



INTERNET OF THINGS CASE STUDY



TRANSFORMATIVE IoT BEYOND CONNECTIVITY

TELUS' Vehicle Tracking Improves Urban Life

END-TO-END IoT SOLUTION IS HELPING CANADIAN CITIES DELIVER SERVICES FASTER AND MORE EFFICIENTLY

In a city in Ontario, 685 snowploughs and other municipal vehicles are being managed by an end-to-end tracking solution supplied by mobile operator TELUS. The solution is developed by FOCUS, which was acquired by TELUS in 2019. This software solution delivers a new approach to delivering telematics capabilities that uses TELUS' LTE and LTE-M¹ networks to provide end to end visibility within an organization by capturing GPS-based telemetric data, such as location, direction of travel and speed, along with other vehicle information, such as engine diagnostic codes while enabling finance, maintenance and other functional teams with at your fingers data on the status of operations and assets.

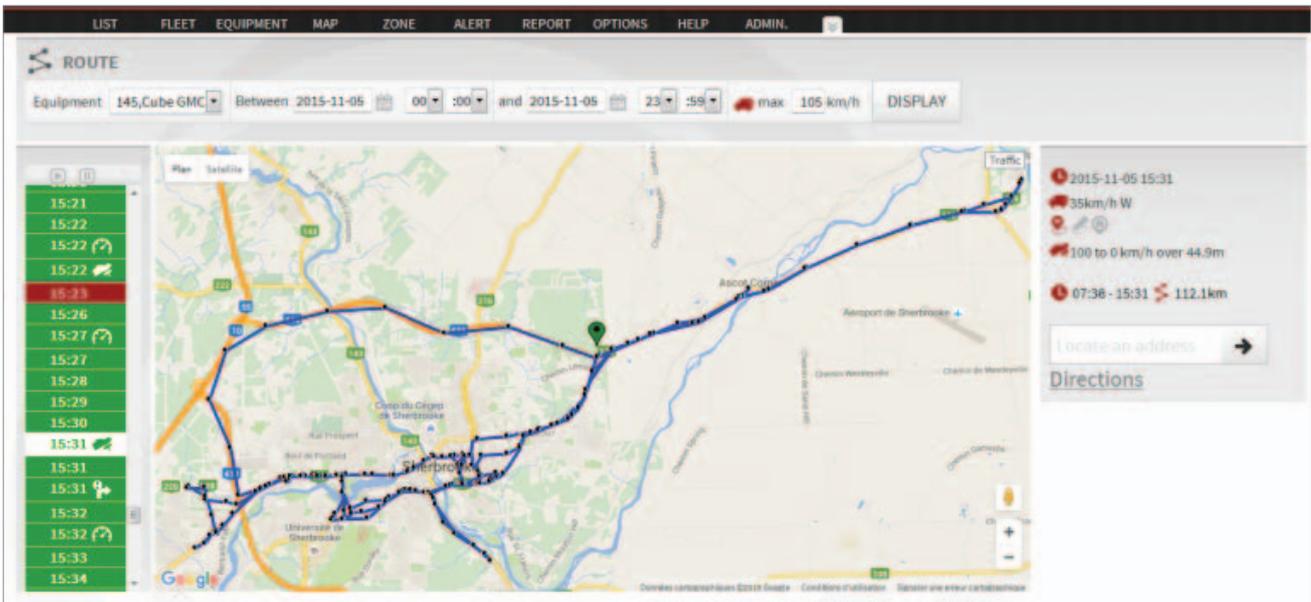
Prior to adopting FOCUS in 2018, the city in Ontario had been using multiple systems to manage its municipal fleet and deliver maintenance reports to city officials. As a result, the municipality was having difficulties integrating the fleet data into a single overview of its operations. By contrast, FOCUS has enabled the city to consolidate all the tracking

information into one system, simplifying data capture and information flow.

The data captured by FOCUS can be used to optimize routes and manage fuel consumption, making each vehicle more efficient and productive. More than 70 municipalities

¹ *LTE-M: Long Term Evolution for Machines. LTE-M is the simplified industry term for the eMTC LPWA technology, which was standardised by 3GPP in the Release 13 specification. It specifically refers to LTE CatM1, which is designed to support the IoT. LTE-M is a low power wide area (LPWA) technology, providing low device complexity and extended coverage, while allowing the reuse of existing LTE base stations (Read more: <https://www.gsma.com/iot/mobile-iot-technology-lte-m/>)





across Canada (including the city in Ontario) are now using the FOCUS solution to provide better services to their citizens.

As well as location co-ordinates, FOCUS can retrieve data from on-board sensors monitoring road and air temperatures, together with information about the plough position, the hydraulics and the rate at which the vehicle is spreading salt and sand to clear ice and snow. All this data is collated in a single in-vehicle unit and transmitted to the FOCUS cloud service via TELUS' LTE or LTE-M connectivity in real-time. The system can also send alerts and notifications to managers and supervisors when pre-configured thresholds are breached.

