Final report

Stanbroke Chinchilla Feedlot

Abstract

A MLA Donor Company partnership project was undertaken to build and deliver a field study that considered a telecommunications network upgrade to the Stanbroke Chinchilla feedlot – including evaluating the impacts from improving Wide Area Network (WAN) connectivity and wireless access at the site. MarchNet upgraded the existing 20 Mbps Internet service to a 50 Mbps Layer 2 Business connection, with a 20Mbps Internet service to the Homesteads. A Managed Wi-Fi and Voice over Wi-Fi (VoWi-Fi) network was installed around the site, to enable roaming Wi-Fi and access to the Telstra mobile network.

The key findings that arose over the 3-year project monitoring period are detailed below.

- An increase in speed and reliability of the network
- Enabled remote monitoring of livestock and operational systems
- Enabled remote access to the Stanbroke private network
- Delivers real time, reliable information to help make smarter, faster decisions
- Enabled video surveillance and recording
- Enabled cloud computing and facilitated scalable technology choices
- Helped to improve staff hiring, satisfaction and retention

These results are expected to be replicable for other regional and remote Red Meat producers as well as the wider industry across the country. MarchNet's smarter telecommunications solutions have proven to provide these results and numerous benefits to producers and their staff. The report provides a case study of the lessons learned from this pilot.

Executive summary

Background

The purpose of this research is to determine if the network upgrades undertaken at the Stanbroke Chinchilla Feedlot meet the below project objectives as an enabler for a data culture led enterprise.

Objectives

- greater efficiency in day-to-day operations
- better connect staff to family and friends
- assist with effective livestock control and decisions
- enable more effective management through real time information and feedback, and
- improve maintenance procedures.

Methodology

- Install a Wide Area Network (WAN) connection of 50 Mbps symmetrical to the site.
- Install a Managed Wi-Fi and VoWi-Fi network around the site.
- Install a WAN connection of 20 Mbps symmetrical to the homestead via Point to Multipoint microwave and Wi-Fi mesh.

Results/key findings

- An increase in speed and reliability of the network
- Enabled remote monitoring of livestock and operational systems
- Enabled remote access to the private network
- Delivers real time, reliable information to help make smarter, faster decisions
- Enabled video surveillance and recording
- Enabled cloud computing and facilitated scalable technology choices
- Helped to improve staff hiring, satisfaction and retention

Benefits to industry

The industry operates in similar rural and remote locations. Access to high speed, reliable telecommunications can produce similar results for other industry participants.

Future research and recommendations

MarchNet will look to perform similar studies with other industry participants in the future to confirm the findings of this report are repeatable.

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1. Background

MarchNet is an established communications provider dedicated to creating value by connecting people and operating exclusively in regional and remote environments. Stanbroke approached MarchNet in 2018 to help with a telecommunications upgrade at their Chinchilla feedlot. Before the upgrade of the network, Stanbroke had an internet service supplied by MarchNet. This service delivered a 20 Mbps download and 20 Mbps upload throughput to the Stanbroke office.

Due to increased bandwidth demand at the site and the planned feedlot expansion, Stanbroke required an extensive network upgrade. MarchNet was awarded the contract to design, build and operate the upgraded telecommunications infrastructure. In line with MLA's desire to drive the Australian red meat industry in a data rich culture, a pilot with Stanbroke was agreed to with key lessons learnt to be captured for the benefit of wider industry.

The results of the research undertaken throughout this project will demonstrate the advantages of faster connectivity, network availability and reliability, and increased wireless network footprint to the Red Meat Industry.

Figure 1 – Stanbroke Chinchilla Feedlot

2. Objectives

The project aimed to improve staff connectivity around the site and to the outside world. This would allow for:

- greater efficiency in day-to-day operations,
- connecting staff to family and friends,
- more effective livestock control and decisions,
- smarter management through real time information and feedback, and
- improved maintenance procedures.

