

- **Advanced UTMC Network**
- **Reduced Network Operating Costs by 90%**
- **Performance improved 50,000 times.**
- **An Asset owned by the council**
- **High Levels of reliability**
- **Self-healing time of under 10ms**
- **Fully managed & controlled from one point**
- **Enough capacity for multiple current and a large number of future services**

### **Aberdeen City Council background**

Aberdeen is known as Europe's oil capital, and as such is a very busy and thriving city.

In a response to the challenging global financial conditions Aberdeen City Council developed an innovative approach to financial planning through the creation of a Five Year Business Plan. The aim was to achieve and maintain a balanced budget, ensuring that the money spent on providing services is no more than the money received.

To assist in achieving this target officers within the Intelligent Transport Systems unit proposed to minimise the expenditure on their communication circuits currently provided by BT. Technical officer Neale Burrows proposed to replace the circuits with a private network that would provide a significant reduction in the costs to the service. The move to a private network was also encouraged by the intention by BT to cease the type of circuits previously utilised for the traffic signal communications.

### **Cost savings**

With the BT circuits that the UTC system utilises becoming obsolete, the most suitable alternative would be to install a private fibre network. If Aberdeen City Council were to use third party fibre circuits typically they would have cost two to three times the cost of the old circuits.

### **Aberdeen's own private fibre in their ducts.**

As Aberdeen City Council had its own duct infrastructure around Aberdeen, (which is utilised for CCTV), it made perfect sense to make use of these ducts. Aberdeen City Council installed their own fibre, and built a private network which is not beholden to any third party, thus avoiding any future operating costs.

### **Tender for a managed switch network.**

Having installed the Fibre, Aberdeen City Council issued a tender for managed Gigabit Ethernet switches, together with an SNMP multi-user network management system and commissioning services. Case Communications was one of a number of companies who replied to Aberdeen City Council's tender and whose products matched the requirements most closely, at the most competitive prices.

### **Central control and management**

Case Communications provided their Industrial Gigabit switches, each of which supports 4 Fibre gigabit ports, and 8 x Copper Gigabit ports which support PoE/ PoE+ (to power Wi-Fi, CCTV etc.) and operates from -40°C to +75°C. The switches are equipped with SNMP (Simple Network Management Protocol), allowing any unusual conditions to trigger an alarm message which goes back to the CaseView management system, where these alarms and traps are stored within a database.

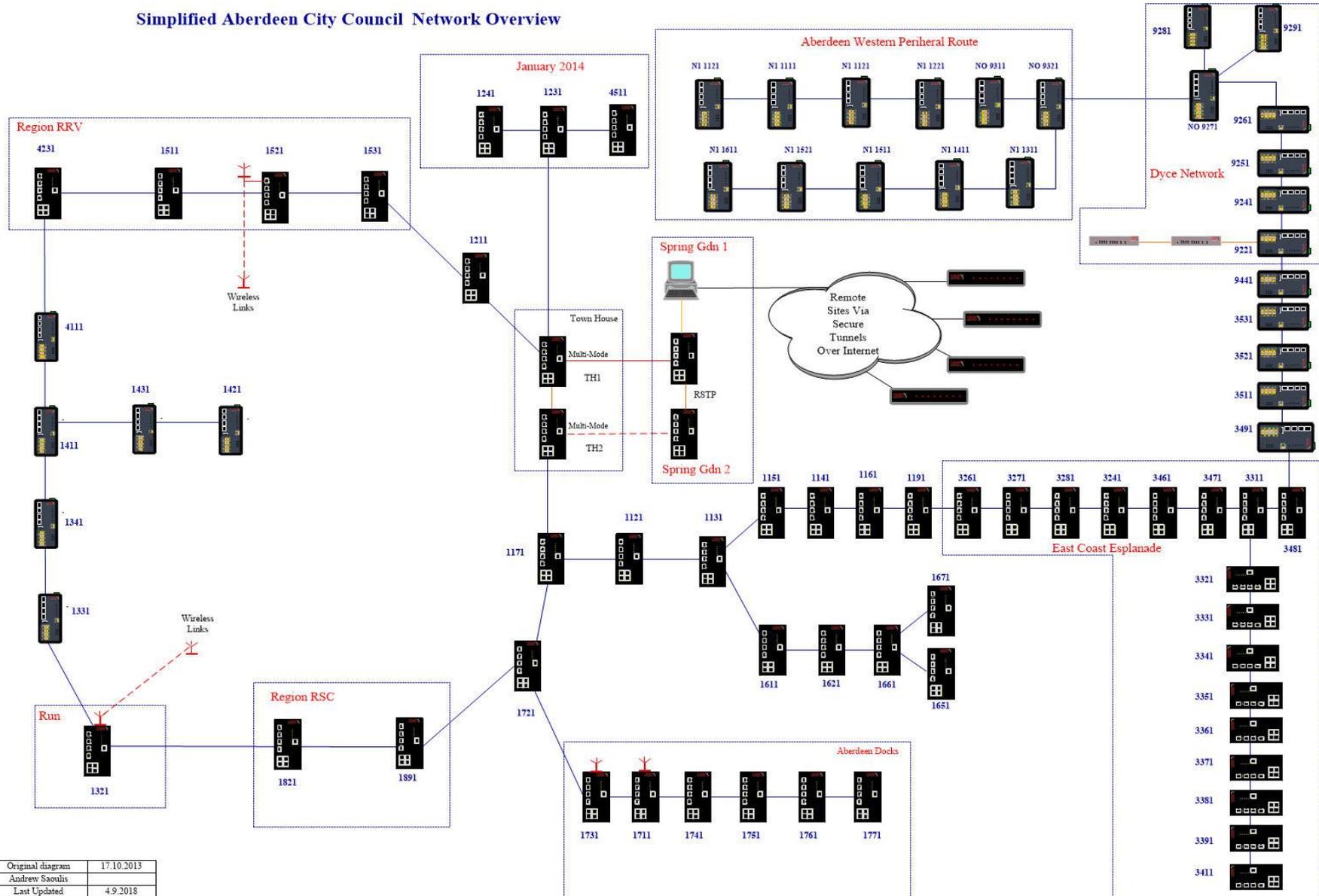
### **Short Form Pluggables with the ability to monitor the fibre.**

