Improving transit efficiency, resource optimization & public safety with real-time transit Wi-Fi data

A CASE STUDY ON THE TORONTO RAPTORS’ CHAMPIONSHIP RUN
Canada let out a collective cheer when the Toronto Raptors won their first-ever NBA Basketball Championship in June 2019. From the night of the nail-biting Game 6 final to the massive parade four days later, Toronto was gripped by ‘Raptors fever’. Nowhere were the celebrations bigger than in the team’s home town.

The festivities around the Raptors’ win put intense pressure on Toronto’s transit system. Fans poured in from across the country to watch the series’ final game live in the city’s public space of ‘Jurassic Park’. Within four days of the win, more than a million people packed the city’s streets to take part in a celebratory parade on what Toronto Mayor John Tory officially declared as We the North day.

Such large crowds can wreak havoc on a city’s transit system – pushing capacity past its limits, forcing street and subway station closures. While the Toronto Transit Commission (TTC), municipal authorities, emergency responders and other players rose to the challenge of Raptors mania, access to real-time data about subway ridership and people flow could have increased operational efficiencies.

The benefits of holistic, real-time data can:

• Help transit authorities make faster, more informed decisions during events and plan more effectively for the future.
• Allow City departments and first responders to tailor services deployed directly to conditions as they evolve, betting addressing commuters’ needs over time.
• Support transit and municipal authorities to target their messages with unprecedented accuracy.
Unprecedented network traffic

It was no surprise that traffic on our TCONNECT subway Wi-Fi network skyrocketed the night the Raptors won – and again four days later when the city held a celebratory parade. Hidden inside those traffic volumes, however, was a story about human flow and transit demand with powerful insights for City officials.

KEY STATISTICS

800 Mbps surge in traffic
from game start until midnight – equal to streaming 53 high definition movies at the same time for four hours straight (or 780,000 Kawhi Leonard buzzer beater videos!)

GAME 6 VICTORY UPLOAD SPIKE

↑494% spike
in uploads between 10 p.m. and 11 p.m. compared to summer average

>12.489 terabytes of traffic on June 13 & 14 – the equivalent of streaming Spotify for 35 years straight
We have systems in place that monitor the network to ensure consistent performance. The night of Game 6, we began to receive alerts of anomalous network behaviour at Dundas station – a sign that, behind the data traffic volumes, something was happening on the ground. Sure enough, ten minutes after our system notifications came in, local TV news channel, CP24, tweeted about subway closures due to overcrowding.

Officials using our network data would have seen the buildup in real-time and could have taken precautionary measures to ensure safety, allowing them to close stations as required and re-route passengers to relieve congestion sooner.

**TYPICAL NIGHTLY TRAFFIC VS. NIGHT OF GAME 6 TRAFFIC**

Average nightly traffic
Night of Game 6 traffic

TTC says subway trains are not stopping at Dundas Station due to overcrowding inside the station. The 505 Dundas Streetcar is also not running due to fan celebrations in the way of its route.

10:03 AM - Jun 14, 2019 · TweetDeck

319 Retweets · 902 Likes
Over a million people descended on downtown Toronto for the Raptors’ parade – even more than the Blue Jays’ 1993 World Series celebrations. The crowd at Nathan Phillips Square numbered 100,000 alone. By comparison, the city’s New Year’s Eve ceremonies at that same location typically draw about 60,000 people.

Unlocking the insights in our Wi-Fi network usage data from events like parade day could be used to improve station safety, guide resource allocation decisions and even shed light on macro population dynamics.

**Seeing the big picture**

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**KEY STATISTICS**

- **↑~6.5 terabytes of traffic**
  - 28% increase in traffic

- **↑91% more upload traffic**
  - than daily average

- **↑53% increase in Wi-Fi logins**
  - at subway stations
  - in the downtown core

- **↑17% increase in Wi-Fi downloads**

**TYPICAL VOLUME VS. GAME 6 VOLUME**

2. Excluding stations closed due to overcrowding

**BAI COMMUNICATIONS MOVING MILLIONS: A CASE STUDY ON THE TORONTO RAPTORS’ CHAMPIONSHIP RUN**
Monitoring traffic patterns and identifying potential overcrowding allows transit authorities and other city services to make faster, more precise decisions about where and when to close streets and subway stations, divert traffic and deploy personnel during special events.

Beyond facilitation of real-time responses to shifting conditions, historical data from events like the Raptors’ Game 6 championship win and parade can give officials information to plan for similar future events. That means having a clearer picture of where extra resources such as trains, buses or personnel will be required over the course of a day or evening – through the build up, peak and trail-off – to keep people moving and services flowing.

What could be done with the data?

Real-time system optimization

WI-FI NETWORK DATA ENABLES TARGETED USER OUTREACH

Three TTC subway stations were hot spots of network usage on the night of Game 6: Union, Finch and Bloor-Yonge. Knowing where the greatest concentrations of users are located, public and private organizations can use the TCONNECT Wi-Fi network to reach out and engage with targeted accuracy.
Hot spots & hubs
Our TCONNECT Wi-Fi network captured a real-time picture of where the biggest crowds congregated and which subway stations saw the most activity over the course of the Raptors’ events.

Predicting pressure points
Understanding the patterns of where volumes are highest could help authorities in Toronto and surrounding feeder communities plan to better support travel into and out of the city. Although St. Andrew, Queen’s Park and St. Patrick stations saw the greatest increase in login traffic, nearly all areas of the TTC experienced greater foot traffic the night of Game 6. Understanding where and when areas become more congested can help transit authorities better address unexpected passenger flows and crowding conditions during special event days.

