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Implementing an Electronic Data Interchange (EDI) System in a Retail Organization

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Implementing an Electronic Data Interchange (EDI) System in a Retail Organization

by

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ABSTRACT

This project has been implemented to replace a legacy EDI translator in a large retail organization with a new EDI platform with enhanced functionality. The old system was outdated, sluggish and could not fully comply with the industry EDI best practices. The legacy system also had additional fail points for potential data loss, due to extensive customization. The main goals of this project were to create a standardized EDI environment that would limit manual intervention and labor costs, and provide better audit/monitoring capabilities for all EDI communication.

Electronic Data Interchange (EDI) refers to the use of telecommunication technologies to exchange data within and/or between organizations in a standardized format to promote data security while maintaining data integrity. Customizations to the EDI communication and translation system hampers data integrity as well as adding extraneous effort for the EDI operations and infrastructure resources to provide support.

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INTRODUCTION

Introduction

The primary intent of this project was to mitigate the current EDI system's performance inefficiencies and eliminate extensive customizations to the EDI infrastructure within a retail organization by implementing a new contemporary E-Business platform / EDI translator. The goal of this project was to increase system stability, reduce long-term development costs, increase employee capacity without headcount and align with industry best practices. The project implementation was structured to follow SDLC (software development life cycle) methodology, over a course of multiple releases, in order to eventually migrate all EDI documents from the older platform known as "Web Methods" to the new EDI platform called "Seeburger".

EDI simplifies communication between organizations in all industries by replacing paper documents with electronic versions and also standardizing the format and syntax. It is due to these characteristics that since its inception, the use of EDI has become global.

The EDI documents in use by the company this project was undertaken at fall under two file format types i.e. X12 and XML. The EDI standards that these document groupings adhere to ASC X12 version 4030, 5010 and GS1 XML version 3.0. As part of the document migration, all these documents were mapped for data translation within the system. Subsequently, all pre-existing trading partnerships that the company has with other organizations were also transferred to the new platform through a detailed process of data conversion.

The EDI communication between the organizations uses two different type of channels i.e. AS2 and VAN and the primary difference between the two modes of communication is that

AS2 is direct node-to-node connection whereas VAN acts as a virtual mailbox that different organizations can connect to send/receive EDI transmissions. As part of the project, these connections were also impacted and were migrated to the new platforms to retain connectivity and minimize vendor impact.

Problem Statement

The older EDI platform WebMethods was selected during a short-lived industry trend away from EDI to XML. It lacked core functionality as a true EDI translator and required a large degree of custom code (greater than 50%) to support EDI business growth needs and industry best practices. This project was conceptualized 14 years later after a critical impasse was reached, within the organization, with respect to stability and scalability.

Nature and Significance of the Problem

Having an outdated legacy EDI platform in place had overarching impact on the core competencies of the organization's supply chain and overall process efficiencies that affect multiple systems that are part of the internal infrastructure. The gamut of EDI application encompasses many different types of departments within the organization, such as transportation, order management, logistics and billing. The current system posed limitations to a number of key success factors for the organization such as transaction throughput limitations which inhibit platform growth and create significant risks to daily operations, creating potential for system failure. This creates customer, vendor and business impacts which are mitigated with the migration to the new application which will be able to handle increased transaction volumes.

Due to the sub-par performance of the legacy system, there were connectivity issues (for both AS2 and VAN connections) causing delays in data transmission and duplication of

documents. The project aimed to rectify this problem with the introduction of enhanced monitoring capabilities as part of the base application.

Objective of the Project

The objective of this project was to overcome the shortcomings of the legacy EDI platform by increasing time savings of daily EDI operations through improved transactional (end-to-end) visibility and reprocessing capability, expediting the setup time for new trading partner onboarding and generate cost savings for the organization by potentially reducing the need for additional EDI support headcount.

Project Questions

After the project has been successfully completed, the following questions should be sufficiently addressed:

I. What improvements did the new platform/application make to the core competencies of the organization?

II. What mitigation measures were taken to minimize customer, vendor and business impact, as part of the change management for the project?

III. What business analysis tools/techniques can be incorporated in the various stages of the Software Development Lifecycle (SDLC) methodology?

Limitations of the Project

Even though the new EDI platform has provided improved efficiencies in day to day EDI operations such as enhanced document search functionality, and improved integration with internal systems for faster data transmission and better monitoring capabilities, certain limitations were identified over the course of the project.

The most significant hurdle in terms of project implementation was the extremely tight timeline that the project team had to operate within. Since the project was being executed within a retail organization, the holiday season (Oct-Nov) in the fiscal year is a technology freeze period i.e. no large IT or technology related endeavors are undertaken during this period in an effort to avoid any potential downtime for critical systems. Any system downtime during this time period can have severe monetary impact for the organization in terms of lost sales and delays in order fulfillment. Due to this constraint, the project that was initially forecasted to be completed over the course of a year was crunched down to a period of 8 months. This hard limit on project completion time impacted the time allocated for the testing phase of the project and reduced the buffer in place to resolve any defects that surfaced as part of the testing and deployment phases.

The other substantial limitation surfaced in the form of budget restraints. Due to the increased urgency in terms of deployment dates, the number of man hours required per project resource escalated. This in term caused delays due to the need of getting additional funding and budget approvals to complete the project on target.

Also, the vendor impact as part of the project implementation eventually exceeded the initial forecasts. Due to the standardization of the EDI documents in an effort to preserve the data integrity of a “true” EDI translator and removal of the customizations, built in over the course of a decade, there were changes that need to be made at the end of the vendors the organization communicates with through EDI. These changes were communicated to the vendors prior to deployment but many vendors did not respond back in time or failed to comply in the requested time frame. Subsequently, there was an increase in the number of vendor-related data issues

arising in the post-deployment period. These unprecedented issues cause further delays in the system stabilization period.

Definition of Terms

Electronic Data Interchange (EDI): Electronic Data Interchange or EDI is a form of electronic commerce, which refers to the communication between trading partners for the purpose of exchanging business information/documents. EDI utilizes telecom channels to allow organizations to send/receive data in computer-to-computer transmissions, independent of any entities internal application systems.

E-business: E-Business or electronic business refers to the application of IT and communication technologies (e.g. the internet) to support business activities and processes. In the context of this project, E-business refers to the business unit within the organization that provides support and governs electronic communication channels with external partners for run-the-business activities.

Trading Partner: A trading partner is any company or entity that routinely conducts business with another company or entity.

Middleware: Middleware refers to any software components that connect two applications at an enterprise level. Middleware is incorporate in the system architecture to support large complex and multi-distributed business applications that are part of an organization's infrastructure.

ASC X12 standards: ASC X12 standards were developed by the American National Standards Institute (ANSI) in an effort to standardize the data formats and syntax used for

organizations for EDI communication. There are several versions of these standards have applications in various types of industries and organizations e.g. version 4030 and 5010.

GS1: GS1 is an independent non-profit organization, similar to ANSI, which develops and maintains standards for supply and demand chain communications between organizations.

AS2: AS2 or Applicability Standard 2 refers to a specification for EDI communication between two entities that occurs directly between the two parties. The intent of using AS2 connections is to ensure that proper security standards are in place for the data transmissions between both parties.

EDI Data element: An EDI transaction document consists of EDI segments, which are further comprised of data elements containing the transactional information.

EDI Envelope: An EDI transmission consists of single or multiple transactions enveloped by header, trailer and other control segments which primarily identify the sender and receiver for the transmission and the type of documents being sent.

Value-added Network (VAN): Value added network or VAN is a hosted service that acts like a virtual mailbox for EDI communications between trading partners. Instead of direct communication, as in the case of AS2, VANs allow companies the flexibility to communicate with multiple trading partners concurrently without having to make specific security protocol changes at either end. The use of a VAN for EDI communication is a paid service, incurring additional costs as more partners are added.

Vendor managed inventory (VMI): Vendor managed inventory refers to inventory of products that is managed and maintained (i.e. production selection, inventory threshold levels etc.) by the supplier versus the actual distributer/retailer.

Data conversion: Data conversion is the process via which the trading partnerships already in place for the old EDI platform are migrated to the new platform, with contingencies built in to ensure data integrity and completeness.

Document mapping: Document mapping is the process of mapping the data elements of an EDI document from one file format to another. Document maps dictate how the data is populated/transformed as it is translated from the source format to the target file format. E.g. EDI X12 file format to an XML file.

Implementation guide: The document that outlines how a business uses a particular EDI document and how its respective trading partners need to structure their EDI documents for communication between the two entities is called an implementation guide. It also includes EDI mapping specification based on the standard being used by the organization.

Summary

This chapter outlined the need and intent for this project as well as a detailed analysis of the problem statement, the nature and significance of the problem to assess its full impact and how it is remedied through the successful implementation of the project objectives. The project questions stated in this chapter will be addressed towards the completion of the project with an in-depth analysis of how well the primary goals of the project were accomplished. The definitions of terms that are recurrently used in this report allow for a better understanding of the project.

Chapter II

BACKGROUND AND REVIEW OF LITERATURE

Introduction

This chapter will provide a detailed background and literature to further elaborate on the initial problem statement in order to provide better cognizance of the project goals and objectives stated earlier. This is followed by literature regarding the methodology best suited for the implementation of this project.

Background Related to the Problem

The company that this project was executed at is a global retailer of electronic goods as well as manufacturer of small electronic appliances. For an organization of this stature, it is critical that all systems supporting the supply chain and communication channels with trading partners are optimized to capacity. The scope of this project encompasses all critical functional areas within the organization such as logistics, transportation, e-commerce, order management, vendor managed inventory as well as accounts and billing.

EDI documents have cross-functional applications within and outside of the organization. Data received from trading partners in transmitted further downstream to internal systems to facilitate business processes and activities ranging from placing orders, routing and receiving shipments, all the way to invoicing and processing sales/inventory data. Within this infrastructure there are multiple layers of middleware, which creates additional breakpoints in the entire network with potential to cause data loss or delays in data transmission.

The current platform is intended to be decommissioned after the completion of the project and in the course of the transition the entire infrastructure supporting this platform has

been transformed to be more simple and streamlined as shown by the before and after network diagrams. Figure 1 illustrates the complexity of the network infrastructure in the “as is” state.

