Conceptual Design

E Cubed Group (P2)

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October 6th	Louis-Philippe Keith	

Introduction:

The E Cubed Group *(formally JREL Group)* took into consideration Shabodi's needs from our initial client meeting and complied a set of design criteria. In *Table 1* we have categorized the needs, ranked them by importance to the client, and the criteria.

The ranking system assigns points to each need with 5 being the maximum number of points. The design criteria asses the needs and applies metrics if applicable. As well as it interprets the needs to be relevant in developing a NetAware Security Application.

In *Table 2* we look at similar products on the market and extract features that can help us create the optimal application. From the technical benchmarking, we can gauge how to improve the product and what the expected functionalities are.

Table 1: Ranked and Categorized Design Criteria

Category	Needs	Design Criteria	Ranking
Functional	The system needs to provide location to admin of the UE	Location accuracy: measured in longitude and latitude, and the radius surrounding the UE.	5
	The client needs there to be a visible and audible alert	Alerts intensity and frequency: measured in decibels for audible and in chromaticity for visible. Number of light flickers and sound emissions in a period.	4
	The system needs to provide real time alerts by first detect GPS then second detect alert	Latency and delays: it must take under 45 seconds to alert the administration once the GPS has detected the change. Can be measured in units of time.	2
	The product needs to work on a private network and be Cloud-ready	Network compatibility and functionality: the product will work on private networks and leverage the cloud. Ensuring the data size is	4

		not too large for the network. It also has to be compatible with available types of networks (LAN, WLAN…). Can be measured in number of supported protocols, ease of configuration and integration time.	
	The system needs to control a device and network for an outcome/experience	Device integration and compatibility: can be measured in number of compatible devices with the system and the amount of time spent during the setup/pairing the devices with the system.	5
	The client needs a fully functioning NetAware application	Functionality, scalability, security, performance: can be measured in rate of unauthorized access, number of vulnerabilities, the amount of data the system can handle within a period, range of accuracy (for GPS) and number of planned features that are implemented.	5
Non-Functional	Shabodi needs a real world applicable and demonstratable system.	Real-World Applicability and demonstrability: can be measured in terms of performance (transmission rates, latency) and in terms of time it takes the client to get friendly with the system.	5
	The product needs to be a microservice, meaning that it is multiuse, where functionality can change by swapping in and out features	Flexibility of the configuration: measured in the number of compatible products the system can work with.	4
	The product needs to be expandable and developable for different and future uses	Customizability: measured in the number of features and/or settings that the users can set to their preference and the time it takes them to do so.	3
	The product can be	User-friendliness: measured with a	4

	utilitarian in design	user satisfaction score (reviews/surveys)	
Constraints	The application must use a minimum of two APIs	API integration: by counting the number or functional APIs being used, we can determine if the constraint is met.	5
	The application must clearly demonstrate Shabodi's Sandbox.	Presence of features: we can demonstrate Shabodi's Sandbox by measuring the number of problems detected and fixed by Shabodi's technology.	4

Table 2: Technical Benchmarking

Criteria category	HFeng RFID Access Control System Kit[1]	GPS Tracker - Optimus 2.0[2]	Ring Video Doorbell[3]
Picture of product			
Physical product	This is security lock that has a RFID card reader and a keypad	GPS tracker that also records location via cellular connection. Alerts via emails and push notifications.	Doorbell camera that records video when a motion sensor is sent of
Positive tech aspects	The card system can accept up to 3000 potential users.	Provides real-time location. Alerts via emails and push notifications.	The doorbell has 1080p HP video which makes it easy to recognize people at the door.
	The system uses a 12-volt power supply which is common therefor easy to replace	Light weight of 2.5 Ounces.	The doorbell Pairs with Alexa, which can help notify people inside.
	Uses EM compatible cards which are very common and cheap to	Comes with its own GPS tracking application	Has motion detection built in so it knows when to

	replace.		turn on.
Negative tech aspects	Companies with more than 3000 personnel cannot use this system	Poor battery life (1-2 weeks).	the notifications can be slow, or there are too many notifications.
	Uses WG25/34 Input/Output which is not ideal for high security system	There is sometimes lag in location updates.	Does not have facial recognition
	Uses 125KHz frequency which means its limited to reading operations.	Some customers claim that the GPS will go offline for seemingly no reason.	Does not hold a charge very long (2 weeks max).
How the product relates to clients' needs	Helps the net-aware application locate where people are located based on RFID cards.	Helps the net-aware application locate where people are based on the location of equipment that is installed with GPS	Helps the NetAware application locate where people are based on the location of video signals.

Discussion:

Upon meeting with the client, we were able to define a set of needs, followed by an interpretation of design criteria. We are all new to every aspect required in application development. The project, being a middleware application design, made it difficult for us to understand the needs of the client before meeting with them. The client was able to explain how their middleware works and provide insight into what criteria needed to be met for the product.

We were able to extract design criteria from the client's needs and from user and technical benchmarking. Ranking the importance of each design criterion was difficult to do since all aspects seemed important to the product development. From Deliverable B we made a few modifications to the client's needs. We initially ranked real-time GPS alerts lower on the importance scale. When developing the design criteria, we realized this aspect is critical to the product functionality.

Conclusion:

Shabodi needs a NetAware application to notify the administration when unauthorized users go into restricted zones. With our list of design criteria and technical benchmarking, we will be able to begin brainstorming potential NetAware application aspects. Once we have completed this task, we can develop prototypes to show to Shabodi to get more feedback and come up with the best possible product.

While creating the prototypes we will use the design criteria as direction markers for the product. We need to keep in mind our abilities to create the system and continue researching techniques to make the project feasible.

References:

[1] Access Control System

[2] GPS Tracker - Optimus 2.0 Bundle with Twin Magnet Case : Amazon.ca: Electronics

[3] Best GPS Trackers In 2022 [Buying Guide] – Gear Hungry

[4] Ring Video Doorbell