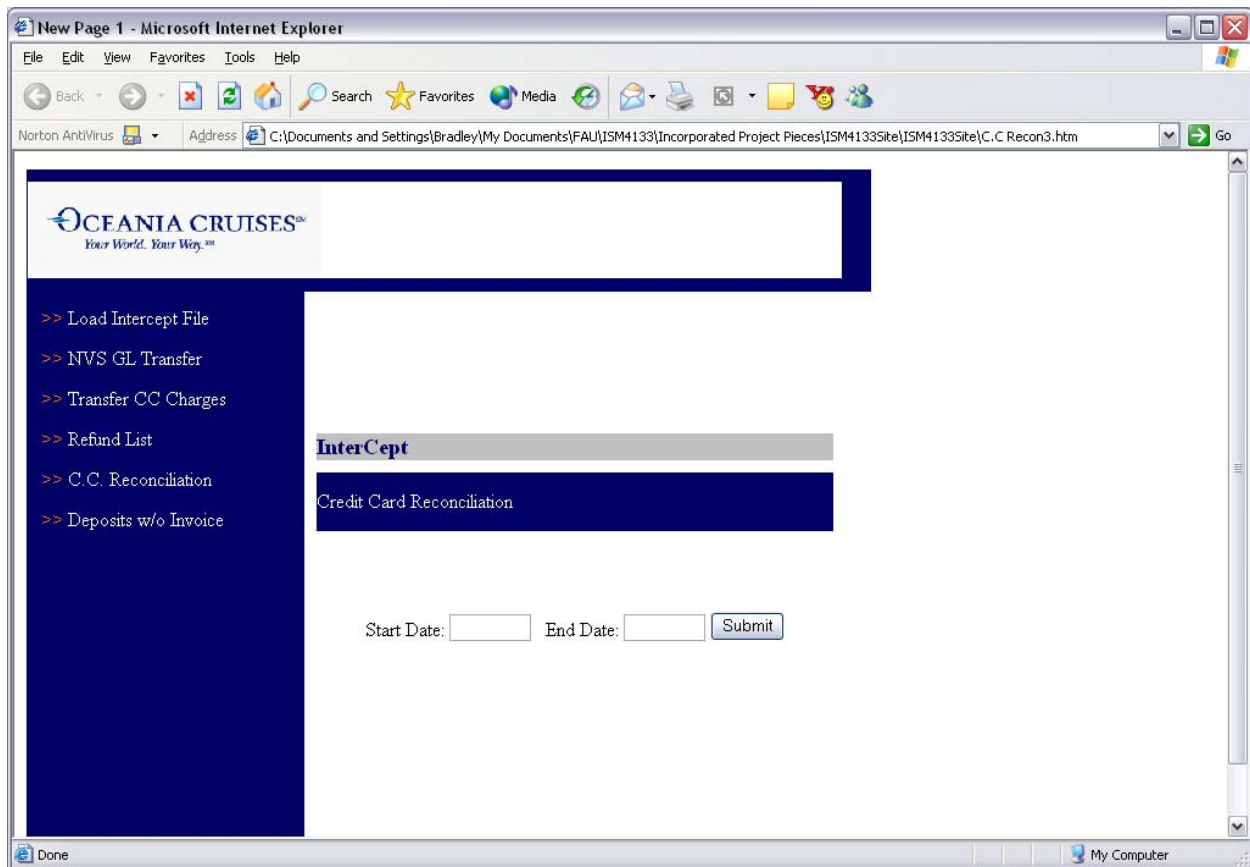


Figure 3.4 Credit Card Reconciliation page

This is the report of reconciliation by date which will be returned when a valid begin date and end date are entered and 'SUBMIT' is clicked:

Date: indicates the date of the reconciliation
 Transaction code: indicates the type of transaction
 C1: credit to account
 C3: refund to account

Total: indicates the amount of the transaction. The sum total for all returned transactions would be printed at the bottom of the list on the line labeled TOTAL

Click on date in the 'DATE' list to view the transactions for that date. If you would like to view the credits click on the date with a TRANSACTION CODE of C1. For a list of refunds, click on the necessary date with a TRANSACTION CODE of C3.



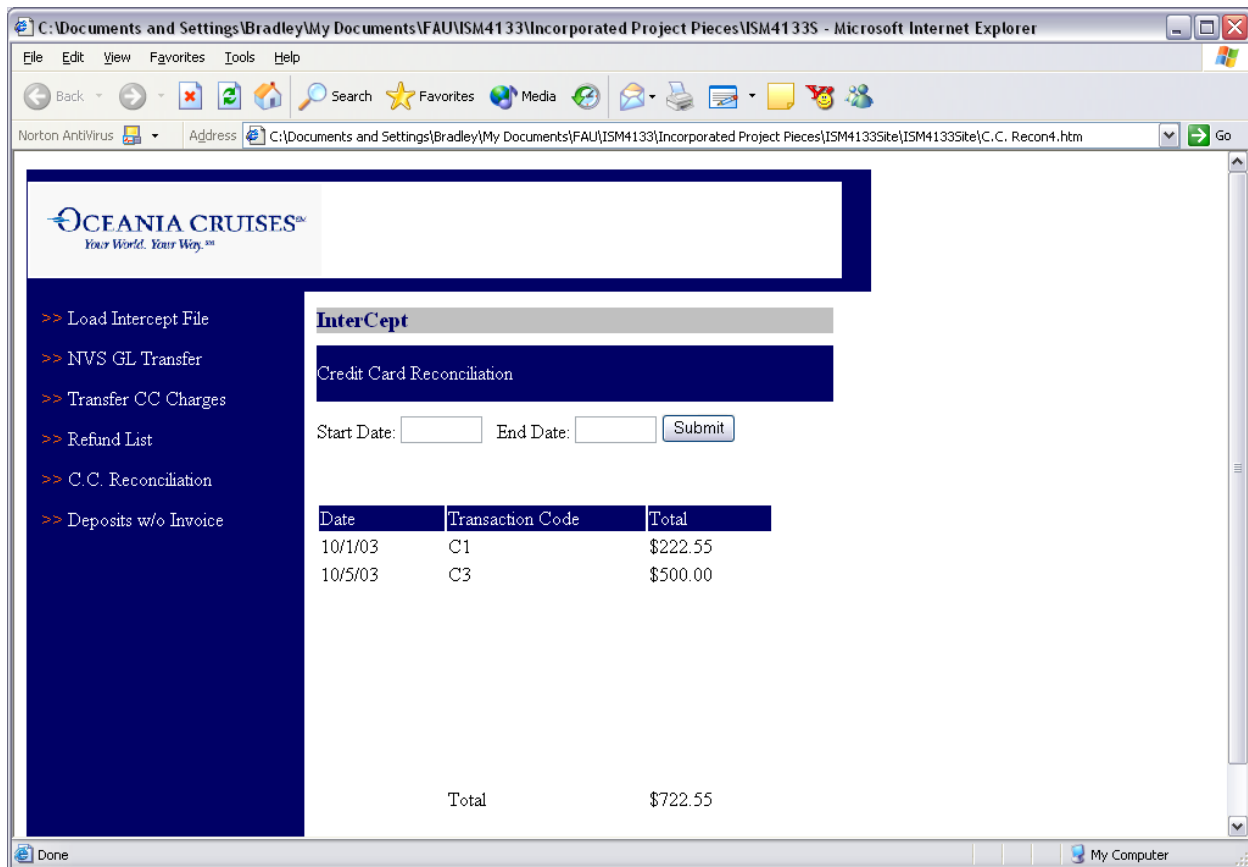


Figure 3.5 Credit Card Reconciliation page cont'd

Once you have selected a date to view transactions, a report will be returned with the following fields:

TransNro: Indicates the 9 digit number assigned by the issuing credit card company

TransDate: Indicates the date and time of the transaction. The time is in the following format mm/dd/yyyy. The date is listed as Eastern Standard Time

TransactionID: Indicates the 19 character id assigned by the issuing credit card bank

First Name: Indicates the first name of the Oceania customer

Last Name: Indicates the last name of the Oceania customer

Amount: Indicates the amount of the transaction

Credit Card: Indicates the credit card number of the Oceania customer

ExpDate: Indicates the expiration date of the Oceania customer's credit card. The date is formatted as mmdd.

