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Case Study

Easy, Scalable Smart City Connectivity To Support Improved Programs in Fredericton, NB

Smart City Solutions


Fredericton, New Brunswick

Customer Challenge

For the City of Fredericton, having access to real-time and historical data to monitor infrastructure, assets and services is necessary to make informed decisions and plans for the future. The predictive models of the past do not provide enough accurate data to be effective. The City of Fredericton wanted to use technology to address specific areas of need, however not all technologies scale for smaller cities, or the cost is too prohibitive to do so. They needed a solution that could address several areas of need at once, and that was scalable and flexible.

Solution

The City of Fredericton partnered with eleven-x to deploy a LoRaWAN® network to expand its digital infrastructure, and provide secure and wireless coverage for connecting cost-effective, battery powered devices. eleven-x is a global leader in terms of integration and deployment of complete wireless DNA (device | network | application software) solutions. Their suite of high performing sensors enable real-time data collection that is communicated through a low power network securely to an intuitive dashboard interface or directly into their existing systems. The deployment of the low power, open standard LoRaWAN network enabled the City of Fredericton to investigate a wide range of Smart City applications tailored to monitor infrastructure, assets, and services in an easy-to-use and cost-effective manner.

With the LoRaWAN network, the City of Fredericton was able to focus on specific areas of need in their community with scalable, cost-efficient solutions, laying the foundation to connect with their citizens, businesses, and academic institutions to provide better services for everyone.

Benefits

- **A multi-use network** provides flexibility in being able to manage many different types of use cases, which was an objective of the city
- **Open standard** has allowed many to access and develop customized devices and solutions to be investigated and they are not limited by 3rd party technology standards
- **Support in network operations.** Being a small city, Fredericton doesn't have the resources to operate a private network, but eleven-x continues to help all along the way
- **The cost-efficient platform** can develop many use cases and LoRaWAN enables the ability to scale backwards (meaning small pilots) and forwards to roll outs very easily.

Fredericton

The City of Fredericton is the capital city of the province of New Brunswick. Internationally and nationally recognized for municipal and community efforts, the City of Fredericton delivers more than 60 programs and services to residents and visitors alike, in a planned and financially responsible manner. Together with its community stakeholders, the City of Fredericton is working to be the most vibrant, small city in North America - using technology to enable civic innovation and solve Smart City challenges.

The City of Fredericton is recognized both nationally and internationally for its innovative approach to municipal and community efforts. eleven-x has deployed a city-wide LoRaWAN® network to support scalable, cost-efficient Smart City solutions.

Challenge Details

The City of Fredericton has a rich history of innovation and has been a leading smart city since the 1990s. As a smaller city, Fredericton has a limited budget for innovation, and they must address real issues within the community while also maintaining their promise and commitment to be innovative.

The City of Fredericton had been using predictive models to make decisions on infrastructure, but these rely on many assumptions. The City of Fredericton needed a way to assess actual performance of existing infrastructure and assets so that they would know where to invest limited capital funding and have the most impact for residents and businesses.

With these challenges in mind, CIO Adam Bell began looking for options that could avoid having multiple systems with different vendors that each used a different platform. He wanted a solution where he could investigate Smart City applications and apply his own use cases, and then open it up to others in the community to contribute.

Solution Details

eleven-x and the City of Fredericton partnered to deploy a broad coverage LoRaWAN® network to enable the City of Fredericton to investigate a wide range of targeted Smart City applications using eleven-x's complete DNA (device | network | application) solutions, tailored to monitor its infrastructure, assets and services. By using the eleven-x network and IoT solutions, the City of Fredericton can efficiently deploy focused pilots to specific areas of need without the need to commit long-term resources or budget before understanding potential ROI. Thanks to the cost-savings from using sensors, the City of Fredericton has been able to explore a range of pilots, all on the same network.

The LoRaWAN network is open standard so the data that the City of Fredericton collects is made available to the public through the city's Open Data Portal. By making this data public, they have seen a boost of creativity, innovation and problem solving with post-secondary education students, entrepreneurs and researchers.

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The city is located on the St. John River which, when combined with spring thaw and fall rainfall, causes flooding in high traffic areas. This seasonal flooding directly influences mobility within the community, which in turn negatively impacts businesses while increasing maintenance and operational costs.

