

Group 12

# StockIT

The Box outside the Box of Inventory Management

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## OVERVIEW

Proper inventory management is the key to any business. One of the largest costs for many businesses, aside from staff, is that of inventory and it takes a great deal of time and effort to keep track of all a business' inventory – imagine a product that alleviated this issue. A product with a full suite of tools, options and in-built systems that gave you full control of your inventory from the purchase point, to the sell point and all the stops in between. Welcome to “StockIT”.

StockIT is designed to scale with the business from the ground up. Whether it be a small restaurant or a multi-site processing facility, StockIT has the tools and systems to ensure that you can accurately keep a track of all your inventory.

The motivation for the creation of StockIT was to create a product or software suite to bridge, what we as a development group saw as, a gap in the market. There are an array of products that can carry out one or two of the functions of StockIT, but none that can fulfil the full suite of needs a customer requires to run an efficient and profitable business. Stock taking applications or programs allow a user to count inventory on hand; PoS (Point of Service) software allows a user to record sales and sales data; accounting software enables a customer to track purchasing and invoicing; and more traditional purchasing methods (emails, phone calls) only allow a customer to place an order. There are very few products out in the market that allow a user to perform all of these functions from a single location and none that are as effective or as affordable for businesses, irrespective of their size. StockIT acts as the conduit for these operations, it feeds the data collected from the different points at which they can be executed into a single repository. Placing an order through StockIT allows the supplier to send an invoice which can then be processed using account software. Creating and receiving a supply purchase with StockIT allows the software to populate the inventory data in the PoS system. Think of StockIT as the root system of a fruit tree, it collects the nutrients – the inventory data - and feeds it to the branches where the fruit grows.

## WHAT IS INVENTORY MANAGEMENT

Inventory management, by definition, is “the process of ordering, storing, utilising, and selling a company's inventory. This includes the management of raw materials, components, and finished products, as well as warehousing and processing of such items.” (Inventory Management Definition, 2021<sup>1</sup>). It is the process by which a company brings a sellable good or product to market. It is the bedrock of an efficiently run and profitable company. The key principles of inventory management are:

- Purchasing:
  - purchasing relates to the buying of Raw goods or Ready to sell goods:
    - raw goods can be raw materials, ingredients or components; and
    - ready to sell goods are finished products. Clothing, materials, consumer goods, electronics; and
- Production:
  - production relates to the purchasing of raw goods. Proper inventory management tracks a product from its raw goods state – usually a combination of different raw goods – through to its classification as a ready to sell good; and
- Holding Stock:

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<sup>1</sup> Investopedia. 2021. *Inventory Management Definition*. [online] Available at: <<https://www.investopedia.com/terms/i/inventory-management.asp>> [Accessed 7 October 2021].

- holding stock relates to the storage of goods. Efficient inventory management negates a siloed style approach, keeping track of raw and ready to sell goods in a simple and clear way; and
- the improper storage of goods cost companies millions of dollars each year. This can be due to a multitude of factors, improper storage (spoilage), misidentified storage and improper stock rotation to name a few; and
- where is a good stored, how is it stored, why is it stored this way;
- Sales:
  - tracking sales – sales will pull from raw goods and ready to sell goods; and
  - accurate tracking and accounting are required for accurate representation to the consumer of quantities and amounts available for purchase; and
  - sale tracking informs the retailer/company of a demand for a product. This data is fundamental to forward projections and future purchasing – this data informs the entire inventory management process; and
- Reporting:
  - data is everything when it comes to inventory management. Much like sales, without accurate reporting and accounting all the demand in the world for a good or product will not matter if a company cannot keep track of a good throughout its purchasing, production and holding lifecycle; and
  - predict trends, notify of shortfalls, overstocks, process auditing, match raw goods in with ready to sell goods out.

According to research from the retail analyst firm IHL Group: overstocks cost the global economy \$471.9 billion each year; internal process failures account for \$284.9 billion; personnel issues \$259.1 billion and data disconnects and systems that are not integrated cost the global economy \$222.7 billion. The IHL report also states that: “retail CEOs are more challenged than ever to answer the growing omni-channel demands of consumers while providing profitable growth for owners and shareholders,” said Kevin Sternecker, CMO of OrderDynamics. “With internal process failures, disjointed data and siloed organizations, the answers C-level retailers need are almost impossible to attain without access to new, innovative technologies purpose-built to deliver the full potential of an organization.”. (Businesswire, 2021)<sup>2</sup>

Proper inventory management has the potential to save the global economy billions each year and this is where StockIT has the ability to make the greatest impact.