TransactionCode: Indicates the type of transaction
C1: credit to account



C3: refund to account
Settled Date: Indicates the date the transaction was paid by the completed by the issuing bank

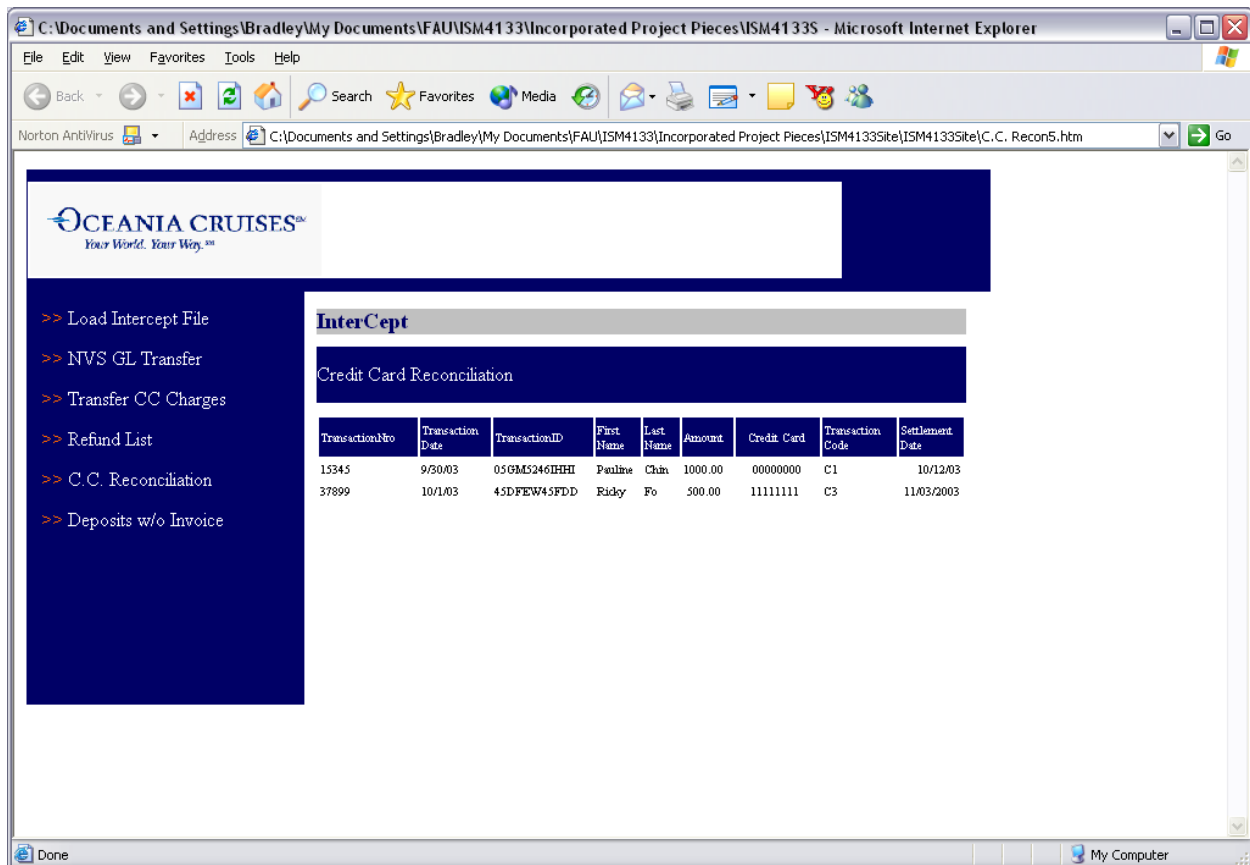


Figure 3.6 Credit Card Reconciliation page cont'd

NVS General Ledger Transfer: This page is used to load the current NVS Ledger file

Click BROWSE and select the intercept file showing the current date. As indicated on the page, intercept file are located in the following path: \\OCMIA009\NVS. Once the file is located, double click on it. The pathname will be populated in the field labeled, SELECT THE FILE TO UPLOAD. Verify the selected filename and click UPLOAD to complete upload of the new file to the database.



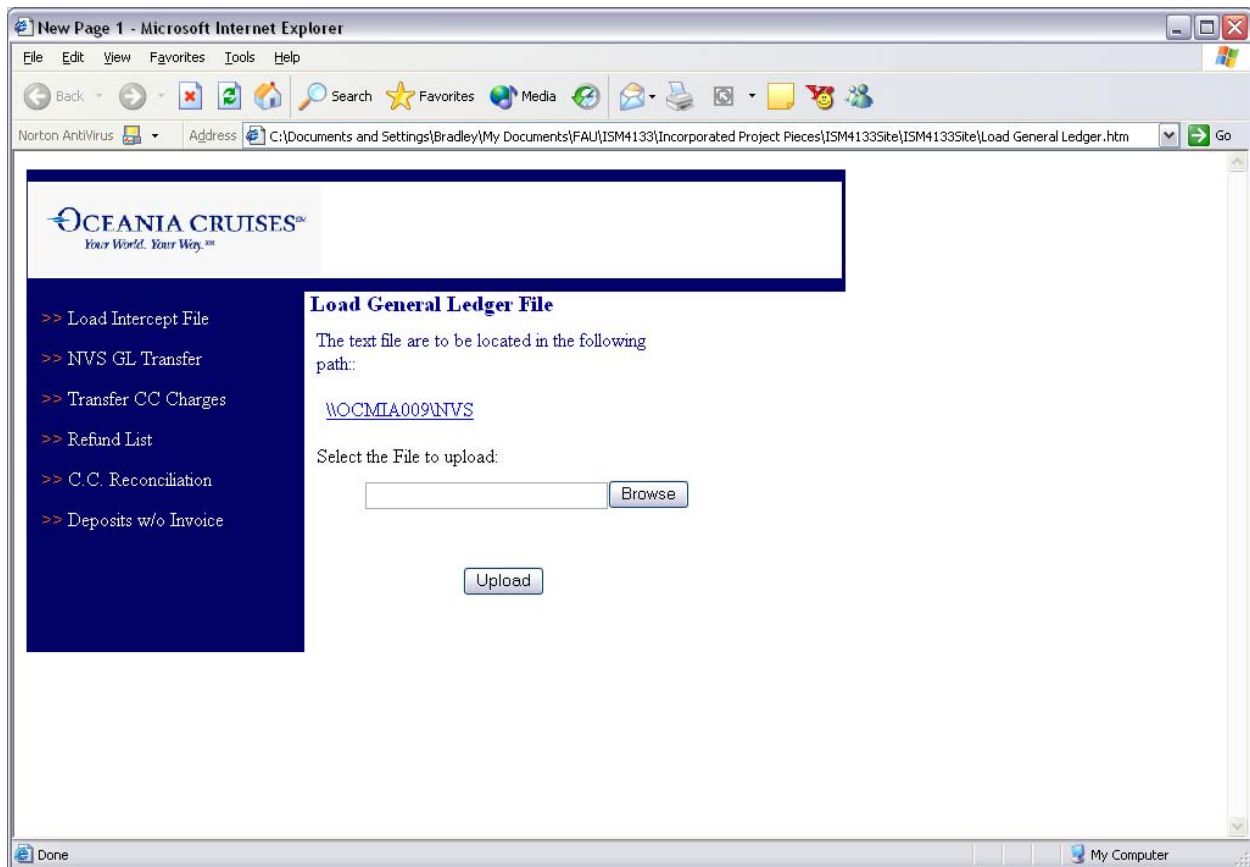


Figure 3.7 NVS Transfer Page

Transfer credit card charges: This page automates the reconciliation of invoices to credit card transactions in the InterCept CSV file. When a customer changes sailings, the credit card transaction listed in the intercept file is not associated with an invoice. Now, the user will be able to quickly reconcile the records with a simple clicking action.

You can search for the unlinked item by credit card number or invoice number, but may only use one option or the other:

Enter 16 digit credit card number in the field labeled CREDIT CARD NRO and click the SEARCH BUTTON or

Enter the 6 digit invoice number in the field labeled INVOICE NUMBER and lick the SEARCH button.