Results and Next Steps

As part of its living lab for civic innovation, Boost Fredericton, the City of Fredericton has pursued deployments for a variety of use cases including water metering, weather monitoring, river level monitoring, smart parking, soil moisture monitoring, people counting and indoor air quality monitoring. From those deployments, they have already had several successful pilots including:

River Monitoring-Forecasting Pilot Project
Fredericton is located on the St. John River, the largest river in New Brunswick. Each spring, flooding is a common occurrence and can be very problematic for residents living and working along major waterways. In the past, it was not possible to monitor the levels in real-time or to act proactively if water levels did start to rise.

The City of Fredericton is using the LoRaWAN® network and IoT sensors to monitor the water level at 3 locations on the Saint John River during its annual flood in real-time. This has enabled proactive flood planning, preparedness and alerts. The City of Fredericton is also using real-time data to undertake research and advanced modelling to forecast flood magnitude and its potential impact.

Other benefits of the River Monitoring Pilot Project include:

- The City of Fredericton can now better predict localized flood impact and provide proactive alerts and notifications
- Cost savings due to advance flood preparations
- Demonstrating return as per infrastructure investments/flood mitigation strategies
- Public value giving citizens the ability to check river water levels real-time on the city's website

Pool Watch Pilot Project
The Fredericton Indoor Pool did not have technology to alert staff when the water required chemicals or other interventions. Staff would have to go to the pool and collect the data manually which was costly and time consuming.

The City of Fredericton used IoT sensors to conduct a technology pilot at the Fredericton Indoor Pool to monitor the pool water remotely and determine when chemicals or other interventions were required. Prior to the pilot, staff had to physically go to the pool to collect measurements.

Benefits of the Pool Watch Pilot Project include:

- Improved the City of Fredericton's ability to measure, monitor and report pool readings quickly & accurately – eliminating need to do manual accounts
- Created a working prototype using IoT sensors on the City of Fredericton's LoRaWAN network
- Created a single monitoring dashboard to manage & analyze IoT network data and provide alerts with social media integration
- This pilot led to two newcomers going on to start businesses using the city's digital infrastructure

Other successful pilots include:

- Weather and precipitation monitoring to determine if there is a variance between the downtown and uptown areas of the city
- Measuring moisture in recreational fields to determine when the fields should be closed due to precipitation
- Monitoring occupancy and utilization of wheelchair accessible parking in the city's downtown core

"For us, it's a journey of innovation. We deploy the network, we build out the use cases, we invite people to collaborate out of it and we look to see what we can learn and **what we can do next**."

– Adam Bell, CIO & Assistant Director – Corporate Services

Results and Next Steps Cont'd

The City of Fredericton has seen cost and time savings by using a LoRaWAN® network with eleven-x's complete solutions to enable real-time, wireless monitoring. Beyond the pilots, post-secondary education students, entrepreneurs and researchers can help design prototype ideas for various use cases to address smart city challenges, as well as conduct research by using collected sensor data that has been made readily available on the City of Fredericton's open data portal. The LoRaWAN network has also created opportunities for other businesses to use and solve their own challenges. The data is also helping the municipality with better informed decision-making and staying on the edge as an intelligent community.

Moving forward, the City of Fredericton will continue to explore verticals that may be able to benefit from the network. As other groups and departments have learned about the LoRaWAN network and solutions, they have already begun exploring the possibilities of other use cases. There have been several ideas that are at proof of concept that they are looking to move into full Boost Fredericton civic innovation lab pilots.

Ready to deliver better programs while reducing operational costs?
Let's connect!

FOR MORE INFORMATION:
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About eleven-x Inc.

eleven-x Inc. simplifies IoT and facilitates faster, evidence-driven decisions through wireless connectivity and real-time data collection for Smart Cities, Campuses, Buildings and Industry. We offer complete device to cloud LoRaWAN™ solutions, comprised of accurate and reliable sensor networks delivering secure data to our customers through easy to use dashboards and industry standard APIs. Organizations rely on eleven-x's wireless connectivity expertise to deliver turnkey solutions that improve operations, simplify processes and deliver value in today's connected world.