## STOCKIT

StockIT is a backend facing software suite that allows the user (a company or business) to track their inventory from purchase to sale and at every point in between. StockIT’s data driven approach allows the user to make informed decisions about inventory management, minimizing the risk of personnel failures and human error, in the tracking, purchasing and fulfilment of orders and inventory.

With a heavy focus on the Retail and Hospitality sectors, StockIT allows its users to keep track of inventory from a variety of different SILOs [Standalone Inventory Locations] (stores, locations, sites), or a single location,

<sup>2</sup> WIRE, B., 2021. *New Research Report: Retailers Lose \$1.75 Trillion in Revenue Worldwide Due to Overstocks, Out-of-Stocks and Returns*. [online] Businesswire.com. Available at: <<https://www.businesswire.com/news/home/20150506005233/en/New-Research-Report-Retailers-Lose-1.75-Trillion>> [Accessed 7 October 2021].

and see at a glance the current inventory on hand. This enables users with different SILOs to see the bigger picture of their organization, but allows them to identify shortfalls or issues at the micro level. Resolving issues at this level allows for business to stem issues before they grow and have impacts on a larger scale. It also allows individual SILO managers to see how small changes on their end impact business more broadly. Only have a single location for your business? No problem. The scalability of StockIT means it can be utilised by a business of any size to help them achieve a greater level of efficiency in their inventory management, the key fundamental functionalities of StockIT apply to a business of any size. This negates the need for small and medium business to seek alternative business solutions as they seek to grow, making StockIT an ideal tool for growing businesses to use.

A clean and user-friendly interface is integral to any piece of software in today's day and age. The hospitality and retail industries can be prone to staff change, especially before and after peak service season towards the end of the calendar year. Further to this, staff will most likely possess a range of different levels of technological literacy. Software that is simple and easy to use is important in ensuring that it is accessible, functional and thus fit for purpose. StockIT uses simple drop down menus and click-through commands, allowing the user to spend less time navigating systems and more time focusing on their work, whether that be customer service or deliverables.

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## UNIT PROFILES

A unit profile is important when entering an item of inventory for the first time in StockIT. Efficient inventory management starts with entering the right information into a unit's profile section. This information is carried forward through-out the life of that item in the StockIT system. In doing so, it creates a robust unit profile section enabling the user to give the software the necessary information for that product is at the core of StockIT's functionalities.

StockIT allows the user to assign an item in the inventory:

- SKU's (Stock Keeping Unit):
  - For tracking, reporting, purchasing and sales; and
- storage Zones/SILO availabilities:
  - where a product stored in the SILO or Single Site; or
  - where product is available at all SILOs; and
- recipe and Ingredients – raw goods, hospitality, inventory creation:
  - assign a product to be a part of a recipe; such as
    - quantities/amounts; or
  - multiple values from a single unit; or
  - shared recipes and ingredients; and
- custom inventory alert status:
  - safety stock notification level; and
- applicable inventory management formulae:
  - which formula is used for this item:
    - economic ordering quantity
    - just in time ordering
    - days inventory outstanding
    - reorder point formula
    - safety stock; and
  - alerts given to user based on the formulae when stock reaches certain points. Custom points can be set according to order days and delivery lead times; and
- supplier information – useful for reordering through StockIT:

- who is the product supplied by; the
- average lead times; and
- contact details; and
- store supplier contracts; and
- purchaser information:
  - who is the product supplied to (if wholesale); the
  - SILO availabilities (if moving products to different SILOs); the
  - Artificial Intelligence integrated demand scaling; the
  - retail/direct to consumer; and
- accounting details:
  - costs and margins; and
  - discount availabilities; and
  - tax codes and information; and
  - prices:
    - Specials/combos/pricing links; and
  - invoice creation and generation for internal StockIT systems:
    - This is fed to a PoS system and a users accounting software; and
- QR code generation:
  - QR codes can be read by a variety of smart phones; and
  - useful for storage locations and large products:
    - Scan a QR code at a zone or location and see a full list of units in that area; and to
  - create a QR code for a product, zone or location within the StockIT software.

While the Unit Profile list may seem exhaustive and appear like a lot of information to be entered per-product. This information is key to a business in getting the most value out of their inventory management. QR codes, stock locations and SKU's give a business a wealth of information when it comes to tracking the physical location of their inventory as it moves through their business; as well as tracking the items through their journey as data through StockIT.