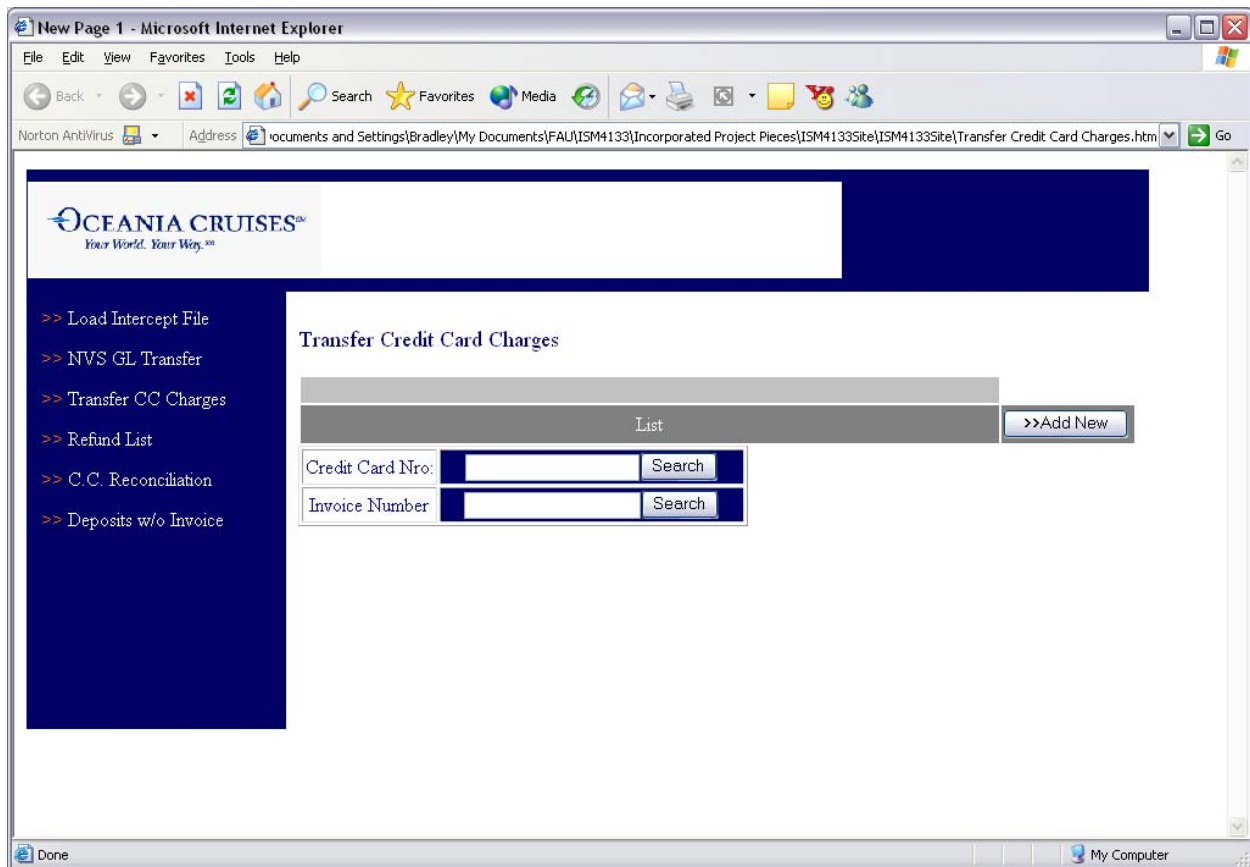


Figure 3.8 Transfer Credit Card Charges page

This page is returned when a valid credit card number is entered and the search button is clicked. The information on the page is delineated as follows:

TransferInv:	Indicates the invoice number to be linked to the correct record in the Intercept file transferred
Invoice #:	Indicates Oceania invoice number
Credit Card:	Indicates the credit card number of the Oceania customer
TransDate:	Indicates the date and time of the transaction. The date is in the following format mm/dd/yyyy. The time is listed as Eastern Standard Time
First Name	Indicates the first name of the Oceania customer
Last Name:	Indicates the last name of the Oceania customer
Amount:	Indicates the amount of the transaction
Code:	Indicates the type of transaction
	C1: credit to account
	C3: refund to account



Transaction: Indicates the type of transaction:
RESERVATION: reservation transaction
POS: Point of sale transaction made during a sailing

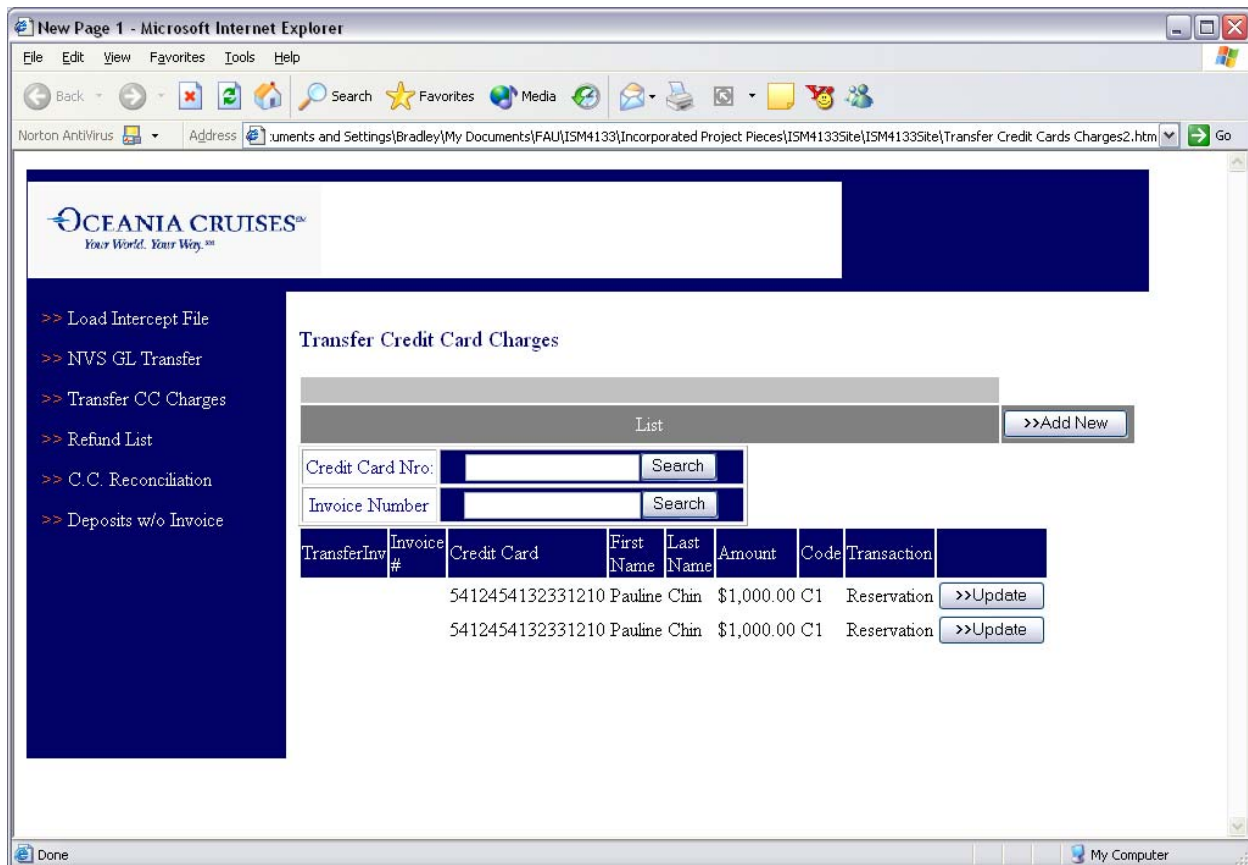


Figure 3.9 Transfer Credit Card Charges page cont'd

The last column on the report is a link labeled UPDATE. Click UPDATE to reconcile the transaction with the proper invoice.

This is the intercept record that needs to be associated with the correct invoice. Information on the page is as follows:

TransferInv: Blank field for the invoice number to be linked to the correct record in the Intercept file
Transfer Type: Allows user to change the associated transaction type
RESERVATION: reservation transaction
POS: Point of sale transaction made during a sailing
Credit Card: Indicates the credit card number of the Oceania customer



TransDate:	Indicates the date and time of the transaction. The date is in the following format mm/dd/yyyy. The time is listed as Eastern Standard Time
TransactionID:	Indicates the 19 character id assigned by the issuing credit card bank
Company Nro:	Indicates the number assigned to Oceania by the clearing house for identification purposes
First Name	Indicates the first name of the Oceania customer
Last Name:	Indicates the last name of the Oceania customer
Amount:	Indicates the amount of the transaction
ExpDate:	Indicates the expiration date of the Oceania customer's credit card. The date is formatted as mmdd.
Transaction Code:	Indicates the type of transaction C1: credit to account C3: refund to account
Approval code:	Indicates the 6-digit approval code assigned by the issuing credit card bank
Settlement Date:	Date charge paid
Phone Nro:	Indicates the Oceania customer's phone
Invoice #:	Indicates Oceania invoice number

Enter the old invoice number to be associated with the new transaction and click SUBMIT at the bottom of the form.

Refund list: This report lists the credit card refund records retrieved from InterCept that are not linked to invoices. The columns are delineated as follows:

TransferInv:	Blank field for the invoice number to be linked to the correct record in the Intercept file
Invoice #:	Indicates associated Oceania invoice number. This column will be blank on this report, as the refunds are not linked to invoices
Credit Card:	Indicates the credit card number of the Oceania customer
First Name	Indicates the first name of the Oceania customer
Last Name:	Indicates the last name of the Oceania customer
Amount:	Indicates the amount of the transaction
Code:	Indicates the type of transaction C1: credit to account C3: refund to account
Transfer Type:	Allows user to change the associated transaction type RESERVATION: reservation transaction POS: Point of sale transaction made during a sailing



The last column on the report is a link labeled UPDATE. Click UPDATE to reconcile the transaction with the proper invoice.