The project would literally connect the paddock to the homestead and office.

3. Methodology

To meet the objectives set out by Stanbroke, MarchNet designed a state-of-the-art network solution for the Chinchilla feedlot. This solution did not only provide Layer 2 connectivity, Internet, Managed Wi-Fi and VoWi-Fi services across the offices and feedlot, but also provided owners and stakeholders with reliable high-speed internet services to the homestead.

The below outlines the technologies used at each location to meet the project objectives.

1. **Offices –** Point-to-Point connection back to the MarchNet Greenswamp Tower (MGT), delivering a dedicated 50 Mbps Layer 2 Connection with a 20Mbps Internet service. Managed Wi-Fi around the offices, this includes provisioning and performance monitoring of the Wireless Access Points, SSID management and per user rate limiting (based on client requirements). MarchNet provides access to the Telstra Mobile Phone network at the offices by utilising VoWi-Fi calling.
2. **Feedlot -** The Managed Wi-Fi solution broadcasts the high-speed Internet service ~10kms and 360 degrees from the existing telecommunications tower beyond the expansive feedlot, grazing/farming operation, 7 homesteads and into neighbouring properties. MarchNet also monitors the performance of the Wireless Access Points, performs SSID management and per user rate limiting (based on client requirements). MarchNet provides access to the Telstra Mobile Phone network at the feedlot by utilising VoWi-Fi calling.
3. **Homestead -** Installation of a Point-To-Multi-Point (PTMP) network from the MGT. A Wi-Fi mesh network was also used to connect houses that did not receive the PTMP connection. The Internet available to the homesteads is rate limited to 20 Mbps symmetrical.

Through rate limiting the homestead a 30 Mbps symmetrical service is always available to the offices and feedlot. In addition, through connecting the homestead to the private network and creating an extension of the office network, MarchNet enabled remote monitoring and control of the feedlot control systems from the manager's property, or any other authorised location.

Figure 2 – Wireless Network Paths

4. Results

Every month a bandwidth usage report is generated and sent to Stanbroke highlighting the total data consumed for the month including upload and download volumes. The usage for the services is recorded against the current bandwidth being supplied to ensure the current plan is meeting the client's expectations. The last three years of bandwidth usage highlights that the 50Mbps upload / 50 Mbps download service is meeting the client's requirements.

The below findings are from MarchNet's active monitoring platform and outline the typical monitoring outputs over the past three years. The areas monitored are:

1. Bandwidth Usage - **Daily**
2. Bandwidth Usage **– Quarterly**
3. Content Usage - **Quarterly**
4. Data Usage **– Quarterly**
5. Service Availability and Latency – **Quarterly**
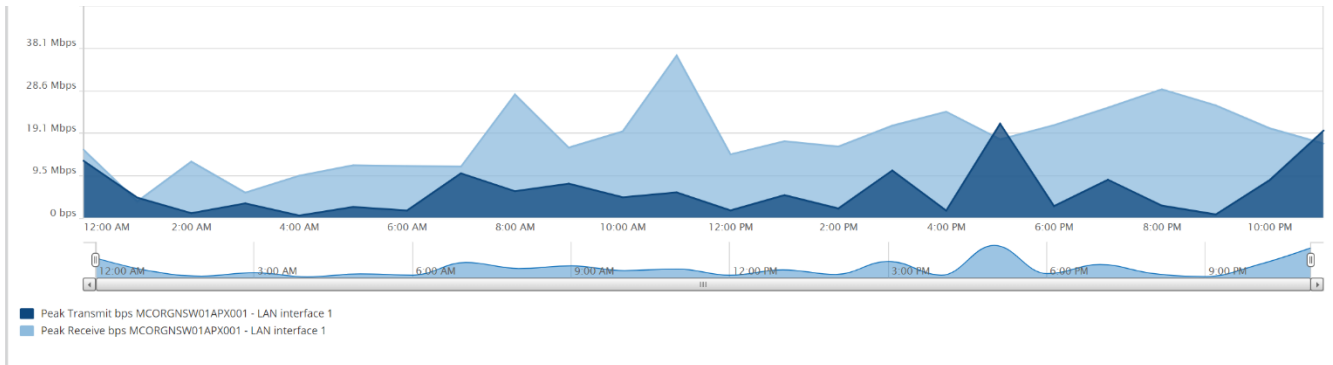
Bandwidth Usage - Daily

