Vicinity: Asset Tracking System (Laptop)

One of our customers is a leading international audit firm and provides audit services to Indian business houses, multinational companies and the public sector. They also provide services to global clients seeking to develop a local business and expand into new markets in India.

Case Background

All employees of company across their locations in India have been assigned Laptops and are responsible for the safekeeping of the same. The Laptops are accordingly under the custody of the employees. Accordingly the Laptop serial numbers were tracked against the employee number manually. The company has 28+ offices all over India with over 5000 employees and found it a daunting task to ensure that the assigned laptops were always in the custody of the authorized personnel whenever they entered or exited the office premises.

The procedure being followed is that during every entry and exits at various gates across offices a manual register and is being maintained by the security wherein the employee number and the laptop serial number are recorded. This is a tedious process as certain offices housed more than 500 employees and during peak hours caused confusion and delay causing loss of productivity hours and consistency/accuracy of the manual process.
In scenarios where additional laptop is being shared or exchanged it is difficult to update across all points of entry/exit and also track the last owner of the laptop.

Employees of the company use a Low frequency (LF) card for access control and attendance and the company had tried unsuccessfully to attach a similar LF card to the laptop. The plan was to use the existing LF infrastructure for validating the laptops. However LF cards when attached over a magnetic/Electronic surface of the laptop were not being authenticated or time consuming and physical exertion of lifting and positioning the laptop surface to expose the LF card on the reader.

Pilot on UHF Solution

At this juncture Vicinity RFID was called for a study of the existing infrastructure and suggest a suitable alternative. Company having had an earlier experience of RFID using LF and HF required a complete understanding of the same and demonstration of the system.
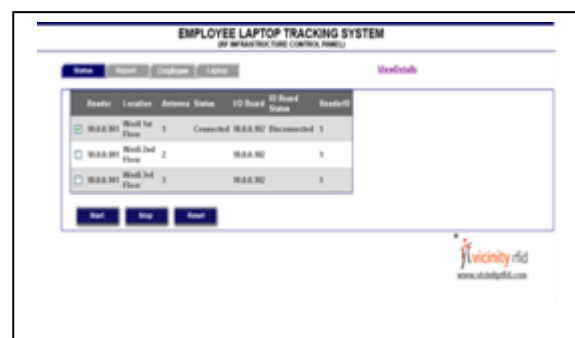
Vicinity demonstrated the concept of UHF and its read range to the IT Management team and got a sanction for a pilot. The site was decided as the Mumbai IT control centre.

Vicinity RFID employed the **D3T** model of **D**esign, Develop **D**eploy and **T**ransform in this project. The site has two entries front and back and each and every employee including the partners of the company required to be tracked automatically with minimal loss of time.

Figure 1&2 – screen snapshots

ATS framework

The software used the Asset Tracking System (ATS) framework which is a collection of objects designed by the Vicinity team for such applications. The ATS framework allows the application to access multiple readers and other IP enabled devices to control signalling systems like visible and audible alarms and other access control options. The ATS framework also allows the users to access any of the IP enabled devices directly using its range of class objects. The ATS has been designed to work on a socket programming level and can work with all types of UHF readers/antenna range which supports this.

Technology Deployed

UHF works on a frequency of 865-928 MHZ and UHF cards also called as TAGs/Transponders are read at a distance of 5-6meters. It was important to ensure that range needs to be tuned in sync with the requirements and the physical locations.

Vicinity RFID deployed Thingmagic Mercury M4 UHF reader and bi-static antenna for the pilot which allowed a software based tuning of the read range and allowed a IP enabled access. The reader and antenna confirming to 865-867 MHz frequency band assigned by WPC Govt. of India.

Vicinity also designed server software based on the ATS framework in Microsoft .Net 2.0 framework using Asp.net 2.0 and SQL server 2005. The SQL database maintains an employee wise laptop details including shared laptops. End of the Day reports like all mismatch entries and Real time remote monitoring for the helpdesk team are some of the features.

An electronic Input output Board (I/O board) is also used to signal a light stack to indicate whether the owner carrying the laptop is authorized. It is important that the Light stack is also controlled through the server based ATS. Leveraging on the ATS framework the system has been developed such that it is scalable to any number of readers and antenna across the RF infrastructure of the company across India. The database being a centralized SQL server out of their data centre eases the IT team to maintain the same and requires zero software configurations across their other sites in India.

Apart from a signalling system, a helpdesk screen allows the back office team to monitor the alerts remotely and notify or act upon in case of an alert.

A control flow diagram depicts the program flow, logical evaluation and triggering for signal.
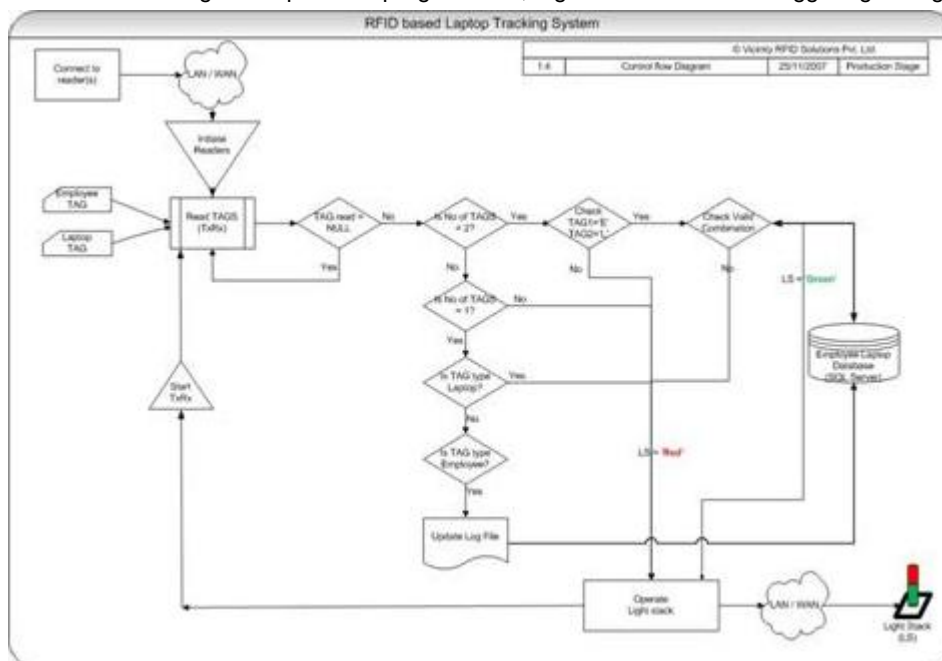
Summary

The end result of the pilot being that the company gets an authentication across the entry/exit points for employees carrying laptop in less than 2 seconds. Based on client feedback, a delay was introduced for 4 seconds between signalling events. The security at the entry/exit now acts in response to the signalling system.