

White paper

The new paradigm for transit communications

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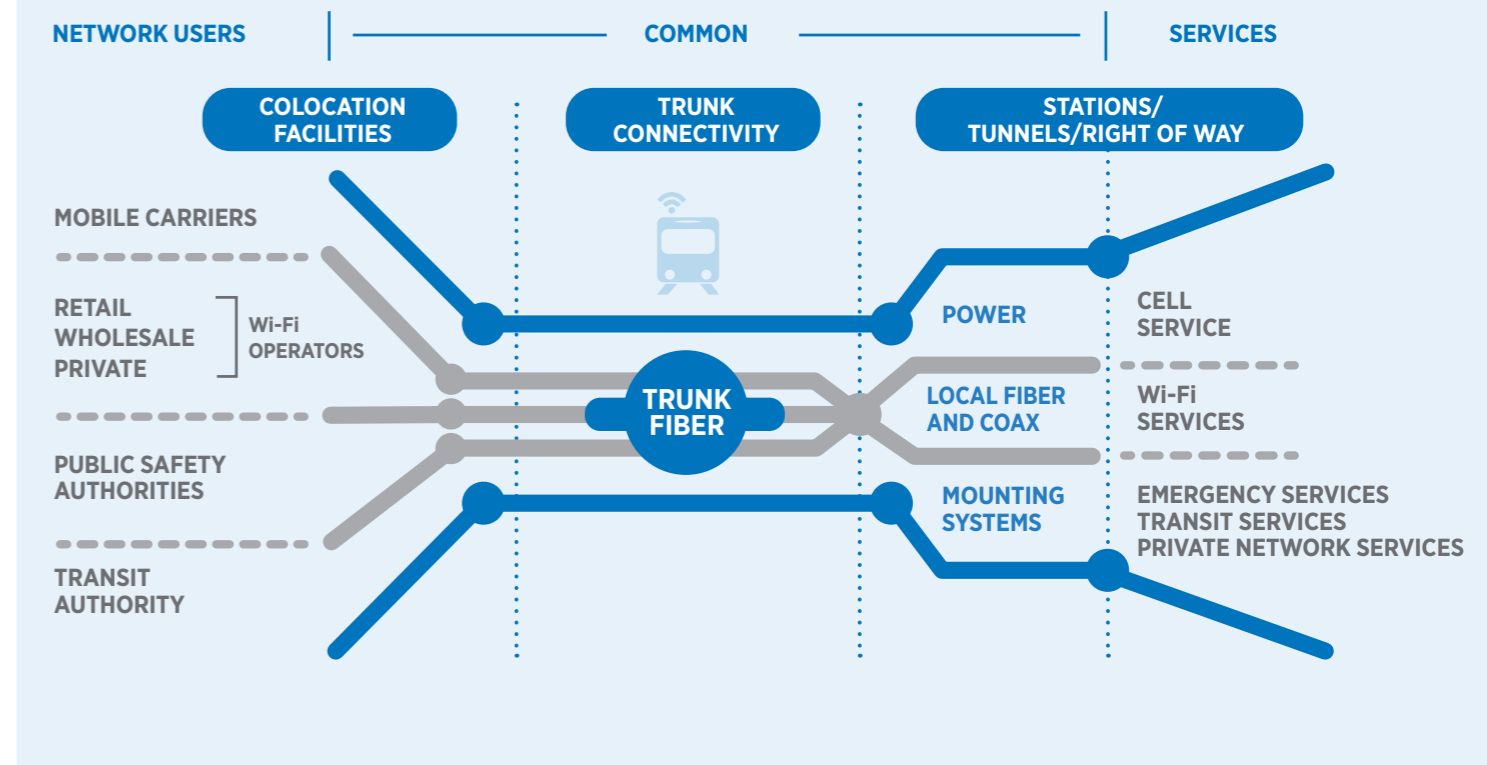


bai communications





The common network paradigm shift



As transit systems gain sophisticated wireless infrastructure for commercial services, a new paradigm is emerging: transit authorities are starting to utilize these private, reliable and highly secure digital networks for the operation of key transit applications.

