Company Description:

Our company is called JMA – Construction CO.

We specialize and pride ourselves in offering construction solutions to our varied amount of clients. Our regular business hours 9 – 5, with the exception of our on-call staff and we are open 6 days a week. We are a nationwide now, firmly established in several states. These are the following states and their respective # of locations: NY = 4, CT = 3, CA = 7, AZ = 6, TX = 5, NJ = 3, FL = 5 making it a total of 33 locations that we have throughout the country. Each state has its own Headquarters that takes care of its local business locations respective to each state. Our main headquarters Is based in California, therefore the HQ located in this state acts as the national HQ that oversees all of the other respective HQ's we have in the country. We have a total staff of 1000 internal workers that vary in trade and skill. They range from plumbers, electricians, ceramic workers, sheet rock etc. we have an extensive and diverse group of individuals suitable for any job. We also do sub contract to other companies depending on the location and the size of the project as well.

The main way we do business with our clients is by either:

- attending various types of service calls
- establishing contracts for sites of development that may vary in length from a few months to even years
- lastly maintenance contracts

Our service calls that we attend can vary through the different services that we provide. However, we do charge at an hourly rate which can range from $60 - $100 or more per hour. Generally, the service calls consist of general maintenance or adding onto an existing service such as installing new lights, building/knocking down walls within a current building, laying new pipe for plumbing etc. The service calls usually last between 1 day to a week and at the end we bill the client the total amount of labor hours. Now as far as the contracts go, these definitely vary in pricing details because it depends on the site, the magnitude of the client's requests, estimated labor costs, deadlines, estimated materials needed and a lot of other factors that may very well vary. However, once we do sit down with the client and iron out the details as far as what they want and what we will be required to do, we do require an initial deposit in order for us to finalize the deal and commence with the job. The amount of the deposit is also dependent on the size of the job as well. Our maintenance contracts are settled with the client so that we may provide assistance on the service specified in the contract in the event of anything that goes wrong or simply doing routine maintenance. We charge a steady monthly fee that does not fluctuate (unless the client adds more things that we need to cover) and once more it depends on the size of the location we are covering and ultimately how many different services we are covering. On average across our different locations, we receive about 1,440 – 1,920 service calls a month (60 – 80 per day approximately), 10 – 20 medium sized to large contracts per month and we have about 200 maintenance contracts with different buildings across the nation. Therefore, our gross annual income is roughly around 400 million.

We also have 3 main suppliers for our materials needed:

- Wesco Distribution Inc
- United Rentals
- Grainger Industrial Supply

Now as far as our clients go, we categorize them in 3 different ways:

- Residential
- Small business
- Corporate

Now that our backstory is covered, it is clear to see that we have to keep track of many many things in our business. Not just in relation to our clients but also internally in our own authorization processes, workflow and expense management. The main locations of our business that will profit from the new information system proposed (even though in reality, all would benefit) would be our state HQ's and our national HQ.

Scope Definition:

The type of information system will be a mixture between a Transaction Processing System and a Management Info System. This type of information system is essential because it will greatly minimize delays and mistakes when it comes to all of the transactions made in our various locations. This new system will also allow our National HQ to keep track of all the other state HQs in their spending and making sure that all the protocols of the company are being properly followed and executed. Lastly, it will greatly improve the workflow between all remote locations by giving real-time access to information and reports needed (especially in time sensitive cases). Approximately the design, implementation and installation of this system will take about 9 months. Once the proposal for the actual system is approved we will immediately commence to work on the Data storage part of the Information System. A group of 25 professionals will be hired to complete this information system per parts. These employees will be divided into 3 separate groups to tackle the 3 parts of the system, which are data storage, software and the UI. A group of 10 professionals' in SQL-based data base development will be set apart to work on the Data storage section of the System. Another group of 10 software developers (proficient in either 2 or more languages) will be hired to write the code as to how the users through the UI will be communicating/doing processing within the system. Lastly the remaining 5 employees will be in charge of developing the UI of the system and making it as simple and comprehensive for the end user as possible. Firstly, we will start with the data storage part of the system which will be built within the first 3 months of this project. Once the storage part of the system is in place we will dedicate 4 months for the code which will act as our internal business logic to be created and lastly the remaining 2 months will be focused on creating the UI for the end user. Our budget for the entire project of this new information system will be $921,722. Each group (Data storage and programmers for business logic and UI) will be led by their own respective senior developer who will oversee their respective part(s) in the system's development. Once the system is developed, our own internal IT staff will be in charge of actually setting up the system for the end users to work with throughout our different locations.