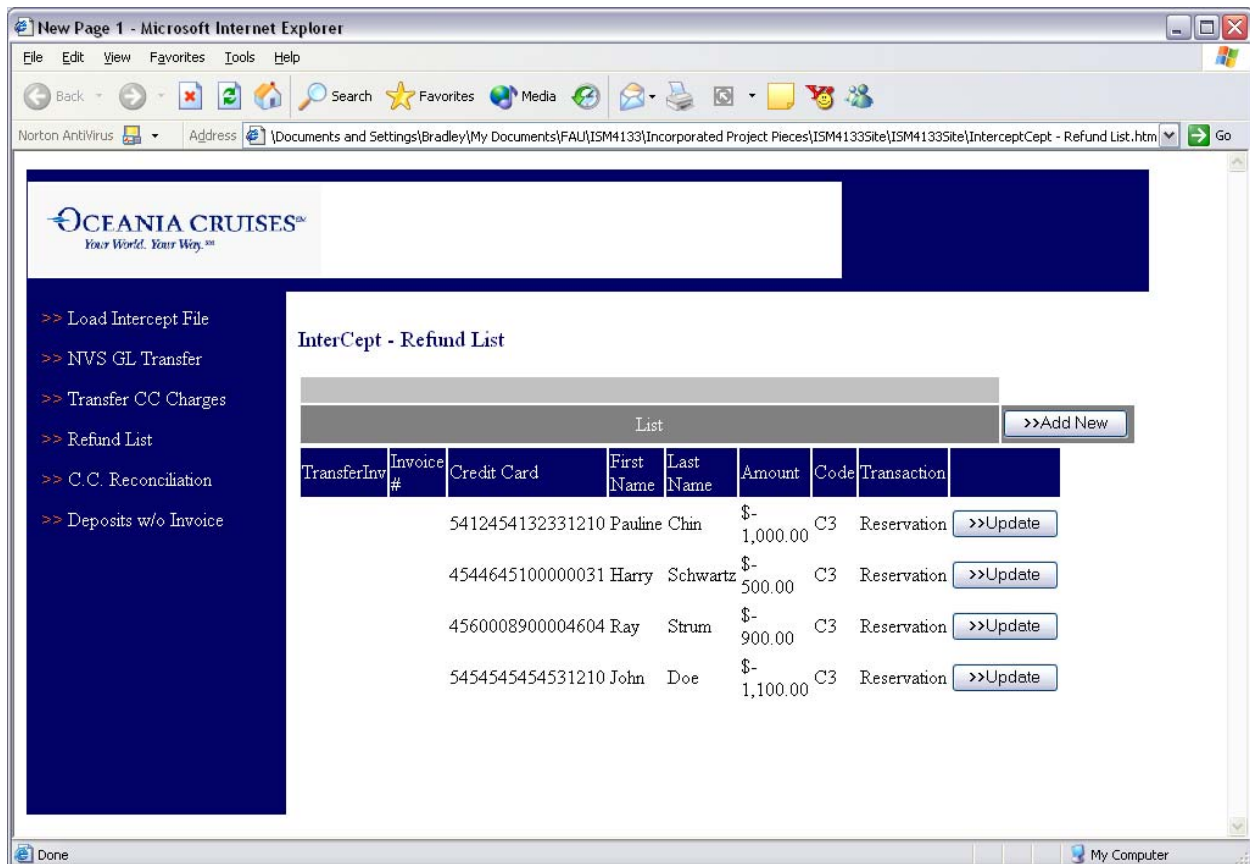


Figure 3.10 Refund List page

The report shows all invoice transactions associated with a particular credit card number. The fields on the form are labeled as follows:

TransferInv:	Most recent invoice associated with the credit card selected
Invoice #:	Indicates associated Oceania invoice number. This column will be blank on this report, as the refunds are not linked to invoices
Credit Card:	Indicates the credit card number of the Oceania customer
First Name:	Indicates the first name of the Oceania customer
Last Name:	Indicates the last name of the Oceania customer
Amount:	Indicates the amount of the transaction
Transaction Code:	Indicates the type of transaction
	C1: credit to account
	C3: refund to account
Transfer Type:	Allows user to change the associated transaction type



RESERVATION: reservation transaction
POS: Point of sale transaction made during a sailing

The refund selected on the previous page is listed at the top of the page with a TRANSINV of 0. The 0 indicates that the refund is not associated with any invoice. Notice it is also listed in the list transactions associated with the credit card number in question with a TRANSINV of 0. To associate the refund with an invoice, select the UPDATE link to the far right of the invoice. The refund will now be associated with an invoice.

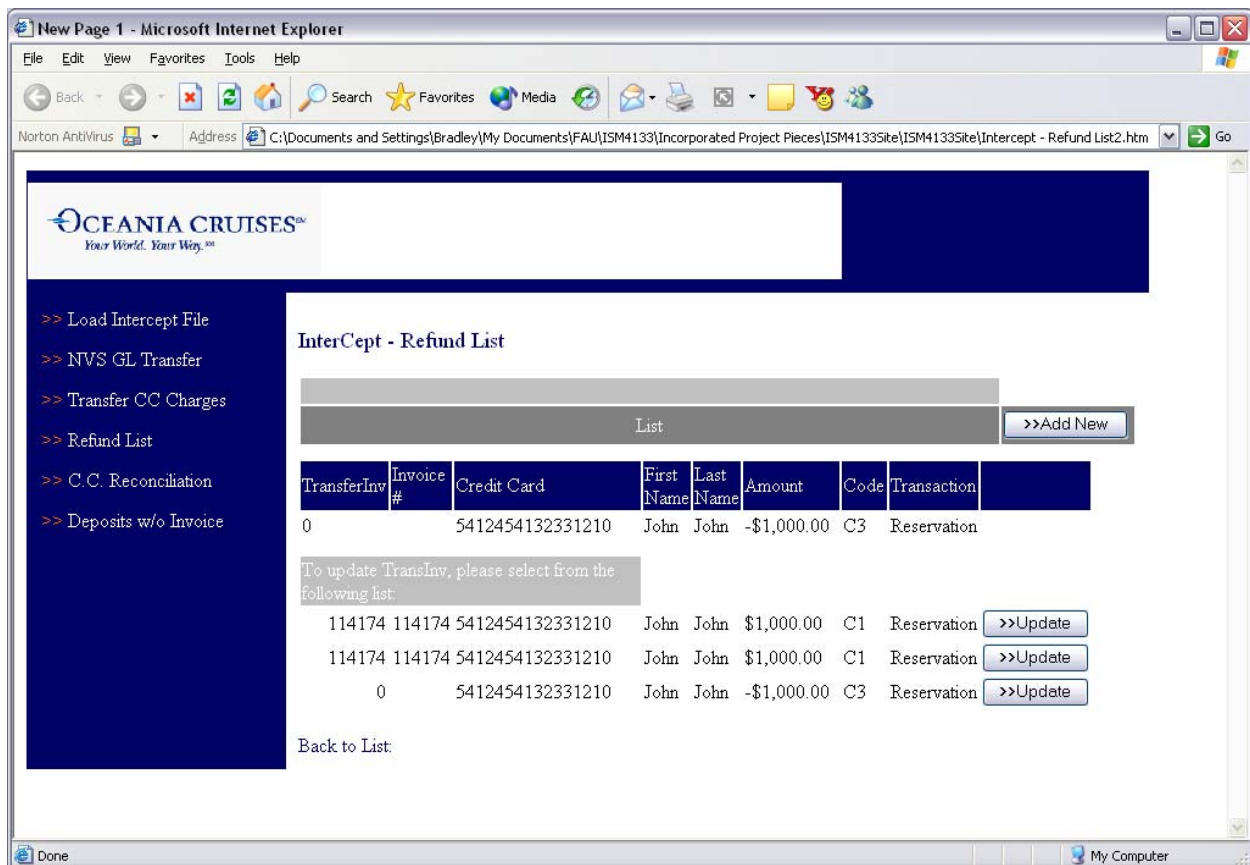


Figure 3.11 Refund List page cont'd

Deposits without invoice: This page displays all credits not associated with an invoice. The columns on this page are labeled as follows:

TransferInv:	Indicates the invoice number to be linked to the correct record in the Intercept file transferred
Invoice #:	Indicates Oceania invoice number
Credit Card:	Indicates the credit card number of the Oceania customer
First Name	Indicates the first name of the Oceania customer



Last Name:	Indicates the last name of the Oceania customer
Amount:	Indicates the amount of the transaction
Code:	Indicates the type of transaction C1: credit to account C3: refund to account
Transaction:	Indicates the type of transaction: RESERVATION: reservation transaction POS: Point of sale transaction made during a sailing

The last column on the report is a link labeled UPDATE. Click UPDATE to reconcile the deposit with the proper invoice.

