BTech 451 2015

Mid-Year Report

CHEP Pallet Management System

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COCA-COLA AMATIL NEW ZEALAND

Contents

Abstract

I have undertaken a project for Coca-Cola Amatil ("CCA") to create a solution to improve their current Commonwealth Handling Equipment Pool ("CHEP") pallet management process. The main goal of my project is to make the current process of managing CHEP pallets significantly more efficient. The result of me achieving my goal will essentially improve current internal business process which would hopefully result in increased levels of productivity and work-throughput for employees at CCA. This report contains my proposed changes for CCA's current system and business processes, which will include a new prototype intermediary system that I plan to build within the next half of my project. The prototype will manage the incoming data from SAP, modify fields as required and parse the information into CHEP's interface. This intermediary system is required to improve business efficiencies and avoid current governance criteria that are set in place by the head office Coca-Cola Amatil Australia.

Disclaimer

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BTech. Information Technology Coordinator: Dr. Sathiamoorthy Manoharan.

The Company

Coca-Cola Amatil New Zealand are the licenced bottlers of the Coca-Cola Company in New Zealand. CCA produce an extensive range of well-known products such as L&P, Coca-Cola, Coca-Cola Zero, Coca-Cola Diet, Powerade and Keri Juice. CCA has been in operation since the early 1900's and currently employs well over 1000 employees in New Zealand alone. Within New Zealand CCA has five production facilities located across Auckland, Putaruru and Christchurch.

CCA have a significant impact on the local economy, recently CCA spent 50 million NZD upgrading two CCA facilities within Auckland and Christchurch to support the blow-fill technology. In 2008 CCA spent 80 million NZD to create their new and advanced distribution centre in Auckland (Coca-Cola Amatil, n.d.). With these investments and upgrades, customers are provided with a high quality product within in timely manner.

Introduction

The goal of my project is to improve efficiencies around their current CHEP pallet movement. CHEP pallets are distinct blue coloured pallets that have standardised sizes for distribution within New Zealand. CHEP pallets are a key requirement when supplying goods to supermarkets and major organisations. As the pallets meet rigorous standards and undergo compliance audits (CHEP, n.d.). The current CHEP pooling model is designed for pallets to be repaired and reused. CHEP reuses damaged pallets in an effort to reduce landfill. CHEP pallets provide many benefits for several organisations such as:

- Compatible with existing supply chain infrastructure (CHEP, n.d.)
- Greater efficiencies during transport and storage (CHEP, n.d.)
- High pallet quality and consistency via CHEP's worldwide network (CHEP, n.d.)
- Load stability and reduced product damage (CHEP, n.d.)

The current CHEP pallet reconciliation process is extremely time consuming and takes approximately four or more days to complete. In addition to the four days required, the pallet reconciliation process requires the assistance of 3 additional internal systems to balance CHEP pallets nationwide. Thus, the logistics team have requested me to complete the process improvement to include customer pallet movements.

Furthermore, the CHEP pallet management process is complex and manual and these processes leave the business open to potential losses with pallets being given to customers without receipts. CHEP holds CCA accountable for these pallets and for inaccuracies in pallet inventory balances, which CCA are financially accountable for. Pallets can be dispatched to distribution centres throughout New Zealand, customers nationwide or dispatch companies. Dispatch companies such as Toll also distribute CHEP pallets, in this scenario the dispatch companies take ownership of the accountabilities associated with the pallets.

At present, all information is manually keyed into CHEP Portfolio Plus, which is CHEP's pallet accounting system that tracks pallet movement and manages transfers. The issue within the business process that I have identified is the lack of accountability and the data integrity factors not being met. Information can be simply forgotten about, which then results in the pallets not being transferred to a customer. In these scenarios, CCA is left accountable for these pallets that have been transferred but not recorded. This issue at present costs CCA hundreds of thousands of dollars per year.

My Project in a Nutshell

To identify and create a solution for CCA, I had to initially discover and address the current issue at CCA. This required a thorough understanding of CCA's current business processes and the ability to identify areas of weakness. Once I understood the extremely complicated business process in regards to the inwards and outwards goods process, I was able to determine areas that could be significantly improved. At present all shipping information is manually entered into CHEP Portfolio Plus software which tracks pallet movement and manages transfers.

The solution I have designed is to create an application that will transfer and modify set fields of information from CCA's SAP system into Portfolio Plus. Though there are possible alternative methods that do not require the use of an intermediary system, I am unable to proceed with them due to the resourcing and governance that have been set by Coca-Cola Amatil Australia.

Furthermore, the application I am going to create will remove these barriers as the application will allow for greater flexibility and control. As I create this solution for CCA, I will ensure that I meet CCA's goals of achieving data integrity of information and zero discrepancies between actual stocktake count of pallets and reported amount of pallets on hand.

Research

Programming Languages

As part of the design process for my BTech project, I am researching and evaluating programming languages that would be suitable for the creation and implementation of my solution for CCA. The primary purpose of this application will be to have information parsed from SAP which is based on the SAP ABAP language – extracted from my created query within SAP and parsed into my Pallet management application for manipulation. The extracted information will be manipulated in accordance with the requirements set by CHEP.

Certain fields of extracted information will need to be adjusted prior to being forwarded onto CHEP's Portfolio Plus application. Therefore, bearing the requirements of the application in mind, my research below will cover 3 major programming platforms. These languages are SAP Advanced Business Application Programming (ABAP), Python and SQLite. After concluding my assessment study on these languages, I will choose the most essential languages that I must know sufficiently in order to complete the design and creation phase of my application.

Due to the requirements of my project, I am required to use different platforms to complete my project at a high quality standard. Bearing in mind the quality

demanded of this project, I will ensure that I meet the functionality requirements that align with CCA's business requirements. Below is a description of each language researched, which will allow me to create my solution for CCA.

SAP ABAP

SAP Advanced Business Application Programming (ABAP) is a programming language that is used by large organisations worldwide. It essentially runs their critical SAP business systems. SAP is the world's largest inter-enterprise software company and the world's fourth-largest independent software supplier (Rose, 2013). The SAP applications provide capabilities to manage finances, asset accounting, cost accounting, production operations and materials, personnel, plants and archived documents (Rose, 2013). This programming language also includes the use of logical databases, which I will use thoroughly within this project.