Breakdown:

- **The Database Developers** will each receive a salary of $7,000 per month (9 developers). And the senior developer that will oversee the project will receive $8,416 per month. The total amount of time that the data storage will take to be developed is 3 months. Therefore, the total amount of money invested in this part of the system will be $214,250
- **The Programmers of our business logic and user UI** will each receive a salary of $6,833 per month (14 developers). The senior programmer will receive a salary of 9,750 per month. The duration of this second half of the project will last for 6 months. The total amount of money that will be invested in these two remaining parts of the system will be $632,472
- **On reserve** We will also have $75,000 on reserve just in case of any delays or extra expenses along the way besides the salary of the workers.

Problem Analysis:

- We currently depend on a 3rd party software system that allows us to do transactions and store client and job related details but it is a system that is only individual per business. The software does not integrate with any of the other locations that we have. In order to share any information from location to location (such as general client, materials ordered/needed, transaction etc. reports) we use excel spreadsheets shared through microsoft one drive. We manually pull up the report and update the spreadsheet manually to keep check of all our local businesses and HQ's. This tedious way of recording our day to day activities and sharing it with Headquarters really slows the workers from attending more requests/service calls and contracts more quickly and it is not an efficient way of sharing data across business locations. Therefore in the new system we will make the data accessible from remote locations by placing it within a central server and sharing it on the cloud.
- Our authorization process is based on the type of clientele that requests it. If the service call or contract is made by a residential or small business client, then the HQ (if the request is made in one of the local businesses that we have within that state) of that respective state must be the one to approve the transaction. If it is a corporate job as far as raising a building, long term construction project, or the budget exceeds 1 million, then both the HQ of the state and the national HQ must approve first before it is actually authorized. As far as ongoing materials requested, state HQ must be the only one to approve for residential and small business but corporate is approved by state HQ and national HQ. The current way we conduct this is by hand written forms and higher up employees emailing and calling lower level department personnel to track form requests or communicate mistakes. This greatly slows down the workflow between sites due to emails being lost, not interpreted correctly, employees unavailable (especially field employees) etc. Therefore in the new system we will make sure that there is a data flow between levels of employees/departments. We will configure the information made on a request form to pass onto the next corresponding superior and after approval, onto the next and if denied it will go back to the initiating user stating the reason for denial. Within all steps of this workflow process, the respective users will be notified via email whenever they have a form request that is pending.
- The main way information is updated on these spreadsheets previously mentioned are through manual data entry. There is little to no automation in the process of data entry, therefore it is prone to many mistakes on the users end. Both updating the information on the spreadsheets and also on the hand written forms (numerical calculation mistakes, hand writing not legible, missing information etc.). In the new system we will make sure to automate as much fields as possible, make mandatory fields required and not allow submissions of data entry to pass if said fields are not filled out (correctly), guides such as pop-up tool tips to guide users to input the right information required in their respective fields.
- Currently the supervisors and project manager have almost a booklet of paperwork as far as all the details regarding the job, employees involved and tracking the status of everything. Any updates are also manually entered and as much as the project manager or respective supervisors try to be careful and make sure they are thorough, mistakes still happen. And in most cases these mistakes either have a medium to significant impact in the jobs completion by the scheduled deadlines. With the new system we will have the supervisors and project

managers on tablets or surface Pros using an offline portal. With this they will have real time access to all of the details pertaining to the job and limit manual data entry as much as possible with automation that will be integrated.

- Currently, specific managers are in charge of monitoring our current suppliers whenever they have any new materials or prices/pricing plans available. If they become aware of any changes, a general email is sent out and each department Head is called and made aware of the new material. This is an issue because it can take up to a whole day to make sure everybody is notified of the new changes and or prices etc. In the new system we will have a supplier's layout which will contain all of their current details in pricing, plans, materials available and any other useful information pertinent to them. All authorized employees will be able to access this page and see any updates immediately upon accessing their page.

Requirements Analysis:

Clients:

- The client (our main contact on site for each job, service that we provide) will be provided with an ID and password unique to that specific job. They will use these credentials to log onto our website and there they will be able to see the current progress on the job that they requested from us. And they will see a clear and brief plan in regards to what is still left to do within that site in sequential order along with good estimated dates until the deadline (which we initially would determine with the user). They will also have an option to put feedback from their end on their general experience or critiques of our job. Overall this will be a very interactive system for our clients in which they will feel a part of the job every step of the way.
- The client will also have the option to make their payments using our system. They can either set it up to be something automatically deducted from the bank account or credit card (depending on how long the project may be). We will offer plans and try to be as flexible as possible when it comes to payment.