During winter, the information collected by the on-board sensors can help municipalities identify which urban areas require snow clearance and what type and priority of service is required (applying salt doesn't work below a certain temperature and, depending on the amount of snowfall, different ploughs/vehicles might be used).

The FOCUS solution also tracks the vehicles providing the service. Through better route planning, municipalities have been able to reduce fuel usage and overtime, while achieving **97% precision in the application of salt** (the FOCUS app measures this metric). As a result, snow and ice is cleared faster, improving citizens' lives in the winter months. At the same time, less fuel is wasted and there are fewer carbon emissions, helping the city to meet its sustainability goals.



In the event of a storm, the municipality also uses the data captured by FOCUS to keep citizens informed about which areas are being serviced and the on-going priority actions. A web portal enables the city's 700,000 citizens to see if their street has been ploughed, using the familiar Google Maps interface.

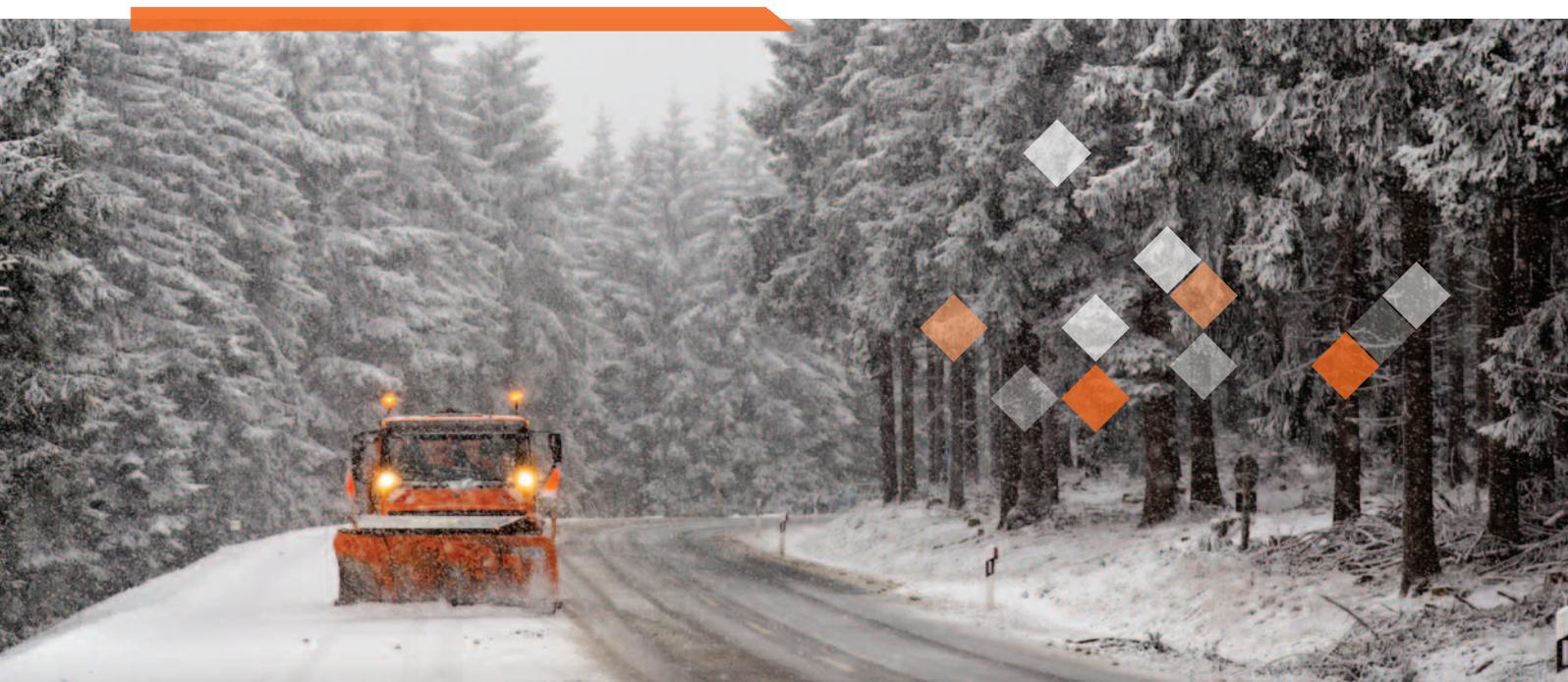


A BROAD RANGE OF URBAN APPLICATIONS

Although snow clearance is only necessary in the winter, FOCUS can be used to help cities with the complex task of managing multiple contractors and sub-contractors engaged in other municipal operations, such as waste management, the enforcement of bylaws and the management of mobile and fixed fuel tanks, all year round. For example, the system can help cities optimize bin collection and commercial waste removal, the management of recycling depots, street cleaning, water treatment, road maintenance and public works projects. Moreover, the information collected by the system can be used by the municipality to identify the nearest relevant employee or police officer (if appropriate) to the source of a complaint.