The use of SAP is required for the first phase of my project as the majority of the required information that is needed for CHEP Portfolio Plus is contained within CCA's SAP system. I am required to educate myself in order to have the required skill level to program and create extract reports of the required information. Since this project with CCA has begun, I have strived to study the basics of SAP and learn how to use the required transactions.

I have learnt the required basics from my industry mentor Jet and I have also used an online SAP ABAP Programming for Beginners Udemy course (Moxon, 2014). Currently within the New Zealand and Australia CCA sites, SAP is used heavily for the critical business systems such as orders, shipping and inventory management. Therefore the use of SAP is a significantly large factor within my project.

Python3

Python is a relatively new language which was released back in February 1991 by Guido Van Rossum who was the primary designer of the language (The Python Programming Language, 1997).
Many of Python's original/initial features originated from the ABC language. ABC had certain problems that Guido Van Rossum wanted to correct. Moreover, certain features were kept and taken from ABC. One of Guido's primary goals was to create a scripting language that was generally extensible (The Python Programming Language, 1997).
The following are the significant features included with Python;

- Object-oriented programming language
- High level dynamic data types and classes
- Combination of remarkable power with clear syntax
- Several interfaces to system calls and libraries
- Extensible in C and C++

Python has been noted as highly suitable for rapid prototyping of complex applications and this is of significant advantage to me. It is important to note that this can enable me to show progress to my stakeholders at CCA and to my university supervisor. Python is a language that is used to connect multiple pieces together to create and operate a complex solution.

Python will be the main programming language used within my solution as I am required to develop a solution to address my brief within a timely manner and also to address the requirement of future modifiability. Additionally, I chose Python as I believe it outweighs Java's advantages for the purpose of my solution. As of July 2014, the Python programming language is the most popular language for teaching introductory computer science at the top-ranked U.S. departments (Guo, 2014).

Python allows me to program an application that is light-weight and runs efficiently with the use of the several libraries that are included. Thus, I have decided to perform my initial research on Python rather than Java. Python is significantly more efficient and simpler language to understand and create in comparison to Java. An equally important factor to note is that the Python

application will be working heavily with .csv formats and at present Python has an excellent .csv module built-in which will allow me to extract and modify the information at ease (Python.org, 2015). The use of the .csv module will be closely tied in with the SQLite module, which will manage the SQLite database in Python (Python.org, 2015).

Another essential module that I am using within Python is the email.generator module that generates MIME documents (Python.org, 2015). This module will be heavily used within my solution towards the final stage of the process.

Concluding with my Python research, I believe that the Python programming language will provide me with the right tools and modules to complete the main coding and aspect of the project for CCA New Zealand.

SQLite

It is defined as an in-process library that implements a self-contained, serverless, zero-configuration transactional SQL database engine (SQLite.org, n.d.). An important aspect to be noted with SQLite is that it is listed within the public domain and is free for use including the commercial sector. SQLite is the most widely developed database in the world (SQLite.org, n.d.). Organisations that currently use SQLite are:

- Adobe
- Airbus
- Apple
- Dropbox
- Mozilla
- Google
- Microsoft
- Python
- Skype

All the above listed organisations including many other high profile organisations use SQLite in some way. SQLite is an embedded SQL database engine that does not use a separate server process which enables the application to be

significantly 'lighter'. A complete SQL database with multiple tables, indices, triggers and views is saved into a single disk file (SQLite.org, n.d.). The database within SQLite is a cross-platform that ensures that if in the future CCA wish to copy the database between different systems, such as migrating from a 32-bit to 64-bit system, then it is a possibility.

The library for SQLite at present is significantly compact, the library with all the features enabled results in a size of less than 500 kilobytes. It is important to note that the size of the library would be dependent on the platform and compiler organization settings (SQLite.org, n.d.). The size of this library alone demonstrates the agility and compactness of such a platform and is therefore a popular database engine choice amongst many individuals and organisations around the world. SQLite runs faster as more memory is allocated to it.

According to sqlite.org, SQLite is carefully tested prior to each individual release and has a reputation for having a high level of reliability (SQLite.org, n.d.). This is an extremely important concern for my project as I must ensure that the database does not crash or have any software related issues. Although my application will initially run within the TEST_DAR environment at CCA, I must ensure that my Python application does not have any bugs before it is released into the Production Environment. Devastating effects can occur for the Production and Distribution plant for CCA New Zealand if the application was to become offline.

Chosen Programming Languages

As a result of my research into SAP ABAP, Python3 and SQLite (Version 3) I have concluded that I must use a combination of all three languages to create an optimized and efficient solution for CCA. Each individual component within my solution must be created to the highest of standards. Robert Martin considered software as rotting design when the following five symptoms where present:

- Rigidity – In this symptom, software would be extremely difficult to change when required. A single change within a system would result in several undesired changes in other linked modules. When a software has such a symptom, many companies are hesitant to allow their software

engineers to work on the program to make changes.

- Fragility – This symptom is closely linked with rigidity. With this rotting design symptom, the software is easily broken in multiple places whilst a change is being performed within another area of the software. Many companies also then become hesitant to allow changes to the software. Robert Martin stated "As the fragility becomes worse, the probability of breakage increases with time" (Martin, 2000).

- Immobility – This relates to the inability of being able to use software from other projects or parts within the same project. Software engineers may attempt to reuse software from other projects but due to the complexity and extra 'baggage' the engineers may decide to re-write the module instead of reusing the module.

- Viscosity of the Design - This is defined as while making a change, many ways can preserve the design of software and others do not preserve the design. Essentially, they can be classified as hacks to the software. It is easier to do the wrong thing than do the right thing (Martin, 2000).

- Viscosity of the Environment – The issue with this symptom is where the development environment is slow and inefficient (Martin, 2000). Compile time may take an excessive amount of time and software engineers may be required to change parts of code that do not require the compiling of the entire code.

