



Massachusetts Bay Transportation Authority

MBTA Wi-Fi Project Update

Presentation to the FMCB

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July 31, 2017



Purpose of Today's Discussion

- ❖ To share the MBTA's findings from its 30-day review period (announced on July 5, 2017), and its evaluation of the Commuter Rail Wi-Fi contract with BAI Communications.
- ❖ To evaluate concerns recently raised by communities.
- ❖ To understand what the MBTA is getting from this contract.
 - ❖ Technology
 - ❖ Financial
- ❖ This is a report and a discussion: no staff recommendations will be made today.



Key Conclusions

Financial

- ❖ The basic structure of the contract provides free, high-quality Wi-Fi to Commuter Rail riders and requires no capital investment by the MBTA.
- ❖ The contract also contemplates the provider will lease space on the monopoles to cellular carriers.

Technology

- ❖ The current Wi-Fi service on Commuter Rail is both unreliable and unsatisfactory.
- ❖ The proposed technology should significantly improve the Wi-Fi on Commuter Rail.
- ❖ BAI Communications has experienced employees who can deploy the proposed trackside network.
- ❖ The technology supporting the trackside network is up to date and will likely work as promised.

Contract

- ❖ MBTA will work with BAI to consider possible mitigation options in light of the terms of the contract.
- ❖ The contract contains no termination for convenience clause.



Our Work Since the Last FMCB Meeting (6/26/17)

- ❖ Performed an internal due diligence to understand events since the original contract was signed with InMotion Wireless and interviewed MBTA personnel who have been involved with the project.
- ❖ Engaged with BAI to understand the work that had been completed to date along the MBTA's right of way and the technology and capabilities of the proposed trackside network.
- ❖ Consulted with experts in the field of mobile wireless communications to vet the technology proposed.
- ❖ Evaluated MBTA's rights and responsibilities, as well as possible mitigation scenarios.



History and Overview

- In 2014, MBTA entered into a License and Operating Agreement with inMotion Wireless to improve Wi-Fi service on the commuter rail at no cost to the MBTA or its passengers.
- In February 2017, due to a lack of significant progress, the License was amended to add various terms, including a construction completion schedule.
- After the amendment, inMotion was acquired in March 2017 by BAI Communications, the current “Licensee.”
- The construction completion schedule has construction starting this summer and lasting one year.
- The design concept for the Wi-Fi service involves a network of approximately 320 monopoles along MBTA’s right of way (ROW).
- Opposition has arisen to some of the monopole locations and heights, which have been designed to be 70+ feet. In addition, MBTA has received correspondence from legislators on this matter.
- On July 5th, a 30-day review period was announced.



Who is BAI Communications?

- BAI Communications purchased inMotion Wireless, the original licensee, in March 2017.
- BAI is a privately-held Australian company with US locations in New York and Cambridge.
- BAI team includes their CEO for BAI's North American subsidiary, Jerry Elliot, and their lead technician, Josh MacKinnon
- BAI itself has not provided Wi-Fi service to an above-ground train system before, but Mr. MacKinnon and his prior employer, the GBS Group, have done so.
- On July 13, 2017, BAI announced that it will use RADWIN's *FiberinMotion*® technology to provide Wi-Fi service.
- RADWIN's technology has been (or will be) deployed on similar Wi-Fi projects in the United States:
 - Amtrak's North-East Corridor (pending)
 - SF BART (pending)
 - Utah Transit Authority FrontRunner



BAI Design

- BAI's design is built around fiber installed below ground along the wayside, which carries the internet data to and from the monopoles.
- Radio transmitters are mounted on each monopole. The transmitters beam broadband to each train, and a router on board each train provides Wi-Fi to riders.
- BAI believes the proposed Wi-Fi service will provide speeds of at least 100+ Mbps (current MBTA system is approximately 0-200 Kbps).
- Proposed Wi-Fi service employs a backup system based upon cellular. It aggregates coverage to simulate broadband service.
 - Backup system is only as good as existing cell coverage and is costly.
 - Current cell coverage is spotty along the right of way (see appendix).
- BAI's design contemplates that the antennae for Wi-Fi will be placed at 35 feet above ground. The space above 35 feet can be leased out to commercial wireless carriers for a fee.
- BAI believes leasing space on the monopoles to wireless carriers will improve cell service in local communities.
- An interactive map of the proposed monopole locations can be found at: <https://bit.ly/mbtawifipoles>



The Contract

- Licensee bears all the costs of designing, constructing, and providing free Wi-Fi to all MBTA commuter rail riders.
- Licensee's expected investment on the Wi-Fi project, as envisioned, has been reported to be \$140 million, but actual costs are unknown.
- Standards of services built into the License require the Wi-Fi service to be "competitive with that of Wi-Fi networks widely available in the Greater Boston area."
- Licensee earns back its investment:
 - By leasing out space on monopoles to commercial wireless carriers.
 - By taking advantage of the additional fiber infrastructure.
- License, as amended in February 2017, imposes a strict schedule for the Licensee to start construction next month and install a fully functioning Wi-Fi system by August 2018 (subject to MBTA extensions).



MBTA Approval Rights

- **The contract was entered in June 2014, and amended in some respects in February 2017. As indicated, the contract does not contain a termination for convenience clause.**
- **Under the contract, MBTA has certain approval rights, including the following:**
 - “Licensee shall submit a construction and installation plan and detailed specifications for the Wi-Fi Network and Infrastructure (the ‘Plans and Specifications’) to the MBTA within thirty (30) days of the MBTA’s approval of the final design specifications...The MBTA shall use reasonable efforts to approve the Plans and Specifications within forty-five (45) days.” License, Section 5.3.1.
 - “The exact locations of the installed Wi-Fi Network on MBTA property and the Infrastructure will be determined by Licensee, subject to approval by the MBTA.”
- To date, Licensee has not provided the MBTA with detailed specifications for the Wi-Fi Network and Infrastructure.



