**System Analysis and Design**



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**Executive Summary**

This analysis is on a Montana family-owned fencing business, Chris Lynch Fencing. Chris has over 25 years of fencing experience and has worked hard to build the business while maintaining its quality reputation. Chris and his wife Jami are the owners and operators of the business, and they employ roughly 6-9 employees at any given time. The business has grown significantly in the last 10-15 years, such that they have had to turn down some projects due to time and weather-constraints. During the winter months, Chris has historically travelled to Hawaii to assist a family friend on state contracts. Now that their children are grown, Chris and Jami have moved their base of operations to Hawaii, not only for the year-round fencing climate, but also because the State of Hawaii contracts are significantly more lucrative. They have been based in Hawaii for just over 3 years now and are realizing that managing these large contracts and operations on 3 different islands is becoming more time-consuming and difficult. Therefore, they felt that this would be a great time to do a system analysis and see where they could improve their business efficiency. They have never looked into a software system to aid with their day-to-day operations outside of the use of QuickBooks for general accounting tasks, which they are fairly content with. They expressed the desire to see if there were options in software systems to help with two aspects of the business. First, they wanted to know if a system could aid with their inventory tracking, mainly their equipment and supplies, as the fencing materials for the State of Hawaii jobs are all brought in by the State. They have jobs on multiple Islands and at multiple sites, so having a system that can track a piece of equipment from the time of purchase, through all of its location movements, as well as its details such as serial/vin#, cost, condition, and depreciation would be beneficial. The second priority for the business would be a system to aid with estimating and bidding on state contracts, as this is currently done manually and is very time-consuming.

There are three main users that would be utilizing the system. Chris Lynch is the owner/project manager and would need to access the system via his cell phone when new equipment or supplies are purchased and when moving or needing to locate equipment or supplies for a job. This would save time tracking things down when needed and assist in record keeping for things such as depreciation. Chris would also use the system for estimating jobs. If the system had the use of GPS, it would cut down on time in the field manually measuring and would assist in calculating line item costs for categories such as supplies, job time, drive time, helicopter time and manpower. This would greatly reduce the time Chris currently spends manually figuring out all of his line item costs on pen and paper. Jami Lynch is owner/office manager of the business and would be the primary user of the equipment tracking system. This would save her time not having to constantly update her spreadsheets when the crew notifies her of equipment and supply movements and would also cut down on manual calculations of equipment expenses, current values, and depreciation for tax purposes. Jami would also be able to assist Chris with his job estimations and is the one that enters these bids into the State of Hawaii procurement system. The third user would be Landon, their son and crew chief. Landon would utilize the system similar to Chris, largely with locating and entering equipment movements, but as he becomes more involved in the business with estimating as well.

I looked at several different types of software and narrowed them down to three systems that could possibly benefit their business, ***Sortly***, ***FieldBin*** and ***Fence Cloud***. Sortly would help with only one of their needs for the least amount of cost but the overall increase in year-end profits would not be as high. FieldBin and Fence Cloud would address both of their priorities, however, I ended up recommending to the business the purchase of FieldBin as the preferred alternative. After looking at the overall hardware specifications, cost of the system, ability to accomplish their needs and the overall best year-end increase in profit, FieldBin stood out above Fence Cloud. Their present computer and mobile systems have the proper specifications for FieldBin, and we could install and train in time for a go live by the first of the New Year.

**Description of Current System**

Chris Lynch Fencing is a Montana owned fencing business that has recently relocated their base of operations to Hawaii. They made this move three years ago for a few reasons, but largely because the State of Hawaii fencing contracts are significantly more lucrative than stateside jobs. Currently, the business does not have a single software system to perform all of their business functions. They use QuickBooks Premiere Contractors Edition for most of the financial operations such as billing, invoicing, and general accounting tasks. However, they rely heavily on the receipting function included with the American Express Platinum card. They currently outsource their onboarding and payroll functions to a Hawaii-based company named Pro-Service. This is because of Hawaii’s extensive requirements for all employees, including health insurance and temporary disability. They have historically used spreadsheets to track their fencing materials, but the State of Hawaii contracts supply all materials, so this is no longer necessary. They currently track their equipment on an Excel spreadsheet which includes items such as purchase amount, year, make, model, VIN, island location and depreciation. All job estimating is done manually on paper and then the price per square foot for each line item is entered into the State of Hawaii’s procurement system, HIePro.