The five symptoms mentioned above must be avoided at all costs to ensure my Python application is of the highest quality of standards and runs efficiently. Whilst programming my application, I will ensure that I have sufficient in-line notation to allow future developers to make changes as and if required by CCA. To ensure I achieve my goal of developing a cost-effective, responsive, efficient and well-designed application, I will follow these key design practices (Microsoft, 2009):

- Keep design patterns consistent within each layer
- Do not duplicate functionality within an application

- Prefer composition to inheritance
- Establish a coding style and naming convention
- Maintain system quality
- Consider the operation of the application

Related Works Research

WiseTrack Asset Tracking

Currently there are similar technologies that are used within the world in relation to tracking assets. From the research that I have been conducting, I am unable to find exact solutions that will be fit for the requirements of CCA. Current solutions include general asset tracking that require the use of RFID Tags. This option is not suitable for a company such as CCA as the pallets that require tracking are not the property of CCA, thus physical changes cannot be implemented to the pallets to allow for tracking.

In addition, inserting a physical RFID tag per pallet is not feasible, on average 40,000 pallets are sent out of the Auckland Distribution Centre per month. Each one of these pallets will not be returned to CCA as these pallets are transferred to the customers and shipping companies accordingly. Once again this proves that adding a chip to each of these pallets is not feasible.

Another point to consider with RFID tracking of each pallet is the practicality concept. Each individual customer of CCA will not install and upgrade their technologies to suit the tracking of pallets. This responsibility does not come down to the customers of CCA. An option to solve this current issue is WiseTrack's solution which is a company that provides RFID tracking of assets (WiseTrack, n.d.).

WiseTrack was built using the Microsoft Structure and uses Microsoft SQL. The WiseTrack software combined with the use of WiseTrack's Antennas and equipment help deliver a solution to their clients and customers.

This option provided by WiseTrack is once again not feasible for CCA due to the costs required and large diverse range of CCA customers within New Zealand. Although the more cost-effective solution of Barcode Labelling is available for customers of WiseTrack, I deem this unsuitable due to the following reasons:

- Not Practical
- Not Cost-effective
- Not Viable for all CCA Customers
- Prone to sticker being damaged during transit

After analysing WiseTrack's solution in-depth, I have concluded that the solution available by WiseTrack is not practical and not cost-effective for CCA. It is important to note that their developed solution is primarily for companies shipping internally within multiple distribution and shipping centres.

Although CCA ship within multiple warehouses within New Zealand, their major consignments are sent to customers and shipping containers. As a result of this, CCA is unable to resolve their issue by integrating a pallet tracking system within their warehouses only.

Bettaway Pallet Systems

This pallet inventory management system known as the Bettaway Pallet System is similar to the technology I am implementing for CCA. The current pallet management in accordance with CCA business processes are managed by CHEP – the manufacturer and supplier of the CHEP pallets. All pallet orders and requests are sent to CHEP who allocate the requested number of pallets and deliver them to CCA's delivery location. The delivery location of the ordered pallets are one of five nationwide distribution centres.

Bettaway have developed a solution that is currently deployed within the United States and Canada, the solution provides pallets to customers from one of 200 pallet yards (Bettaway, n.d.). Bettaway's solution is primarily a dispatch and management system that looks to improve current pallet distribution within the United States and Canada. Bettaway state that customers can save up to 35% whilst using their platform and service. This is compared to the traditional

methods of purchase and discard methods of pallets (Bettaway, n.d.).

The use of Bettaway leans significantly more towards the supply-chain process where end-users must contact Bettaway to organise pallet retrieval. Whereas with CHEP, pallets are transferred to the customer's organisation who can then use those pallets to ship inventory to other vendors or back to CCA. Bettaway also manages repair and reissue of pallets, which, although it is similar, is not the same as CHEP. CHEP will not dispatch faulty pallets to their clients and if a client is to damage a CHEP pallet, they are liable to pay for a total replacement. The following diagram represents the Bettaway current pallet management process.

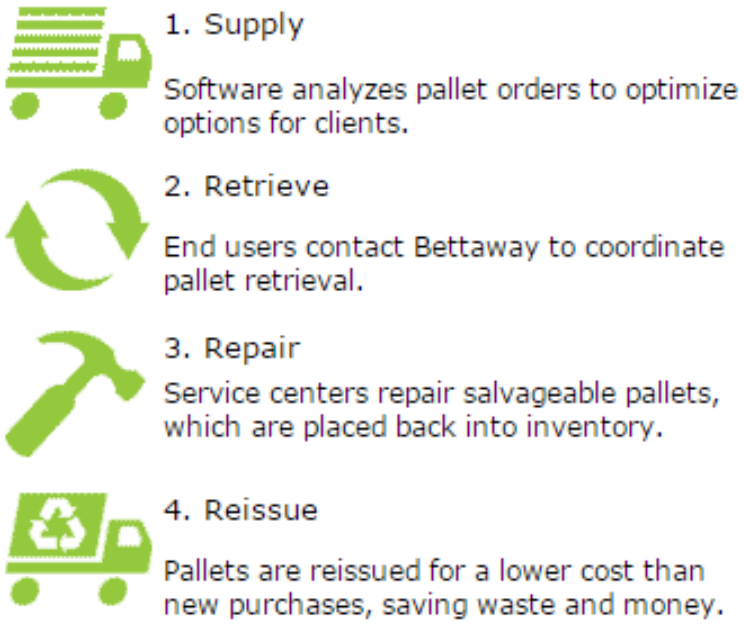


Image retrieved from:

https://www.bettaway.com/baw/palletsServices

Given the Bettaway process, I am unable to implement this solution for CCA due to the fact this solution is based on general wooden pallets which are not CHEP branded. These pallets do not undergo the same level of testing and compliance tests as compared to CHEP pallets. Additionally this solution is also restricted to clients based in the United States and Canada. I find this potential solution unfeasible for the current business issue I face due to the following reasons:

- Limited to United States and Canada
- Not adherent to requirement of CHEP pallets

- No consistent quality and strength of pallets
- Not feasible to implement solution for all New Zealand CCA customers

TrackIt Asset Tracking

TrackIt asset tracking is a New Zealand based company who specialise in asset tracking with the use of RFID and GPS technology combined. Their software is a web-based solution that enables customers to track, manage and monitor their assets. This solution is similar to the previously mentioned WiseTrack solution, which uses RFID tags and barcodes to enable a client to track their assets in real-time (TrackIt, n.d.). The TrackIt solution allows a user to track their assets and inventory in real time on any device or computer worldwide.