Consider a scenario in which a rail transit authority focuses on its core business of running trains, supported in this endeavor by a digital communications system operated by an independent network specialist. In this scenario, the communications system is as sophisticated as they come – founded on an optical fiber backbone, providing reliable and seamlessly integrated LAN, cellular and Wi-Fi connectivity both above and below ground. It handles digital fare collections, public safety communications, remote monitoring and control, scheduling and digital signage... the full gamut of transit communication requirements.

The private network operator (PNO) is agile and fast when it comes to network expansion and maintenance, and responsive to the transit authority's needs. Best of all, the transit authority no longer has to sink resources into building and running a communications network, or keep abreast of the latest technology developments. It can trust its PNO partner to ensure communications run smoothly, secure in the knowledge this is not only a practical solution, but an economical and low-risk one as well.

Far from being a fantasy, the above scenario describes an evolving new paradigm for rail transit communications.

The advance of digital communications is transforming the operations of many industries across the world, particularly those with sprawling infrastructure and geographically dispersed users. Workforces can now interact with business systems via handheld devices; information can now be collected and distributed and analyzed and *utilized* automatically across different applications in real time. The effect on productivity – and thus a business's bottom line – is significant.

But all this high-tech goodness does not come without challenge and change. The latest digital systems demand specialists who keep abreast of the latest technologies to deploy and maintain them. Although it is certainly possible for organizations to commit

in-house resources to this – and remains the current model for many transit authorities around the world – the option to outsource communications to a PNO starts to look economically and logistically attractive. The major hurdle to be overcome in realizing the outlined scenario, which does represent a change in paradigm, is that of trust. For any business to relinquish control of its critical systems, without which it cannot operate at all, the highest level of trust and confidence must be present. And, as everyone knows, trust can only be earned.

So how does the industry get to this point where a transit authority is comfortable partnering with a PNO to operate some or all of its critical communication systems? How does a PNO earn that required level of trust? In these early days of the new paradigm, the answer is (unsurprisingly), *gradually* – at first. And then steadily, with increasing speed.

What might begin as a neutral relationship, with a PNO engaged to build and operate a network for commercial services (as an example), grows as the PNO is entrusted first with non-critical transit systems, as a means of leveraging the new network infrastructure. As the PNO proves itself, this trust progresses to some critical systems, until the transit authority considers the PNO its trusted network partner.

The easiest way to illustrate this new paradigm is by looking at the close relationship between Transit Wireless and New York City Transit, which has developed in this way since 2010.



NYC Subway

In the beginning, Transit Wireless was awarded the license to build and operate a new communications network carrying commercial cellular and Wi-Fi services to the 279 underground stations of the New York City Subway. This was primarily in response to consumer demand – commuters wanted to be able to use their smart phones and tablets in places the outdoor cellular networks couldn't reach.

As the transit authority, New York City Transit (NYCT) recognized the advantage of awarding the license to a PNO, instead of undertaking the network deployment itself. Transit Wireless as the PNO would not only deliver a state-of-the-art solution, but also take on the capital investment and risk.

The scope of this massive project, which commenced construction in 2010 and is still underway, involves the deployment of five 'base station hotels' or mega data-centers (two in Manhattan, one each in Queens, the Bronx and Brooklyn) networked via a high-capacity optical fiber ring. Each of these base station hotels is in-turn connected by optical fiber to between 40 and 80 subway stations,

at which point localized station networks, specially engineered for underground environments, provide commercial cellular and Wi-Fi services to commuters.

So far, so good. Commuters and carriers are happy.

NYCT is happy too. After the first six subway station networks were rolled out in Chelsea (September 2011) and then the next 30 stations in Midtown Manhattan including Times Square (April 2013), NYCT saw Transit Wireless could implement these networks rapidly and to a high quality. And when NYCT started to consider updates to its own communications needs, it looked at Transit Wireless's technical ability, speed of deployment and the new high-capacity optical fiber network already going in as a very cost-efficient opportunity... then initiated discussions.

The first step was engaging Transit Wireless to assist with some of NYCT's critical systems – such as an upgrade to the 'help point intercom' in many subway stations. Then, recognizing the opportunity to utilize the new and privately secured fiber network within the subway system, NYCT made the decision

to use the Transit Wireless infrastructure for a variety of impending applications (i.e. On-the-go terminals, digital screens, fare' pay system support).