**System Users**

There are three primary users at Chris Lynch Fencing. Jami Lynch, the owner/office manager of Chris Lynch Fencing is the primary user of all the information systems. Jami is the one that collaborates with Pro-Serve for employee management, accesses HIePro for entry of contract bids, utilizes QuickBooks for accounting, maintains the company spreadsheets, and manages the receipts via the American Express app. Jami will continue to need access to all information systems for the business. Chris Lynch is the owner/project manager of Chris Lynch Fencing and primarily relies on communication with Jami for all system interaction. For example, when Chris purchases or moves inventory, he communicates with Jami who enters/updates the data in the appropriate spreadsheets. Similarly, when Chris manually computes the line-item job estimates, he passes them to Jami for input into the HIePro procurement system. Chris does use the American Express receipting app, however, and uses his phone to take pictures of all receipts. These receipts are then immediately available to Jami in the American Express App. Landon Lynch is a Crew Chief for Chris Lynch Fencing and primarily relies on communication with Jami for all system interactions. However, like Chris, he does utilize the American Express receipting app on his phone.

**Problems**

They are fairly satisfied with QuickBooks for their financial and accounting system. However, their reliance on American Express for receipt tracking poses some problems. Most importantly, only items purchased with American Express are being tracked and secondly, there must be manual intervention to match these receipts to the corresponding expenditures in QuickBooks.

As the business continues to grow, they have jobs spread across many Hawaiian Islands, necessitating storage facilities on each island to house their equipment such as trucks, trailers, tractors, drills, tools, tents, etc. It is impossible for the project manager and crew chief to know what equipment is on each island at all times and they have to communicate with the office manager to locate the information on her spreadsheet. It would be nice if they could access their equipment inventory in real time from their phones. Ideally, when these crew members purchase or move a piece of equipment, they could access the inventory system and update it accordingly. This would save the office manager a significant amount of time trying to keep this spreadsheet up to date. Additionally, the office manager has to use this spreadsheet to do calculations for yearly sales tax owed on each piece of equipment. It would be nice if the inventory tracking system could do this for her.

As the business continues to grow, Chris is also spending more time doing manual estimating and calculations for jobs. It would be ideal if he had a system that would assist him with job estimation. The ability to have a system that does the leg work of estimating costs from information input for size of job, materials needed, supplies necessary, helicopter costs, employees for the job with time estimates both of job site and travel time while saving time in the field due to using GPS for job size estimates, could greatly free Chris for other aspects of the business.

**Existing Spreadsheet Diagram 1 (Sample Portion)**

**A white and yellow grid with black text

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**Needs Assessment**

After discussing their business process and needs, it became apparent that their primary need is equipment inventory tracking. They need a system that will allow them to track equipment inventory and customize the details that they need to track. It’s important for them to track purchase price, Year, Make, Model, Body Type, VIN number, Cost of new sales tax, Sales tax. Purchase cost after trade in, and Island. It’s important that this system allows the Project Manager/Crew Chief to be able to access this from their mobile devices to locate inventory and enter inventory movement. This would free up a great amount of time currently lost in communicating inventory actions between the Project Manager/Crew Chief and the Office Manager. This will also lessen the burden of keeping the spreadsheet updated solely by the Office Manager. This system also needs to be able to calculate the cost and depreciation of equipment.

Their second priority is a system that would assist with estimating jobs and creating proposals. This is mainly done by the project manager; he needs to be able to visit a job site and ideally using a GPS system determine the overall linear Ft or miles of fence needed. To go along with this, it will be able to assist him in calculating the milage cost and man hours. The system needs to be customizable to assist him in estimating additional costs depending on the job such as the number of gates, line clearing, helicopter flight time, and travel time. Utilizing a system that could automate this process would be a huge time-saver for the project manager.