A collection of technologies are used such as RFID, barcodes and numerous other methods. The management platform allows their clients to track the use of their fixed assets. As mentioned previously, this form of solution is also not feasible and practical for CCA as the TrackIt solution is primarily used for tracking fixed assets. Each individual pallet cannot have such technology implemented within them, the costs involved to do such a task would heavily outweigh the proposed cost-savings of my solution.

Subsequently, this form of solution is suitable for a company of who transfer their goods between multiple sites and will not dispose of the asset within one shipment such as the transfer of a CHEP pallet. TrackIt provide a great solution for clients who may require features such as the Real-Time tracking screen (TrackIt, n.d.), but it is important to note that CCA do not require these extensive features to track a pallet.

TrackIt provide site auditing, which is a critical feature that I will implement in my solution to address CCA's current business problem. My implementation of this concept will be a monthly reconciliation total of the pallets dispatched. In addition to the current issue of pallet count discrepancies, CCA also face the issue where pallet stocktake is an extremely time-consuming and tedious task to complete. I shall use the knowledge that I have learned from current similar

technologies to develop an optimal solution for CCA New Zealand.

Solution Design

My solution for CCA requires the use of several platforms and technologies to create a cost-effective and efficient solution, which will be heavily used on a day-to-day basis within the CCA production environment. As with any project, changes to the project continue to occur as the project progresses. Initially, I had planned for my solution to be a sub-interface of CCA's SAP system that would collect and aggregate all the required fields of information. I have learnt that, within a large business organisation, several requirements and constraints are always present.

Due to resourcing and governance in-place by Coca-Cola Amatil Australia, I am restricted to making environment changes to the production and development SAP environments. My latest revision of the solution requires me to create an intermediary application that will receive the majority of information from the current CCA SAP system. The five main tables I will use to extract information from are as follows:

- VTTK: Shipment Header
- VTTP: Shipment Item
- VBFA: Sales Document Flow
- VBAK: Sales Document: Header Data
- KNA1: General Data in Customer Master

I have chosen the above tables as this allows me to join the necessary tables together in order to link all the required fields of information together. Now that all the required tables from which information will be extracted have been chosen, the next step in the design process is to come up with a solution to view and extract that information.

Subsequently, I will create the table joins in SAP QuickViewer also known as SQVI transaction code. Within this transaction of SAP, I will create the required layout of the information that is to be extracted from CCA's SAP system. Furthermore, I will design and generate a SQVI report, which will include the

majority of fields. The report contents will be parsed into my Python application which will handle all the incoming fields on regular timing basis and append set fields of information. As I previously mentioned, certain fields will be modified by my Python application to suit the level of quality, accuracy and data integrity of information required by CHEP Portfolio Plus and CCA accounting requirements.

This technological layout and design will enable me to create the most efficient system for CCA, within the resourcing and governance that have been implied by CCA Australia. Once the report template is completed with the final layout design, I will convert the SQVI extract into SE93 - Maintain Transaction Code, which will allow me to view the transaction code and modify it further to allow for automatic batch extract movements every 7 minutes. This automatic scheduled run time will be discussed in-depth with CCA and CHEP to ensure that all information is present on CHEP's Portfolio Plus at any given time or day.

The scheduled batch job from SE93 with the set fields of information will run as scheduled and the output file will be extracted as a .csv file. I aim to parse the output file from SE93 by uploading it to a set location that my Python application will constantly update and read from. This location will be located within the internal network of CCA. This file will be imported by my Python application and will be edited according to the required input specifications by CHEP. Furthermore, my application will allow the user to check the total number of dispatched pallets at any given time. This will allow for a much greater, simpler and more efficient pallet reconciliation process.

The Python application will be required to match customer addresses from SAP to a CHEP-recognised customer ID. This will be implemented with the use of a data dictionary. The Python application will match any other values required to the data dictionary to ensure the aspect of data integrity and credibility is matched at all times. To maintain table data within Python I will be using SQLite to handle all the tabular data. SQLite will enable me to also create tables which will then be extracted with the correct header and field records.

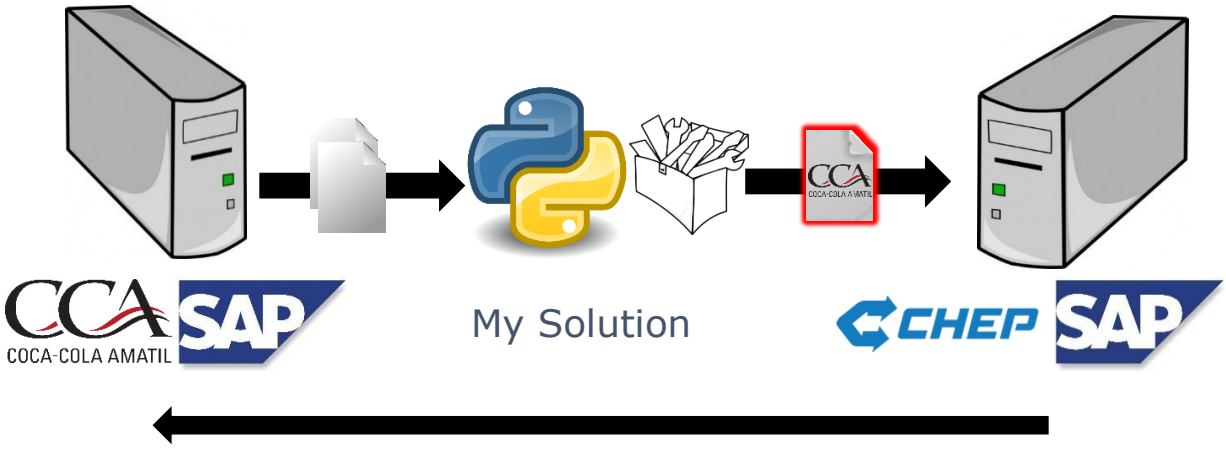
Once my Python application has completed performing all operations on the received data from CCA's SAP SE93 transaction, the Python application will apply

an EDI – Electronic Data Interchange process. An EDI is defined as computer-to-computer exchange of business documents in a standard electronic format between business partners. The business partners in this instance are Coca-Cola Amatil New Zealand and CHEP New Zealand (EDI Basics, n.d.).