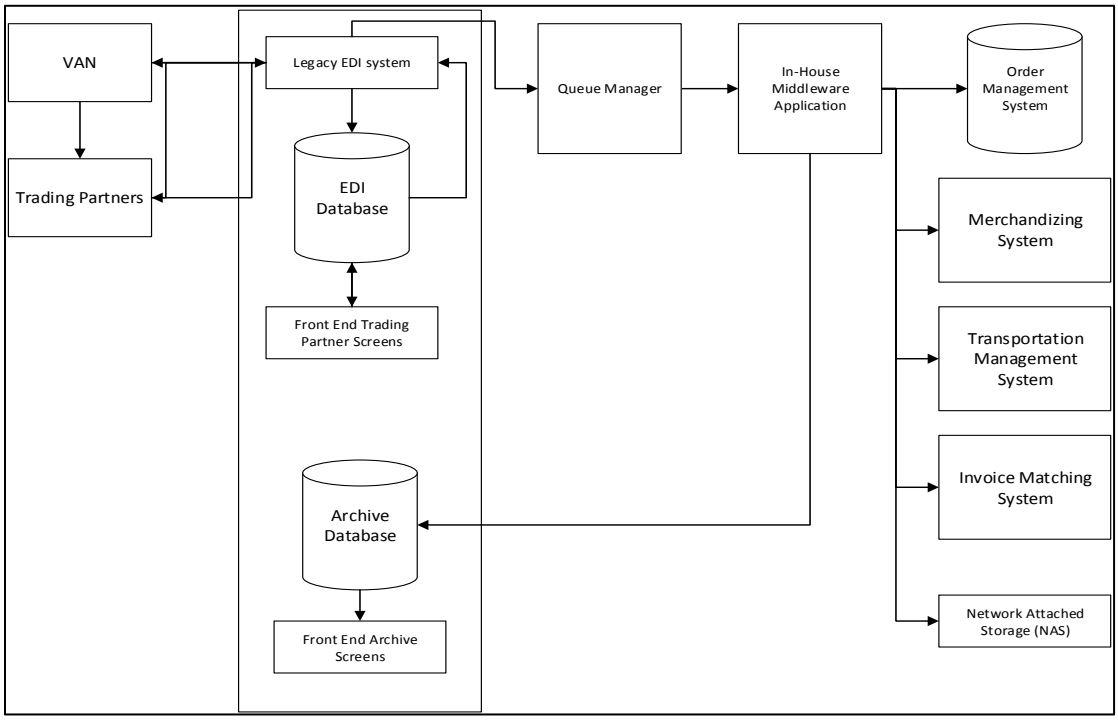


Figure 1

EDI System Architecture: “As Is” Diagram

Figure 2 demonstrates how the system architecture was simplified with the implementation of this project to improve the performance of the EDI platform in the “to be” state.

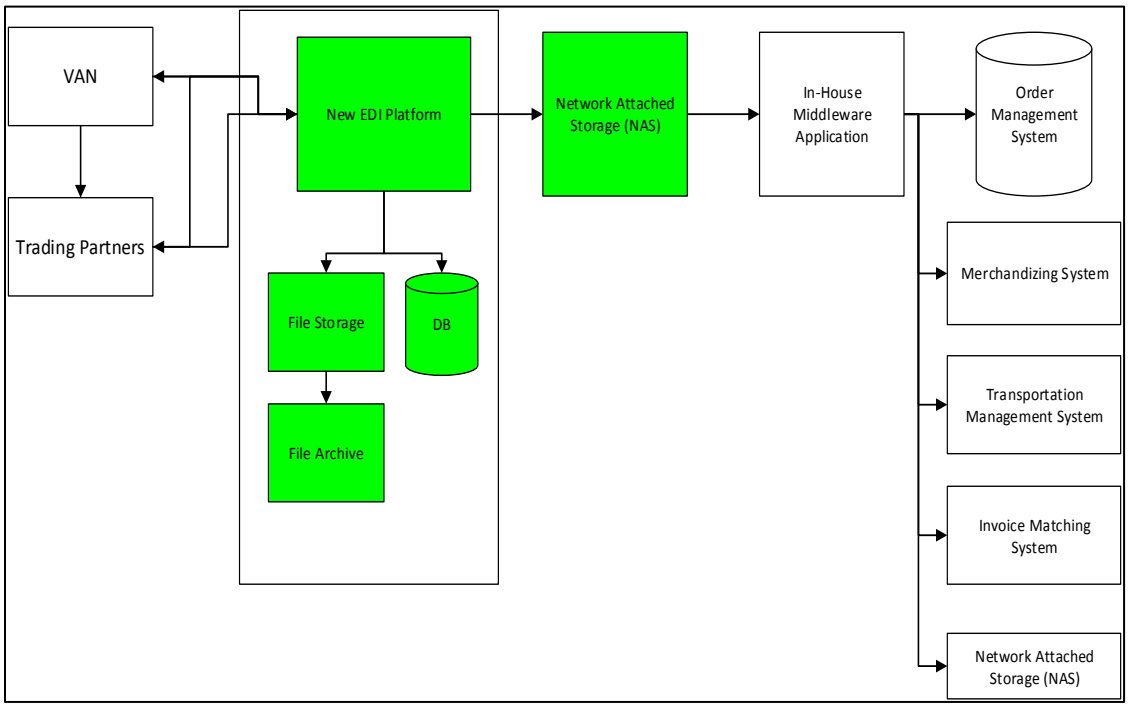


Figure 2

EDI System Architecture: "To Be" Diagram

Literature Related to the Problem

Benefits of EDI: Electronic Data Interchange (EDI) revolutionized business communication by replacing paper documents and standardizing the communication format, effectively making EDI independent of all internal application systems within individual organizations. EDI facilitates faster communication between organizations and promotes the economy of electronic commerce (GXS, 2008).

One of the fundamental advantages of EDI over paper document transactions is the increase in efficiency due to the reduction in time required for manual preparation and transmission of paper documents versus electronic documents. EDI communication is also more

secure and accurate in terms of data integrity. Figure 3 provides a high level overview of the EDI communication process and components in the ecosystem.

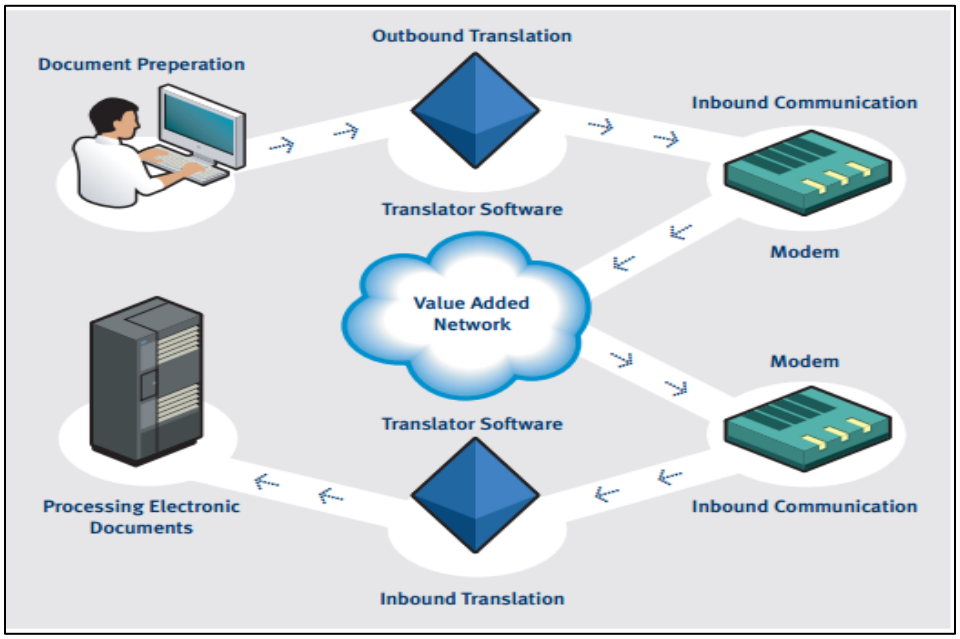


Figure 3

Basic steps of EDI

Other benefits of using EDI can be summarized as follows (Hill, 1993):

(a) *Reduction in labor costs:* Non-EDI systems require manual work for the preparation of documents. These overheads are significantly reduced with the introduction of EDI.

(b) *Reduction in errors:* The fewer the number of touch points within the data communication channel the lesser the occurrence of potential human errors which cause vendor and customer impact.

(c) *Scalability:* Because of the faster transmission and processing times, and increased reliability of communication for EDI documents, the volume of transactions that can handled concurrently can be increased exponentially versus a non-EDI organization.

EDI Translator: EDI translators are software applications that convert elements of a user-defined file to an EDI standard format file (e.g. ANSI ASC X12 or EDIFACT) or vice versa for inbound/outbound EDI transmissions (Copeland & Hwang, 1997).

Literature Related to the Methodology

Software Development Life Cycle (SDLC): Software Development Life Cycle is an all-inclusive working model that defines the sequence of phases and activities that will or should take place during the entire software development process (Öztürk, 2013). There can be several variations to this model based on the activities involved, number of iterations and schedule for product delivery (piece-wise or as a whole). A generic SDLC model consists of the following activities/stages (Tayntor, 2003).

(a) Project initiation: At this stage, the scope and stakeholders of the project are identified and articulated in the form of a project charter, which then is finalized and signed off on.

(b) System analysis: In this phase the current state of the system and existing work flows are analyzed for gaps and to identify the requirements that will be geared towards achieving the desired/future state.

(c) System design: After the requirements have been crafted and communicated to the development arm of the project team, the design specifications are drawn up to correlate to each defined requirement.

(d) Construction: After the blueprint for design of the new system/software has been laid out, the actual construction/development/coding for the product would commence.

*(e) Testing and quality assurance: A*fter the software construction has been completed, the testing and quality assurance phase begins, to ensure system functionality and adherence to pre-set quality standards (industry as well as organization specific).

(f) Implementation: When the production and testing activities are complete, the new system is now ready to enter the implementation phase whereby the system/software/product is delivered to the end client/business.

Types of SDLC models: As mentioned earlier, there are several variations of the SDLC model which dictate the project management methodology that will be used to manage an IT software development endeavor. The selection of the appropriate model is critical because it is used to communicate a universal understanding of the steps that will be needed to execute the project, provide a set of milestones to quantitatively measure the project progress, define roles and responsibilities and deal with uncertainty (Öztürk, 2013). Some of the different models frequently used are waterfall, prototyping, agile, IID (Iterative and Incremental Development) and spiral SDLCs (Öztürk, 2013).

Waterfall SDLC methodology: The waterfall model, also known as the linear-sequential model, each phase of the cycle needs to be completed before the next phase can commence, without concurrence between the distinct phases (Öztürk, 2013). This linearity follows the principle that the output of one phase becomes the input of the next phase and so forth. Figure 4 provides the linear order of the project phases included in the waterfall SDLC model.