Figure 3- Typical Daily Bandwidth Usage

This graph highlights the bandwidth usage as an example of a typical day during the period. This indicates the service is being utilised well. The graph shows a peak in the morning when operations begin with usage peaking around midday and continue into the afternoon through to the evening.
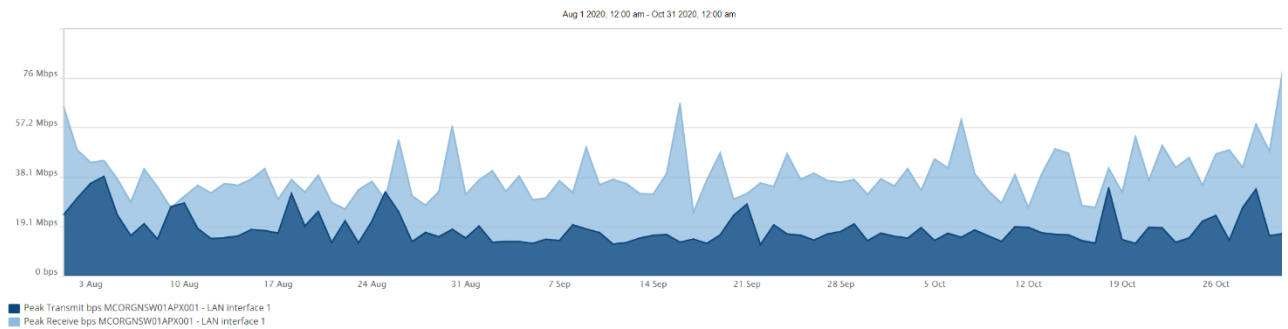
Bandwidth Usage - Quarterly

