COMP2250 Proposal

Executive Summary

Intro

The objective when making business and technical decisions should not focussed on the quality of the outcome,

## Wireless Network (Warehouse)

Many external factors need to be considered when designing and configuring a wireless networking solution. Business requirements, technical requirements, and any constraints caused by the network’s expected physical environmental must first be investigated. From this information, the wireless solution can be designed within the bounds of the constraints whilst meeting all of the identified requirements as accurately as possible.

### Business requirements

Through use of this methodology, Bancroft Systems have clearly stated the following business requirements. Strong wireless coverage is required throughout the entire area of the warehouse so that workers are able to use scanning equipment from any position to update an existing warehouse stock database, a crucial aspect of the warehouse. The use of the network will be limited and will only be utilised by a few workers at a time. Finally, there is a low bandwidth requirement, and the tasks that will be performed using the network are not bandwidth intensive.

### Network constraints

Now that the requirements have been clearly identified, constraints must also be investigated to understand the bounds of the potential solution. Bancroft Systems have only stated the size of the warehouse, which is 100 meters in length, 40 meters in width and 15 meters in height. However, it would also be valuable to understand the material of the walls and roof, any existing electromagnetic interference within the area, and the number, size, and material of the physical obstacles and objects used within the warehouse area. Given that these critical details have not been provided, multiple solutions should be conceived so that a best fit solution can be chosen based on each solution’s advantages and disadvantages.

### 802.11x Technology

There are many different variants of wireless networking technologies. 802.11 refers to the family of wireless LAN (WLAN) standards developed by the IEEE. The following sequence of characters, such as “n”, “ac”, or “ax”, refers to the generation within that family. All WLAN hardware will implement at least one of these 802.11 generations. Using these standards, we can benchmark the expected performance of the WLAN hardware, such as an Access Point (AP), and make more informed decisions with this information.

The most common method of wireless communication uses the electromagnetic spectrum and is often referred to as radio waves. Data to be transmitted is encoded and used to manipulate the transmitted waves. A key aspect of this technology is the use of frequency bands to allow for more efficient use of the electromagnetic spectrum. This means that transmitted radio waves will only occur within a small subdivision of the entire electromagnetic spectrum. Sending and receiving devices will operate within this tiny frequency subset and, through the careful use of both hardware and software, will ignore waves of other frequencies. For example, each channel of the radio uses a different frequency and allows for reduced interference between channels and an increased number of transmitters of the electromagnetic spectrum.

WLAN technologies implement similar techniques, allowing for multiple channels across the frequency bands they operate in. Currently, the two most common frequency bands used for WLAN are the 2.4GHz and 5GHz range. These values are often determined by a country’s regulations and indicate the allowable frequency use within the electromagnetic spectrum. In Australia, the 2.4GHz frequency band consists of a total width of 100MHz. This range is broken down further into 14 different 22MHz channels, of which only channels 1-13 are legally usable. Given that 14 channels with a width of 22MHz equals a total of 308MHz, channels must overlap one another to fit within the 100MHz requirement. The use of overlapping channels is very undesirable and increases the probability of wave collision. Waves of the electromagnetic spectrum are a form of energy, and much like waves in the ocean, collisions manipulate the waves causing the data to be illegible or corrupt. Furthermore, radio waves are a half-duplex networking solution, meaning that data cannot be both sent and received at the same time. Similar to a walkie talkie, WLAN devices cannot transmit at the same time, or no data will be received.

Q2 – Network Security

Q3 – Wide Area Network (WAN)

Q4 – Network Diagram