A third priority was determined to be assistance with tracking receipts. The Office Manager needs to be able to efficiently track receipts of purchases. Upon a deeper dive

into the functionality of QuickBooks, we realized that if they were to upgrade from QuickBooks Desktop to QuickBooks Online, they would have access to a better receipt tracking system. Therefore, I did not include receipt tracking in my analysis.

**A diagram of equipment inventory

Description automatically generated****Diagram 1: Existing Equipment Inventory System**

**Chris Lynch Fencing Data Flow Diagram 1**

This diagram shows their existing system that they use for equipment inventory management. This shows that if they do anything like moving or buying new equipment instead of just entering it into a system, they will need to communicate with Jami the office manager and then she would have to enter it into a spreadsheet. This is a very complicated and time-consuming process.

**A diagram of a company

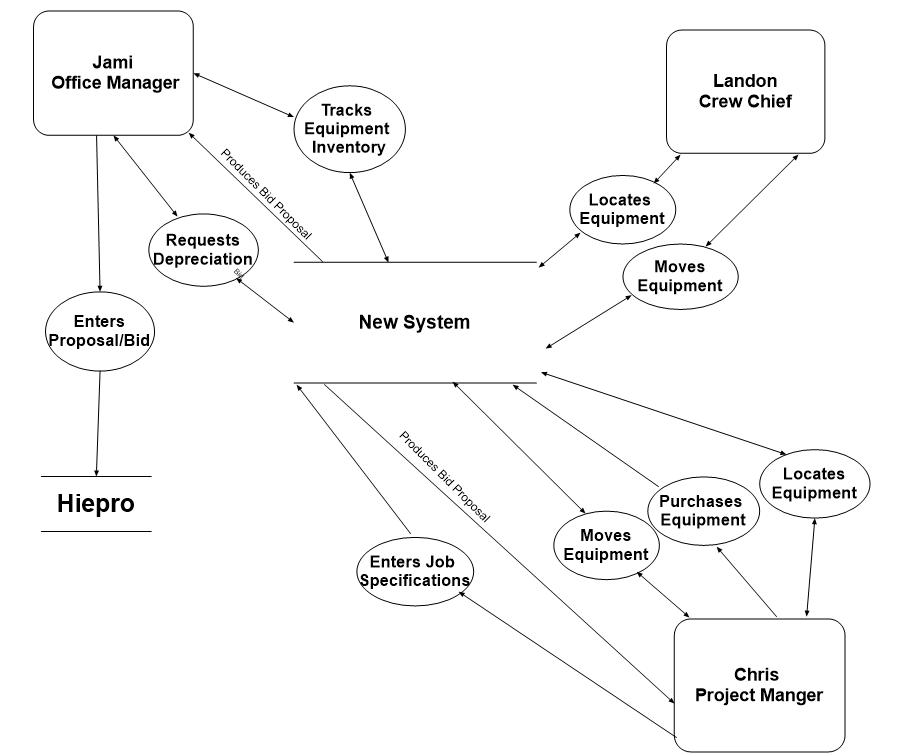
Description automatically generatedDiagram 1.1: Existing Estimating System**

**\**

**Chris Lynch Fencing Data Flow Diagram 1.1**

This diagram is showing the existing Estimating system that they are using at Chris Lynch Fencing. This shows all of the elements that go into calculating jobs and creating bid proposals. It also shows how if Chris the project manager wanted to create a bid proposal he would have to calculate it manually, then send the proposal to Jami the office manager, at that point Jami would request a bid modification, after she will enter the proposal to Hiepro, After Hiepro will review the bid and send it back to Jami if there are any questions.