Recipe information is incredibly important, being able to assign a raw good item as part of a recipe (whether it be in a hospitality situation or as part of manufacturing) gives the user the ability to track that item as it assimilated into another product. Being able to see total finished goods as a percentage or as a part of a larger combination of raw goods gives a wholistic view to the user. Stock alerts and notifications come in handy here when a specific raw good is running low and is used in the creation of a finished product, StockIT can notify the user of the shortfall and bring attention to the problem. The alerts can be tailored within the system to set safety stock levels for each item, as part of both the raw good and the finished product itself, in turn triggering two alerts and feeding into the re-order and accounting section of StockIT.

A clear record of accounting is vital to the success of a business. A business must know where each dollar is going so knowing how much capital is tied up in each item of inventory, the margins, tax implications, storage costs and possible profits are very important. Through StockIT, a user is able to enter this information when creating a Unit profile for each item of Inventory. This gives the user an overview of their currently Inventory liabilities, what inventory items need to move, what they have too much of and the costs and profits associated with each item.

Created with the end user and their required functionality in mind, StockIT is a full-service suite of software that integrates into your PoS system. Inventory data can be stored locally for increased efficiency for separate SILOs, allowing individual SILO users to run their own process auditing in real-time before pushing the information to the larger organisations cloud storage. Inventory information can be pulled from the organisations cloud storage to also provide SILO's with the total inventory of the organisation; or shared between individual SILO's if inventory needs to be shared between different sites or to point customers towards availabilities of inventory.

Multiple users have access to the live StockIT SILO map and any changes made by each user can be either updated in real-time or when a push is made. Back-ups are stored in a central organisational SILO to avoid mishaps with a custom back-up timer available for all users. Multiple back-ups can be stored to ensure data validity and accuracy.



**Figure 1 Example of StockIT's SILO system<sup>3</sup> (Spark Adobe - StockIT SILO Graphic, 2021)**

This dual pronged approach to the management of the inventory data (local and cloud storage) means that a company has a greater flexibility, as to how their data is stored and handled. This increases the efficiency of the workflow on a local level, reduces technological disconnects and provides a greater level of overview and inventory management on a company wide basis.

The primary focus of StockIT is to provide a clean, simple to use inventory management and inventory data storage system, whilst providing a high level of integration with established PoS. By integrating StockIT with established PoS systems we avoid having to create an entirely standalone fully packaged software suite, a jack of all trades, instead allowing us (the developers and creators of StockIT) to focus on the core functionality of our product to really maximise its capabilities.

The roadmap and endgame is for StockIT to run on a variety of operating systems, however initially our primary focus will be Windows and Android based architecture. This is because windows systems are so prevalent in the market already, meaning a smaller barrier to entry for the user and customer. Android is the natural fit alongside a Windows system as both already have an excellent level of integration. StockIT is designed to run as a program that can be installed on these devices, without the requirement to solely run as a browser based system – this alleviates concerns surrounding cloud connectivity and allows for better functionality for the software.

<sup>3</sup> 2021. *Spark Adobe - StockIT SILO Graphic*. [image] Available at: <<https://spark.adobe.com/sp/design/post/urn:aaid:sc:AP:9b2612eb-6bc6-483b-a1dc-0dfb319e5ec1>> [Accessed 11 October 2021].

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## CORE FUNCTIONALITY

Inventory management is not always seen as an exciting aspect of a business' operation, it is an often overlooked and undervalued practice that is fundamental to a business' bottom line and financial success.

Data driven reporting allows a business to make key decisions with the backing of hard data. This takes the guess work out of the decision, giving the business a greater level of confidence when making decisions. StockIT allows a business to see more holistically: purchases sales, accountings, current inventory levels, supplier lead times and current trends and predictions, regarding their inventory levels and sales. Having all this information in the one piece of software, not tied to any individual person or spread across multiple spreadsheets or programs, means that a company can easily manage a large array of information and make the small decisions that will yield big results.

StockIT's supply chain integration – either from data fed by suppliers also using StockIT or inputted using the unit profile section – gives a business the ability to effectively plan for in the short and long term. Data fed from suppliers using StockIT gives the purchaser the real-time availability and delivery lead time for a product. Direct purchasing integration of StockIT enables a business to place an order from within the StockIT software directly with a supplier. The item inventory information is then inputted by the supplier and “pushed” to the purchaser for acceptance with the purchase delivery. This process negates the purchaser having to manually enter the details of an invoice to keep inventory information up to date. It enables the purchaser to approve, deny or amend a supply invoice on receipt of delivery. StockIT's software then records the time between purchase order and purchase delivery to create the purchase lead-time. This lead-time is then updated with each re-order to establish a baseline and average time for delivery.