Key statistics

**RAPTORS’ GAME 6**  JUNE 13 OVERNIGHT INTO JUNE 14, 2019

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**KEY STATISTICS**

- **20% more network traffic**
  at Union Station, signalling its central role as a transport hub for fans and commuters alike
- **43% increase in Wi-Fi login traffic**
  at St. Andrew, Queen’s Park and St. Patrick Station

**RAPTORS’ PARADE DAY**  JUNE 17, 2019

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<td>Our data shows the TTC’s commitment of additional resources clearly helped keep people moving as quickly as possible on parade day, with shorter trips on average across the system. Analyzing this data could help the TTC better allocate city or transit resources and personnel - and may have helped anticipate the increased foot traffic seen on the day.</td>
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**KEY STATISTICS**

- **23% shorter average trip**
  durations on parade day compared to the summer average
- **61% higher traffic**
  at King as a result of other station closures – with similar volumes at St. Andrew and St. Patrick
Better, more accurate transit planning

Journey analytics from events such as the Raptors’ championship final and parade reveal opportunities to optimize the transit experience overall and for future special occasions.

Identifying the most heavily travelled routes allows transit operations teams to determine where to assign peak-volume trains, easing burden on individual stations and optimizing trips for passengers. It also provides a baseline for developing optimal route plans for similar events in the future.

The data has larger-scale and longer-term applications as well. Urban planners can use it to better understand how residents traverse the city on event days and on regular commuting days, providing support for business cases to improve city services and infrastructure.

SPEEDING UP TRAVEL ACROSS THE CITY
By looking at which origin-to-destination trips are most trafficked, transit planners have clear, objective data to support decisions about where to locate future stations.
An explosion of app usage

Understanding riders’ app use can also help transit authorities like the TTC understand riders’ behaviour – and their preferred sources of information. For the Raptors’ events, the top apps focused mostly on social media, ride sharing services, live streaming and news feeds.

RAPTORS’ GAME 6  JUNE 13 OVERNIGHT INTO JUNE 14, 2019

Where people go at the end of the night

To get home once the subway was closed, many people got off at interchange stations or the end of the line and called for ride share services such as Uber and Lyft. That is valuable information for ride share service operators, who could strategically deploy vehicles to be waiting where passengers will need them most. By leveraging insights derived from riders’ social media patterns, public and private partners can better deliver localized information to their customers.

RAPTORS’ PARADE DAY  JUNE 17, 2019

Information consumption and sharing

People’s online behaviours are clear indicators of where they’re getting – and how they’re sharing – information over the course of a given event. The significant increase we saw in live-streaming traffic during the Raptors’ parade day can give transit authorities and city officials greater line of sight into peak times for optimizing the reach of their messages. An increase in traffic to local news apps can help authorities stay on top of incidents and ensure they are communicating resolutions in a timely manner. It points to where people are most reachable and accessible. The 6.4 terabytes of data (2.2TB of social content) used throughout the parade day equates to more than 9,000 hours of watching Netflix: a massive amount of attention to capture with relevant content and messages.²

Public authorities and private companies can both benefit from the use of our subway Wi-Fi network data – identifying the most effective, most-used platforms to manage traffic in real-time, target advertising and even to promote increased ridership.

Knowing which social media platforms riders are using gives transit authorities and other public officials the opportunity to publish important information about subway station closures, route changes and other conditions, enabling better management of traffic through the city. First responders can monitor the network for sudden, localized changes in usage that could indicate an emergency situation, quickly identifying if personnel need to be deployed.

What could be done with the data?

**Capitalizing on engagement**

Our data from the night of the Raptors’ Game 6 showed that most commuters were using ride share services toward the ends of the subway lines and at junction stations. That information could be used by ride share providers or by the TTC itself to provide greater service continuity for commuters.
What can BAI data do for you?

Using the data captured live and in real-time over BAI Communications’ TCONNECT Toronto subway Wi-Fi network, the TTC, other city authorities and private companies can make faster, sharper, more precise decisions to make future city events even more successful and efficient.

BAI Communications enriches commuter experiences and helps create smarter cities. We provide Wi-Fi and cellular connectivity throughout the TTC subway system, supporting approximately 150,000 sessions from 100,000 unique devices every weekday. We design, build and operate communications infrastructure – cellular, Wi-Fi, broadcast, radio and IP networks – connecting communities around the world.

The data from our network has three distinct characteristics that make it exceptionally valuable to transit authorities, city officials, public safety organizations, advertisers and consumer service providers:

• **It’s holistic**
  providing an end-to-end view of the entire subway system at once for an accurate, by-the-minute picture of the commuter experience.

• **It’s always live, in real-time**
  accurately reflecting changing conditions as they occur for the most precise and timely decision-making possible.

• **It’s reliable**
  based on advanced algorithms and network monitoring statistics, we ensure all insights generated are trustworthy, sable and follow best practice.

**BUILT-IN PRIVACY PROTECTION**
Our subway Wi-Fi network logs connections and app use by device. Based on the number of devices connected, algorithms are used to calculate overall ridership. Protection of users’ privacy is a top priority – we have implemented security measures designed to ensure user privacy, in accordance with industry best practices. All data is handled anonymously and in aggregate. While we do not store any personally identifiable information, we treat all our data with the same stringent privacy protection as if it is.

Find out what our subway Wi-Fi network data can do to support your business goals. **Connect with us today.**