**Diagram 1.2: New System**

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**Chris Lynch Fencing Data Flow Diagram 1.2**

This diagram shows how the new system that I would propose would be more efficient. This shows that with the new system there would be less back and fourth with Jami the office manager, Chris the project manager, and Landon the crew chief, Making it easier for calculating and more time efficient. This diagram shows that all they would need to do for estimating and inventory management is to enter it into the new system and the others would be able to see the changes they make

**Summary Benefits**

When looking at the overall workflow of the business, there are both tangible and intangible benefits to the addition of a software system to help streamline their processes. Tangible benefits of all three proposed systems include an aspect of decreasing the amount of man hours needed to do a job, thus leading to more time spent on a job, increasing production and ultimately increasing yearly profits. Intangible benefits of instituting one of these systems would include an easier, less time-consuming process for both their inventory tracking and measuring and estimating jobs. Both of these would lead to overall better job satisfaction with the employees along with allowing for fewer after hours needed if not having to spend the extra time doing it the way they are now.

**User Stories**

Chris is the owner/project manager, he wants to measure a job with or without GPS and generate lost estimates and conveniently send a proposal and relieve signed consent saving time out of office.

Chris is the owner/project manager, he wants to easily track equipment inventory as to which island equipment is in, decreasing the time tracking equipment down.

Jamie is the owner/ Office Manager, she wants to be able to track equipment location from island to island and location to location along with overall condition, so that new equipment is purchased and delivered to sites as needed.

Jamie is the owner/ Office Manager, she wants to find a less expensive receipt tracking system, thus saving the business overhead.

Chris is the owner/ project manager, he wants to move equipment from one island to the other or one job site to another and wants to enter this in a system using mobile app, this allows Jamie to follow equipment remotely.

Landon is the crew chief; he wants to easily input equipment location by island or site with his mobile to increase efficiency or equipment inventory.

**Alternatives**

**Alternative #1: Sortly**

Sortly is a cloud-based software that is for inventory management, but it does not have any options for estimating. Sortly is user-friendly software designed for businesses of all sizes to track and organize their inventory easily. It is valued for its simplicity and flexibility, making it a good fit for industries like construction management.

**Software:** Windows 10 or later

**Web Browser**: Latest version of Google Chrome, Microsoft Edge, Safari, and Firefox

**Processor:** A standard multi-core processer (Intel i3 or higher and equivalent AMD processor)

**Memory:** At least 4 GB for general usage but 8 GB or higher is recommended.

**Hard Drive:** Minimal storage is required locally, a system with 64 GB, or more is sufficient.

**Network Controller:** A stable internet connection is crucial for syncing data to the cloud.

**Data Protection:** Does not require extensive local protection, but ensure the device has basic antivirus software and uses secure passwords.

**Mobile Device:** IOS and Android compatible

**Cost:**

* **Free:** $0/mo
  + 1 user licenses
  + Track up to 100 unique items.
* **Advanced:** $24/mo ($288/Year)
  + 3 users licenses
  + Track up to 500 unique items.
* **Ultra:** $74/mo ($888/Year)
  + 5 User licenses
  + Track up to 2,000 unique items.

**Cost Estimate:**

Among the three options of Sortly, the free option only allows for 1 user and 100 unique items of which they will need at least 3 users and have over 100 items to track. The Ultra version has a much higher cost per month putting it closer to my other two alternatives without the added benefit of measuring/estimating. That leaves Sortly’s advanced option which is listed at $24/month or $288/year with no upfront purchase cost. After speaking with the two owners of Chris Lynch Fencing, Jami feels she spends 4 hours per week on inventory and Chris and his crew close to 6 hours per week tracking and getting equipment. With the aid of an inventory tracking system Jami feels she could possibly decrease her time by as much as 50%, and Chris feels he could decrease their time by 2 hours. I used an hourly wage for Jami of $45 per hour and an average for the crew of $37.50 per hour.