I will be using the EDI process to provide CCA with the following benefits:

- Increased volume of CCA Transactions
- Time savings
- Monetary savings
- Greater flexibility for staff
- Increased staff productivity
- Enables CCA information transfer directly to CHEP systems
- Data accuracy
- Data integrity
- Eliminates several paperwork processes
- Business streamlining
- Better reporting information

Electronic Data Interchange Solution for CCA:



Electronic invoice sent to CCA

Furthermore, my Python application will be required to send CHEP an approved format document with set fields of information. These fields are required as CCA are responsible for reporting the movements of their CHEP pallets. With this reported information CHEP determines the company that the pallets must be transferred to. For accurate pallet movement, each field must be accurately reported to CHEP. Seven movement record fields are required to successfully log each movement. The fields are listed below with their respective representation:

- Docket Number – Unique docket number
- Sender ID – CCA's sender ID
- Receiver ID – CCA's customers CHEP ID
- Dates – Date of Dispatch (DOD), Date or Receipt (DOR) and Effective Date (EFD)
- References – Sales Order, Purchase Order and Consignment Note
- Material – CHEP Equipment ID
- Quantity – Number of pallets

Once my Python application has composed a document with all the relevant fields according to criteria set by CCA and CHEP, the next stage in the process will be to compose the document in the approved format and layout for CHEP's EDI. Many conditions must be met in order to successfully log a pallet movement. These conditions are the correct header records and movement records. The following header records are also required to successfully log a pallet movement:

- Header Indicator – Indicated by 'H'
- Recordnum – Running total of the record/row
- RecordCount – Total records in file including header record
- SendDate – Date record sent
- ProgramName – Indicated by CDKTF
- ProgramVersion – CHEP Standard EDI Docket format version number
- InformerGLID – CHEP Assigned Customer GLID, this indicates CCA location
- CountryCode – Indicated by 64, thus New Zealand

- CustomerFileRef – First 4 characters of the CCA allocated docket prefix with an additional sequential counter. This is unique for each file that is sent to CHEP.

The next step in the solution process is to parse the fully composed document with the correct header records and correct field record to the CHEP Portfolio Plus software. I have discussed this in-depth with CCA and CHEP and the most cost-effective and easiest solution will be to securely e-mail the file on an automatically scheduled basis.

Bearing in mind confidentiality and sensitivity of the data that will be sent on a daily basis, I must consider the key security requirements whilst transmitting the data over to CHEP. I have requested for a secure email account from CCA which will be used primarily for data transmission to CHEP.

Ideally, the account would require Transport Layer Security (TLS) to encrypt all outgoing mail. This is high priority when considering security and confidentiality of information. The security of incoming mail is negligible as this e-mail account will not be used to receive any e-mails. Any e-mails received into this account will be automatically deleted, this condition will be set by default by CCA mail administrators.

Current Progress

A significant amount of time has been spent completing the initial and preliminary stages of this project due to the fact that a large amount of investigation work into the current business process has been required. To begin with I was required to understand the current shipping process at CCA and attempt to identify an area that needed to be improved.

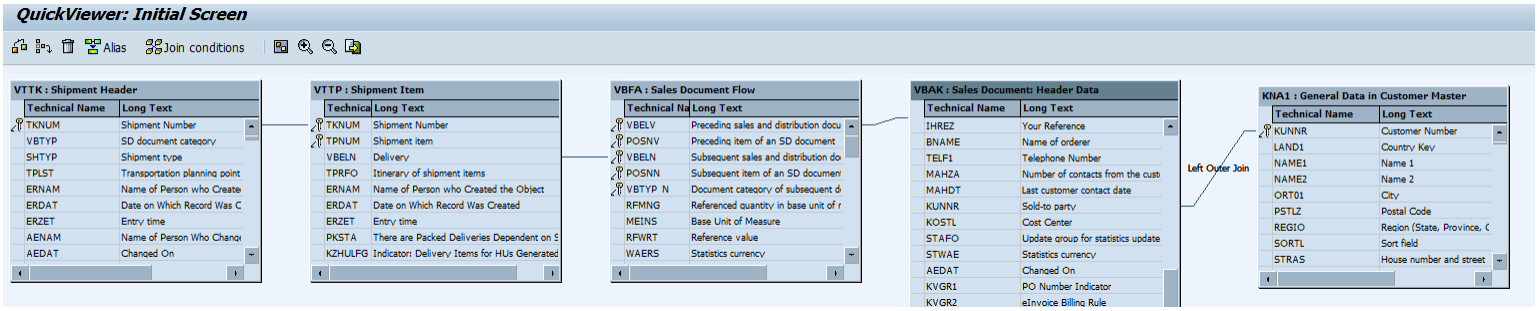
My current progress with my project has also required me to meet several stakeholders within the CCA business to understand their requirements and the limitations within the business and their relative processes. I have been in contact with CHEP and their Senior Manager, who manages their Business Solutions and Assets. My progress has consisted of me conducting interviews

with Distribution Centre staff and Outwards Goods staff. As part of my continual learning and development process within CCA, I have been creating the initial stage of my project within two main SAP environments:

- SAP ECC Production - PAR
- SAP ECC Development - DAR

Within these two environments I have created and developed an extract report, with the use of the SAP Tables described within the Solution Design chapter of this report. The following screenshots represent my progress in the Client-specific TEST_DAR environment within SAP.