The deposit record selected on the previous page is listed at the top of the page with a TRANSINV of 0. The 0 indicates that the deposit record is not associated with any invoice. Notice it is also listed in the list transactions associated with the credit card number in question with a TRANSINV of 0. To associate the deposit with an invoice, select the UPDATE link to the far right of the invoice. The deposit will now be associated with an invoice.



3.4 Technical Summary for Systems Analysts

This section presents a guide written for the systems analysts who will build and support the new system.

3.4.1 System Structure

The chosen environment for the new system is that of a web based environment. The new system will be housed on an application (web) server. This new server will be located on-site in the Oceania offices, via the existing Ethernet backbone. The enterprise database will be housed on a separate database server, also located at the Oceania offices. Figure 3.12 Map of Current System

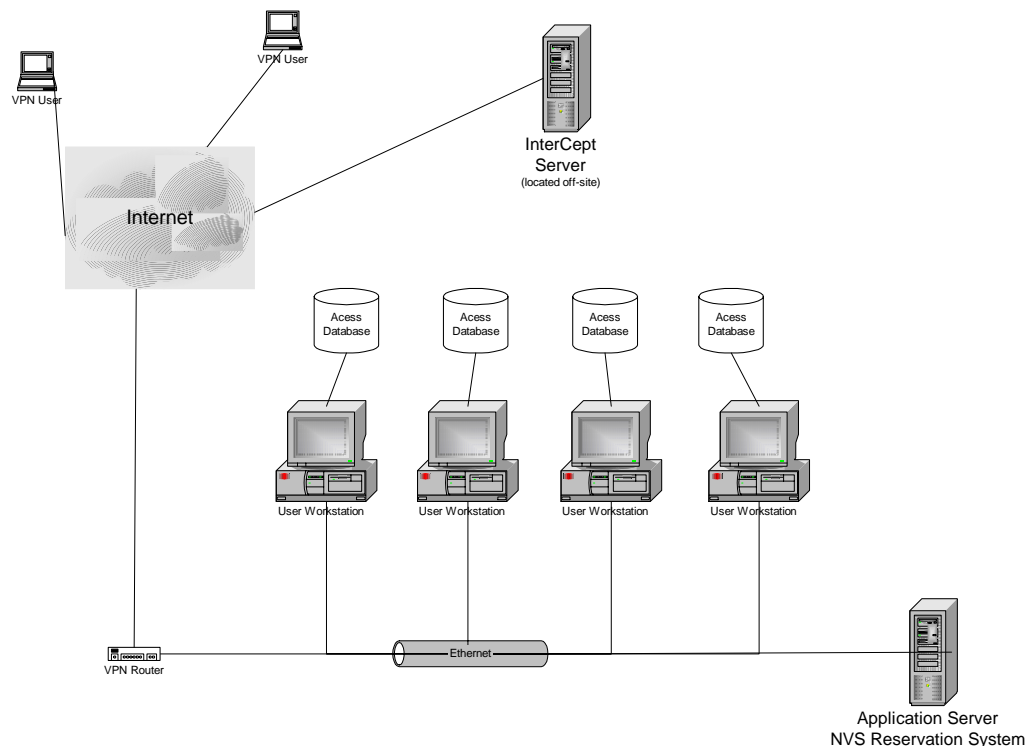


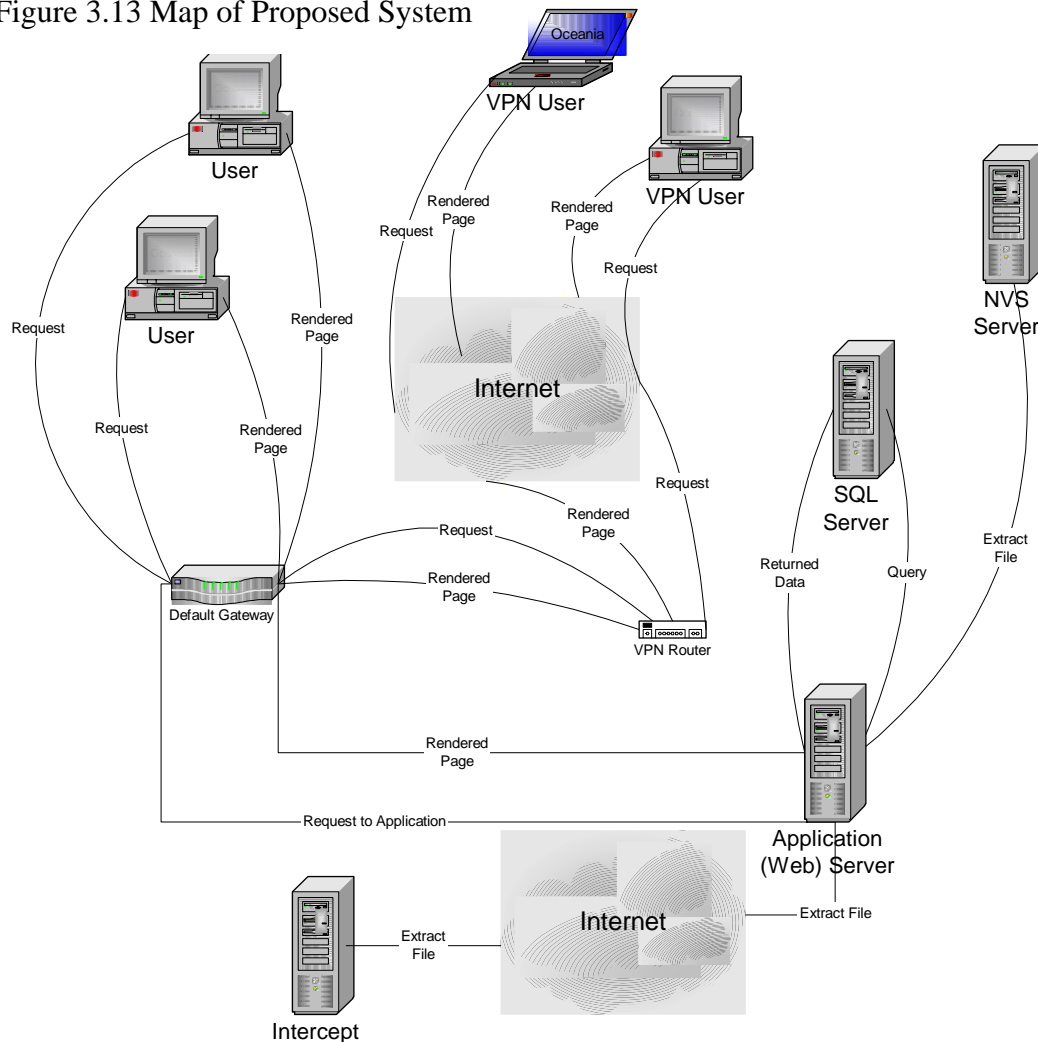
Figure 3.1 at left is a diagram of how requests and responses flow across the network right now.

The structure of the network will not have to change to implement this system. The new servers will simply be placed directly on the existing Ethernet backbone shown above.



In the new system, requests and responses will flow between the workstations and the application server. VPN users may also logon to the corporate network and make requests to the application server. The application server will send requests to the data

Figure 3.13 Map of Proposed System



store, which will return the needed data. The application server will also request the NVS extract file from the NVS server on a daily basis. The application

server will also need to request the data file from the InterCept system, which is located on a server that is off-site. Figure 3.2 above shows the flow of requests and responses in the proposed system. The new application server will be dealing with a volume of traffic that is directly proportionate to the level of usage of the new system.



3.4.2 Modeling Logic for Processes

In the following section the logic flow is described and detailed. This information is helpful both to the developers responsible for coding the new system, as well as those responsible for supporting the system.