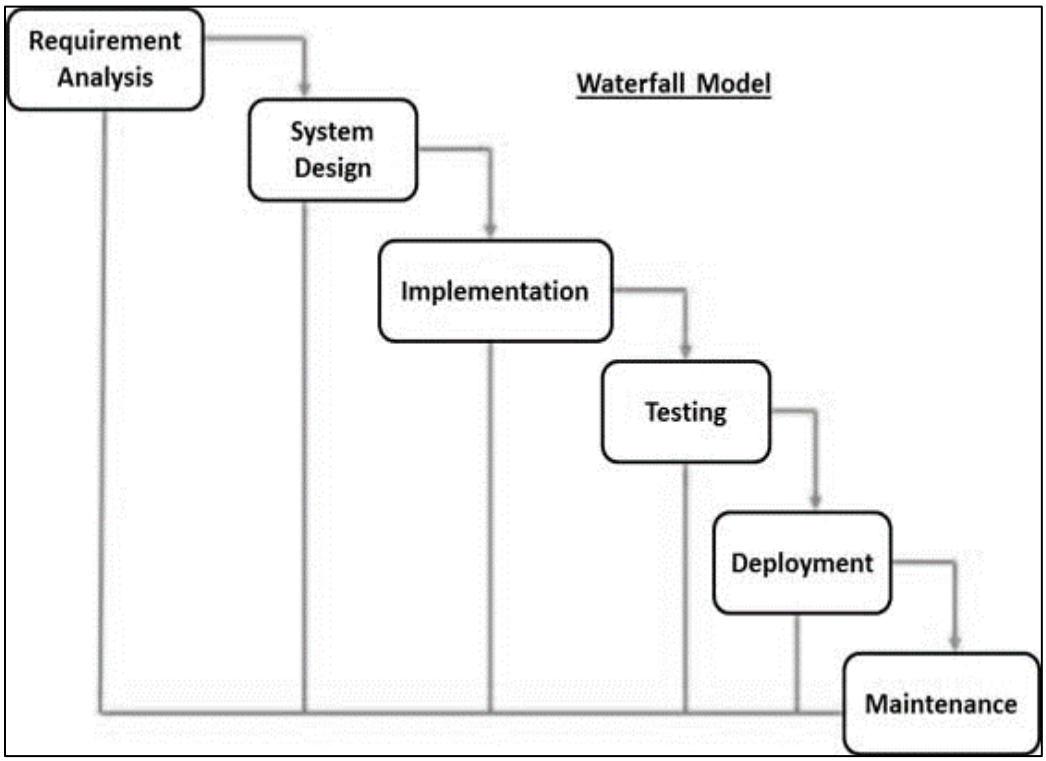


Figure 4

The Waterfall methodology SDLC model

The application of the waterfall model is most effective where the requirements are well articulated and properly documented, the scope of the project and the product definition is stable versus dynamic, and resources with sufficient knowledge of the existing systems and technical expertise are available.

The advantages of the waterfall model include the fact it is easy to understand and communicate, the milestones are clearly defined, project phases are completed one at a time, ease of management and, the process and deliverables are well-documented. It is not suitable for

longer on-going projects which are complex and object-oriented because a working software is not available until towards the end of the entire project.

Business Analysis: With respect to IT software delivery projects, business analysis comes into play from the very inception of the project charter. When the project scope has been defined, it is important to develop and implement a strategy that details out all the activities that would be required to close the gap between the current and future states of the system or deliver the required product (Cadle & Paul, 2010). Business analysis is used to identify the tactics that align the project deliverables to the organizational goals and strategy as well as provide support for the implementation of these tactics (Cadle, 2010)

There are several tools and techniques that can be employed to conduct effective business analysis:

I. *Joint Application Requirements (JAR)/Scoping sessions:* Joint Application Requirements gathering or Joint Application Development (JAD) is a systematic technique that is used to gather requirements from the project stakeholders in a collaborative manner through iterative team discussions. Effective JAR sessions are highly structured and interactive in order to provide opportunity for clarification of raw high-level requirements and obtain precise detailed requirements; Effective requirement gathering is completed while providing a safety net against scoop creep and project derailment (Brennan, 2009). During these workshops, stakeholders get together to analyze the business systems and state, and identify solutions to the situation identified as part of the project scope.

The attendance of these sessions has to be a diverse mix of business, technology, subject matter experts and facilitators (usually business analysts) to represent all aspects of the project and keep the workshop agenda on schedule. It is also important that decision makers be present at these sessions to ensure that requirements are documented and finalized concurrently. The business requirements gathered need to be identified as functional, non-functional, technology and transition requirements.

II. *Activity Diagrams:* Activity diagrams can be created using UML (unified modeling language) as a visual aid to illustrate the flow of activities within a system. Once the functional requirements for the new system have been identified and defined, activity diagrams are a helpful tool to capture the dynamic behavior of the system and help in the construction of a final executable system.

III. *Use Cases/ Use Case Diagrams/User stories:* Use cases are represented in UML using use case diagrams which help illustrate a black box view of the system (Gomaa & Olimpiew, 2005). It is the external view of the system as seen from the end user to help assess the ease of use of the system. Use case walkthroughs can help answer critical questions such as 'will the new system provide all the existing functionality of the current system while providing additional capabilities?' 'Would the enhanced new functions be user friendly?' 'Is the system intuitive enough?' If gaps are identified, requirements can be revisited and improved upon.

IV. *Requirements Tracking Matrix:* After requirements have been signed off upon, design phase has been completed and development has begun, the support role of business analysis becomes integral. A requirements tracking matrix is a tool that is used to ensure that all the functional, non-functional and technical requirements are continuously being addressed throughout each stage of SDLC through interactive analysis.

RASCI Chart: RASCI chart (Hightower, 2008) for a project refers to a matrix that defines who the resources that fulfill the following roles (figure 5 provides an example of a RASCI chart):

I. "Responsible": This role identifies the resource who is responsible for completing a project task.
II. "Approve": This role identifies the owner of a project task who needs to provide approvals.
III. "Support": This role identifies resources that don't directly own the task execution but provide support.
IV. "Consult": This role identifies subject matter experts (SME) or other resources that act in a consulting role for the project/task.
V. "Inform": This role identifies project stakeholders that are not required for approvals but still need to be informed regarding the project plan/task updates.

	Project Manager	Change Manager	Business Analyst	Board of Directors	Service Manager	Legal Advisor
Task 1	R			A		
Task 2			R		S	C
Task 3		R		I		I
Task 4			R			C
Task 5	R			A	S	

Figure 5

RASCI Chart Template

User Acceptance Testing: User Acceptance Testing or UAT is the final phase in the application testing cycle of the project in which real world end users of the application execute test scenarios based on their use cases and validate that the final product meets the business requirements that were defined at the beginning of the project.

Regression Testing: Regression testing refers to all testing activities that are executed to ensure that the system still has all functionality that existed prior to the changes made as part of the project. End-Users leverage regression testing tools to validate that no additional defects arise in the system usability.

Summary

This chapter provided a detailed background of the project problem and extended literature to deliver a deeper understanding of the subjects related to this project. Following this was a discussion regarding the various elements of the methodology used for the execution of this project. The next chapter will provide further inside into the project methodology and details specific to the project tools, timeline and budget.

Chapter III

METHODOLOGY

Introduction

This chapter provides details regarding the project methodology and the design of study that was employed to execute this project and collect data for analysis at the completion of the project. Also discussed are the project timeline, budget and constraints that dictated the progression of the project. The goal of this project was to improve the overall efficiency of EDI operations and framework within a large retail organization by replacing an outdated legacy EDI platform with a new EDI platform with enhanced core functionality.

Design of the Study

The design of study for this project was a combination of a qualitative and quantitative approach. The data collected in the execution of this project was then analyzed through an objective qualitative analysis. The structure of the project methodology and design are outlined as follows:

Pilot Phase: As part of the process to obtain desired funding and budget for the project, the first step for the project team was to execute a successful pilot test to illustrate the actual benefits that would be gained with the implementation of the project in its full capacity. Two EDI documents were selected as part of the pilot i.e. EDI 846 and EDI 852.

I. EDI 846 is an inbound document used by vendors (part of the vendor managed inventory) for communicating Suggested Inventory Returns to the retail stores.
II. EDI 852 is an outbound document that provides Sales and Inventory information to the vendors.

The pilot involved creating the maps for these documents that would translate these documents to/from internal systems that are part of the infrastructure. After the map development was completed, the documents were migrated to the new platform, tested successfully and then finally activated to go live on the new platform.

Requirements gathering/Scoping: Once the project received the necessary funding to move forward, scoping sessions were scheduled with all the stakeholders of the project. Since the project impact extended to multiple business and functional units within the organizations, the list of stakeholders was extensive and input from every team was mandatory. The list of business units impacted as part of the scope of this project is as follows:

I. Transportation
II. Accounts Processing
III. Order Management
IV. Core/ Supplier Direct
V. Independent Sellers marketplace
VI. Mobile

Over the course of next few weeks requirements gathering workshops were conducted with each of the business units, focusing on EDI documents in use by each of the teams. E.g. the transportation team utilizes EDI 204, 214, 240, 990, 753 and 754 (see appendix A for EDI document glossary). Figure 6 provides an example of the business requirements document (BRD) template used in this project.

Business Requirements					
ID	**Requirement Description**	**Direction**	**Business Area**	**Priority**	**Impacted Systems**
BR1	**General Requirements (existing functionality)**		**Transport**		**Transport System**
1.1	The system shall detect technical EDI validation errors and raise alerts to E-business support and IT support teams				
BR2	**General Requirements (new)**				
2.1	The transmission time to/from the trading partner for the document shall be reduced to near real time				
BR3	**EDI 204 (Load Tender)**	Outbound			
3.1	The system shall provide auditing capability for exceptions to verify the number of documents passed/failed through the system		All	High	TMS

Figure 6

Business Requirements Document Template

After the requirements for each document type were documented as part of a business requirements document, the BRD was then circulated to the approving parties identified as per the RASCI chart.

The solution architect then created a functional requirements document (FRD) that was used as a framework for any infrastructure/ system architecture changes required to meet the business requirements for the project.

Functional Design Specifications: Based on the approved BRD and FRD, functional design specifications were created for all the EDI documents which defined all functional changes required in the impacted systems to facilitate the changes required in the business processes going forward. This task required collaboration with the system development and infrastructure support resources.