Figure 4 – Typical Quarterly Bandwidth Usage

Stanbroke's bandwidth usage during an average reporting period shows consistent download and upload usage throughout the reporting period. This graph demonstrates that the service is being well utilised and the speed profiles are adequate for Stanbroke's current requirements.
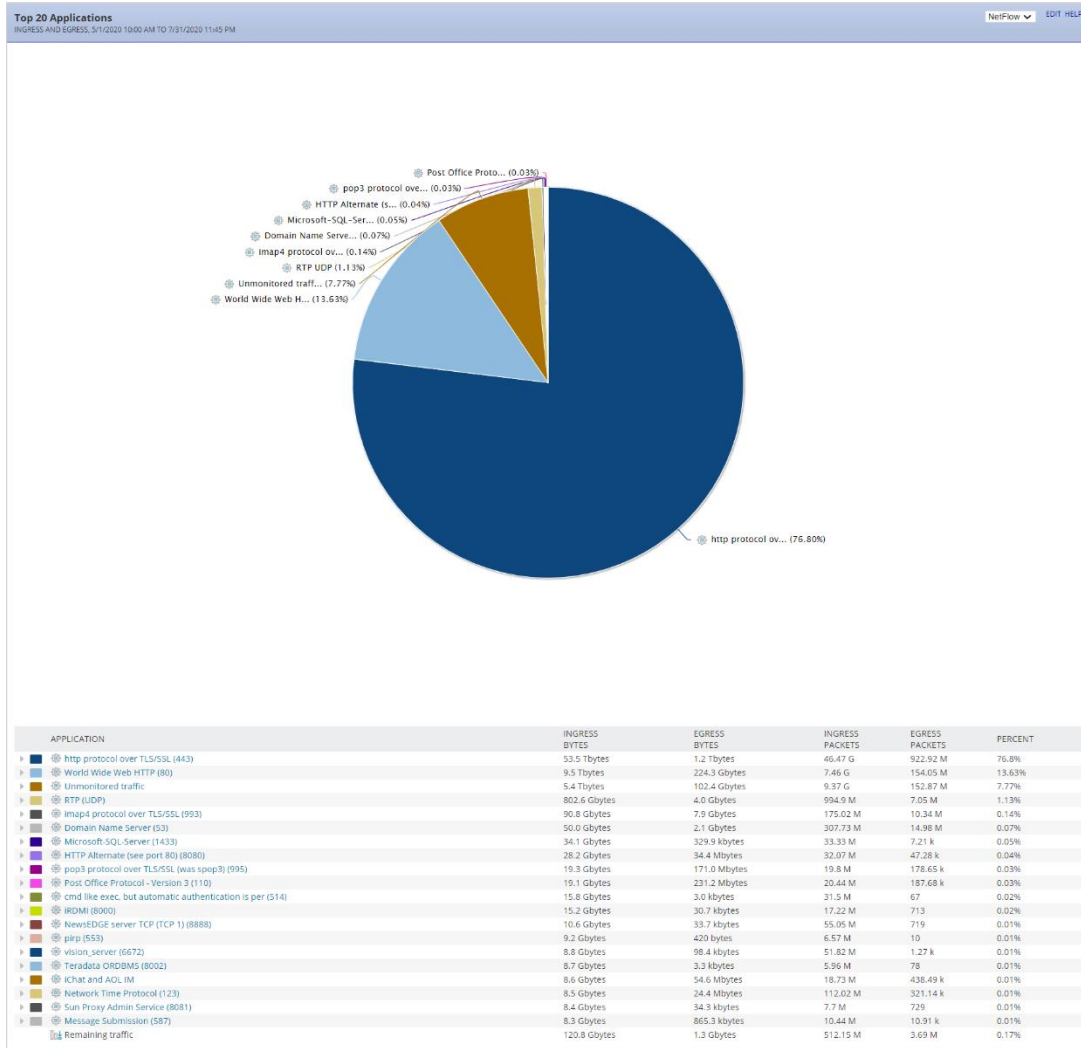
Content Usage - Quarterly

