The Presbyterian Support Central Wi-Fi Network Deployment

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ABSTRACT

The Presbyterian Support Central Wi-Fi Network Deployment project, was the analysis and a pilot implementation of Wireless (Wi-Fi) services to the residents that are living in their care facilities, giving them access to full Wi-Fi services and to enable Presbyterian Support Central to automate bedside administration of their healthcare.

Once this pilot had been trialled and approved, it was to be rolled out across twenty-two of its other sites throughout the lower North Island of New Zealand.

Keywords: Support, Care, Wi-Fi Network

1. INTRODUCTION

Presbyterian Support Central (PSC) is a not for profit organisation that provides support and care to people from three months to over one hundred years old, for over one hundred years, in their lower North Island facilities. These operate under the Enliven and Family Works brands, employing over fifteen hundred staff.

There is a need to adopt new technology and provide services to residents that are living in some of the PSC facilities and compliance to several PSC and Government run systems.

As some of the locations are remote with some of the materials limiting mobile coverage, PSC investigated the possibility of using Wi-Fi to provide a platform that could be used to deliver current and future Information Technology (IT) infrastructure needs for both the business and residents, and to look at the opportunities to enable monitoring and recording of their healthcare from the patient's bedside.

Upon conducting a Request for Proposal (RFP) to select a suitable hardware vendor and support company, they moved to implement a pilot scheme to confirm that a Wi-Fi solution would meet their requirements now and into the future.

With the scale of the Wi-Fi deployment and the number of sites involved (22 physical sites in total), the overall Wi-Fi deployment was to be rolled out covering several financial years.

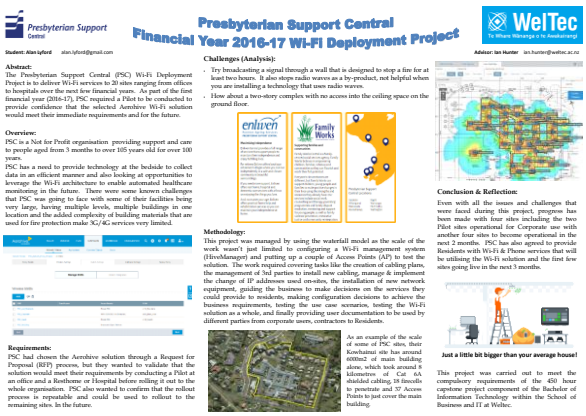

Fig 1 the Presbyterian Support Central Wi-Fi Network Deployment

2. OVERVIEW OF PROJECT

The Presbyterian Support Central Wi-Fi Network Deployment project was completed by a single student as part of his requirements in completing his third year capstone project as part of his Bachelor's Degree of Information Technology - Networking Major.

As more and more requirements from Government Agencies /funders are being applied to the different industries that PSC is currently working in, more data is required to be collected and inputted into either PSC or Government run systems. The point of data collection thus can no longer be restricted to just a few locations within the facility, as the need for assessments to be performed at the resident's bedside or medication to be tracked and dispensed wherever the resident is within the facility adds further complexity in the collection of patient data.

This was a challenge as some of the facilities are very large or have multiple levels, and along with the added complexity of the materials used to create fire cells to protect people from fire, is known to either limit or in some cases destroy Radio Frequencies (RF) from being available in some parts of the facility.

As PSC is currently using different devices like Laptops, Terminal Laptops and Android Mobiles all with different Operating Systems, a selection of these devices needed to be made available for testing purposes. As PSC is planning on using the Wi-Fi for Bring your own Devices (BYOD) to residents, other devices like Android Tablets, iPad, Mac, Chromebooks and Voice over the Internet (VoIP) handsets, will need to be made available for testing.

Other tools were identified and required during the testing stage once the Test Plans had been created.

2.1 Decisions made in the Request for Proposal

Due to the pre-selections of the Hardware vendor and Support Company:

- Aerohive was selected as the Hardware Vendor to provide network Switches, Access Points and Management Software.
- NSpire Technologies was selected as the Structured Cabling Installation Company
- Multimedia Connect was the cable standard to be used along with Cat6A shielding.
- Fibre will be used between network switches on the same site.