Development Phase: The next stage of the project was finish all the development activities required to support the new platform and the migration of the EDI documents and trading partner setups to the new system.

I. *Document Mapping:* Inbound and outbound documents need to be mapped within the new system to translate then from EDI standard formats (e.g. X12, GS1 XML, EDIFACT) to the in-house document formats (e.g. CSV, Flat File, XML) and vice versa. This is a critical activity since the EDI data essentially becomes useless or unreadable if there are defects in the mapping. The document maps define which data elements are written to which XML tags or line positions in a flat file for incoming EDI documents from the vendor. If these elements are not mapped correctly, the data integrity is severely affected and there's vendor, business as well as possibly customer impact. The tool used to create the document maps for this project is called BIC Mapping Designer. The coding for a document maps is similar to writing code in Java Script and uses similar functions and calls. Figure 7 shows a view of the BIC mapping designer software used in the project.

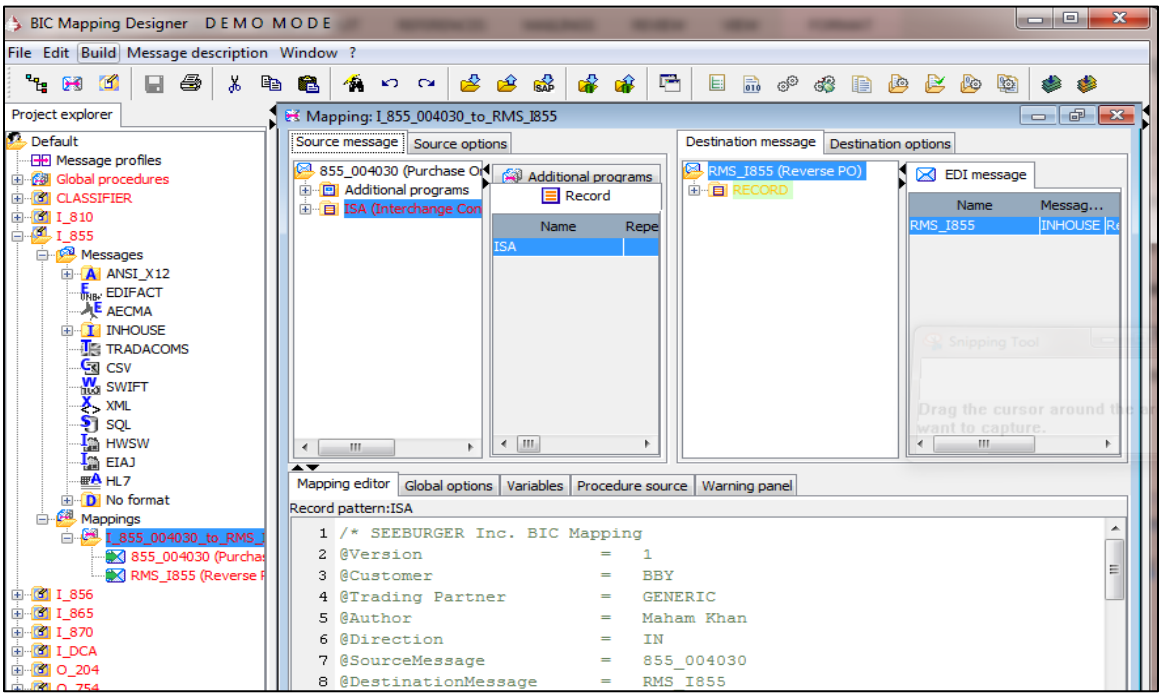


Figure 7

BIC Mapping Designer

II. *Data Conversion:* All the existing trading partnerships and respective contact details and settings for the vendors were also migrated to the new EDI platform as part of the data conversion process. The partnerships were grouped together based on the business unit they pertain to and what type of EDI connection they use to communicate with the host company. There are two type of communication channels used for EDI i.e. VAN and AS2. AS2 partners need to comply with the security protocols and standards set forth by both partners in order to communicate successfully with each other. The VAN is a paid service used by both parties as an intermediary pick/drop location for documents. It is a virtual mailbox service that needs to be set up with the correct mail slots to connect to all partners. The mail slot settings were also

migrated to the new platform as part of the data conversion and system preparation efforts.

III. *Software development:* This set of activities incorporated all development activities that were required to allow the new platform to connect to all upstream and downstream system and ensure proper flow of data through the pipeline. During this phase, auditing and monitoring capabilities were also built into the base application to provide better visibility of the data flow within the organization and to external partners.

Testing Phase: There were multiple stages within the testing phase of the project which are detailed as follows:

I. Unit Testing/Debugging: After the document maps had been created and deployed in the lower test environments, these maps were unit tested for any high level defects related to map functionality. Defects identified in this staged were debugged and rectified by the developers before promoting the maps to the Production- Like (PL)f Test environment.

II. Application Product Testing (APT): During this stage, the core functionalities of the new EDI platform were testing and validated by the testing team. Any defects identified were resolved prior to moving to the next stage of testing.

III. Integrated Product Testing (IPT): After the APT was successfully completed and all outstanding defects closed, the integrated product testing was executed which validated the connections and functionality of the new platform after all the links to the downstream/upstream systems and middleware were activated.

This stage validates data flow and data integrity as the files pass through the various hops within the network infrastructure.

IV. User Acceptance and Regression testing: In the final stage of testing, the system functionality was validated by the business users by executing test scenarios based on everyday use cases for run-the-business, operations and support activities. Figure 8 illustrates the lifecycle followed for the defect resolution as part of the testing phase.

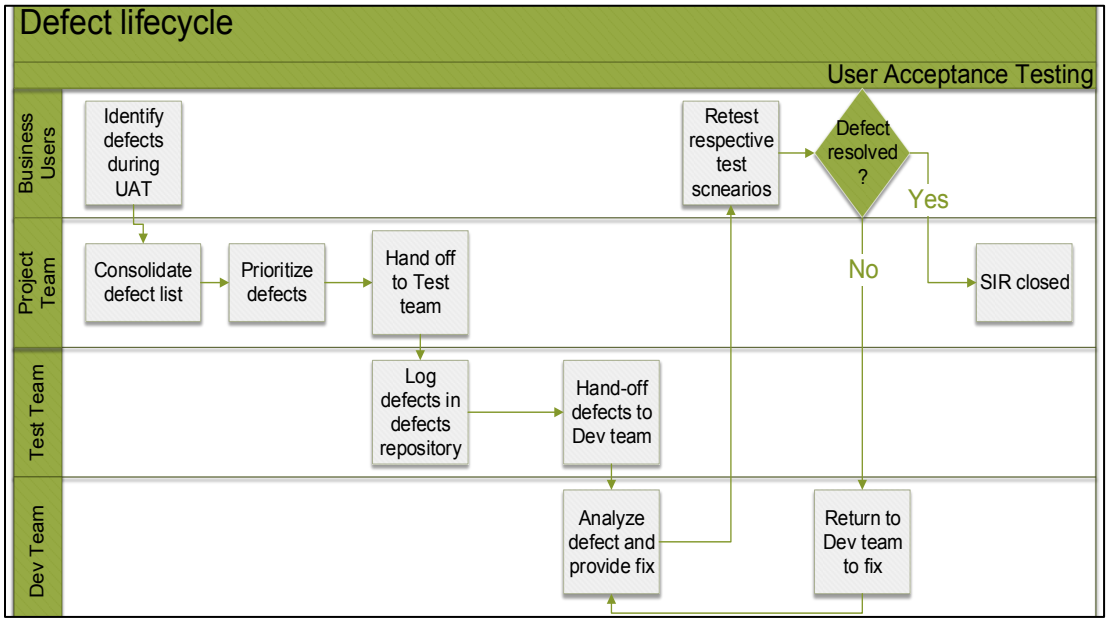


Figure 8

Defect Lifecycle

Deployment/Go-Live Phase: The final phase of the project was the actual deployment. All the EDI documents were grouped into multiple releases so as to minimize the vendor and customer impact and curtail any potential high level production issues that could arise post deployment. This period included constant monitoring activities and break fixes for issues identified during the stabilization period.

Data Collection

Data collection activities and tools facilitate the process of evaluating the success of any project against pre-defined performance metrics and ascertain that all the project objectives have been adequately fulfilled. For this project, the data collection involved gathering transaction volumes from the EDI database as well as the SQL database for internal systems, based on document types and the business/functional units in the company they relate to.

The qualitative data collection tools employed were feedback surveys (see Appendix B) conducted with the various business units to gauge their satisfaction level with the performance of the EDI framework in the organization with the new platform in place versus in the old world.

Transaction/document volumes were collected from the EDI system using the Message Tracking Portal known as the SEEBURGER B2B Portal. Figure 9 shows a sample of pictorial view of the transaction volumes obtained from the B2B portal.

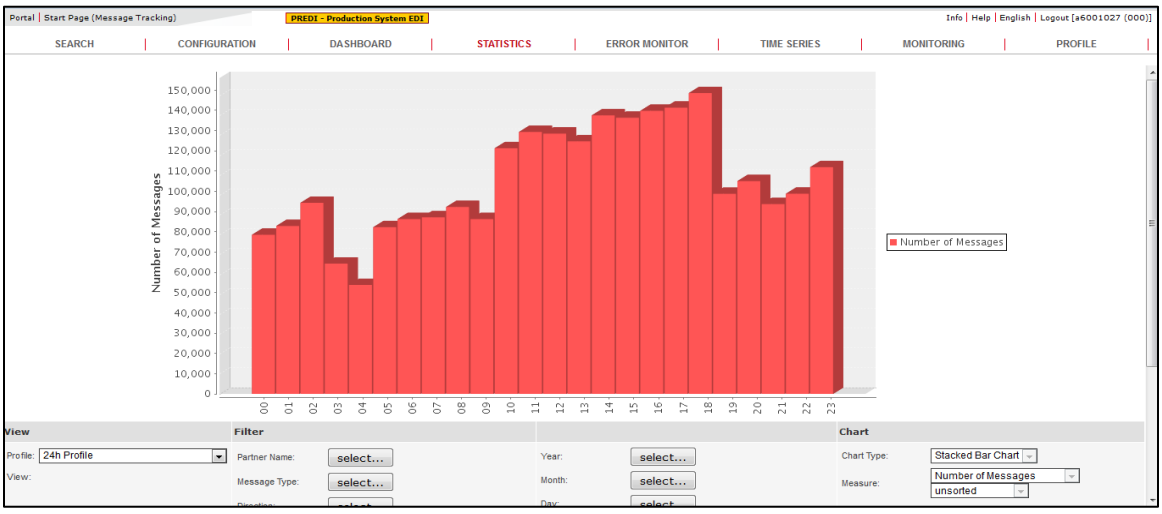
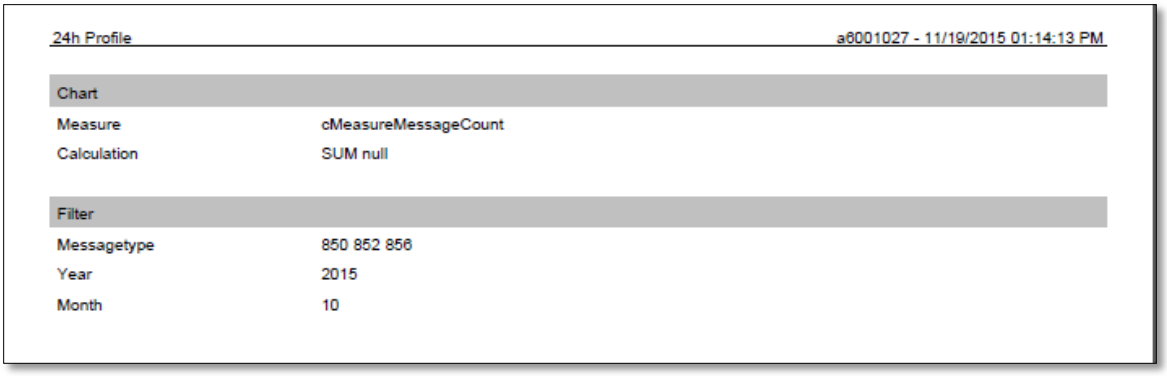