To further improve reliability, the Case Communications switches are fitted with the latest SFP (Short Form Pluggables) (Modular Fibre Optic drivers) which use the advanced DMI (Dynamic Managed Interfaces). They detect the transmit and receive levels, and the temperature at the fibre interface. In the event of any conditions being detected which are outside of 'normal parameters', alarms are sent to warn management of impending problems.

# Aberdeen City Council

One of Europe's most advanced SMART City networks

Simplified Aberdeen City Council Network Overview



Original diagram	17.10.2013
Andrew Saoulis	
Last Updated	4.9.2018

# Aberdeen City Council

## One of Europe's most advanced Smart City networks

CASE STUDY-SMART CITY

### Phase One Gigabit switch network.

The first phase of the network consisted of 18 switches in two rings with a number of spurs feeding odd sites. Any break in the rings will self-heal within 10 milli-seconds, so quick that none of the systems working on the ring will even know there has been a problem. This makes it even more important to utilise a Network Management System, to track and keep a log of problems. By 2018 the network had expanded to over 80 switches supporting part of the Transport for Scotland network and the Aberdeen Western Peripheral route. A simplified network diagram can be seen above.

### Quality of service and bandwidth

The network is fully equipped with QoS (Quality of Service) to allow applications such as UTMC to take priority over less important applications such as public Wi-Fi web browsing, thus allowing UTMC to be provided with the highest level of priority over other data sources.

### Increased bandwidth

Using analogue circuits and modems on the legacy BT network data rates of 1,200 bps to 2400bps were typical; with the new fibre network, the network is operating at 1.25Gbps, and with far greater reliability.

### Multiple Applications sharing a common infrastructure.

One of the criteria for the network was to be flexible enough to support a variety of systems and not just UTMC functions. In order to achieve this Case Communications' networks support VPN's (Virtual Private Networks), which allows one physical network to support multiple logical networks. While all applications will make use of a common infrastructure, each application will appear to have a dedicated network and will not have access to other virtual networks. In November 2016 the council added Public Wi-Fi to the network and this required that public service be segmented from the main UTMC, CCTV, Metro Bus and Office networks. Therefore new Virtual LAN's were added which not only passed through the Case switches but also communicated with the councils IT Network and the Wi-Fi equipment.

### Industrial Secure Managed ADSL Routers for remote sites.

For sites which are remote from the city centre, Case Communications Industrial ADSL routers are used. These run a secure encrypted Tunnels over the Internet back to the Traffic HQ. The 6401's are fully managed via the same management system as the Case Communications industrial switches allowing the same level of management and control as the switches. Traffic controllers sited within 2 or 3km of the Case routers use Case Communications 260Mbps Industrial Ethernet Extenders (XLR 564's), which bring the O.T.U's into the nearest router or switch. These are also fully managed via the CaseView Network management system.

### Summary

Technical officer Neale Burrows says of the network 'We have initiated the first phase of a self-healing fibre optic ring utilising single mode fibre optic cable with 1.25Gps Industrial Managed Ethernet Switches, which in 2020 are being upgraded to Case Communications 10Gbps Switches. Case Communications also deployed a network management system which will allow the network to be monitored and any issues on the communications network to be resolved In addition the management system will monitor any degradation in the network and carry out preventative measures prior to any potential failures. The network has been designed to not only be resilient to failures but to allow for a high capacity of bandwidth for future system expansion, creating a highly flexible and modern network."

Since the original ring the network has expanded and now covers the Aberdeen Western Peripheral Route and goes as far as Dyce Airport.

In November 2016 the council added Public Wi-Fi to the network for the Winter Festival, providing a valuable service to the citizens of Aberdeen

The project was a 'Spend to Save' project with a ROI of under 5 years. Aberdeen are saving £90,000 a year on the Traffic Signal network alone and have added more value with the other services on the network.