Figure 5 – Typical Quarterly Content Usage

The content access graph highlights the top 20 applications utilised by Stanbroke during this reporting period. The statistics highlight that 91.74% and 5.08% of usage is web-based traffic across both secured and unsecured content respectively.
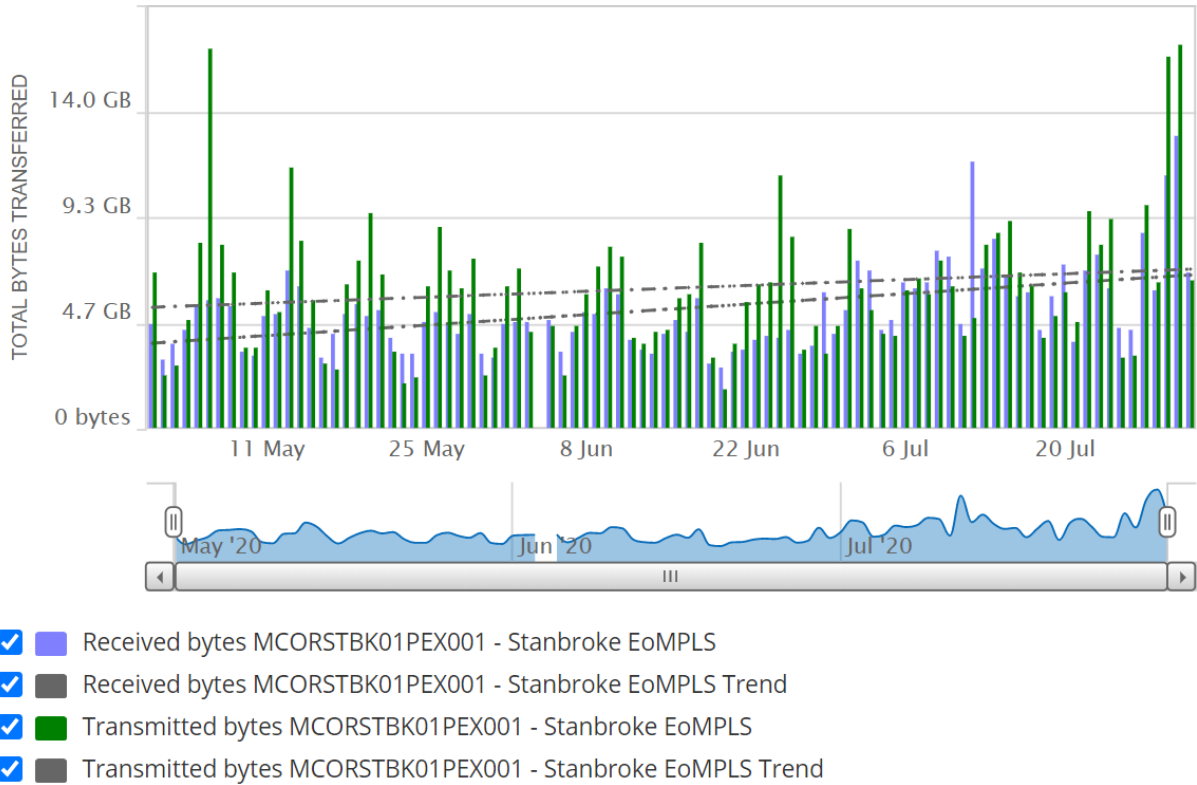
Data Usage - Quarterly

Figure 6 – Typical Quarterly Data Usage

The data usage graph shows both download usage in blue and upload usage in green. The data usage graph shows that there are steady downloads throughout a typical reporting period. The upload data, while quite consistent, does see several days across the period that are higher than the average.

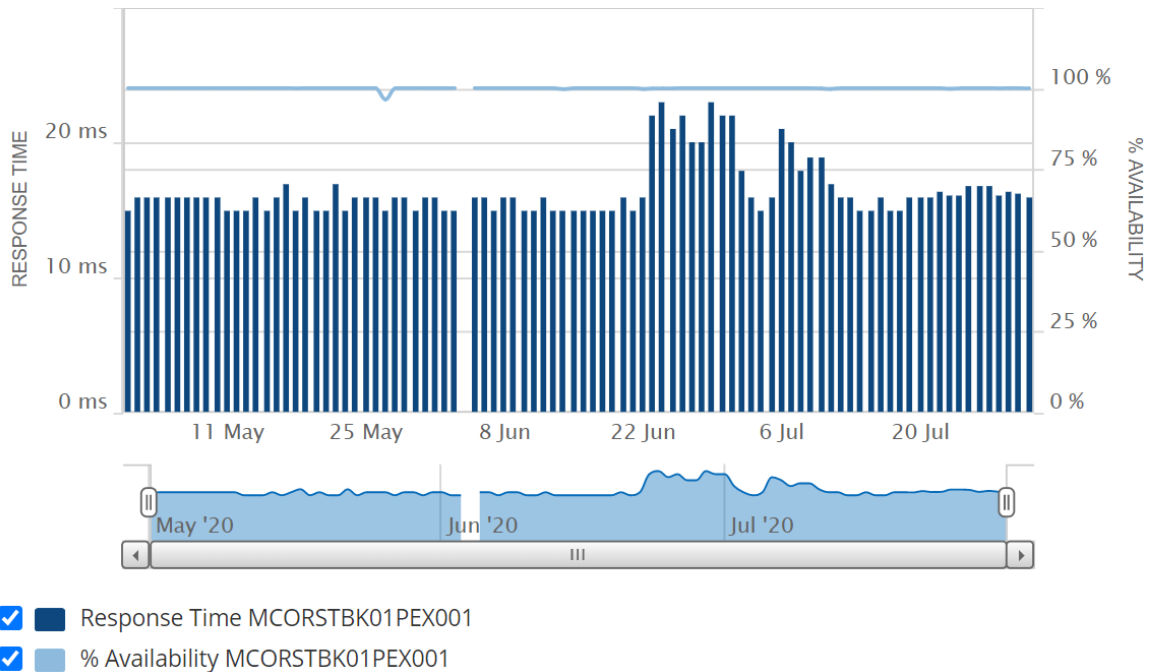**Service Availability and Latency – Quarterly**