**Conservative Estimate:** 1 hour saved by both Jami and the crew.

1 hour at $45/hour = $45

1 hour at $37.50/hour = $37.50

Totals $82.50/week saved \* 4 weeks = $330/mo or $3,960/year

$3,960 - $288 = $3,672 savings per year

**Optimistic Estimate:** 2 Hours saved by both Jami and the crew.

2 hours at $45/hour = $90

2 hours at $37.50/hour = $75

Totals $165/week saved \* 4 weeks = $660/mo or $7,920/year

$7,920 - $288 = $7,632 savings per year

**Alternative #2: FieldBin**

FieldBin is another cloud-based software service. It provides customer communication, Time tracking, estimates and quotes, inventory management, invoicing, scheduling and dispatch, and reporting. It is compatible with QuickBooks, making accounting easier. FieldBin also allows you to measure jobs by using GPS. FieldBin has specific trade options that you can use to specific your service including fencing. The design is simple and accessible for small to mid-size business owners without extensive technical expertise. It also allows users to access and manage tasks remotely via mobile apps.

**Software:** Windows 10 or later

**Web Browser**: Latest version of Google Chrome and Safari

**Processor:** A standard multi-core processer (Intel i5 or higher and equivalent AMD processor)

**Memory:** At least 8 GB to handle simultaneous operations

**Hard Drive:** Relies on cloud storage, a device with 128GB or more is ideal for storing.

**Network Controller:** A stable internet connection is crucial for real-time updates in the field

**Data Protection:** Ensure devices have up-to-date antivirus software and encryption tools along with secure password management.

**Mobile Device:** IOS and Android compatible

**Cost:**

* **Basic:** $19/mo ($228/Year)
  + 1 user
* **Sync:** $65/mo ($780/Year)
  + 1-5 users
* **Build:** $99/mo ($1,188/Year)
  + More than 15 users

**Cost Estimate:**

Of the three options available on this platform, I see the middle, Sync, as being the most viable for Chris Lynch Fencing. The basic does not allow for enough users, while build is similar to Sync, except having priority support, for 33% more per month. Sync allows for 1-5 users for $65 per month or $780 per year, again with no upfront cost. This platform would help similar to Sortly with inventory but has the added advantage of measuring/estimating for Chris. Using the GPS sum for measuring and not having to manually figure cost Chris feels he could save up to 6 hours per job depending on job size. I used 2 hours of job time for a conservative estimate and 4 hours for optimistic, with an hourly wage for Chris at $95/hour. I plan on them bidding 8 large Hawaii state jobs per year.

**Conservative Estimate:**

2 hours at $95/hour = $190

$190 \* 8 jobs = $1,520/year

$1,520 (estimating/bidding) + $3,960 (inventory from alternative 1) = $5,480/year

$5,480 - $780 = $4,700 saving per year

**Optimistic Estimate:**

4 hours at $95/hour = $380

$380 \* 8 jobs = $3,040/year

$3,040 (estimating/bidding) + $7,920(inventory from alternative 1) = $10,960/year

$10,960 - $780 = $10,180 savings per year

**Alternative #3: Fence Cloud**

Fence Cloud is a specialized cloud-based software designed for the fencing industry. It provides tools to streamline operations, such as estimating materials, creating job sketches, managing customer relationships, tracking project progress. With features like preloaded supplier database, material templates, and integration with tools like GeoDraw. Advantages of Fence Cloud include its easy use, with customizable options and automatic routine tasks. Features like duplicating estimates, syncing with external calendars, and integrated communication tools. It is designed specifically for the fencing industry and is adaptable for many fence types.

**Software:** A modern web browser is required, compatible with Windows, macOS or Linux operating systems.

**Web Browser:** Latest versions of Google Chrome, Mozilla Firefox, Microsoft Edge, or Safari

**Processor:** A multi-core processor Intel Core i5 or equivalent.

**Memory:** At least 8GB of RAM for desktop; 16GB is recommended.

**Hard Drive:** Minimum 256 GB SSD; 512GB or higher if managing related project files locally.

**Network Controller:** A standard Ethernet or Wi-Fi supporting modern standards. 802.11ac or better for Wi-Fi

**Data Protection:** Use antivirus and anti-malware software to ensure access to the platform. Ensure data transmitted between your device and Fence Cloud’s servers is encrypted. While Fence Cloud most likely handles data backups, maintaining local backups of critical files or estimates can add a layer of protection.

**Hardware:** Dual Monitors are useful for project managers or estimators working with multiple windows but are not required.