Whilst creating the extract report interface, I was required to link all 5 tables to create a relationship, which resulted in the related information becoming available for extraction. The following screenshot demonstrates this respectively. These fields were linked to create the required table relationship they are listed as follows;

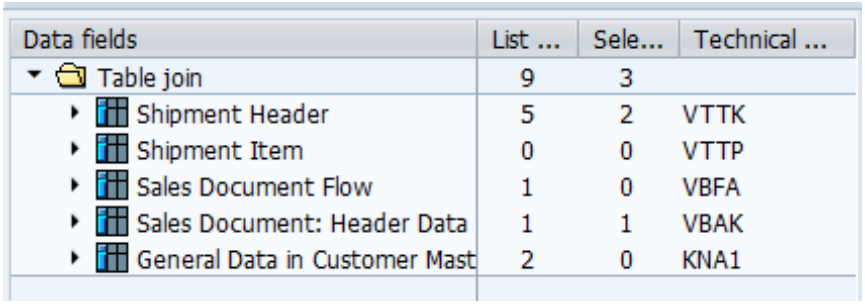


- TKNUM: Shipment Number = VTTK – VTTP
- VBELN: Delivery / Subsequent sales and distribution document = VTTP – VBFA
- VBELN: Sales Document = VBFA – VBAK
- KUNNR: Sold-to-party / Customer Number = VBAK – KNA1

The next step in my process was to research and learn about the required fields I would need to use to gather the correct information as required by CHEP's EDI and Portfolio Plus. This process took me a significant amount of time as there are hundreds of fields within these 5 tables of which all are not used or required

for this stage of development. The fields that I have used to extract information are as follows:

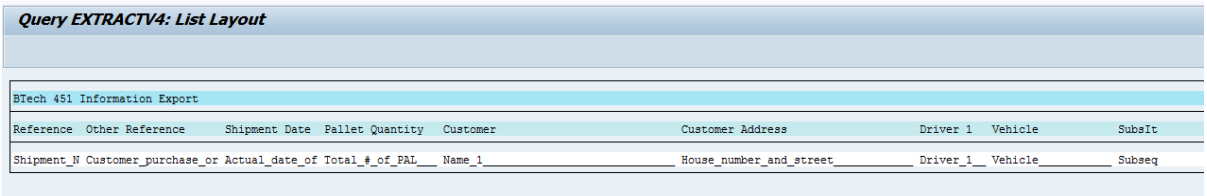
- Driver 1
- Vehicle
- Actual date of check-in
- Total # of PAL
- Shipment Number
- Subsequent item of an SD document
- Customer Purchase order number
- Name 1
- House number and street



Data fields	List ...	Sele...	Technical ...
Table join	9	3	
Shipment Header	5	2	VTTK
Shipment Item	0	0	VTTP
Sales Document Flow	1	0	VBFA
Sales Document: Header Data	1	1	VBAK
General Data in Customer Mast	2	0	KNA1

The fields listed above have been retrieved from these 5 tables within SAP

Furthermore, as part of my initial development process I created the layout and set the required fields into an information extract report template. The fields as listed in the following screenshot do not have the same names as listed by SAP due to the requirement input from CHEP's EDI. The fields have been modified and created by me to accommodate CHEP's requirements.



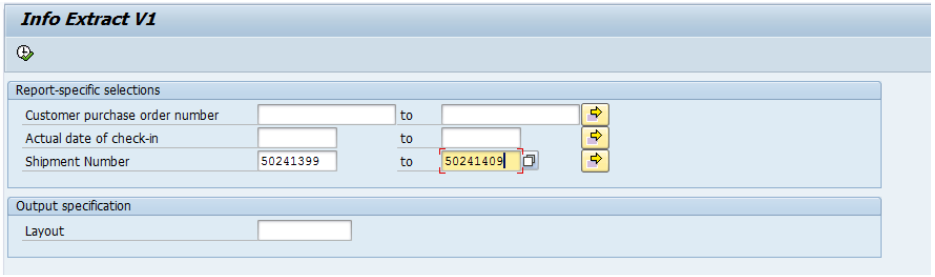
Query EXTRACTV4: List Layout

BTech 451 Information Export

Reference	Other Reference	Shipment Date	Pallet Quantity	Customer	Customer Address	Driver 1	Vehicle	SubsIt
Shipment_N	Customer_purchase_or	Actual_date_of	Total_#_of_PAL___	Name_1_____	House_number_and_street_____	Driver_1__	Vehicle_____	Subseq

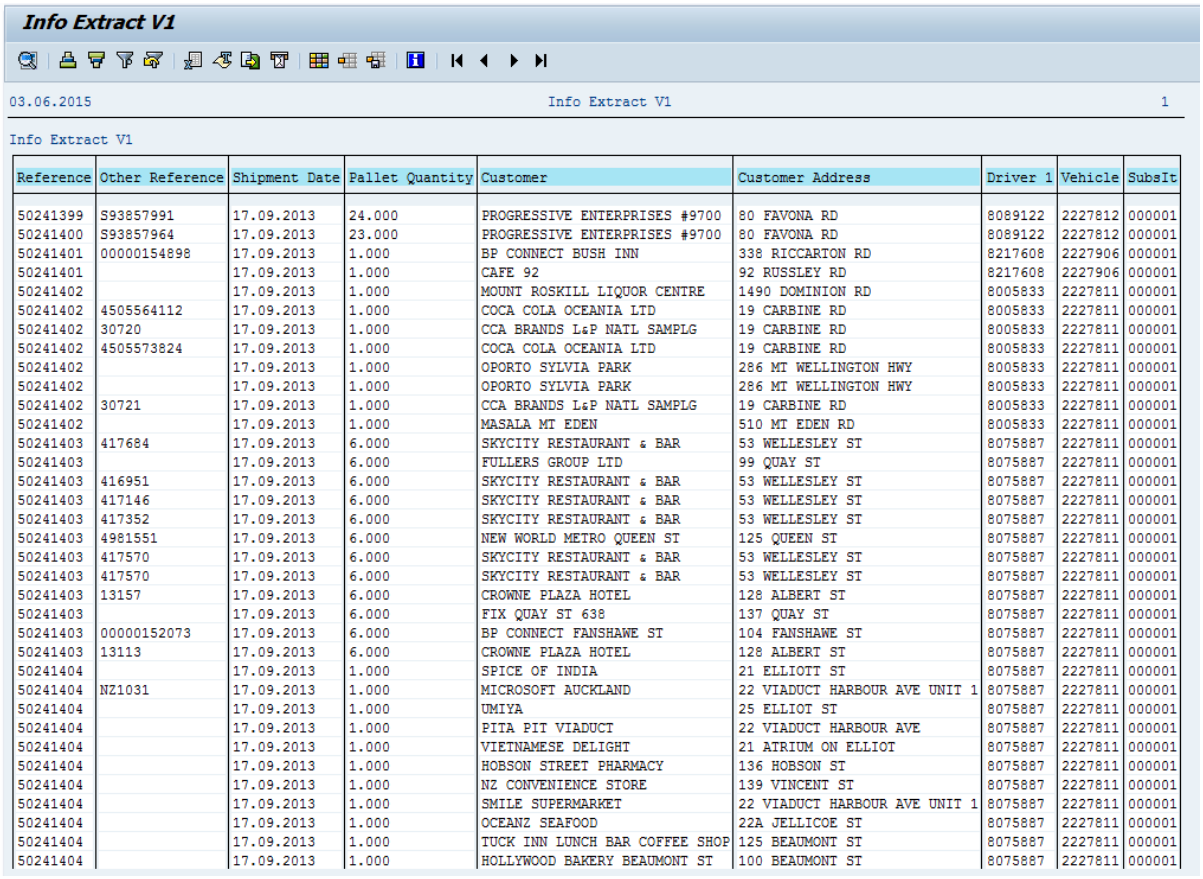
To limit the duplication of queries and to ensure I meet the requirement of data integrity and validity, I have created and set a default filter on the subsequent item field. With the filter on as default, data is not duplicated and listed multiple times in the results. This modification was required as entries for multiple types of items were listed with the same quantity of pallets. The total number of