When a supplier is not also using the StockIT software, an order can still be placed by the purchaser directly to the supplier using StockIT. An order invoice is then created within the software based on the information in the purchase order, this is when the delivery lead-time counter will begin. Rather than the supplier then being able to push the supply invoice to the purchaser, the purchaser needs to wait until the delivery is received. At this point the purchaser need only confirm the information in the previously entered purchase order is correct within StockIT, deny the purchase order, or amend the purchase order with any different delivery amounts or prices. While the process remains straightforward and fairly simple in both scenarios there is a clear advantage when both supplier and purchaser are using StockIT. It allows for a greater level of symbiosis between both parties, making the relationship between purchasers and suppliers stronger.

To really get to the core of the functionality of StockIT, it's best to look at an example scenario so that we can run through all of the features and functionalities.

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## SCENARIOS

In understanding the core functionality of StockIT, it is useful to explore some different scenarios;

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### TOMS BAR AND GRILL

In this scenario, a hospitality business called “Toms Bar and Grill” is placing an order with a long standing supplier of Fresh Fruit and Vegetables. While Tom knows from personal experience that he has a busy weekend in sales coming up, StockIT is also on the case and sends Tom an alert about low stock items. The alert is based on historic sales data fed from the PoS system to Tom's StockIT software and lets Tom know that mushrooms, tomatoes, lettuce and onions are all running low. StockIT knows that Tom sells a large amount of pizzas and burgers on the weekend, compared to his usual weekday sales, and knowing this alerts him that he will not be able to sell his usual weekend quantities of pizzas and burgers without running-out of the aforementioned vegetables. The alert also comes through just in time for Tom to be able to place the order and receive the goods in time for the weekends service.

Tom logs onto his StockIT software before heading home for the night, places an order with his Fresh Fruit and



Vegetables supplier (whom also uses StockIT) and receives confirmation of the order and lead-time from the supplier.

The next afternoon Tom arrives to find his order ready and waiting in his kitchen, he checks through the items to ensure they have all arrived in the correct quantities. It seems more mushrooms have been supplied than were ordered, so when Tom approves the receipt of the order in his StockIT system he amends the amount of mushrooms ordered to reflect the amount delivered. This automatically populates Tom's inventory list with the newly supplied quantities which in turn updates the number of burgers and pizzas Tom is able to create from the recipes linked to those items.

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## SIMONS SHOES

Let's look at another example, this time from a retail perspective. In this scenario, Simon has decided to fulfil his dream and open a shoe store – "Simon's shoes". After undertaking a vast amount of research, Simon has decided to use StockIT as his chosen inventory management suite. While his shop undergoes a fit-out, Simon gets to setting up StockIT and its systems. Simon has chosen a PoS system because of its integration with StockIT and his chosen cloud-based accounting software. After meeting with various suppliers, even finding a few through StockIT's supplier marketplace functionality, Simon goes about entering each product into his StockIT software, completing a full unit profile for each item. This allows him to set the price, applicable taxes, store storage and overstock locations, enter supplier information and the inventory management formulae for each item. As the store is only just opening, Simon has no historic supply data to base his purchasing on and so simply orders what he believes to be the right amounts using the StockIT purchase tool. As each new delivery arrives, Simon approves, denies and amends the orders to keep accurate track of each item.

Simon's Shoes is a huge success and his customer service focussed approach is getting him a lot of praise. By using StockIT Simon has to spend less time cataloguing orders, checking inventory and keeping track of his stock than his competitors and is able to do more of what he loves – selling shoes!

Next on the cards is a new store. The new store is in a smaller location on the high street, therefore Simon will have less room for extra inventory storage at the location and must keep a close watch on his inventory numbers. To do this, Simon utilises the SILO approach inbuilt into StockIT. He sets his first store as the central SILO and the high street store as a secondary SILO. All inventory items coming into the high street store will be inventoried using the 'just in time' supply formula, meaning he can keep a lower quantity in-store before StockIT re-order or low-stock alerts are triggered.