Process 1.1 Reservations Data Extracted from NVS file

```
BEGIN IF
    IF end-of-day NVS file available
    THEN BEGIN IF
        IF NVS file in proper format
        THEN read NVS file
            DO
                READ reservation record
                EXTRACT data to temporary file
            UNTIL end of file
        ELSE DO nothing
    END IF
    END IF
    ELSE DO nothing
END IF
```

Process 1.2 Data in Temporary File Compared and New Data Added

```
DO
    READ next reservation record in temporary file
    COMPARE record to records in Bookings table
    BEGIN IF
        IF reservation is not found in the Bookings table of the database
        THEN ADD new booking record to the Bookings table
    END IF
UNTIL end of file
```



Process 1.3 Data in Temporary File Compared and Existing Data Updated

```
DO
    READ next reservation record in temporary file
    COMPARE record to records in Bookings table
    BEGIN IF
        IF reservation is found in the Bookings table of the database
        THEN UPDATE existing booking record
    END IF
UNTIL end of file
```

Process 2.0 Data from “Settled” and “Refunds” Files Merged

```
BEGIN IF
    IF InterCept “Settled” file available
    THEN BEGIN IF
        IF “Settled” file in proper format
        THEN read “Settled” file
            DO
                READ settled record
                ADD to Payments table of the database
            UNTIL end of file
        ELSE DO nothing
    END IF
    END IF
    ELSE DO nothing
END IF
BEGIN IF
    IF InterCept “Refunds” file available
    THEN BEGIN IF
        IF “Refunds” file in proper format
        THEN read “Refunds” file
            DO
                READ refund record
                ADD to Payments table of the database
            UNTIL end of file
        ELSE DO nothing
    END IF
    END IF
    ELSE DO nothing
END IF
```



Processes 3.1 User Makes Request for Report

```
READ user request for report
SELECT CASE
    CASE 1 (User requests report of cancellations and refunds)
        SEND request to Process 3.2
    END CASE
    CASE 2 (User requests report of funds by sailing)
        SEND request to Process 3.3
    END CASE
    CASE 3 (User requests report of funds to be paid by bank)
        SEND request to Process 3.4
    END CASE
END SELECT
```

Process 3.2 Report of Cancellations and Refunds Requested

```
SEND request to enterprise database
DO
    READ next Payment record
    BEGIN IF
        IF Payment type is refund
            AND Payment record is not linked to a Booking record
            THEN ADD to report data
        OR
        IF invoice transaction code equals c3
            ADD to report data
    END IF
UNTIL end of file
DISPLAY report of cancellations and refunds
```



Process 3.3 Report of Funds by Sailing Requested

```
SEND request to enterprise database
DO
    READ next Booking record
    BEGIN IF
        IF Booking sail date EQUALS report request date
        AND associated Payment has not been marked as requested
        THEN ADD to report data
        AND mark associated Payment records as requested
        OR
        IF Payment has not been marked as requested
        THEN DO nothing
    END IF
UNTIL end of file
DISPLAY requested report of funds by sailing
```

Process 3.4 Report of Funds to be Paid by Bank Requested

```
SEND request to enterprise database
DO
    READ next Payment record
    BEGIN IF
        IF Bank associated with Payment record is EQUAL to bank requested
        AND Payment is NOT associated with a Fulfillment
        ADD to report data
    END IF
UNTIL end of file
SUM Payments to be requested LESS Escrow Amount
ADD to report data
DISPLAY requested report of funds to be paid by bank
```



3.4.3 Database Structure

This new system will implement an enterprise database that is designed to grow as the company's information needs expand. At this point in time, the database will be housed on the array of disks on the new database server. This physical database structure will allow the database to grow as the company grows, as well as providing redundant copies of the data stored in the database.

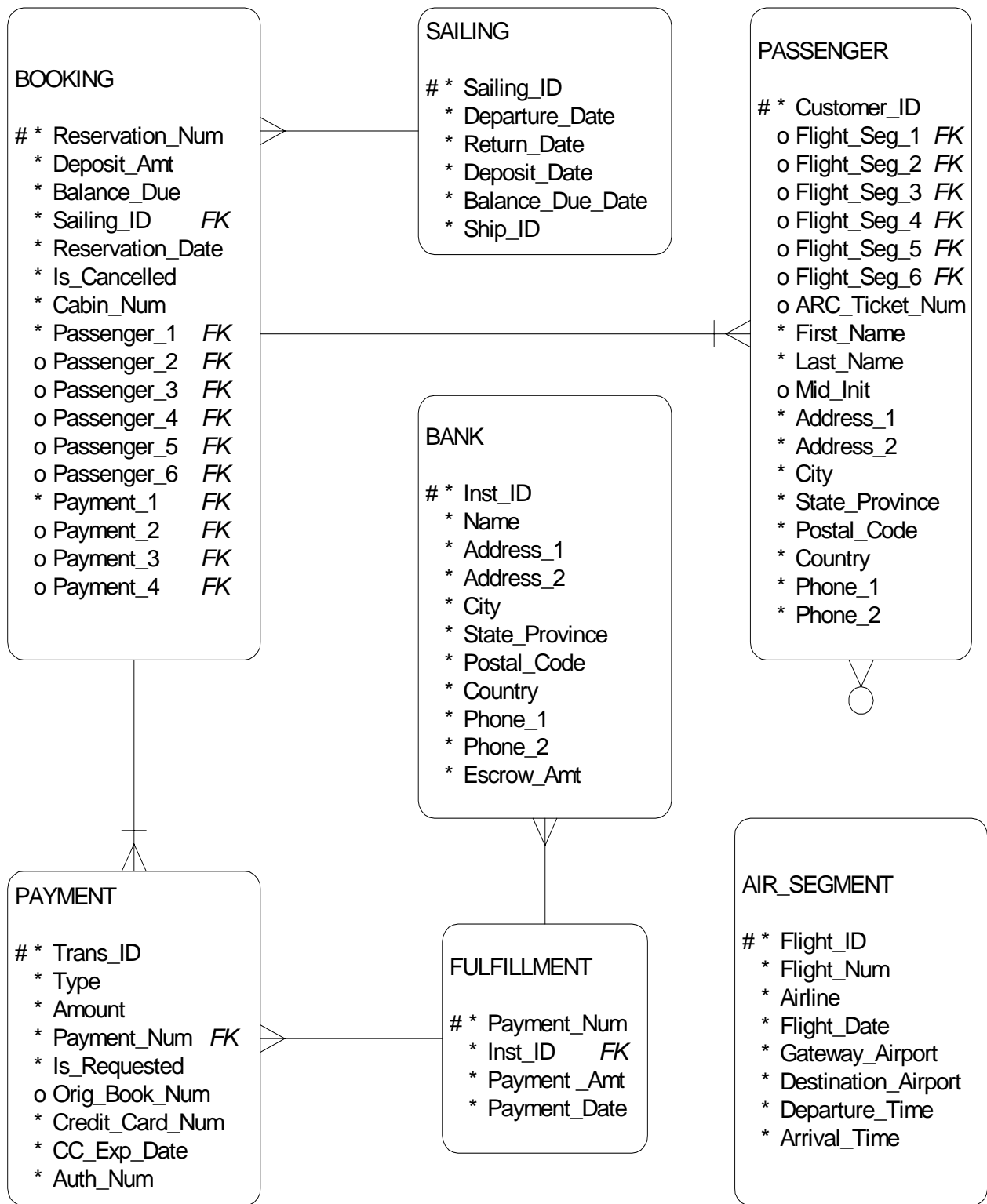
On the following page, Figure 3.3 describes the logical structure of the database.

The following statements describe the relationships between the tables in the database:

- Each Booking must be for one and only one Sailing.
- Each Sailing may be reserved with one or more Bookings.
- Each Booking must be for one and at most six Passengers.
- Each Passenger must have one and only one Booking.
- Each Passenger may have one and at most six Air Segments.
- Each Air Segment may be booked by one or more Passengers.
- Each Booking must have one and at most four Payments.
- Each Payment may be for one and only one Booking.
- Each Fulfillment must be for one or more Payments.
- Each Payment may be collected through one and only one Fulfillment.
- Each Bank may send one or more Fulfillments.
- Each Fulfillment must be sent by one and only one Bank.



Figure 3.14 E-R Diagram of the Database for Oceania Cruises



3.4.4 File Layout

The NVS extract file will still reside on the application server that hosts the NVS application. It will be read on a daily basis by the new system. The temporary file for storing values as they are read out of the NVS extract will be stored on the new application server where the proposed system will reside. The files containing credit card information must be requested from the InterCept system that is located on a remote server. These files are downloaded to the new application server where they are temporarily stored until processing of the data contained in them is complete. No files will be stored on individual user desktops.

3.4.5 Hardware Requirements

New hardware acquisitions for the proposed system will include a new application server and a data store. Since the new server will be attached to the network right on the backbone, no new networking equipment will be necessary. The following is a description of the server and the data store to be used in the new system.