Figure 7 – Typical Quarterly Service Availability and Latency

Latency is the delay before a transfer of data begins. The latency for Stanbroke's service was recorded at a consistent 15 milliseconds across the three-month period, which results in an excellent experience for users. This is the typical latency experienced over the three-year period. As a comparison, NBN Skymuster Satellite services operate with 600-1,000ms of latency.

The MarchNet service delivered to Stanbroke was designed and built to meet the MarchNet Service Level Agreement of 99.9%. The service availability and capacity for the last three months performed at 99.999%, which represents the typical performance over the three-year period.

5. Key findings

The below overviews the key findings throughout this project, it is a combination of Stanbroke's feedback and MarchNet's observations through its active monitoring throughout the project.

- When asked for feedback Stanbroke stated that, "speed, reliability and our remote monitoring service often picks up and resolves issues before we know there is a problem".
- Remote access to private networks has been very positive. The ability to not be restricted to the location of the office to complete tasks, not only saves time but also allows for a more flexible work environment for staff.
- Remote monitoring of critical operational control points is now available and being utilised, enabling access to controls and reliable information to assist in making better operational decisions.
- Video surveillance and recording throughout the property enables staff to centrally view conditions, providing an increase in productivity and reduced staffing costs, as well as an increase in safety and security.

- Remote Access to monitor farming systems throughout the property presents a major opportunity to increase efficiencies. As an example, increased visibility of telemetry data for irrigation systems has resulted in a large reduction in water usage. The ability to instantly record and transmit data from irrigation systems has resulted in the number and frequency of breakdowns decreasing, as well as response times for maintenance decreasing. The outcome is less equipment operating downtime and less water wastage.

- The ability to automate pivots is another benefit on the back of this new connectivity, which assists in achieving the greatest yield return from their irrigation systems, whilst efficiently using water resources.

- The ability for live information capture and transfer ensures instantly accurate information transfers between all operational departments. This transfer of data provides huge benefits for Stanbroke for not only the handling of cattle but for accounts and financial reporting purposes as key examples.

- Prior to the MarchNet service being installed, Stanbroke was utilising a server-based version of Stockade Software. Through Stanbroke's now strong, reliable, high speed network, they were able to deploy the web-based version of this software which has resulted in increasing the productivity of each staff member. They have been able to reduce head count in this administrative function. The total savings that this change in process has resulted in is one entire person's annual salary, which equates to a reduced wage cost of around $50,000-$60,000 every single year. Stanbroke now have the ability for each individual staff member working on their cattle management administration to look after up to 3,000 head of cattle each. As a result, Stanbroke can now utilise an equivalent of only 5.5 full-time staff to administer their current 16,000 head Chinchilla Feedlot facility.

- The introduction of StockMate on tablets throughout the feedlot also provides a live set of data supported by a cloud-based console providing increased reporting and management of Stanbroke's Feedlot operations. Staff now have the ability to wirelessly transmit feed ration data from their operations across the property into their feedlot operational software. Access to these types of applications and systems are now available through Stanbroke's investment in connectivity.