Using the first store's historic supply and purchase data, Simon calculates the safe-stock levels for each item in the high street store. As the high street store is now treated as a SILO within the Simon's Shoes organisation, Simon is able to set StockIT to trigger re-order or low-stock alerts when an item in the high street store reaches a certain level. Simon can then see at a glance the number of that item in the inventory of his much larger first store (the central SILO). The low-stock and re-order alerts can be set up to trigger when inventory reaches a certain level at a specific SILO or across all SILOs. This means that rather than having to purchase more inventory for just one SILO, Simon can simply move inventory between locations, place an order for a customer to collect from his other store or place a purchase order for both SILOs. The SILO feature means that Simon can always be across the inventories of each store, their individual inventory levels and the current stock levels of each store. It also allows Simon to create marketing pushes or discounts tailored to the inventory levels of each SILO to help move dead or idle inventory.

Simon is also able to utilise the artificial intelligence integration of StockIT to adjust his purchasing to suit predicted trends and purchase behaviour as his historic sales data grows.

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## ARTIFICIAL INTELLIGENCE INTEGRATION

Artificial Intelligence can be an incredibly powerful tool when it comes sifting through and collating large amounts of data. As a branch of computer science, “Artificial Intelligence is focussed on the creation of intelligent machines programmed to work and react like we humans do” (How Inventory Control Can Benefit from Artificial Intelligence - Unleashed Software, 2021), <sup>4</sup>with the AI’s specific targets being learning, planning and problem solving.

This means that with the help of Artificial Intelligence, StockIT’s software suite is able to learn and predict a user’s purchase and supply behaviours, predict lead-times, offer deployment advice and give advanced warning of overstocks and shortfalls in inventory on hand.

In StockIT, the Artificial Intelligence will only recommend actions to be taken and will never take those actions itself of its own volition (unless instructed to). The AI incorporated into the software acts more as a canary in the coal mine, running through multiple scenarios and situations to advise the user of the current situation and the potential outcomes.

For example, a hospitality business has been using StockIT’s inventory management software for a period of 6 months. StockIT has learnt from inventory data and by being integrated into the businesses PoS software, that the business has their busiest period of the week on a Friday between 12:00pm and 2pm. The learning the StockIT system has done over the course of 6 months: monitoring what inventory items have been entered into the system from purchases; when they have been sold (in this situation even down to the specific time of day); how many have been sold (this can operate in a predictive manner over a greater period of data sets i.e. compare data from this period to the same period 12 months ago) and is able to notify the business that they have not ordered enough of a certain product, to meet the expected demand of an item on their menu. StockIT knowing the lead-time for delivery of this item is 12 hours then gives the user the option to order the item by Thursday for a Friday delivery.

This example may seem simple and even intuitive to a person. If am out of this item that means I cannot make this product and I will need to order the item by this time to be able to provide the product. But in the same sense this is where StockITs Artificial Intelligence is crucial to a business’s inventory management. A person can make mistakes and perhaps miss an item in purchasing, they can also under order an item or perhaps the person that usually does the purchasing is away on leave. StockIT provides the business with a safety net, a level of security and foresight that means that the element of human error can be mitigated in the purchasing and inventory management process. This can assist in preserving and maintaining a business’ reputation, by ensuring that they can always meet the demands of customers.

In the same way, StockITs Artificial Intelligence can collect information on undersold or dead stock. This information can then be provided to the user on a set basis (weekly, monthly) to allow the business to create marketing specials or promotions around the undersold or dead stock inventory items. This reduces the businesses capital tied up in the inventory and prompts sales by the business’ clients or guests. Over-orders are another problem that many businesses face. Using StockIT a business can identify where overorders are being created, which products or items are being overordered and then use that information to create promotions or direct marketing towards those products. Dead stock, overstock and idle inventory can hold up a large percentage of a businesses operating capital and budget. Inventory that moves, arrives just in time and is sold in a prompt manner means a business can spend less time managing inventory and more time creating sales improving end products and customer experience.

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<sup>4</sup> Unleashed Software. 2021. *How Inventory Control Can Benefit from Artificial Intelligence - Unleashed Software*. [online] Available at: <<https://www.unleashedsoftware.com/blog/how-inventory-control-can-benefit-from-artificial-intelligence>> [Accessed 8 October 2021].