Figure 9

SEEBURGER B2B Portal

The transaction volumes for specific data/time ranges and message types were obtained by defining these parameters on the Statistics screen in the B2B portal. These volume statistics were then imported via a CSV file as well as PDF file for record as shown in figure 10.1 and 10.2.



24h Profile — a6001027 - 11/19/2015 01:14:13 PM

Chart	
Measure	cMeasureMessageCount
Calculation	SUM null

Filter	
Messagetype	850 852 856
Year	2015
Month	10

Figure 10.1

Sample PDF Transactional Volume Report- Part 1

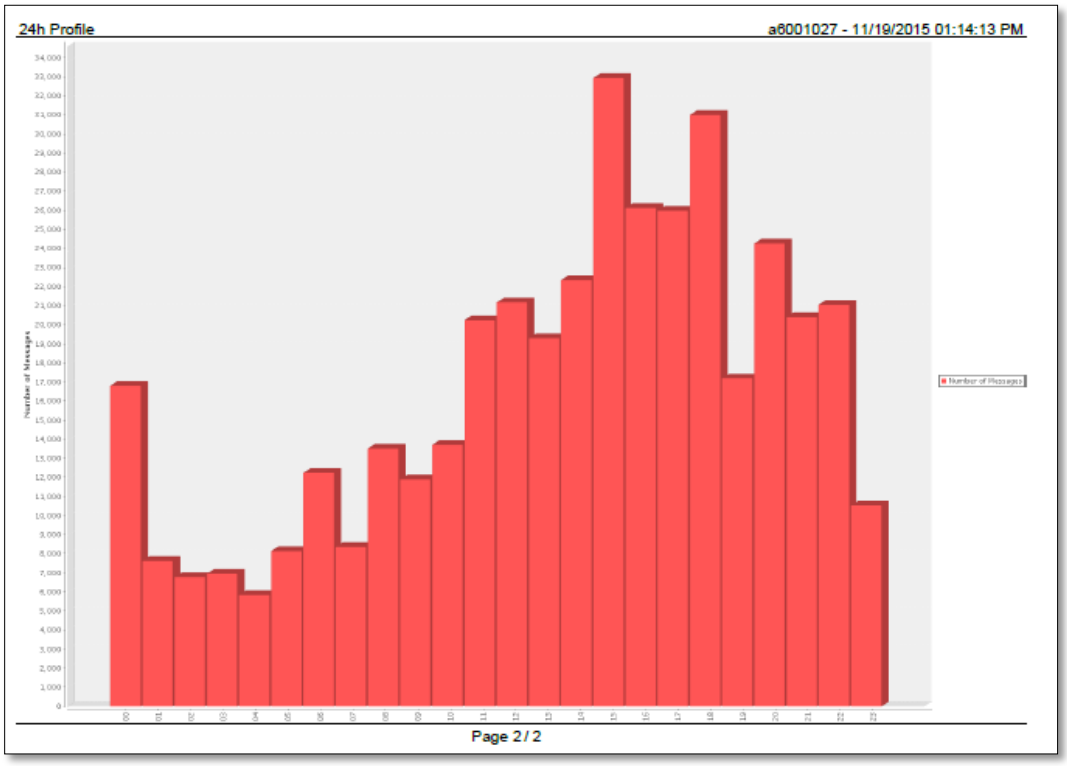


Figure 10.2

Sample PDF Transactional Volume Report- part 2

In order to get more detailed view of the document volumes break down by message and partner types, the Message Tracking screen in the B2B portal was used. This screen (see figure 11) can be used to run queries of the data from the EDI database to get detailed counts of documents processing through the system. The queries are run using different search parameters including data content specific values e.g. Purchase Order number, Invoice number, Type of document, process state (failed/successful). The query results generated (e.g. figure 12) were then exported from the Portal in a CVS format to an excel spreadsheet as shown in figure 13.

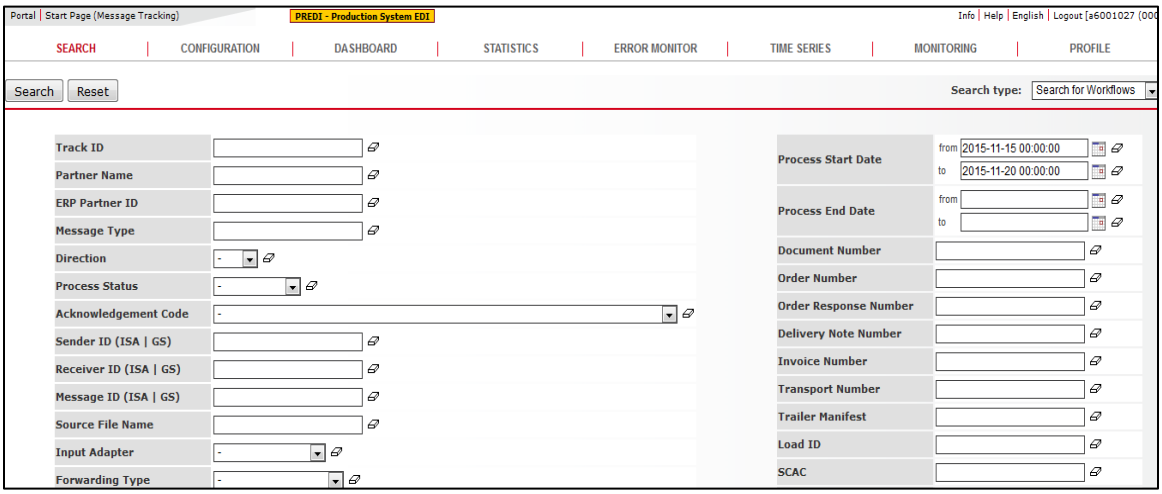


Figure 11

B2B Portal Message Tracking Screen

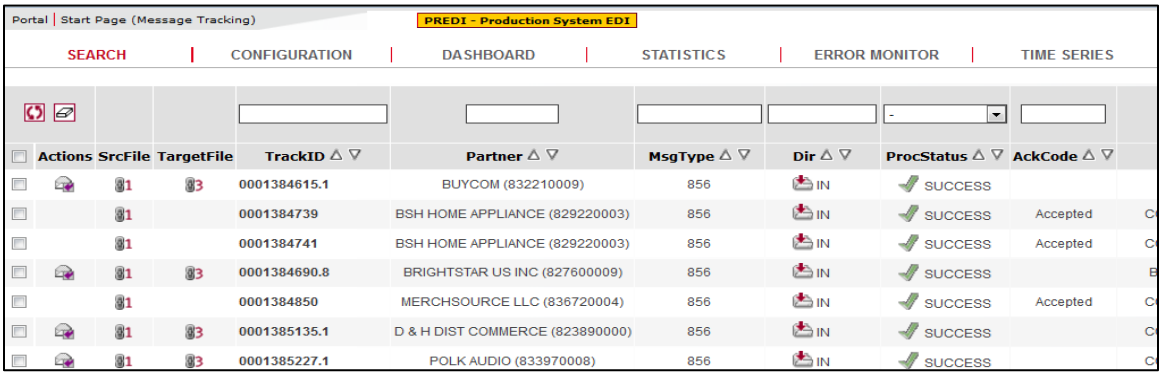


Figure 12

Sample Query Search Results

A	B	C	D	E	F	G	H	I	J	K	L	M
TrackID	Partner	MsgType	Dir	ProcStatu	DeliveryDate	ProcStartDate	ProcEndDate	MsgTypeC	ERPPartnerID	InputAdap	MsgSize	MsgTypeI
1384615	BUYCOM (	856	IN	SUCCESS	11/16/2015 14:58	11/16/2015 14:58	11/16/2015 14:58	856		AM-IN-Ho	432	ANSIX12
1384739	BSH HOME	856	IN	SUCCESS	11/16/2015 15:00	11/16/2015 15:00	11/16/2015 15:00	856	829220003	FTP	549	ANSIX12
1384741	BSH HOME	856	IN	SUCCESS	11/16/2015 15:00	11/16/2015 15:00	11/16/2015 15:00	856	829220003	FTP	907	ANSIX12
1384691	BRIGHTST/	856	IN	SUCCESS	11/16/2015 15:00	11/16/2015 15:00	11/16/2015 15:00	856		AM-IN-Ho	85105	ANSIX12
1384702	ALEN COR	856	IN	SUCCESS	11/16/2015 15:00	11/16/2015 15:00	11/16/2015 15:00	856		AM-IN-Ho	559	ANSIX12
1384704	ANDIS CO	856	IN	SUCCESS	11/16/2015 15:00	11/16/2015 15:00	11/16/2015 15:00	856		AM-IN-Ho	2719	ANSIX12
1384708	ANDIS CO	856	IN	SUCCESS	11/16/2015 15:00	11/16/2015 15:00	11/16/2015 15:00	856		AM-IN-Ho	1997	ANSIX12
1384691	BRIGHTST/	856	IN	SUCCESS	11/16/2015 15:01	11/16/2015 15:01	11/16/2015 15:01	856		AM-IN-Ho	85105	ANSIX12
1384691	BRIGHTST/	856	IN	SUCCESS	11/16/2015 15:01	11/16/2015 15:01	11/16/2015 15:01	856		AM-IN-Ho	85105	ANSIX12
1384691	BRIGHTST/	856	IN	SUCCESS	11/16/2015 15:01	11/16/2015 15:01	11/16/2015 15:01	856		AM-IN-Ho	85105	ANSIX12

Figure 13

Sample Excel Extract of Query Results

The next phase of data collection was to get the daily counts for the "stopped after error" processes from the EDI system through a user interface known as BIS Front End, as displayed in figure 14. "Stopped after error" processes refer to documents (inbound + outbound) that have erred out in the system and not transmitted further upstream or downstream. There can be a multitude of reasons where processes get stuck in the error queue ranging from syntax errors causing conversion failure, partner lookup errors caused by the system not being able to find trading partnership the document is associated with and communication errors caused by a failure in the communication pipeline.