Suppliers:

- Will always have the most latest products available on display and the products they no longer sell will also be updated within our systems as well. Any pricing plans
- The users that will be in charge of placing orders of new materials will be able to place an order in our system and the output of that order will go to a printable/pdf file that will contain all of the necessary request information needed. The page will also be pre-designed to format the "official" request order form of each supplier to comply with their ordering rules (to have the request form in a specific layout)

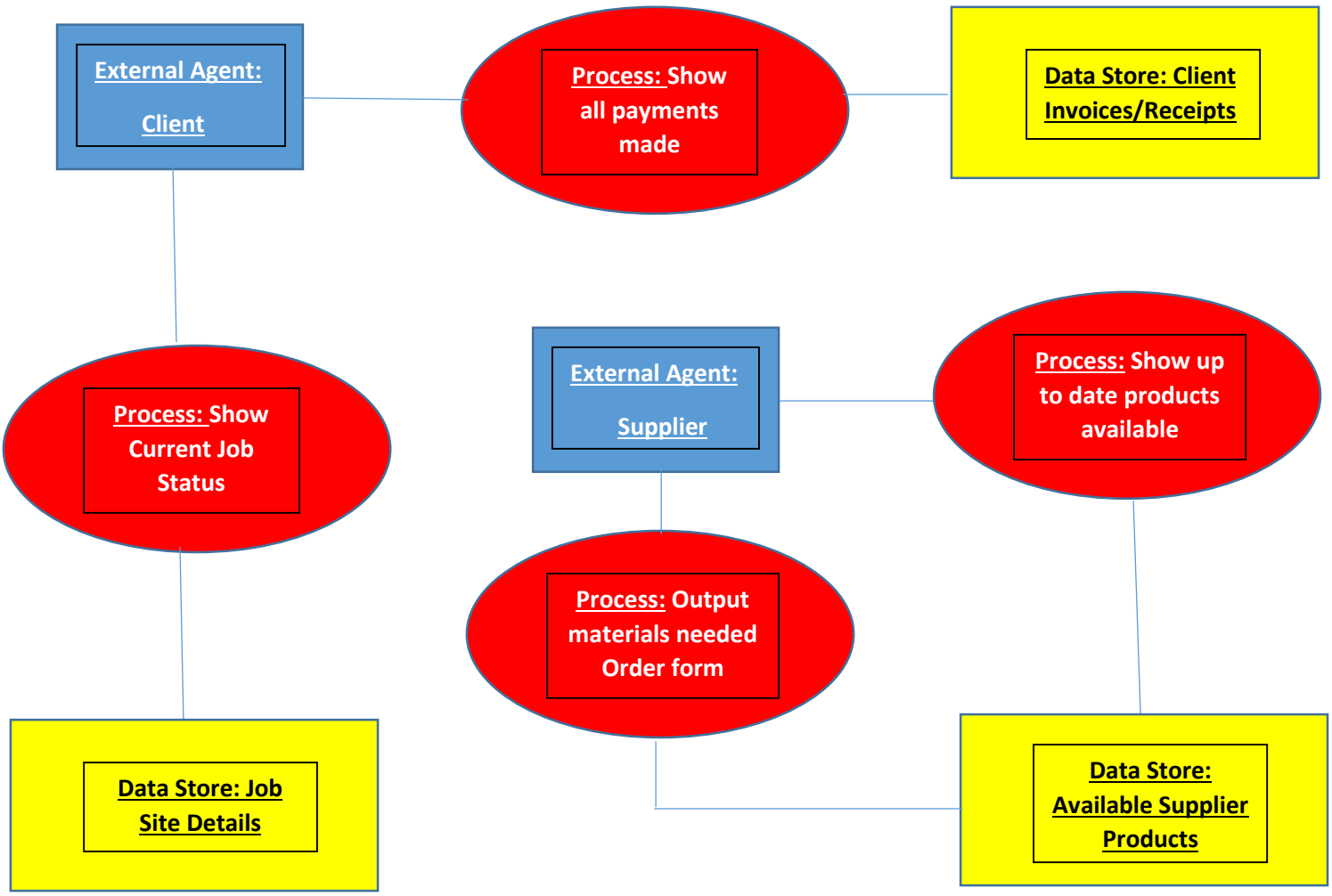
Administrators:

- The administrators of the system will be in charge of giving the user privileges of every respective employee that must access the system to perform their daily duties. The various users will sign in and only have access to the layouts, data and processes that go along with their "group/department etc."
- There will be built in protocols within the system to check for any errors and run diagnostics tests to make sure that everything is up and running. There will be specific tests and commands that the admins will have to execute to make sure that each critical area of the information system is functioning properly. They will also be in charge of doing routine maintenance and updates on the system.

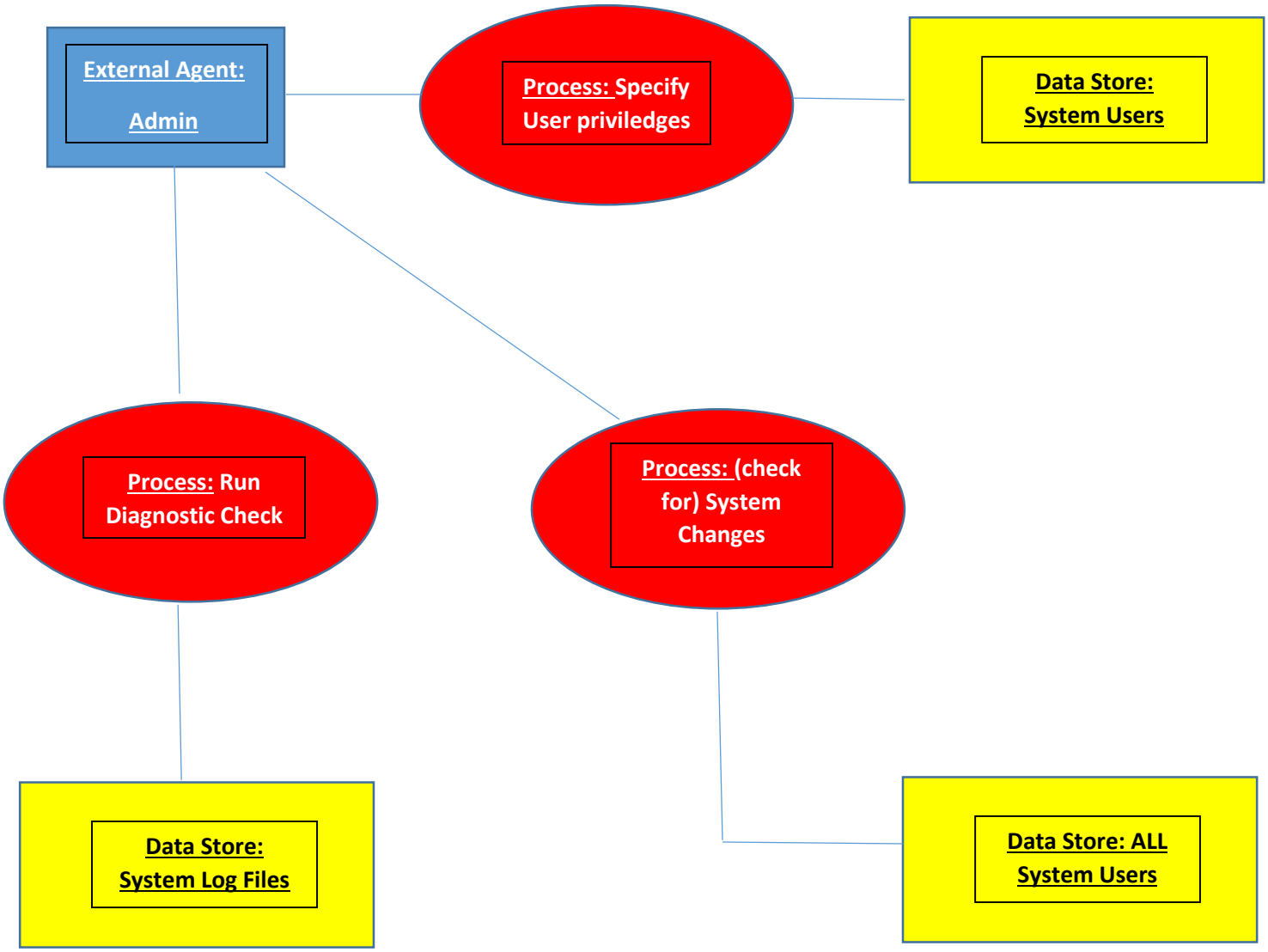
Employee:

- The project manager (whether he is onsite or in a remote location) for each site will have access to the profile of the current client to which the job is being done for and will be able to monitor the progress, payments, expenses, materials needed, permits acquired/needed, blueprints and all other important details pertinent to that specific site. The on sight supervisor(s) (depending on how big the job is) will be in charge of updating the current client's profile in all these aspects so the project manager can oversee everything as a whole. This will be extremely beneficial for the project manager to constantly be ontop of all of the necessities of the current job.
- The employees both at the state(s) and national HQ's will have access to pull reports and also manage their locations (in the case of state HQ's) and the national HQ employees will be able to manage the rest of the state HQ's. The workflow (especially in the authorization process) will be much more efficient and management of all our various sites and their transactions.

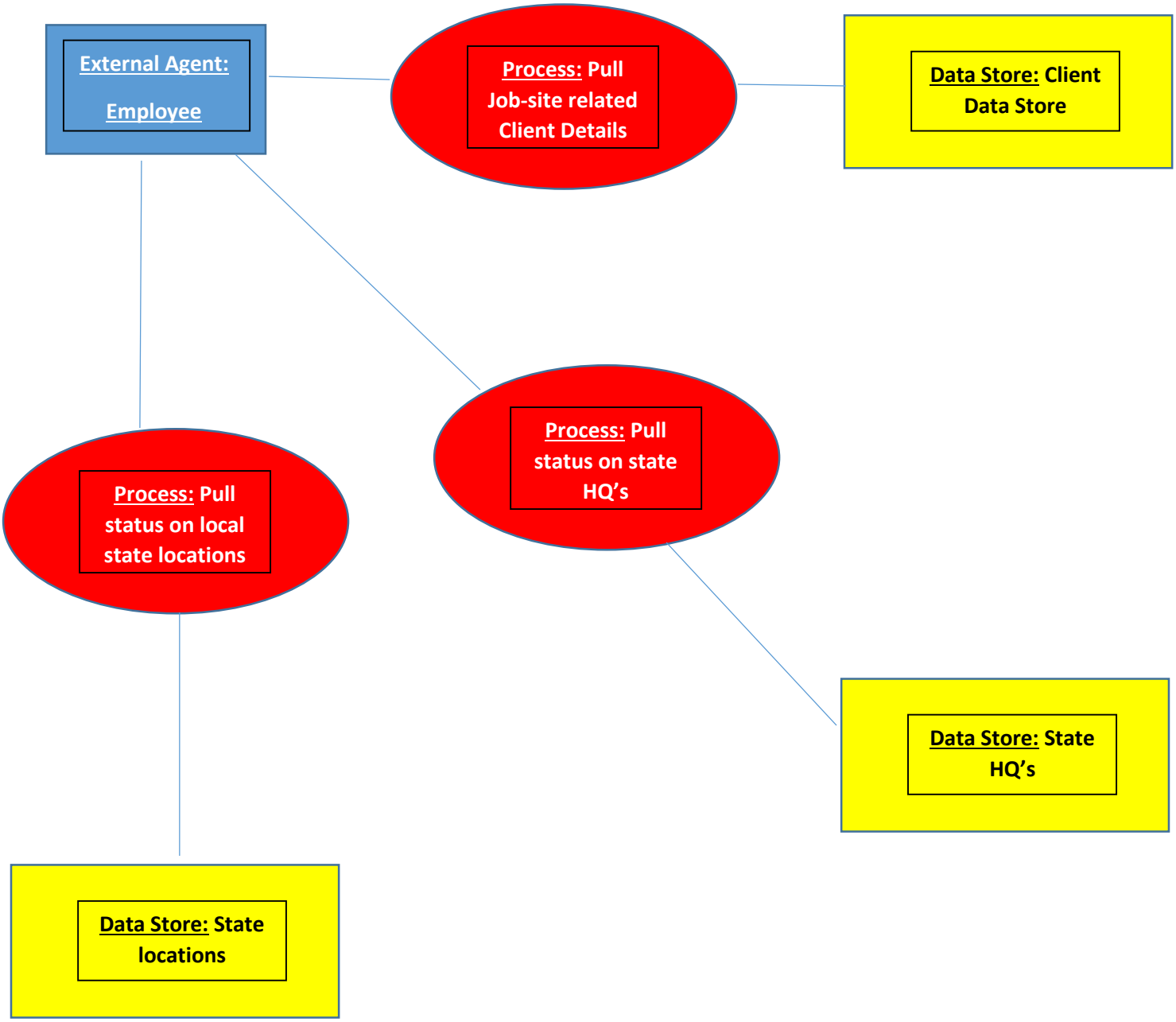
Logical Design: Clients/Suppliers



Logical Design: Administrator



Logical Design: Employee



Decision Analysis:

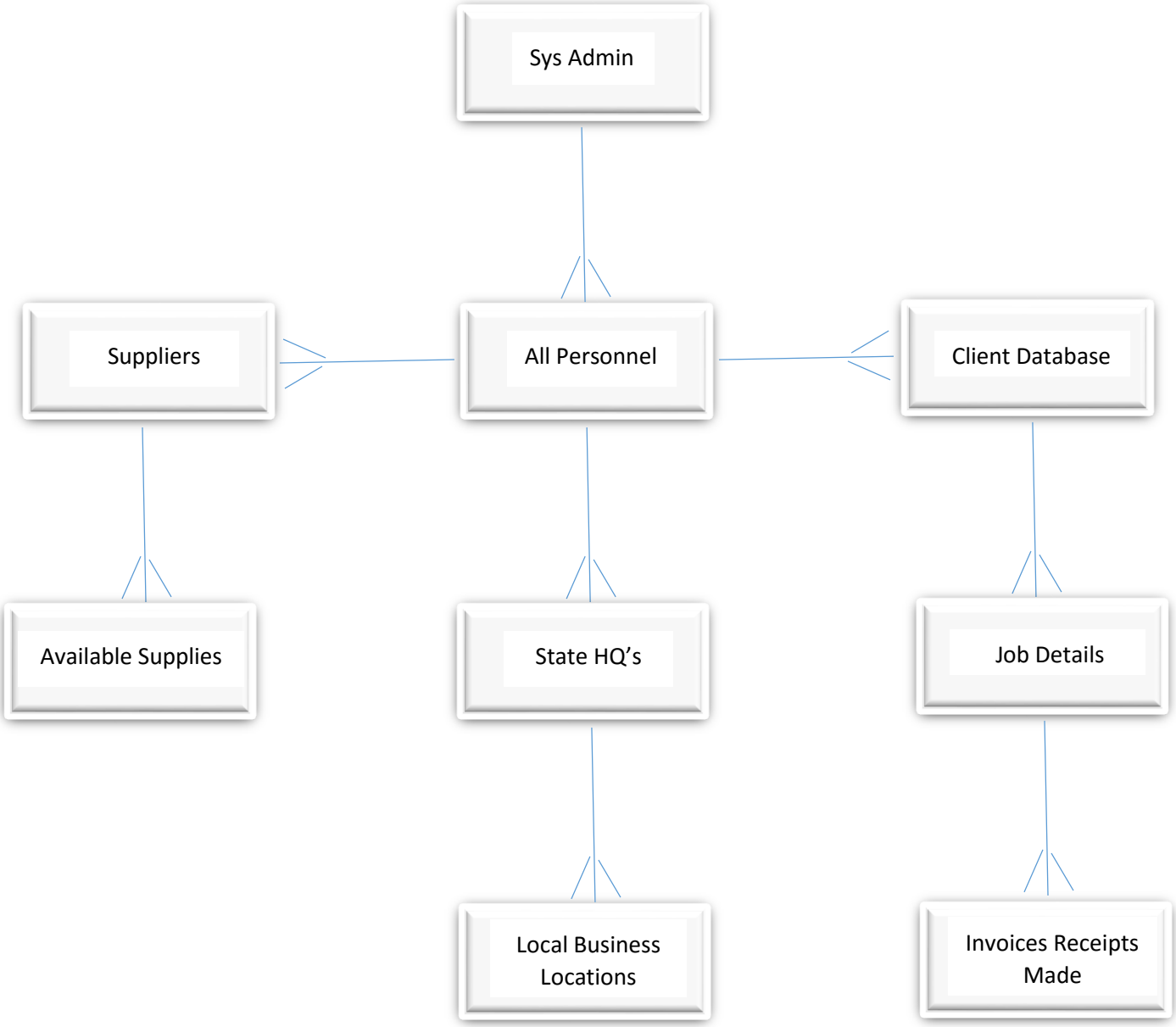
Technical Feasibility: The information system will be primarily accessible over the cloud. It will be hosted in the National HQ in which we will make into a datacenter. There we will broadcast the specific web link shortcut via a separate sub-domain address that we will integrate with our own current public website. Therefore, the real technical setup would be done mainly in the national HQ in setting up all of the needed servers and storage.