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## THE BUSINESS MODEL

StockIT will operate using a subscription model, rather than as a once off purchase, but will give users the option of paying for a subscription for up to 24 months at a time for a discount. This also allows a user to budget their overheads and cut down on unnecessarily repeating transactions, thus cutting down their time spent accounting. As StockIT is designed for a scaling business, we believe that offering our users greater flexibility with their billing periods, subscriber agreements and functionalities we can convince them to make the switch to StockIT.

By operating using a subscription model, StockIT can provide consistent updates to its users, without requiring license repurchasing for a user to receive updates to the software. It provides for a much lower barrier to entry, allowing more businesses to take advantage of the software for a much lower upfront investment than the traditional perpetual license model. For a new business, the initial cost of setting up and purchasing software can have a huge impact on a businesses operating capital and be the deciding factor when choosing between competing software packages.

A key concept of StockIT is establishing a thriving supplier and purchaser ecosystem. With the lower barrier to entry that comes with a subscription model, we are able to actively encourage the growth of this ecosystem. With more purchasers using the software, more suppliers will be willing to come on board and vice versa. The more users we have populating this ecosystem the faster our Artificial Intelligence integration is able to gather data to learn and grow and become more effective. Once a critical mass of users is achieved, the ecosystem becomes self-sustaining. We can then offer referral promotions to users for referring new users, thereby setting up both the business and the ecosystem to be in a position of constant recruiting and constant growth in a cyclical manner.

A subscription model also allows us greater flexibility in trial periods and tiered offerings. In terms of a trial period, a subscription model allows us to give a potential user access to a basic list of StockIT utilities with core functionalities. This keeps the true depth of StockIT locked away in the subscriber tier. This encourages users enjoying their experience with the software to purchase a subscription to unlock more functionalities.

Once a trial subscriber has come aboard, we are then able to provide tiered subscriptions to suit their current business and their projected business growth. For example, if a small upstart single site business comes a board, we can tailor the subscription to not include access to SILO's and SILO functionalities. This allows them to grow their subscription and financial commitment with StockIT as their business grows. Once a business like this small single site upstart is already familiar with using the software, heavily integrated within the ecosystem and reliant upon using the software for the operation of their business StockIT becomes the natural choice to stay with when they grow to become a multi-site location. This individual business growth is at the core of StockIT. We can be with a business at every step of its development lifecycle – from seedling to a fully established tree.

Having a tiered subscription model allows us to present a potential user with an array of options to help solve their problems. Increasing the marketability of the StockIT software, thereby increasing the size of the ecosystem and ongoing users.

All this is to drive the profitability of the StockIT company. A subscription model means a constant and predictable source of income to support the growth of StockIT as a company. At first, a small development team will create a working prototype of the StockIT software, this will then be marketed towards seed investment firms already operating in the Cloud software, tech start-up fields. If investment is secured, we will continue to develop the software further to create a working version of StockIT to allow roll-out and marketing towards small start-up retail and hospitality businesses. At first, the focus for StockIT will be to find like-minded businesses with clear growth potential, this allows StockIT to grow alongside a business, where new functionalities can be created and designed with input from the end user.

Note: In terms of this assignment, a working model of StockIT will be created with a group members pre-established hospitality business in mind. This will allow us to create and model functionalities of StockIT with real data sets and tangible benefits in mind. It will also allow us to implement features and test their use in a real-world scenario. Whilst a significant investment of time, resources and skills would be required to bring the end product of StockIT to market, we believe that by using a real world set of data and information obtained for this business we will be able to demonstrate key functionalities intended to be in the end product.

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## THE TOOLS AND TECHNOLOGY

When it comes to creating a fully functional software suite, there are several different tools and technologies that come into play.

Both applications and systems development are key areas to be implemented. Application development to build out the user side of the program, systems development to build out the back-end databasing, network operations and securities aspects of the StockIT software suite.

Our exact programming language will come down to our developers, early builds will likely be built using an element of Python with a transition being made into Java or C++. C++ is useful for any web-browser based functionalities of the software with Java being useful for a large range of application-based programming – especially in this instance with the standalone program aspect.

“SQL is a standardised programming language that’s used to manage relational databases and perform various operations on the data in them”.<sup>5</sup> (What is SQL (Structured Query Language)? - Definition from WhatIs.com, 2021). SQL will be heavily involved to build out the database of the software and is possibly one of the more important aspects of the inventory software itself. Using SQL we can create large data structures and databases and have full access in modifying, updating and changing the data. Data Manipulation Language (DML) and Data Definition Language (DDL) are then used in unison as part of SQL. DML vocabulary will be used to retrieve and manipulate the data whilst the DDL statements are used for defining and modifying database structures<sup>6</sup> (What is SQL (Structured Query Language)? - Definition from WhatIs.com, 2021).