Stopped after error processes

Stopped after error processes

State	Track-ID	Process name	MsgType	Partner ID	Error details	Start time
Stopped after error (9)	0001358378	see:SSC-IN-FTP	810	968175377	[Standard fault] fault name: {http://www.seeburger.com/}act	2015-11-15 03:55:00
Stopped after error (9)	0001470521	see:SSC-OUT-Control	855		SSCForwardingOutbound[0]:OK	2015-11-19 13:34:08
Stopped after error (9)	0001468111	see:SSC-OUT-Control	855		SSCForwardingOutbound[0]:OK	2015-11-19 12:24:34
Stopped after error (9)	0001467088	see:SSC-OUT-Control	855		SSCForwardingOutbound[0]:OK	2015-11-19 11:53:22
Stopped after error (9)	0001464925	see:SSC-OUT-Control	855		SSCForwardingOutbound[0]:OK	2015-11-19 11:02:05
Stopped after error (9)	0001465962	see:SSC-OUT-Control	855		SSCForwardingOutbound[0]:OK	2015-11-19 11:28:23
Stopped after error (9)	0001467715	see:SSC-OUT-Control	856		SSCForwardingOutbound[0]:OK	2015-11-19 12:09:18
Stopped after error (9)	0000809886	see:SSC-IN-FTP	997	COMMERCEHUB	[Standard fault] fault name: {http://www.seeburger.com/}act	2015-10-22 21:05:13
Stopped after error (9)	0001469669	see:SSC-OUT-Hotfolder	RMS_O852	025985946MUSIC	SSCForwardingOutbound[0]:OK	2015-11-19 13:06:43
Stopped after error (9)	0001467436	see:SSC-OUT-Hotfolder	RMS_O861	025985946MUSIC	SSCForwardingOutbound[0]:OK	2015-11-19 12:03:29

Figure 14

Sample "Stopped After Error" Processes Report

Data Analysis

The data collected was then analyzed by conducting an audit of the transaction/document volumes processed through the new EDI system versus the documents following through to the upstream/downstream systems that constitute the functionality of various business process flows.

For example, when a customer places an order through the retail website, a purchase order is created in the order management system which conveys that feed to the internal merchandizing system/database and also sends the order XML file to the EDI translator. The EDI system then converts the XML to an X12 standardized format to transmit to the respective vendor/supplier. Within this network there are multiple middleware hops which creates potential

for data loss. The transaction volume audit analysis provides validation that all documents have been received/sent and processing successfully and the data flow is not interrupted. The accuracy of the audit count is an important performance metric for this project.

The second part of the data analysis was a trend analysis of the daily "stopped after error" process volumes to assess the system performance during the period of stabilization as well as compare the system performance to that of the legacy system using historical data.

The final step in the data analysis for this project involved quantifying the results obtained from the business user satisfaction/feedback surveys to obtain a holistic view of the success of the overall project from the internal customers' perspective.

Budget

Table 1, 2 and 3 provide the details of the project budget and breakdown by expense type and work effort.

Table 1

Project Budget Overview

	Capital	**Expense**	**Total Cost**
Labor Fees	$3,183,517	$425,455	$3,608,972
Travel Expenses	$0	$70,134	$70,134
Total Budget	**$3,183,517**	**$495,589**	**$3,679,105**

Table 2

Project Budget-Expense Breakdown

Expense Breakdown	
Scoping	$153,635

Post Deployment Support / Delivery Oversight	$60,980
Change Management	$137,421
Data Conversion	$33,935
Decommission	$21,152
Training	$18,332
Travel Expenses	$ 70,134
Total Expense	**$ 495,589**

Table 3

Break Down of Project Work Effort

Breakout of Application Work Effort for Project			
Phase	**Hours**	**$**	**%**
Program Management	4,164	$ 360,897	10%
Scoping	8,328	$ 721,794	20%
Design/Build	14,574	$ 1,263,140	35%
Test	12,492	$ 1,082,691	30%
Deploy	1,249	$ 108,269	3%
Post-deployment support	833	$ 72,179	2%
TOTAL	**41,641**	**$ 3,608,972**	**100%**

Timeline

The proposed timeline for this project, including project deliverables, milestones and tasks is defined as follows in table 4.

Table 4

Project Timeline

Task Name	Duration	Start	Finish
EDI Platform Transformation Program	**193 days**	**Tue 3/10/15**	**Thu 10/29/15**
SYSTEM PILOT	**64 days**	**Tue 3/10/15**	**Fri 6/5/15**
PHASE 1	**128 days**	**Mon 3/9/15**	**Wed 9/2/15**
Scoping EDI Documents (using Deliverables Tracker)	**40 days**	**Mon 3/9/15**	**Fri 5/1/15**
System Architecture	**43 days**	**Wed 3/18/15**	**Fri 5/15/15**
SEEBURGER Gap Build	**47 days**	**Mon 3/9/15**	**Tue 5/12/15**
EDI 852 & EDI 846 Delivery	**65 days**	**Thu 4/2/15**	**Wed 7/1/15**
DESIGN Phase	**30 days**	**Thu 4/2/15**	**Wed 5/13/15**
BUILD Phase	**32 days**	**Thu 5/14/15**	**Fri 6/26/15**
TEST Phase	**30 days**	**Tue 6/9/15**	**Mon 7/20/15**
Test Planning	**5 days**	**Thu 7/16/15**	**Wed 7/22/15**
Create Test Approach / Test Plan - AN05	5 days	Thu 7/9/15	Wed 7/15/15
Test Approach Review	5 days	Thu 7/16/15	Wed 7/22/15
Test Approach Sign-off	2 days	Mon 7/20/15	Tue 7/21/15
Application Product Test	**5 days**	**Thu 7/23/15**	**Wed 7/29/15**
Perform APT	**5 days**	**Thu 7/23/15**	**Wed 7/29/15**
Apptalk	5 days	Thu 7/23/15	Wed 7/29/15
RMS	5 days	Thu 7/23/15	Wed 7/29/15
SEEBURGER - EDI 846 and EDI 852	5 days	Thu 7/23/15	Wed 7/29/15
Integrated Product Test	**15 days**	**Thu 7/23/15**	**Wed 8/12/15**
Smoke Testing	5 days	Thu 7/23/15	Wed 7/29/15
Execute IPT Pass 1	5 days	Thu 7/30/15	Wed 8/5/15
Execute IPT Pass 2	5 days	Thu 8/6/15	Wed 8/12/15
User Acceptance Testing - Day in the Life (DILO) scenarios	**34 days**	**Fri 7/10/15**	**Wed 8/26/15**

Complete UAT Test Plan	2 days	Fri 7/10/15	Mon 7/13/15
Determine test scenarios by Document	10 days	Tue 7/14/15	Mon 7/27/15
Confirm testers by Document	5 days	Thu 7/23/15	Wed 7/29/15
Schedule room/s for testing	2 days	Thu 7/23/15	Fri 7/24/15
Provide list of computers & user ID's for testing	5 days	Thu 7/23/15	Wed 7/29/15
Prepare testing schedule & assign test cases & timing	10 days	Thu 7/30/15	Wed 8/12/15
Business test kick-off (to include any UAT training needs)	1 day	Mon 8/3/15	Mon 8/3/15
Conduct User Acceptance Testing	5 days	Tue 8/4/15	Mon 8/10/15
Monitor UAT completion & defect resolution	5 days	Fri 8/7/15	Thu 8/13/15
Business Signoff	10 days	Thu 8/13/15	Wed 8/26/15
DEPLOY Phase	**50 days**	**Thu 8/27/15**	**Wed 11/4/15**
Business Readiness	**15 days**	**Thu 8/27/15**	**Wed 9/16/15**
Service Introduction	**5 days**	**Thu 8/27/15**	**Wed 9/2/15**
Prepare Hypercare Support Plan	5 days	Thu 8/27/15	Wed 9/2/15
Define Hypercare Business Metrics	5 days	Thu 8/27/15	Wed 9/2/15
Go-Live Readiness Checklist	**5 days**	**Thu 8/27/15**	**Wed 9/2/15**
Develop Go Live Readiness Checklist	5 days	Thu 8/27/15	Wed 9/2/15
Review Business Readiness Checklist with Business Leadership	5 days	Thu 8/27/15	Wed 9/2/15
Go-Live Readiness Sessions	**15 days**	**Thu 8/27/15**	**Wed 9/16/15**
Define the session objectives and content (e.g. cutover activities, timing, etc.)	10 days	Thu 8/27/15	Wed 9/9/15
Define impacted groups and level of impact	10 days	Thu 8/27/15	Wed 9/9/15
Conduct Go-Live Readiness Sessions	5 days	Tue 9/8/15	Mon 9/14/15
IT Deployment	**10 days**	**Thu 8/27/15**	**Wed 9/9/15**
Pre-Deployment	**10 days**	**Thu 8/27/15**	**Wed 9/9/15**
AS2 Partner Connection Setup		Thu 8/27/15	
Deployment Plan review	**10 days**	Thu 8/27/15	**Wed 9/9/15**
RMS	10 days	Thu 8/27/15	Wed 9/9/15
SEEBURGER	10 days	Thu 8/27/15	Wed 9/9/15
Apptalk	10 days	Thu 8/27/15	Wed 9/9/15

Infrastructure	10 days	Thu 8/27/15	Wed 9/9/15
e-Business	10 days	Thu 8/27/15	Wed 9/9/15
GO/NO-GO Decision	0 days	Fri 9/11/15	Fri 9/11/15
Deployment	**5 days**	**Mon 9/14/15**	**Fri 9/18/15**
RMS Deployment	5 days	Mon 9/14/15	Fri 9/18/15
SEEBURGER Deployment	5 days	Mon 9/14/15	Fri 9/18/15
Apptalk Deployment	5 days	Mon 9/14/15	Fri 9/18/15
Infrastructure Deployment	5 days	Mon 9/14/15	Fri 9/18/15
MILESTONE: GO-LIVE	0 days	Mon 9/21/15	Mon 9/21/15
Post-Deployment	**30 days**	**Mon 9/21/15**	**Fri 10/30/15**
Business Activities	**30 days**	**Mon 9/21/15**	**Fri 10/30/15**
Post Deployment Activities	**20 days**	**Mon 9/28/15**	**Fri 10/23/15**
Daily Status Meetings	20 days	Mon 9/28/15	Fri 10/23/15
Gather Lessons Learned to incorporate into future deployments	5 days	Fri 10/23/15	Thu 10/29/15
Draft Capstone final project Report	12 days	Fri 10/30/15	Mon 11/16/15
Capstone project Dense	0 days	Fri 01/01/16	Fri 01/01/16

Summary

This chapter described what data was collected as part of this project and what tools were used in this project to do so as well as the data analysis techniques, both qualitative and quantitative, that were employed in this project to get answer for the project questions raised in the beginning of this report. To gain a better idea of the project structure, also provided in this chapter were details regarding the proposed project timeline (including deliverables and milestones) and the project budget breakdown.