NYCT will be able to secure and manage its own network, as well as contemplate upgrades to current systems and future technology-enabled projects, advancing technology deployments by years.

Back in 2010, the relationship between Transit Wireless and NYCT began in the 'neutral' zone, but it has grown closer and closer as NYCT developed confidence and trust in Transit Wireless as a communications partner. Further, the partnership is hinged on a dedicated team of NYCT subject matter experts assigned to guide the Transit Wireless design and deployment effort. Transit Wireless's ability to provide the security, reliability and functionality required by NYCT, means it has almost become second nature for the transit authority to look to the PNO for solutions.

Toronto Subway

Meanwhile, the Toronto Transit Commission (TTC) also embarked upon a project to provide wireless connectivity to the Toronto subway system – and in December 2012 awarded BAI Canada (a sister company to Transit Wireless) an exclusive 20-year license to build, deploy and operate wireless infrastructure in both subway stations and tunnels.

Once again, the initial charter was for BAI Canada to deliver commercial cellular and Wi-Fi services; but in this case, the two parties engaged early in constructive discussions around using BAI Canada's network as a platform for long-term connectivity projects.

Although not as large as the New York City Subway, the Toronto subway is still the second largest subway in North America by volume of passengers, and comprises 65 underground stations. Also founded on a high-capacity optical fiber ring, the resulting network will ultimately comprise three base station hotels to integrate with all the station and tunnel

networks. The first four station networks were delivered in December 2013, and by spring 2015 the downtown loop of 18 stations was completed.

With the build about a third completed overall, a number of potential opportunities for TTC and its partners to utilize BAI Canada's infrastructure for other applications have arisen. These include the impending new digital fare payment system (being deployed by PRESTO, a division of provincial transit agency Metrolinx), Wi-Fi services in shopping malls adjacent to major stations, and around 10 other TTC transit applications (for example, enterprise, station manager and other transit applications).

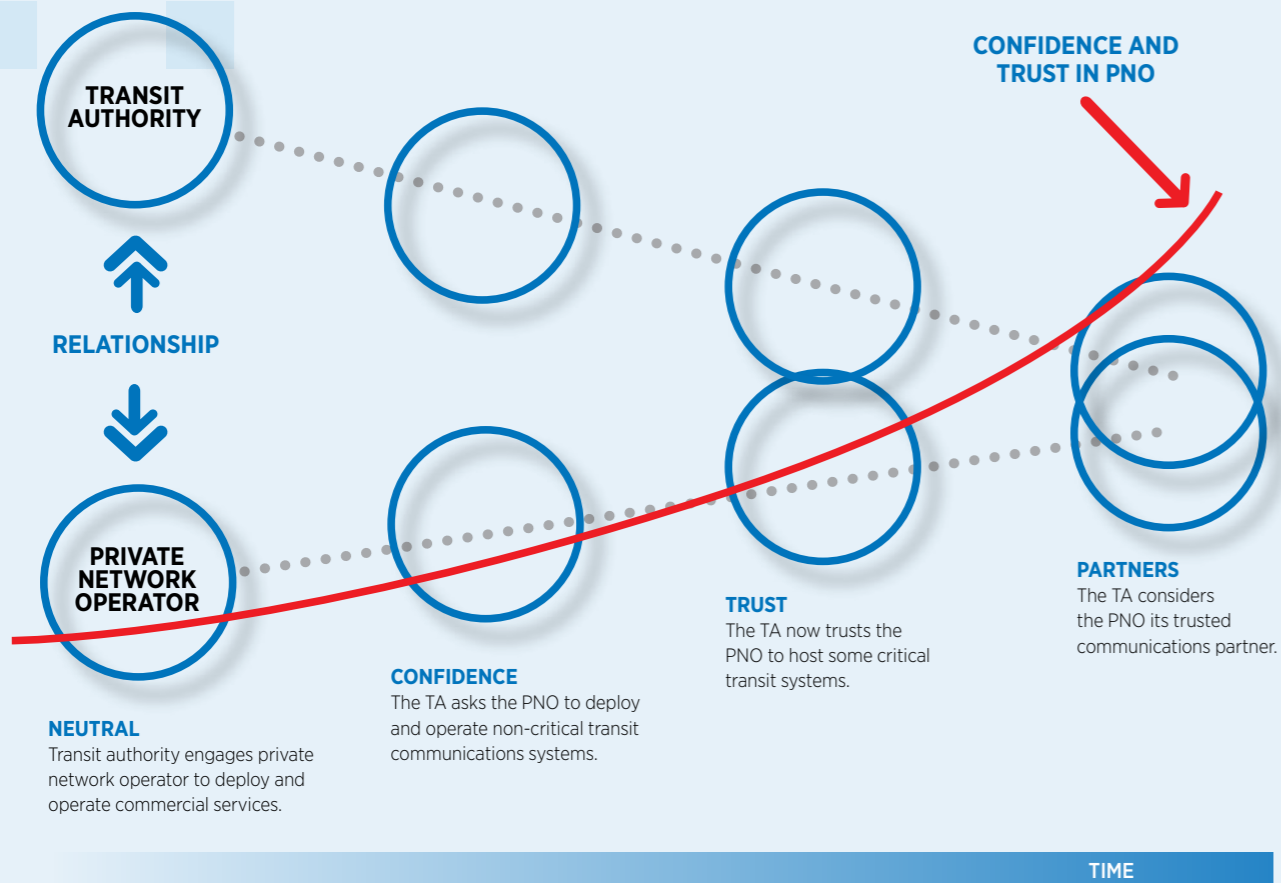
Again, TTC's confidence and trust in BAI Canada as its PNO has grown with the progression of the project. The initial neutral relationship between the two parties has become closer, thanks to the availability of a new, dedicated and secure fiber network, deployed swiftly and to a high quality. There's a strong likelihood TTC will also come to view BAI Canada as its first option when it comes to implementing new digital communications systems.