Application Server:



Dell Poweredge 1750 Rack Mounted Server

\$7,055

Catalog Number	Description	Product Code	SKU	Id
PowerEdge 1750:	Free Upgrade to an Intel Xeon 2.8GHz, 512K, 533MHz FSB at a 2.4 price	175285U	[462-3308]	1
ADDITIONAL PROCESSORS:	Single Processor for 533FSB	1P533	[311-3141]	2
Operating System(s):	Windows Server 2003 Enterprise Edition with 25 Client Licenses	W2K3ENT	[420-2966]	11
Special Offers Dollars Off:	Special Offer - \$400 Off	DT400	[461-9294]	120
Memory:	1GB DDR,266MHz,2X512MB DIMMS	1GB2D	[311-2441]	3
RACK RAILS:	No Rails Included	NORAIL	[461-2446]	28
BEZEL:	No Bezel Option	NOBEZEL	[313-0869]	17
Power Supplies:	Redundant AC Power (2X320 Watt Power Supplies) 533 FSB	REDPWR5	[310-4223]	36
PCI RISER:	2X64/133MHz PCI-X Riser	64BPCI2	[320-0623]	7
DOCUMENTATION:	Users Manual,Installation and Trouble Shooting Guide on CD	EDOCS	[310-0438]	21
Hardware Support Services:	3Yr BRONZE Support, Next Business Day Onsite	BZEBSD	[900-1122][900-1120][960-1305]	29
Installation:	No Installation	NOINSTL	[900-9997]	32
HD Configuration:	On-Board RAID 1, 2 drives connected to on-board RAID	MR1	[340-8165]	27
Hard Drive Controller:	PERC4-DI, 128MB Battery Backed Cache, 1 Int 1 ext Ch-Embedded Raid	ROMB128	[340-8156]	9
1st Hard Drive:	36GB,10K RPM, 1in (Ultra 320) SCSI Hot Plug Hard Drive	36HP10	[340-8357]	8
2nd Hard Drive:	36GB,10K RPM, 1in (Ultra 320) SCSI Hot Plug Hard Drive	36HP10	[340-8357]	23
1st Network Adapter:	Dual Onboard NICS for 533Mhz Front Side Bus	OBNICS	[430-8991]	13
Floppy Drive Options:	1.44MB Diskette Drive	FD	[340-3612]	10
CD-ROM or DVD:	24X IDE CD-ROM	CD24X	[313-1281]	16
Keyboard:	No Keyboard Option	N	[310-3281]	4
Mouse:	No Mouse Option	N	[310-0024]	12
Monitor:	No Monitor Option	N	[320-0058]	5
Purchase Intent:	Purchase is not intended for resale.	NOT4SEL	[462-4506]	138
Software and Accessories:	SQL Server 2000	SQLSV2K	[483266-4]	181



Data Store:



Dell PowerVault 221S Rack Mounted Data Store

\$4,951

Catalog Number	Description	Product Code	SKU	Id
PowerVault 220/221:	PowerVault® 221S External SCSI Storage Array	PV221T	[220-4477]	1
Rack Rails:	No Rails Included	NORAIL	[310-4111]	27
Power Supplies:	Redundant 600W Power Supply for PowerVault 22XS	REDPWR	[310-0682][310-0677]	36
Documentation:	Hard Copy Documentation	DOCS	[310-1321]	21
Primary Controller:	PowerVault 22XS, Single, U320 Enclosure Management Module	320EMM1	[340-9324]	9
Cables:	Two 4 Meter, ROMB/2940U2W Cable for PV22XS (Wide HD to Wide HD)	IU3204M	[310-0681]	20
1st Hard Drive:	36GB 10K U320 SCSI Hard Drive	36G103	[340-9370]	8
2nd Hard Drive:	36GB 10K U320 SCSI Hard Drive	36G103	[340-9370]	23
3rd Hard Drive:	36GB 10K U320 SCSI Hard Drive	36G103	[340-9370]	54
4th Hard Drive:	36GB 10K U320 SCSI Hard Drive	36G103	[340-9370]	51
5th Hard Drive:	36GB 10K U320 SCSI Hard Drive	36G103	[340-9370]	52
6th Hard Drive:	36GB 10K U320 SCSI Hard Drive	36G103	[340-9370]	53
7th Hard Drive:	36GB 10K U320 SCSI Hard Drive	36G103	[340-9370]	71
8th Hard Drive:	Single Blank Hard Drive Carrier	1HDBLK	[310-0686]	72
9th Hard Drive:	Single Blank Hard Drive Carrier	1HDBLK	[310-0686]	102
10th Hard Drive:	Single Blank Hard Drive Carrier	1HDBLK	[310-0686]	103
11th Hard Drive:	Single Blank Hard Drive Carrier	1HDBLK	[310-0686]	104
12th Hard Drive:	Single Blank Hard Drive Carrier	1HDBLK	[310-0686]	105
13th Hard Drive:	Single Blank Hard Drive Carrier	1HDBLK	[310-0686]	96
14th Hard Drive:	Single Blank Hard Drive Carrier	1HDBLK	[310-0686]	95
Cluster Status:	Storage Cluster Information No Cluster	CLUSTNO	[310-1786]	614
Purchase Intent:	Purchase is not intended for resale.	NOT4SEL	[462-4506]	138
Hardware Support Services:	3Yr Same Day 4Hr Response Parts + Onsite Labor (M-F 8am-6pm)	W3Y5X10	[900-2180][900-2182][960-1305]	29
Installation Services:	PowerVault Installation Declined	NOINSTL	[900-9997]	32



Key Features:

Server:

- Windows 2003 Enterprise Edition with SQL Server and 25 client licenses.
- Redundant Power Supplies for Maximum Availability
- Mirrored 36 GB Hard Drives for Operating System
- 3 Yr Warranty with same next business day on site

Data Store:

- Seven (7) 36 GB Hard drives for data store
- 7 Empty Hard Drive bays for future data expansion needs
- Redundant Power Supplies for Maximum Availability
- 3 Yr Warranty with same day 4 hour response time on parts, onsite labor included

Cost

Server and Software Licenses	\$7,055
Data Store	\$4,951
Total	\$12,006



4.0 Phase IV – Systems Design

In this stage of the system development project, the team will outline the programming methodology, as well as identify the specific software controls and describe the software testing process.

4.1 Programming Methodology

Test Driven Development refers to the concept of writing unit tests for each piece of code as you go. Once the test criteria for the specific module have been defined, the programmer then writes the code to make the unit test pass the test.

In a distributed environment, requiring active unit testing and check-in of unit tests with code can significantly reduce quality risks the project incurs on the choice of individual developers.

Some specific benefits of programming following a TDD Methodology are:

- Test first code is born with two clients, not one. This makes adding a third client twice as easy.
- Unit test availability permits more aggressive reorganization of code with confidence.
- Ability to reorganize code without risk allows many design decisions to be deferred.
- Code tends to be less coupled. Effective unit tests only test one thing. This exposes poor design.
- Unit Tests are valid tested documentation for objects usage.



- When the developer has to write tests for what he is going to do, he is far less likely to add extraneous capabilities. This helps control developer driven scope creep.

Test-driven development (TDD) offers something new. It regards testing as a continuous process to be carried out as an integral part of developing code. TDD deals with unit tests written by the developer to ensure that his or her code works fine and stays that way. It's more a way of doing things than anything else and doesn't rely on any specific tools.

A fundamental difference between TDD and the normal methodology of creating test plans before starting development is that, with TDD, the tests are not in the form of a forgotten Word or Excel document. The tests exist as proper code and the developer is the one responsible for writing the test. Test Driven Development will be the driving programming methodology utilized for this projects development.

4.2 Software Controls

User controls are very important in an enterprise system. One of the objectives of our system design was to increase the security and manageability. Global User Controls allow organizations to define parameters that govern user activity throughout the system, and to designate system administrators, financial administrators and set other system wide permissions. Specifically, the controls will include provisions for centralized, scalable authentication and authorization control. The new system will perform the Authentication, Authorization, and Accounting (AAA). It will authenticate users against



a central database, authorize policy for user network connection type and access rights, and generate account logs for all connections. The software can enforce session-limit policies, time-of-day restrictions and other access control features.

Testing these controls should prove rather straightforward. The administrators will create test accounts and assign necessary permissions to each account. The administrators will assign these accounts to users from each department for testing. The accounts will be exhaustively tested and the accounting log will be checked to verify proper tracking of what changes the users of the accounts affected on the Oceania database.

4.3 Software Testing

Once the new system has been designed and coded, it needs to be tested in simulated operation before it can be implemented. At each stage in the testing process, the tester will complete a document showing the results of the test. The testing document that will be used is shown in Figure 4.1 below.



Figure 4.1 Software Test Review and Summary Document

Oceania Cruises, Inc.	
Software Test Review and Summary	
Prepared By: _____	Administrator: _____
Unit Name: _____	Testing Stage: _____
Test Number: _____	Test Date: _____
Test Description: _____ _____ _____ _____	
Description of Test Data: _____ _____ _____ _____	
Expected Results: _____ _____ _____ _____	
Actual Results: _____ _____ _____ _____	
Explanation of Differences: _____ _____ _____ _____	
Suggestions for Next Steps: _____ _____ _____ _____	



Since the team has chosen to develop with the Test-Driven Development (TDD) method, code walkthroughs and desk checks will be completed during the course of development. The TDD method ensures that each module can function independently of the other modules that make up individual programs.