Chapter IV

DATA PRESENTATION AND ANALYSIS

Introduction

This chapter will cover the structured presentation of the data collected as part of this project followed by the application of data analysis tools and techniques to help answer the project questions and compile the results and recommendations that will be delineated in the next chapter.

Data Presentation

After the successful deployment of the new platform and the completion of the project, data was collected regarding transaction and document volumes, per document type. This was done with a weekly frequency under the stabilization period.

Table 5

Transaction Volumes from EDI System

Transaction Counts from SEEBURGER/EDI Database								
Message/Doc Type	**Week 1**	**Week 2**	**Week 3**	**Week 4**	**Week 5**	**Week 6**	**Week 7**	**Week 8**
EDI 204	1162	3883	3474	4737	3267	3937	3493	4028
EDI 990	1177	692	1046	3296	1452	2094	3837	1950
EDI 210	3199	3122	2044	1477	3564	3320	1372	2940
EDI 212	49	4599	393	2507	6449	4014	733	5069
EDI 214	6694	2052	2527	2707	4883	741	4440	2475
EDI 240	3761	3898	4250	553	3081	3525	1123	1292
EDI 753	1973	1239	1936	1749	3706	2072	6664	3406
EDI 754	1253	5109	3184	5920	5325	3236	617	6528
EDI 812	1458	4675	4150	760	5956	1450	6349	2375
EDI 846	250	1803	3847	5818	6021	1912	6070	909
EDI 850 Core	1415	6669	1310	3319	5390	1300	1962	5698
GS1 Order	2914	2303	5104	2988	6284	5499	2300	3896

XML								
EDI 850 Mobile	2914	4506	2201	1674	6678	204	1692	3998
EDI 855	5878	1717	5918	5511	2004	4513	1287	5746
EDI 852	4239	4820	3420	4776	6248	3567	1918	2711
EDI 856 Core	3210	5283	4974	2103	2323	136	1778	4256
GS1Despatch XML	4125	3074	1098	2548	4066	3021	4225	6258
EDI 856 Mobile	6998	4652	724	6276	4966	1333	2859	1553
EDI 860	246	987	2310	3526	738	1265	6095	1218
EDI 861	2310	1414	3901	4730	3303	824	3807	595
EDI 865	6756	2282	1150	1022	6454	3238	6929	6548
EDI 870	299	3534	84	4266	587	2747	5915	6700
EDI 810	3124	1654	2588	3369	3096	1408	3545	2050

Table 5 provides the document volumes for each type of EDI document per week for 8 weeks (the duration for which the data was collected). Note that the weekly volume counts are not cumulative from the preceding week but only represent the total volume of documents processed during the respective week.

For the same time periods, transaction volumes were also pulled from the internal upstream/downstream systems within the organization (see table 6) to validate that there was no loss of data between the various integration hops within the network. The volumes highlighted in yellow are lower than the EDI system volumes and the volumes highlighted in red are greater.

Table 6

Transaction Counts from Internal Systems

Transaction Counts from Internal Downstream/Upstream Systems										
Doc Type	**Dir**	**Source/ Destination System**	**WK 1**	**WK 2**	**WK 3**	**WK 4**	**WK 5**	**WK 6**	**WK 7**	**WK 8**
EDI 204	Out	TMS	1162	3883	3474	4737	3267	3937	3493	4028
EDI 990	In	TMS	1177	692	1046	3296	1452	2094	3830	1950
EDI 210	In	TMS	3180	3122	2044	1477	3564	3320	1372	2940
EDI 212	In	TMS	49	4599	393	2507	6449	4014	733	5069
EDI 214	In	TMS	6694	2052	2527	2707	4883	741	4440	2475
EDI 240	In	TMS	3761	3898	4250	553	3081	3525	1123	1292
EDI 753	In	TMS	1973	1239	1936	1749	3706	2072	6664	3406
EDI 754	Out	TMS	1253	5109	3184	5920	5325	3236	617	6528
EDI 812	In	OMS	1458	4675	4150	760	5956	1450	6349	2375
EDI 846	Out	Merch. System	286	1803	3847	5818	6021	1912	6070	909
EDI 850 Core	Out	OMS	1415	6669	1310	3325	5390	1300	1962	5698
GS1 Order XML	Out	OMS	2914	2303	5104	2988	6284	5499	2300	3896
EDI 850 Mobile	Out	OMS	3010	4506	2201	1674	6678	204	1692	3998
EDI 855	In	OMS	5878	1717	5918	5511	2004	4513	1287	5746
EDI 852	Out	Merch. System	4239	4820	3420	4776	6248	3567	1918	2711

EDI 856 Core	In	OMS	3210	5283	4974	1998	2323	136	1778	4256
GS1Despatch XML	In	OMS	4125	3074	1098	2548	4066	3021	4225	6258
EDI 856 Mobile	In	OMS	6998	4652	724	6276	4966	1333	2859	1553
EDI 860	Out	OMS	246	987	2310	3526	738	1265	6095	1218
EDI 861	Out	Merch. System	2310	1414	3901	4730	3303	824	3807	595
EDI 865	In	OMS	6756	2282	1150	1022	6454	3238	6929	6548
EDI 870	Out	OMS	305	3534	90	4266	587	2747	6859	6700
EDI 810	In	Invoice Matching System	3100	1654	2588	3369	3096	1408	3545	2050

The second set of data that was collected from the EDI database was the counts for daily "stopped after error" processes for a 30 day period as shown in table 6.

Table 7

Daily "Stopped After Error" Process Counts

"Stopped After Error" Processes- Daily Count	
Date	**No. of Processes**
9/21/2015	58
9/22/2015	18
9/23/2015	69
9/24/2015	23
9/25/2015	36
9/26/2015	38
9/27/2015	69

9/28/2015	48
9/29/2015	74
9/30/2015	51
10/1/2015	42
10/2/2015	95
10/3/2015	12
10/4/2015	52
10/5/2015	127
10/6/2015	96
10/7/2015	80
10/8/2015	114
10/9/2015	99
10/10/2015	69
10/11/2015	146
10/12/2015	46
10/13/2015	28
10/14/2015	141
10/15/2015	43
10/16/2015	22
10/17/2015	49
10/18/2015	63
10/19/2015	113
10/20/2015	17

To perform error processes trend analysis, historical data was also pulled from the older system for a period of 30 days prior to deployment as shown in table 7.

Table 8

Historical Data Volumes

Error Processes from WebMethods-Daily Count	
Date	**No. of Processes**
8/21/2015	158
8/22/2015	54
8/23/2015	199

8/24/2015	156
8/25/2015	112
8/26/2015	105
8/27/2015	65
8/28/2015	172
8/29/2015	94
8/30/2015	155
8/31/2015	198
9/1/2015	134
9/2/2015	121
9/3/2015	169
9/4/2015	88
9/5/2015	90
9/6/2015	100
9/7/2015	108
9/8/2015	129
9/9/2015	136
9/10/2015	55
9/11/2015	174
9/12/2015	198
9/13/2015	199
9/14/2015	200
9/15/2015	123
9/16/2015	153
9/17/2015	135
9/18/2015	96
9/19/2015	104

The Feedback survey was circulated to participants of the all impacted business units 3 weeks post deployment. Participants were asked to rate 5 statements regarding the project performance on a 5 tiered scale ranging from strongly agree to strongly disagree. The statements presented in the survey are given below:

I. "The new EDI platform has improved the processing time for transactions"

II. "I have noticed a significant reduction in no. of errors/ missing documents since the deployment of the new EDI platform"

III. "The changes made to the business process as part of this project were easy to adapt to"

IV. "I prefer how the EDI processes and related systems functioned prior to this project"

V. "All the relevant project business requirements for my business unit have been fulfilled by this project"

Table 8 provides the total number of responses received were 15 and the summary of responses:

Table 9

Summary of Survey Results

Business Unit	**Response Date**	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**
Core/Supplier Direct	10/15/2015	Strongly Agree	Strongly Agree	Strongly Agree	Disagree	Agree
Transportation	10/15/2015	Agree	Agree	Strongly Agree	Neutral	Agree
Transportation	10/15/2015	Strongly Agree	Agree	Disagree	Strongly Disagree	Disagree
Core/Supplier Direct	10/15/2015	Agree	Agree	Agree	Disagree	Neutral
Core/Supplier Direct	10/15/2015	Disagree	Disagree	Disagree	Agree	Strongly Disagree
Mobile	10/15/2015	Agree	Neutral	Agree	Strongly Disagree	Neutral
Transportation	10/16/2015	Strongly Agree	Agree	Strongly Agree	Disagree	Neutral
Mobile	10/16/2015	Agree	Agree	Agree	Neutral	Agree
Accounts Processing	10/16/2015	Agree	Agree	Strongly Agree	Neutral	Agree
Marketplace	10/16/2015	Neutral	Neutral	Neutral	Agree	Disagree
Order Management	10/16/2015	Disagree	Disagree	Disagree	Neutral	Strongly Disagree

Mobile	10/16/2015	Agree	Agree	Agree	Disagree	Agree
Order Management	10/16/2015	Strongly Agree	Agree	Agree	Disagree	Agree
Transportation	10/16/2015	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree
Accounts Processing	10/16/2015	Agree	Agree	Agree	Disagree	Agree
Accounts Processing	10/16/2015	Agree	Neutral	Agree	Strongly Disagree	Strongly Agree
Core/Supplier Direct	10/17/2015	Neutral	Neutral	Neutral	Disagree	Agree
Order Management	10/17/2015	Agree	Agree	Agree	Disagree	Agree

Data Analysis

Document Audit/Data Flow validation: The volume data that was obtained during the data collection from the EDI database was then compared to the volumes obtained from the other systems that the EDI platform flows data to and from. Table 9 summarizes the discrepancies identified.