At the same time, FOCUS can help the city administration and its contractors monitor how much individual vehicles are being used, enabling proactive maintenance and improvements to reliability. On-board sensors and cameras can also capture data and images relating to the state of critical urban infrastructure, such as bridges and other key structures: The connected vehicles effectively become mobile IoT sensors collecting information on the urban environment in real-time.

TELUS acquired FOCUS in 2019 to further expand its portfolio for the transport industry: TELUS offers a range of fleet management solutions to meet the needs of everything from a small business to a major enterprise. As an end-to-end solution, TELUS says FOCUS addresses a number of challenges associated with alternative fleet management solutions, such as the complexity of installing diverse equipment and services, painful on-boarding processes, technological obsolescence and unfriendly and unresponsive user interfaces.





RELIABLE, YET COST-EFFECTIVE, CONNECTIVITY AND CLOUD SERVICES

TELUS also regards FOCUS' reliability as a key differentiator. TELUS says the mobile connectivity, the cloud software, the data storage and the hardware used for the solution are all highly reliable. FOCUS is able to employ both TELUS' LTE and LTE-M networks, with the latter providing low power wide-area coverage, purpose-built for low-cost Internet of Things connectivity.

There are 3 major vertical areas that the FOCUS capabilities are specialized in, which are public administration, construction and specialty transport, encompassing a wide range of applications from school buses to livestock transfers and concrete ready-mix deliveries.

The FOCUS solution is delivered by a dedicated team within the broader TELUS family, which provides the custom solution configuration, installation, and ongoing management after deployment. FOCUS is also backed by TELUS' dedicated IoT Centre of Excellence, which can help customers with everything from solution consulting to on-boarding and ongoing technical assistance. The Centre of Excellence is staffed by experts that know all of TELUS' IoT tools, can provide free training to customers and help troubleshoot any issues. TELUS says the FOCUS team works closely with new customers to ensure they can use all the system's functionality from the start and there are no issues during installation which is driven by its customer success team.

“The FOCUS solution is managed end-to-end and removes any concerns for the customer on technology obsolescence and provides fast, user-friendly modules that meet industry requirements in a robust environment,” explains Julio Villalta, Director of IoT Products at TELUS. “We are providing more value to our customers by moving up the IoT stack and becoming a meaningful part of their business,” he adds. “Being in constant contact with the customer informs the ongoing capabilities to the solution, often at no charge to the customer.”

Find out more:

<https://telus.com/municipality>
<https://www.focusoptimization.com/fleet-tracking/>

About the GSMA

The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators and nearly 400 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences.

For more information, please visit the GSMA corporate website at www.gsma.com.

Follow the GSMA on Twitter: [@GSMA](https://twitter.com/GSMA).

About the GSMA Beyond Connectivity campaign

Delivering seamless IoT connectivity has been a crucial element in helping operators to launch new services such as low power wide area (LPWA) networks, using NB-IoT and LTE-M technologies and create added value and sustainable growth. Now leading IoT operators are building on this and their reputation as trusted industry partners by delivering value added services beyond connectivity.

These end-to-end solutions include services across big data, machine learning, analytics, edge computing and distributed ledger technologies. They are delivering substantial benefits to customers such as increased productivity, reduced costs and automated business processes as well as driving innovative new products and services, new lines of business and new business models.

Services beyond connectivity are transforming businesses and industries.

www.gsma.com/BeyondConnectivity

About Telus



TELUS (TSX: T, NYSE: TU) is a dynamic, world-leading communications and information technology company with \$14.6 billion in annual revenue and 14.5 million customer connections spanning wireless, data, IP, voice, television, entertainment, video and security. We leverage our global-leading technology to enable remarkable human outcomes. Our longstanding commitment to putting our customers first fuels every aspect of our business, making us a distinct leader in customer service excellence and loyalty. TELUS Health is Canada's largest healthcare IT provider, and TELUS International delivers the most innovative business process solutions to some of the world's most established brands

Driven by our passionate social purpose to connect all Canadians for good, our deeply meaningful and enduring philosophy to give where we live has inspired our team members and retirees to contribute more than \$700 million and 1.3 million days of service since 2000. This unprecedented generosity and unparalleled volunteerism have made TELUS the most giving company in the world.

With 13+ years of experience within transportation, TELUS fleet solutions spans every segment from small business all the way to enterprise. All connected to Canada's largest and fastest 4G LTE network and supported by our dedicated IoT Centre of Excellence and deeply experienced roster of IoT specialists. FOCUS was acquired by TELUS in 2019, further expanding its depth in the Transportation vertical. The FOCUS solution is delivered by the FOCUS team, providing the custom solution configuration, installation, and ongoing management beyond deployment with a specialized customer success team.

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