**Mobile:** IOS and Android compatible

**Cost:**

* **Essential:** $175/mo ($2,100/Year)
  + Allows 1-3 Users
  + 2 Company Profiles
  + Full Feature Suite
* **Professional:** $299/mo ($3,588/Year)
  + Allows 4-10 Users
  + 5 Company Profiles
  + Full Feature Suite

**Cost Estimate:**

Fence Cloud would allow for similar benefits to the business as that for FieldBin. It has the added advantage of allowing for growth with up to 10 users if you are going with the professional package. I did not look at the less expensive essential as it is identical to FieldBin’s platform for $1,000 per year more. So, using the same numbers as alternative number 2 with the professional cost my two estimates are as follows.

**Conservative Estimate:**

$5,480 - $3,588 = $1,892 savings per year

**Optimistic Estimate:**

$10,960 - $3,588 = $7,372 savings per year

**Current Hardware of Chris Lynch Fencing:**

* **Software:** Windows 10 Pro
* **Web Browser:** Google Chrome
* **Processer:** Intel(R) Core(TM) i7-10510U CPU @ 1.80GHz 2.30GHz
* **Memory:** 8 GB
* **Hard Drive:** 461 GB
* **Network Controller:** Standard Wi-Fi
* **Data Protection:** McAfee
* **Mobile Devices:** Android with GPS capabilities

Their current equipment meets all standards and specifications for all three systems, so no new equipment is needed.

**Similar Business Research**

I was able to contact and discuss other business models with two other fencing contractors, FenceCrafters and Helena Fence. Both companies were interested in similar software solutions for aiding with inventory tracking and with improving job estimating. They were unable to give feedback on any of the three software platforms I have researched as they are not using them. They are similar to Chris Lynch Fencing in that they both have functioning user friendly websites and rely on QuickBooks for much of their business and payroll tracking. They develop their own spreadsheet tracking systems for fencing and equipment inventory and still do a lot of their measuring and estimating of jobs by plugging in what is needed and calculating it themselves.

Although I was not able to obtain firsthand knowledge of these systems, their interest in these systems gave credence to my belief that both tangible financial benefits and intangible business benefits could be obtained with their implementation.

**Time Analysis: Go live for 2025**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Phase** | **Task** | **Start Date** | **End Date** | **Duration** |
| **Phase 1**  **selection** | **Research of software** | **11/6/24** | **11/10/24** | **5 days**  **(completed)** |
|  | **Acquire software** | **12/16/24** | **12/17/24** | **2 days** |
| **Phase 2**  **training** | **Sign up/take training** | **12/18/24** | **12/20/24** | **3 days**  **(each employee 2-3 hours needed)** |
| **Phase 3**  **implementation** | **Software goes live** | **1/2/24** | **forward** | **ongoing** |
| **Phase 4**  **Maintenance** | **Acquire and install updates and access support** |  |  | **As put out or as needed** |
|  |  |  |  |  |
|  |  |  |  |  |

**Recommended Alternative**

After researching 3 different software systems to aid Chris Lynch Fencing business operations, I have recommended to them the possible implementation of the Sync Application of the FieldBin application. Overall, I feel this application will cover both of their greatest needs at this time for with no real upfront costs, an overall low yearly expense, a minimal learning curve and an increase in yearly profit. Sortly will not allow for the addition of a measuring/estimating aspect and Fence Cloud really does not have any benefits outside of growth for more users, which really is not planned for Chris Lynch Fencing, over FieldBin and will cost the business up to $2800 per year.

With the present systems the business has, no further computer or mobile purchases are necessary. For $65/month, they can have the added benefits of a software that allows for inventory management, measuring and estimating for up to 5 users and will have the added benefits of being Quick Books compatible to allow them to maintain current practices with invoicing as discussed earlier. Other aspects it will allow if they decide to use can be scheduling, time tracking and SMS customer communications.

With the research done and minimal time needed to purchase, set up and train, this option does give the business the opportunity to have a realistic go live date to start calendar year 2025. I feel this software system is cost effective and will not only increase morale with the users, but also shows a decent increase in yearly profit.