StockIT will be first be built to operate on Windows and Android System, therefore a knowledge of the Android Software Development Kit (Android SDK)<sup>7</sup> is required. The Android SDK can utilise Java and C++ (which will be our preferred programming languages) and will allow us to build out our android app for StockIT in a relatively quick and straight forward manner. Android SDK also allows us to run profiling and bench marking, to test the performance and viability of the Android App version of our software. Further down the development lifecycle and roadmap of StockIT we will look to build out the Apple version of our application. To do this we will need to become familiar with the Swift programming language. Swift was developed by Apple Inc. as a replacement for Objective-C<sup>8</sup> (Swift (programming language) - Wikipedia, 2021), and is an excellent language to use when building applications specifically designed to run on an Apple operating system.

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<sup>5</sup> SearchDataManagement. 2021. *What is SQL (Structured Query Language)? - Definition from WhatIs.com*. [online] Available at: <<https://searchdatamanagement.techtarget.com/definition/SQL>> [Accessed 11 October 2021].

<sup>6</sup> SearchDataManagement. 2021. *What is SQL (Structured Query Language)? - Definition from WhatIs.com*. [online] Available at: <<https://searchdatamanagement.techtarget.com/definition/SQL>> [Accessed 11 October 2021].

<sup>7</sup> Android Developers. 2021. *Download Android Studio and SDK tools | Android Developers*. [online] Available at: <[https://developer.android.com/studio?gclid=Cj0KCQjwnoqLBhD4ARIsAL5JedK12bkMRcfXZ3DZigICAeRw\\_l2-BE4uZOO1IcT\\_wrM8OUCO09JL2TYaAh59EALw\\_wcB&gclidsrc=aw.ds](https://developer.android.com/studio?gclid=Cj0KCQjwnoqLBhD4ARIsAL5JedK12bkMRcfXZ3DZigICAeRw_l2-BE4uZOO1IcT_wrM8OUCO09JL2TYaAh59EALw_wcB&gclidsrc=aw.ds)> [Accessed 11 October 2021].

<sup>8</sup> En.wikipedia.org. 2021. *Swift (programming language) - Wikipedia*. [online] Available at: <[https://en.wikipedia.org/wiki/Swift\\_\(programming\\_language\)](https://en.wikipedia.org/wiki/Swift_(programming_language))> [Accessed 11 October 2021].

Cloud computing and cloud infrastructure will also play an important role in some of the key functionalities of StockIT (SILO's) and so a firm understanding of how Cloud computing works will be required. Whilst the data and information used by StockIT can also be accessed on a local storage only basis, cloud computing plays an integral role in sharing the inventory information among different wireless devices connected to the same StockIT account. The cloud infrastructure component allows us to offset the storage costs of the data, utilising pre-built cloud data storage centres. It will also utilise the user's own machine as the host and central storage location for the data, with periodic back-ups of the data available both on the cloud and locally. It also allows the user to interact with the data in a virtualised way given the user interface provided by the StockIT software.

The aforementioned tools and technology are the lynchpins behind the StockIT system. Many more separate tools and technologies are required to really build out the software suite, but we believe these components are integral to the success of the platform itself. A list is provided below of tools and technologies that are more than likely required for the full implementation of the StockIT software with some notes attached and assigned to a position with the roadmap.

Tools and Technology list:

- fluency and expertise in either Java, C++, Swift and Python
  - for program development and implementation
- using the Android Software Development Kit (Android SDK)
  - for android application creation
- experience and knowledge working with SQL
  - databasing, DML and DDL
- knowledge of cloud Infrastructure and Data storage
  - required for cloud data sharing aspect of the program
    - key for SILO development
- MariaDB
  - databasing language
- Artificial Intelligence integration and development [end-game features]
  - machine learning models
  - in this instance, we will have to outsource development of the artificial intelligence
    - Artificial Intelligence will unfortunately likely not be part of the proposal we can put forward initially and will have to be delayed to further in the timeline
    - in its place we will need work-around solutions to notification and alert systems.
      - possibly have the StockIT system allow a user to set a "safety-stock" level for each item. With alerts generate and sent to the user when an item reaches a certain level.
  - Chatterboxes
  - natural language tools
  - Artificial Intelligence used to read and understand data
    - Predict trends
    - Alerts for inventory issues
- Extensible Markup Language (XML)
  - useful for creating data structures
  - tied directly to API's used to display the data created with the XML's
- material design language guidelines
  - guidelines for publishing applications and software
- Apple Human Interface guidelines
- exporting data to CSV and associated databasing