Once the proper operation of each module has been established, the individual units can be integrated into the various programs. The programs in this system include the NVS extraction component, the Intercept extraction component, and the on-line reporting and data-entry system. The testing that takes place here is called integration testing. Here the project team will determine if the modules integrated properly to become programs. If all the functions of each program can be carried out properly, then the programs pass the integration test. If there are any issues, they must be resolved at either the module or program level before testing can continue to the next stage.

After integration tests have been completed, a total system test must be completed. Here the project team will tackle the system as a whole, again using sample data. This system test helps the designers locate and resolve any system-wide issues.

Once the system test has been completed, then system is ready to be tested by the users. A user representing each group of employees that will use the system will be selected to test the system with sample data. The users test the system to make sure that it completes the functions they are required to complete with the new system.

Once the users have accepted the system, the system can then be tested as a beta system with live data. As soon as the beta tests are completed by both system analysts



and end-users, the testing process is completed and the project team can move on to the implementation phase.

4.3.1 Data Generation Methodology for Testing

For the testing process, sample data must be generated. This will be accomplished by using the existing data that Oceania has. Oceania already has an existing store of reservation data in the NVS system. A sufficient amount of this data will be copied to a sample database that will be destroyed once testing is completed. Instead of using a copy of live credit card data from the InterCept system, credit card and other numeric data relating to purchases, deposits, and payments will have to be generated randomly. A small program module will be written to generate a sufficient quantity of numeric data and copy the data to the sample database.

4.3.2 Test Constraints

The testing process will be constrained by several rules. The list of points below outlines the test constraints:

- The testing process is limited to a period of no more than three weeks.
- No higher level testing is to be completed without the testing administrator's authorization to proceed.
- Beta testing with live data will only be used after all other stages of testing have been completed using sample data.
- According to the TDD method, unit testing will be completed during the course of development.



- In the integration testing stage, developers will not test programs for which they wrote modules.
- Sample data must be destroyed once alpha testing is completed, or at the latest, once installation of the new system is complete.

4.3.3 Analysis Procedures for Test Results

The testing administrator will collect the test review documents produced by the software testers on a regular basis. The administrator will then review the documents, ensuring that the recommended courses of action actually address the issues and making adjustments if necessary. The administrator then assigns the necessary corrections to a developer to complete by specified date. These procedures guarantee that many individuals participate in the testing process, ensuring a higher degree of error detection and correction.



5.0 Phase V – Systems Implementation

The final phase of this project includes all the events and activities surrounding the implementation of the new information system. Discussed here are the training plans that have been developed for the new system, the plan to convert from the existing systems and procedures to the new system, maintenance procedures for the new system, and the upcoming post-installation audit.

5.1 Training Plans

The new system is imperative to the further development of Oceania as a competitor in a very challenging industry. It will be important that all of the users are comfortable with the newly developed system, and that the system is meeting the necessary requirements. In this case, formal and thorough training is vital to the success of the system. Formal training is important to the successful use of both complex and simple application and system software.

As the Oceania organization is smaller in size, training can be engaged and in a more informal setting, while still meeting the necessary requirements. However a keynote is the various levels of user competency in the company. It ranges from the IT literate to basic user. This has created the following proposal for training, it will include:

- Online help reference in the user application
- System and User documentation located on the company intranet
- User training meetings



- Designated off staff contact person for troubleshooting and application support.

Regular update of web site information- Policies, procedures, and forms can be found on Oceania's intranet web site. In addition to online assistance through the net, the user the guide will be posted online to further support the users with FAQ (frequently asked question) and system functionality.

Regular user training sessions (hands on walk through of the system)- for the first 3 month of implementations to ensure that user are acclimating themselves to the new system. After the 3 months have been concluded, regular user group meetings will begin. These sessions will be held once a month, first thing in the morning, last approximately one hour and provide a forum for application problems and solutions to be shared between users, and to contributed to any system accommodations that may become necessary as Oceania grows and the system requires re-evaluation. They session will also assist the IT department to further develop the system and gage when new options are need in the system to maximize user functionality and productivity.

Oceania will designate an information technology employee to forefront the training correspondence. This person will behave as a liaison between the IT department and the system users. If users are not able to resolve an issue through the online resources, FAQs, or the user documentation, the liaison will be there to address and resolve the issue and to further document that system to ensure that the same problem does not reoccur.



The Oceania information technology support goal is to reply with answers by the close of the next business day (and sooner if possible). Also Oceania will desire to properly provide users with the necessary skills to maximize to potential of the newly developed system.

5.2 Conversion Plans

The following details the plan to convert from the existing system and procedures to the new system.

5.2.1 System Cutover Method

The project team has chosen the direct method of system installation. The reason for this is that the current system is not automated and the procedures are mixture of automated and manual. Once testing of the new system is completed, a date will be selected. On that date, Oceania staffers will simply cease using the old procedures and the new system will be live and operational. Also, there is only one location where this will occur, so there is no reason to stagger the implementation.

5.2.2 Database Conversion

Before the system can be implemented, however, the data residing in the current data stores must be brought into the new enterprise database. A set of stored procedures will be called that will migrate the data from its current location (the NVS system) into its new location, the enterprise database.



5.2.3 File Conversions

The only file conversions necessary will be to bring the existing data from the InterCept system, currently stored in CSV files, into the enterprise database. This will be accomplished in much the same way as the database conversion outlined above. A set of stored procedures will be called that will connect to the CSV files individually and then migrate the data into the new database.

5.3 Maintenance and Modification of the New System

All maintenance of the system will be governed by the Maintenance Manual. The Maintenance Manual will provide maintenance personnel with the information necessary to maintain the system effectively. The manual provides the definition of the software support environment, the roles and responsibilities of maintenance personnel, and the regular activities essential to the support and maintenance of program modules, job streams, and database structures.

The Maintenance Manual will be developed by the IT department during system development and will be augmented as needed.

5.3.1 Authorizations

The information technology department will handle all authorization issues for maintenance of the information system. The director of IT will have the responsibility of deciding when to authorize maintenance to the system. A formal process will be established to ensure no unauthorized system maintenance occurs.



5.3.2 Procedures

Standard system maintenance procedures are as follows: Since most IT tasks require flexibility, there will only be three rules that shape IT policy regarding system maintenance.

- 1) Maintenance will occur during non-production whenever possible.
- 2) Business Functions and/or departments that will be affected by the proposed system maintenance will be notified in advance of the following:
 - a. The system component that will be affected
 - b. When the maintenance will occur
 - c. How long the maintenance is expected to take
- 3) After the system maintenance has been completed, the director of IT will contact the affected departments with the status of the maintenance.

A quarterly review will be done of the system maintenance process to identify areas of improvement. Representatives of the IT staff and the heads of the functional units that use the system will attend this review.

Once an issue requiring system maintenance surfaces, the requesting party completes a System Maintenance Request Form, seen below in Figure 5.1.



Figure 5.1 System Maintenance Request Form

Oceania System Maintenance Request Form					
Date: _____			MRN (IT Use Only): _____		
Requestors Name: _____					
Requestors Department: _____					
Priority (1 – 5, 1 – highest): 1 2 3 4 5					
Maintenance Request – (Describe in specific detail the issue with the system which will be addressed by the requested maintenance)					
Business Impact: - (Describe in specific detail the business case for completing this maintenance on the system)					
IT USE ONLY					
Date Received by IT: _____			Date Completed: _____		
Authorized by: _____					
Maintenance Completed by: _____					



5.4 Post-Installation Audit

The post installation audit is the final step for Oceania in implementing the system. Post audit review takes place after a software application is installed. Oceania will review the operating procedures, user provided feedback, and any other feedback about the project. From there this information will be submitted to the management, this will inform how the system is being controlled (assuring accuracy of the data), and determining whether the staff is operating correctly (as trained) with the new software system. The post audit includes the following activities:

- Review the reliability and integrity of the system
- Review the design, implementation, and operation to determine whether:
Adequate controls are incorporated in the systems, and system documentation is complete and accurate.
- Determine that appropriate controls are maintained in the process of on-going system enhancements or changes.
- Review system to determine goals and objectives are being achieved and they are executed as planned.

The audit will be schedule during the project closedown phase. It will run parallel to the different evaluations that will occur of the overall project, for example the post project reviews and closing evaluation and/or interviews. It will assist in determining the overall short-term success of the project in its early implementation stages.