pallets field represents the pallet quantity for the entire order. The following screenshot displays the interface created that will run in an automated extraction of results every 5 minutes. As an example, I have created an extraction report for 10 individual shipments. Shipment numbers 50241399 – 50241409 have been entered into a select query.



Shipment Numbers 50241399 – 50241409 to be selected

As a result of the above conditions that were entered into the shipment number range, the following results were produced by my extract report interface:



Info Extract V1

03.06.2015 Info Extract V1 1

Info Extract V1

Reference	Other Reference	Shipment Date	Pallet Quantity	Customer	Customer Address	Driver 1	Vehicle	SubsIt
50241399	S93857991	17.09.2013	24.000	PROGRESSIVE ENTERPRISES #9700	80 FAVONA RD	8089122	2227812	000001
50241400	S93857964	17.09.2013	23.000	PROGRESSIVE ENTERPRISES #9700	80 FAVONA RD	8089122	2227812	000001
50241401	00000154898	17.09.2013	1.000	BP CONNECT BUSH INN	338 RICCARTON RD	8217608	2227906	000001
50241401		17.09.2013	1.000	CAFE 92	92 RUSSLEY RD	8217608	2227906	000001
50241402		17.09.2013	1.000	MOUNT ROSKILL LIQUOR CENTRE	1490 DOMINION RD	8005833	2227811	000001
50241402	4505564112	17.09.2013	1.000	COCA COLA OCEANIA LTD	19 CARBINE RD	8005833	2227811	000001
50241402	30720	17.09.2013	1.000	CCA BRANDS L&P NATL SAMPLG	19 CARBINE RD	8005833	2227811	000001
50241402	4505573824	17.09.2013	1.000	COCA COLA OCEANIA LTD	19 CARBINE RD	8005833	2227811	000001
50241402		17.09.2013	1.000	OPORTO SYLVIA PARK	286 MT WELLINGTON HWY	8005833	2227811	000001
50241402		17.09.2013	1.000	OPORTO SYLVIA PARK	286 MT WELLINGTON HWY	8005833	2227811	000001
50241402	30721	17.09.2013	1.000	CCA BRANDS L&P NATL SAMPLG	19 CARBINE RD	8005833	2227811	000001
50241402		17.09.2013	1.000	MASALA MT EDEN	510 MT EDEN RD	8005833	2227811	000001
50241403	417684	17.09.2013	6.000	SKYCITY RESTAURANT & BAR	53 WELLESLEY ST	8075887	2227811	000001
50241403		17.09.2013	6.000	FULLERS GROUP LTD	99 QUAY ST	8075887	2227811	000001
50241403	416951	17.09.2013	6.000	SKYCITY RESTAURANT & BAR	53 WELLESLEY ST	8075887	2227811	000001
50241403	417146	17.09.2013	6.000	SKYCITY RESTAURANT & BAR	53 WELLESLEY ST	8075887	2227811	000001
50241403	417352	17.09.2013	6.000	SKYCITY RESTAURANT & BAR	53 WELLESLEY ST	8075887	2227811	000001
50241403	4981551	17.09.2013	6.000	NEW WORLD METRO QUEEN ST	125 QUEEN ST	8075887	2227811	000001
50241403	417570	17.09.2013	6.000	SKYCITY RESTAURANT & BAR	53 WELLESLEY ST	8075887	2227811	000001
50241403	417570	17.09.2013	6.000	SKYCITY RESTAURANT & BAR	53 WELLESLEY ST	8075887	2227811	000001
50241403	13157	17.09.2013	6.000	CROWNE PLAZA HOTEL	128 ALBERT ST	8075887	2227811	000001
50241403		17.09.2013	6.000	FIX QUAY ST 638	137 QUAY ST	8075887	2227811	000001
50241403	00000152073	17.09.2013	6.000	BP CONNECT FANSHAWE ST	104 FANSHAWE ST	8075887	2227811	000001
50241403	13113	17.09.2013	6.000	CROWNE PLAZA HOTEL	128 ALBERT ST	8075887	2227811	000001
50241404		17.09.2013	1.000	SPICE OF INDIA	21 ELLIOTT ST	8075887	2227811	000001
50241404	NZ1031	17.09.2013	1.000	MICROSOFT AUCKLAND	22 VIADUCT HARBOUR AVE UNIT 1	8075887	2227811	000001
50241404		17.09.2013	1.000	UMIYA	25 ELLIOT ST	8075887	2227811	000001
50241404		17.09.2013	1.000	PITA PIT VIADUCT	22 VIADUCT HARBOUR AVE	8075887	2227811	000001
50241404		17.09.2013	1.000	VIETNAMESE DELIGHT	21 ATRIUM ON ELLIOT	8075887	2227811	000001
50241404		17.09.2013	1.000	HOBSON STREET PHARMACY	136 HOBSON ST	8075887	2227811	000001
50241404		17.09.2013	1.000	NZ CONVENIENCE STORE	139 VINCENT ST	8075887	2227811	000001
50241404		17.09.2013	1.000	SMILE SUPERMARKET	22 VIADUCT HARBOUR AVE UNIT 1	8075887	2227811	000001
50241404		17.09.2013	1.000	OCEANZ SEAFOOD	22A JELLICOE ST	8075887	2227811	000001
50241404		17.09.2013	1.000	TUCK INN LUNCH BAR COFFEE SHOP	125 BEAUMONT ST	8075887	2227811	000001
50241404		17.09.2013	1.000	HOLLYWOOD BAKERY BEAUMONT ST	100 BEAUMONT ST	8075887	2227811	000001