- creating spreadsheets and data from the inventory data that can be used in different formats by the user.
- back-end PoS design, architecture and data storage
  - an in-depth understanding of how Data from StockIT can be fed to and from the PoS system used by the user.
  - how this data is presented by the PoS
  - how the data is collected
  - integration and communication between StockIT and the PoS
  - how a PoS system works – eftpos, storage, data management
- wireframing
  - used to map and create UI and UX concepts and articulate how StockIT will look.
  - low fidelity for basic and first drafts.  
high fidelity for close to finished product and versions.
- GitHub for project data sharing in creation and development phases.

The tools and technology section is a difficult segment to surmise. Over the journey of StockIT, the development group and myself will learn a lot and grow our skills in the technology sector. The feasibility of StockIT as a whole software product is at the forefront of the development group's mind, we are realistic about our approach and our roadmap.

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### DELIVERABLES FOR ASSIGNMENT 3

The StockIT that you see above is the endgame for its development. For assignment 3, we will make steps towards completing the below elements for our presentation. A HTML interface will be built for the StockIT system based on wireframe designs. While the functionality of the HTML system may be reduced due to the smaller database, we aim to have a functioning system based on the information from a group member's hospitality business. The wireframes will extend to cover the web version, software version and mobile version of StockIT. Wireframing will be a very useful tool for us to be able to present our vision to our audience and provide a visual guide. The MIT app inventor software will be used to create a functional mobile version with scaled back elements of the endgame version of StockIT. Python is a programming language most group members are familiar with, however we are concerned with its integrational power and so will be leaning into a group member's current experience with PHP, MariaDB and Java. Extensive research will be carried out into Artificial Intelligence and how it could be integrated, however due to the limited time and resources for assignment 3 there will not be any implementation that can take place. We do understand the large undertaking that is StockIT and made a deliberate choice to aim high with its possibilities and scale back the functionalities for assignment 3. It may seem counterintuitive, but we believe by doing this we can and will expose ourselves to more concepts and ideas that we can research and explore, thereby learning more through-out the process.

### REFERENCES

Investopedia. 2021. *Inventory Management Definition*. [online] Available at: <<https://www.investopedia.com/terms/i/inventory-management.asp>> [Accessed 7 October 2021].

WIRE, B., 2021. *New Research Report: Retailers Lose \$1.75 Trillion in Revenue Worldwide Due to Overstocks, Out-of-Stocks and Returns*. [online] Businesswire.com. Available at: <<https://www.businesswire.com/news/home/20150506005233/en/New-Research-Report-Retailers-Lose-1.75-Trillion>> [Accessed 7 October 2021].

Unleashed Software. 2021. *How Inventory Control Can Benefit from Artificial Intelligence - Unleashed Software*. [online] Available at: <<https://www.unleashedsoftware.com/blog/how-inventory-control-can-benefit-from-artificial-intelligence>> [Accessed 8 October 2021].

Unleashed Software. 2021. *How Inventory Control Can Benefit from Artificial Intelligence - Unleashed Software*. [online] Available at: <<https://www.unleashedsoftware.com/blog/how-inventory-control-can-benefit-from-artificial-intelligence>> [Accessed 8 October 2021].

SearchDataManagement. 2021. *What is SQL (Structured Query Language)? - Definition from WhatIs.com*. [online] Available at: <<https://searchdatamanagement.techtarget.com/definition/SQL>> [Accessed 11 October 2021].

SearchDataManagement. 2021. *What is SQL (Structured Query Language)? - Definition from WhatIs.com*. [online] Available at: <<https://searchdatamanagement.techtarget.com/definition/SQL>> [Accessed 11 October 2021].

Sumo Logic. 2021. *What is Cloud Infrastructure? | Sumo Logic*. [online] Available at: <<https://www.sumologic.com/glossary/cloud-infrastructure/>> [Accessed 11 October 2021].

2021. *Spark Adobe - StockIT SILO Graphic*. [image] Available at: <<https://spark.adobe.com/sp/design/post/urn:aaid:sc:AP:9b2612eb-6bc6-483b-a1dc-0dfb319e5ec1>> [Accessed 11 October 2021].