Operational Feasibility: The majority of the data that will be entered manually will be by the field personnel and the entry level employees in each respective office location. The information entered will be first time client/supplier details and updating those same individual client/supplier records whenever any changes pertain to them. We will automate as much of the process as possible with drop down/pop up menus, navigation buttons, sorting options (when pulling up lists), drop down/auto calculated dates & age and things of the sort. And the higher level employees or supervisors will be able to pull all desired information on clients, suppliers and even lower level employees sorted by whatever criteria is available to them. The goal is to make interaction with the system as simple and as user-friendly as possible to maximize the throughput of work from every user using the system.

Economic Feasibility: A substantial amount of money will be invested in the creation of this system, but based on our calculations on all of the improvements most related to time efficiency and minimize costly mistakes, we will be most definitely (at least) doubling our profits.

Schedule Feasibility: Our 9 month schedule with the team that we are looking to hire should be a very concise and well – decided time frame to make sure that there is ample time to get the project done and at the same time apply a little pressure with the deadline to make sure consistent work is being done and no procrastination at all.

Physical Design and Integration: Entity Relationship Diagram (ERD)



Construction and Testing:

Administrator:

- A code can be written up to have a couple of test users with specific privileges to see different layouts and interact with different process. We can make an executable that logs each test user in and tries to navigate every single layout and try and access everything within the information system. We then will identify if the permission settings were successful based on how many fails and success's we will have on the specified layouts.
- As far as the updates, we can have 100 new (dummy) feature updates prepared to be added to the system. The purpose of this code will be to have these updates uploaded to the system through series of 10 and after each set of 10 is uploaded, to run the diagnostic/check available updates protocol and see if it is able to find them and successfully install them (and report an error if it wasn't able to do so). And also if after installed, it will dispose of the actualy update properly from the system and just keep a reference of what was installed. And when the previous updates would already be installed, that the system automatically checks for new updates apart from the ones already installed. We can check each step of this process in the end to determine if everything was successful

Employee:

- We can write a code that pulls a report of 5 different intervals of time (specified in: days, weeks, months etc.) and have the data be sorted by every type of field available. Once done will be able to verify the data integrity and make sure that everything was pulled out right. The purpose of this test would be mainly to see if the system can sort and pull the data based on the pre-determined criteria. To see if it appropriately distinguishes between data requested and data that is not.

Client:

- A code can be written to input random values for payment(s) per individual clients and status's (not paid, pending, fully paid) and specify payment due dates for 50 fake clients. And once the values are in, the code will distinguish between the 3 previous criteria one by one to see if the client records is sorted right and the invoices match the correct amounts + date paid.

Suppliers:

- Code will be written for a fake supplier to log in and do 100 new updates to their available products and after each update, a test is ran to see if the update/change actually populated in the system. We will then determine if the updates were actually taken or not.

Installation and Delivery:

We will have the data center built with all of its appropriate server(s), NAS devices equipped for very large amounts storage and extra networking equipment within our National HQ. Once we have the software hosted in our server(s), all our clients, suppliers and employees will have access to the system via the cloud.

The new information system will be publically displayed on our home page informing every existing and new incoming user that it is now officially launched and available for processing. The link will be a subdomain of our website and we will make sure to integrate a button within our current website to allow users to navigate to the information systems Web UI (this will be mainly for clients and suppliers to track either progress or supplies).

The employees however (the ones in fixed steady workstations, mainly office personnel) will have an application actually installed in their computers. Once this application is executed, it will go out to the cloud and already be pointed to find our server over the web connecting the end user employees to our information system. This will allow faster processing and puling of data on the employee side. They will also have a backup link of the website as well just in case the desktop application fails for any reason.

Lastly we will deploy the tablets/Ipads out to the field supervisors and on-site project managers so that they can have access via the offline portal that we integrated with our information system. They will mainly be in charge of inputting all daily information on the job progress and necessities and once they come back to their respective main offices, the data will immediately be pushed to the system and update it as soon as they connect to the wireless network of their job location.