Table 10

Summary of Document Audit

	Doc Type	Doc Direction	No. of documents processed by SEEBURGER	No. of documents sent/received by internal system	%Discrepancy
Week 1	EDI 210	Inbound	3199	3180	-0.6%
	EDI 846	Outbound	250	286	14.4%
	EDI 850 Mobile	Outbound	3000	3010	0.3%
	EDI 870	Outbound	299	305	2.0%
	EDI 810	Inbound	3124	3100	-0.8%
Week 3	EDI 870	Outbound	84	90	7.1%
Week 4	EDI 850 Core	Outbound	3319	3325	0.2%

	EDI 856 Core	Inbound	2103	1998	-5.0%
Week 7	EDI 990	Inbound	3837	3830	-0.2%
	EDI 870	Outbound	6700	6859	2.4%

Based on the data analysis, the following observations can be made:

I. Out of 23 total document types, volume discrepancies were found for 8 documents i.e. 65% of the documents had no issues in data flow.

II. Only 1 document type i.e. EDI 870 showed multiple occurrences of discrepancy. The average discrepancy for EDI 870 over the entire period of observation 4%.

III. The largest discrepancy in volumes was found for a single document i.e. EDI 846 and only within a single week time period.

Error Trend Analysis/Comparison: The daily error counts over a course of a month were compared to the previous month's daily error counts in the old EDI environment to measure changes in the system performance as shown in figure 15.

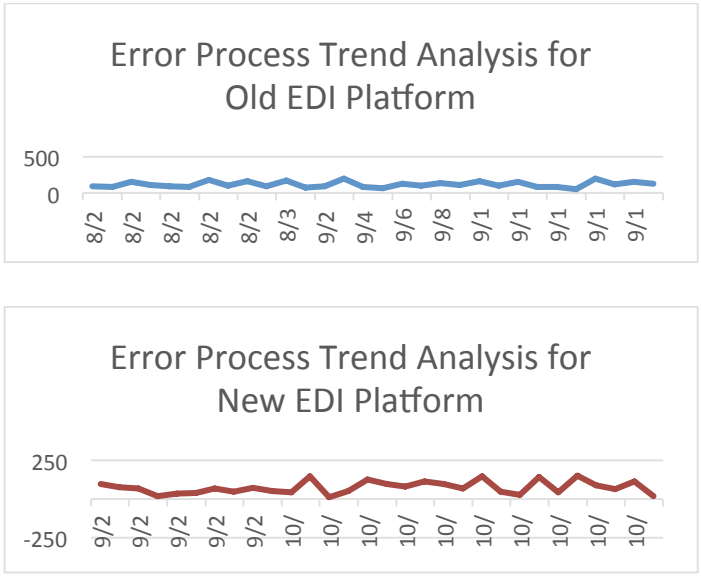


Figure 15

Error Volume Comparison (Before vs. After)

Comparison of the error volumes over the same length of time prior to and post deployment of the new system shows that the overall error volume for EDI documents was significantly lower in the latter case.

User Satisfaction Analysis: The responses received through the post-deployed user feedback survey regarding the system performance can be summarized as follows in table 10:

Table 11

Survey Response Sheet

	"The new EDI platform has improved the processing time for transactions"	**"I have noticed a significant reduction in no. of errors/ missing documents since the deployment of the new EDI platform"**	**"The changes made to the business process as part of this project were easy to adapt to"**	**"I prefer how the EDI processes and related systems functioned prior to this project"**	**"All the relevant project business requirements for my business unit have been fulfilled by this project"**
Strongly Agree	28%	11%	28%	0%	11%
Agree	50%	56%	44%	11%	50%
Neutral	11%	22%	11%	22%	17%
Disagree	11%	11%	17%	44%	11%
Strongly Disagree	0%	0%	0%	22%	11%

Based on the analysis of the survey responses the following observations can be made:

I. 78% of the respondents either agree or strongly agree that the new EDI platform has improved document processing times.

II. 67% of the respondents either agree or strongly agree that the number of document errors has gone down since deployment of the new system.

III. 72% of the respondents either agree or strongly agree that the business process changes made as part of the project were easily adaptable.

IV. 66% of the respondents either disagree or strongly disagree with the premise that the old system was better.

V. 61% of the respondents either agree or strongly agree that their business requirements were met as part of the project.

Summary

This chapter provided details regarding what data was collected as part of the project design and what tools/techniques were employed to analyze this data. The next chapter will discuss the results that were compiled as an outcome of the data analysis as well as lessons learned and recommendations for similar projects in the future.

Chapter V

RESULTS, CONCLUSION, AND RECOMMENDATIONS

Introduction

This chapter outlines the results obtained at the conclusion of this project, after the data collection and data analysis was completed. The report concludes with a discussion of recommendations based on lessons learned as part of the project execution.

Results

The overall methodology selected and employed for the completion of this project was based on the Waterfall model of the Software Development Lifecycle Cycle (SDLC). The traditional waterfall model functions on the principle that each preceding phase of the project needs to be completed before the next phase can be started. For example, requirements gathering and analysis activities need to be concluded before the functional specifications can be drafted and until these two stages have been completed, the design phase cannot be started.

This project utilized a hybrid approach to the waterfall model by breaking down the testing and deployment stages into multiple releases so as to mitigate the impact of any high severity post-deployment production issues.

Following is a summary of the results obtained from the study of this project:

I. The audit of the document volumes shows that the majority of the EDI document types remained unaffected by data loss issues. The discrepancies that were identified were traced back to middleware issues and documents that had gotten stuck in the message queues between systems due to queue manager downtimes. The new EDI system was not responsible for any data loss or missing transactions.

II. The reduction in the overall number of system errors observed per day, validates that the performance of the overall EDI environment and communications improved with the implementation of the new EDI platform.

III. Based on responses obtained through the feedback survey, the overall consensus was that the majority of the stakeholders were satisfied with the system performance and changes that were brought about as part of this project.

The project questions that were stated at the initiation of this project can now be answered as follows:

I. What improvements did the new platform/application make to the core competencies of the organization?

The core competencies of a retail organization are largely dependent on the supply chain model functioning within the company, and all factors that impact the efficacy and throughput of the supply and delivery channels. EDI plays a significant role in supporting these functions within an organization. Therefore, the process improvements such as faster transaction time, support for a larger volume of transaction throughput and improved data integrity, achieved as a result of this project, can therefore be directly correlated to the improvement of the company's inherent core competencies.

II. What mitigation measures were taken to minimize customer, vendor and business impact, as part of the change management for the project?

The hybrid model of the waterfall methodology that was used to execute this project served to mitigate the customer, vendor and business impacts by

reducing the number of EDI documents going live in a single deployment release. The decision to piecemeal the deployment diminished the potential for any catastrophic production defects that would have derailed the entire project and cost the company millions of dollars in lost sales and revenue.

III. What business analysis tools/techniques can be incorporated in the various stages of the Software Development Lifecycle (SDLC) methodology?

Business analysis refers to the research and techniques used to understand and articulate business needs as well as determine feasible solutions to fulfil said needs. It remained a critical component of the entire life cycle of the project because all project deliverables, including process documentation and design specifications, can be traced back to the initial business requirements obtained through the in-depth analysis of the business systems and processes. During the scoping phase, the analysis tool employed was Joint Application Requirements (JAR) sessions along with Use Case diagrams and processing modeling to illustrate the as-is and to-be states of the business processes. Even after the design and development phases have been concluded, business analysis again comes into play to ensure that all the requirements defined in the scope of the project were met, via testing and validation activities.

Conclusion

In conclusion, the objectives that were stated at the inception of this project served as guiding principles for the course of the entire endeavor. Based on the results of the project study, it can be deduced that the problems inherent with the old EDI platform and infrastructure were

mitigated through the successful implementation of the new EDI platform, with minimal impact to vendors, customers and business units within the organization.

Recommendations

Replacing a legacy system for a field of operation as critical as EDI communications is a monumental task. This is especially true when the old system is highly customized and deeply entrenched in multiple functional units within the organization. Based on the results obtained from the project, following is a list of recommendations to further improve the execution of similar projects in the future:

I. The audit of documents/data flowing between multiple middleware and internal application systems should be automated to provide better monitoring capabilities. This should be a proactive rather than a reactive activity to ensure proper flow and integrity of the data.

II. Instead of just breaking down the deployment stage into multiple releases, the use of Agile methodology to delineate the project tasks for all the releases would provide the flexibility for revisiting and improving upon any design deficiencies as well as conducting more rigorous unit and application testing.

III. When the scope of the project encompasses all functional areas of the organization, it is critical to keep all the stakeholders in the loop and maintain effective communication regarding the all changes with the impacted vendors as well.

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APPENDIX A

EDI DEFINITIONS

EDI Document Type	Definition
204	Load tender
210	Carrier Freight details and invoice
212	Trailer manifest
214	Carrier shipment status message
240	Small package status
753	Request for routing instructions
754	Routing instructions
812	Credit/Debit Adjustment
846	Inventory inquiry/advice- suggested returns
850	Purchase order
855	VMI Reverse Purchase order/Vendor initiated purchase order
852	Sales and inventory data
856	Shipment notice/manifest
860	Order cancellation request
861	Receiving Advice
865	VMI Reverse Purchase order change/Vendor initiated purchase order change
870	Order cancellation
990	Response to load tender
997	Functional acknowledgment
810	Vendor invoice

APPENDIX B

CUSTOMER SATISFACTION SURVEY QUESTIONNAIRE

User Satisfaction Survey

"The new EDI platform has improved the processing time for transactions"

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

"I have noticed a significant reduction in no. of errors/ missing documents since the deployment of the new EDI platform"

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

"The changes made to the business process as part of this project were easy to adapt to"

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

"I prefer how the EDI processes and related systems functioned prior to this project"

- Strongly Agree
- Agree
- Neutral

- Disagree
- Strongly Disagree

"All the relevant project business requirements for my business unit have been fulfilled by this project"

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

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