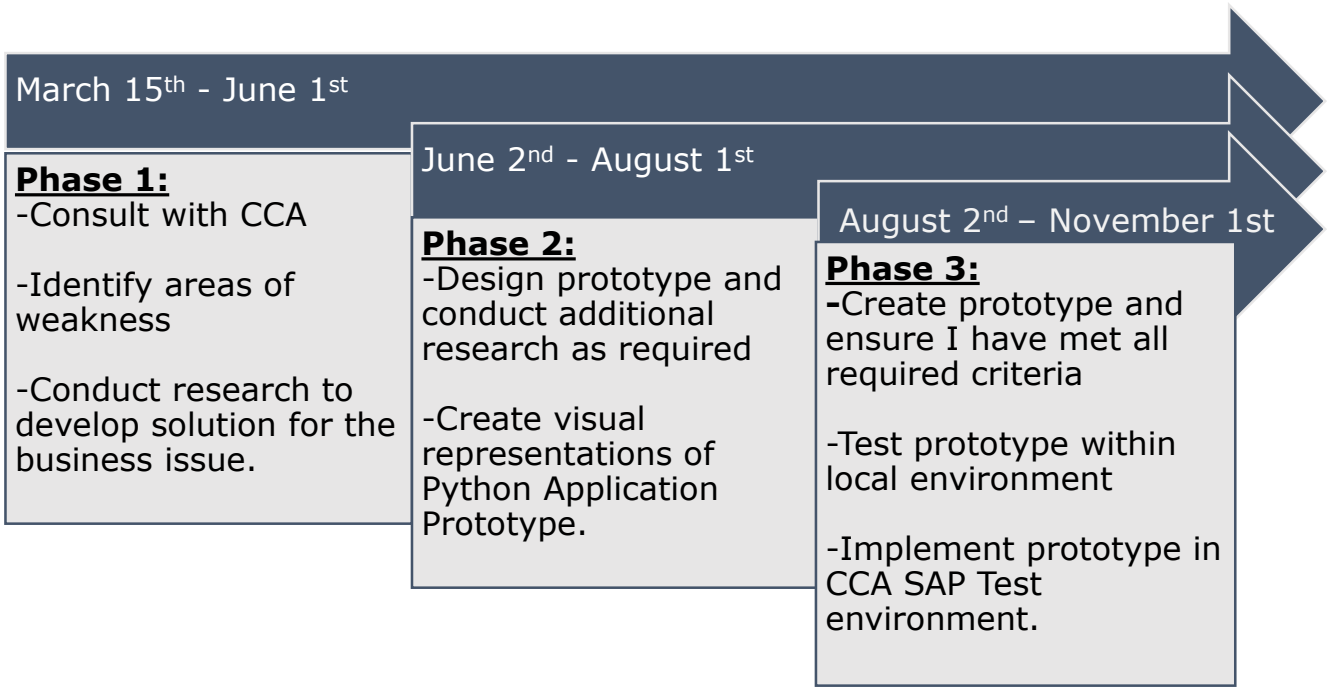
Shipment Numbers 50241399 – 50241409 selected with the main pieces of information displayed.

The above screenshot of information will, for instance, be automatically created and extracted by a batch job approximately every 5 minutes. This information file will be exported and will then be read by my Python application. My Python application will also be programmed to match the customers' details within the extracted CSV to the CHEP global ID that must be fed through the EDI.
Minor adjustments will be required in the due course to ensure that the export file is continuously sent and is in the correct format prior to deployment of my Python application.

Moreover, to ensure I am on track to meet deadlines and milestones set by my industry mentor, I have also contacted CHEP to obtain access to their test SAP environment. Additionally, I have requested for the test e-mail which will allow me to test my EDI configuration.

Furthermore, as part of my project progress I have begun compiling a list of required libraries for my Python application and demonstrations of their optimal forms of application. I will ensure that my code has been written in a manner that reinforces program and running efficiencies. Additionally, I have begun creating visual prototypes of the Python application that will be used primarily for finding and choosing the best-fit design for the business.

Project Timeline



The project as outlined in this report is currently on-schedule despite the original setbacks with the governance to start a project within the Auckland IT team at CCA. Initially, I had planned to develop an interface within SAP that would address CCA's current business issues. My plan was to resolve the current business issue of discrepancies with pallet counts and data integrity within the Distribution sector of the business via the use of the current business management system SAP.

As I previously mentioned the governance and resourcing allocations did not allow for me to implement a solution that required heavy modifications to the SAP Production and Development environments. This resulted in me having to re-evaluate the issue and readdress possible solutions. The setback had originally put me behind schedule, but I have now gained lost time by working with a quicker pace to bring myself back onto schedule.

I have already begun phase 2 of my project, which consists of a large amount of design of the interface for the Python application and the manner in which it will be used. I must also consider best practices for CCA staff who are the primary stakeholders within this project. The design phase also included my above progress with the extract report I have created in SAP.

The next stage in the process is for me to invest a significantly large amount of time designing and creating the product that consists of my Python application plus the user interface, which includes ensuring the EDI works correctly within CHEP's test environment. I look forward to completing the project to the utmost highest quality standards and also within my set timeframe.

Conclusion

I am currently making consistent progress within the project and am currently on track with my project. The constant milestones that are put into place for me by my industry and academic supervisors ensure that I stay on track. Additionally, I have put in a significant amount of time and effort into pacing out my workload to ensure a quality solution is produced. I am constantly ensuring that the work and research I perform currently will significantly help me with the competition of my project.

Throughout the project I have come about road-blocks and hurdles that I have overcome. To ensure I am in a position to handle such issues again, I have planned to finish the project slightly prior to the scheduled date. This will allow sufficient time for the final report and testing of the final solution to adhere to CCA's quality benchmark of software development.

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