Logical and advantageous

The acknowledgement that a PNO can provide the security and reliability demanded by a transit authority represents a shift in the industry – but a logical and advantageous one for transit authorities. Rail transit authorities in particular are in the ideal position to utilize sophisticated subway infrastructure initially deployed for commercial services.

Once a PNO has proven its ability, agility and responsiveness, the reluctance to relinquish control of operational systems will begin to wane and the prospect of outsourcing will look more attractive. Close and successful business relationships such as those developed between Transit Wireless and New York City Transit, and BAI Canada and Toronto Transit Commission, will help the new model take hold.

A new paradigm



The growing demand for sophisticated wireless infrastructure in subways is leading to a new paradigm, where a transit authority is comfortable partnering with a private network operator (PNO) to operate some or all of its critical communication systems.

But how does a PNO earn the required level of trust? Let us look at the various stages of the growing relationship.

Neutral

Transit authority licenses PNO to deploy and operate commercial wireless services.

In the beginning, the transit authority recognizes the advantage in awarding a PNO the exclusive license to fund, build and operate a network to carry commercial cellular and WiFi services in subways. The PNO delivers a state-of-the-art solution, and takes on the capital investment and risk.

Confidence

The transit authority asks the PNO to deploy and operate non-critical transit communications systems.

The transit authority needs to improve aspects of its own communications, and sees a network specialist on the ground deploying a high-capacity digital network quickly and inexpensively. The transit authority decides to engage the PNO to deploy and operate some of its own less critical systems and take advantage of that infrastructure.

Trust

The transit authority now trusts the PNO to host some critical transit systems.

The transit authority realizes having a network specialist onboard frees up its own resources and adds communications functionality and flexibility. As the non-critical systems have been operating smoothly, there's enough confidence and trust to transfer some critical systems to the PNO's infrastructure as well. There is no sense in deploying or upgrading a parallel network.

Partners

The transit authority considers the PNO its trusted communications partner.

The transit authority is very happy with the way its seamlessly integrated systems are running in the hands of its trusted network partner. It's a more technologically advanced and reliable system than ever before, and the transit authority is now starting to look for ways to further exploit the new infrastructure.

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