- The speed and reliability of the new service has allowed Stanbroke to start utilising cloud-based services. This not only provides a greater level of flexibility, access and security to server contents, it also eliminates the requirement for capital-expenditure for on-site hardware. The ability to utilise these services have resulted in an immediate elimination of over $20,000 worth of planned server upgrades. Additionally, they will reduce hardware costs into the future where upgrades and/or replacements would have been required.

- Having reliable high quality connectivity available to staff living and working on-site provides an incentive to potential staff in the recruiting process. Stanbroke's Chinchilla Feedlot is positioned close to several competitors who are all sourcing candidates from the same local resource pool. Any additional incentives that an employer can utilise to attract new staff is an advantage and becoming an extremely important requirement for many employees.

- Apart from the benefits in hiring new staff, existing employee satisfaction has increased which is expected to improve staff retention. The estimated average cost of hiring and training new staff is $30,000 per recruit, which does not account for intangible safety and distraction costs. Stanbroke have recorded that their staff retention rates have improved dramatically since the installation of the service. Whilst it is difficult to attribute all the improvement to having access to quality, reliable telecommunications at the Chinchilla Feedlot's accommodation facilities, it is a significant contributor towards improving the conditions for staff living and working in this remote location.

- The installation of the service has provided Stanbroke with the ability to invest in future R&D projects. Stanbroke is currently planning for internal R&D projects to increase operational efficiencies.
- The feedback received during the COVID-19 pandemic was positive. COVID-19 impacted the requirement and ability to travel. Stanbroke reported that Feedlot staff were and are heavily utilising the MarchNet service for video calling and conferencing with internal and external stakeholders. Similarly, staff training and internal meetings have been held using video conferencing from the feedlot. Stanbroke also reported that the amount of time and money saved from reduced travel to and from the Feedlot was substantial. Additionally, the reduced travel requirements increased safety for all staff.

6. Conclusion and recommendations

Through their investment in the latest technology, Stanbroke has committed to their future through innovation. Using new technology such as VoWi-Fi, mobile coverage is extended across the property and delivering a platform for improved asset management, livestock control and condition monitoring. The intent of the project was to demonstrate from improved connectivity the following:

- greater efficiency in day-to-day operations,
- connecting staff to family and friends,
- more effective livestock control and decisions,
- smarter management through real time information and feedback, and
- improved maintenance procedures.

Through client feedback and active monitoring over a 3-year period the following benefits and positive outcomes were attributed to the Stanbroke network upgrade:

- An increase in speed and reliability of the network
- Enabled remote monitoring of livestock and operational systems
- Enabled remote access to the private network
- Delivers real time, reliable information to help make smarter, faster decisions
- Enabled video surveillance and recording
- Enabled cloud computing and facilitated scalable technology choices
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Stanbroke will continue to roll out new systems and processes that are now available to them via their new network. Stanbroke will continue to conduct research and development of their own to work on operational efficiencies and potential productivity increases.

The MarchNet solution is demonstrating that it is fit for purpose and MarchNet is providing concrete evidence that future deployments of a similar design will deliver the required results for future projects within the same industry.

There are several benefits that an appropriate telecommunications infrastructure can deliver for any Red Meat producer. Considerable cost savings can be attributed towards making better business decisions with access to live data. Remote monitoring and remote controls provide the ability to watch and respond to situations are they are required, providing a huge benefit in productivity and improvement in response times.

Access to high speed Internet services also provide other producers with the ability to adopt cloud based services. These can have major economic benefits through the elimination of onsite infrastructure such as servers for backups.

Regional and remote Red Meat producers have the opportunity to provide major social benefits to their staff by providing a reliable telecommunications infrastructure. The ability to connect with friends and family who do not live with them is a huge benefit. Staff and their families can also afford to relocate to a remote or rural property with good communications, because it provides greater access to educational platforms for their children to complete schooling.

This project provides evidence to ensure deployments of a similar design will deliver the required results for the Red Meat industry.