- A pilot will be conducted using Central Office and Kowhainui as the two locations, to confirm the Aerohive overall solution.

Even with some of the decisions, products and toolsets already selected, a number of others needed to be made like:

- Where and what will the Aerohive HiveManager be hosted on? The possibility of using Amazon Web Services (AWS) was considered as PSC already uses this environment, an Aerohive Appliance or on a Virtual Machine, VMWare environment that PSC currently doesn't have.
- What user types /categories are required, what types of authentication methods are available and what policies settings will be required to configure for PSC to manage the different users/devices.
- As the testing stage will be testing the system for access control, speed restriction and security, this will require different tools and a combination of the tools to be used.
- If residents were to use Wi-Fi services in the future, what controls, functionality and pricing options would be required? This will require work around what can be provided to residents, what controls can be put in place to protect both PSC and residents, and work out what the costs would be to both parties.

2.2 Trust in data.

The system had to provide: accurate, precise data without interference. Transmitted in clear and understandable audio, and free of directional or transmission errors; and only give the recipient essential information required without being bombarded with information about every business or patient activity.

2.3 Providing access anywhere within a facility on any device.

An infrastructure had to be developed within each facility, with opportunities to provide additional services to residences anywhere around the facility, to replace the less reliable Mobile 3G/4G current services.

2.4 Reliability

It was required that the new Wi-Fi Network system achieve 100% coverage of each facility regardless of the building's structure and spread, without interference.

2.5 Methodology

To provide confidence to PSC that the vendor Wi-Fi solution is right for them, a basic Prince 2 methodology was used to manage the work required to deliver the pilot and the other success criteria that PSC had defined. This required staging the work to utilise the resources that were available and to follow a Waterfall model to implement the different stages required to deliver the pilot sites ready for corporate Wi-Fi use.

A number of project management controls using change control processes and risk management were used to manage the delivery, control and the impact of changes during the project.

We used an interactive technical/development methodology throughout the project life cycle, in order to perform rework and future conditions. These were based on tester feedback and functional testing. Change requests were created which lead to further development, testing and evaluation as required. This cycle continued until 100% tester satisfaction feedback was attained, and then deployed once the client had signed off each iterative.

2.6 Testing

To test this stand-alone pilot from Central Office to Kowhainui (Wellington to Porirua), several representatives from the hardware vender and Presbyterian Support Management were involved, driving the requirements gathering and testing.

PSC provided a number of tools to enable the configuration and the testing of the Wi-Fi solution to validate that the requirements are met. They provided a hosting environment to host the Wi-Fi management against a platform that was used to manage the user/device policies, Access Points and Network Switches.

These tests were conducted against all the different Wi-Fi policies and functions, based on the different types of use and users/devices that had to be set up. Part of these was the access, firewall testing and some policy restrictions such as speed security and time limitations.

2.7 Documentation and training requirements

Wi-Fi usage Policies were created for different types of users (i.e. Employees, Bring Your Own Device (BOYD), Contractors and Residents).

A resident Pricing Model was constructed to verify if it is feasible and cost effective for PSC to provide Wi-Fi services to residents in the future.

A process was created on how PSC would put residents on to the Wi-Fi platform (also known as resident on –board) and this would require identifying who and how it could be done

User Documentation was created on how to setup the different types of users/devices to be able to use the PSC Wi-Fi platform.

User Training to all staff was provided to the pilot sites on how to setup devices and use the Wi-Fi platform.

This pilot project has been in operation successfully throughout the PSC community for nine months now and is in the testing and is now in the roll out phase to other sites throughout their support region.

3 ACKNOWLEDGEMENTS

We would like to acknowledge the Presbyterian Support Central Management for allowing this pilot project to be conducted, their testers for their ongoing support and effort, helping to introduce this pilot and advancing this new Network and advancing this out into their work place.

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