Financial Aspects of the Contract

- **The MBTA is entitled to:**
 - “7.5% of the net revenue proceeds from all revenue sources in connection with the Wi-Fi Network and Infrastructure, including without limitation, revenue generated from sublicenses of the Infrastructure and/or third party sponsorship of the Wi-Fi Network, if any.”
 - “Net revenue proceeds” shall be defined as all revenue, less repayment of capital expenses and operating expenses.”
- Total net revenue proceeds to the MBTA, over the 22-year life of the contract, are estimated to be \$20-40 million.
- Because of the back loaded nature of the income stream, the MBTA’s view is that the net revenue paid to the MBTA will not be significant.
- At the end of the term, ownership of the Network and Infrastructure will revert to the MBTA.



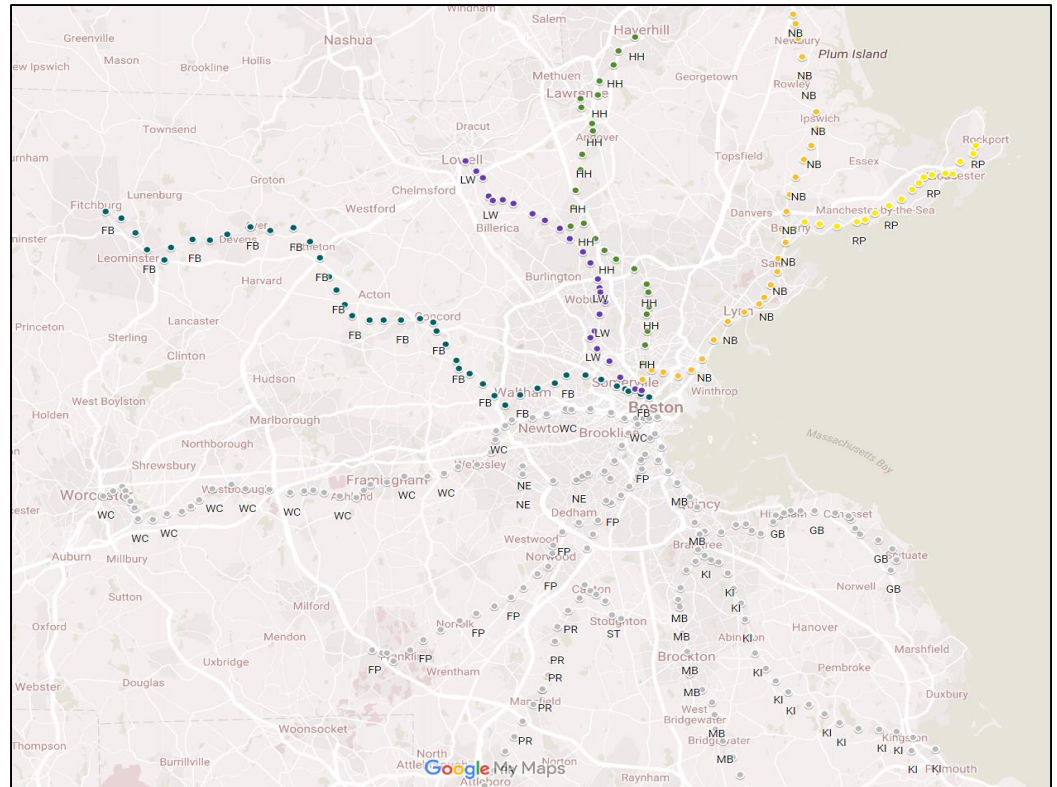
Role of the National Historic Preservation Act (Sec. 106) and FCC

- The Federal Communications Commission (FCC) must license the monopoles as they will be used for cellular communications.
- Section 106 Review: National Historic Preservation Act requires FCC to consider ways to “avoid, minimize or mitigate the adverse effects” of projects on or near sites listed on, or eligible for, the National Register of Historic Places.
 - Section 106 analysis to consider mitigation generally must be performed if there is a historic site within ½ mile of a tower.
 - Process requires public consultation and can include studies.
 - FCC may force mitigation if a “National Historic Landmark” is impacted.



BAI Progress and Status of Section 106 Notices

- BAI has chosen nearly all of the tower locations and has contracted with Ramaker & Associates to facilitate the required National Environmental Policy Act (NEPA) and Section 106 review process.
- Ramaker has submitted Section 106 notices on a rolling basis to municipal planning boards on the Northside where monopole sites have been chosen, but has not submitted notices to the Southside.
- BAI has mapped out the strength of existing Wi-Fi service along all but Attleboro Line.
- BAI is currently completing soil testing and boring logs to determine the final locations of the monopoles.
- BAI installed stationary Wi-Fi in North, South, and Back Bay Stations.
- BAI is testing its backup cellular aggregation system on the Cape Flyer service.





Contractual Completion Schedule

- The Completion Schedule includes rolling deadlines on a line-by-line basis.
- BAI only recently selected its technology, no monopoles have been installed, and no final construction or design documents have been submitted to MBTA.
- Under the current contract, Lowell line must be live by **November 9, 2017**, with additional lines coming due on a monthly, rolling basis, with a winter break scheduled in January and February.

Line Name	Total Poles	Design Submitted to MBTA	NEPA/SHPO Complete	Construction Start	Construction Complete	Line Go Live	North Wayside Complete	South Wayside Complete	North Go Live	South Go Live
Lowell Line	25	8/13/17	8/13/17	9/17/17	10/26/17	11/9/17				
Fitchburg	42	8/13/17	8/13/17	10/12/17	12/17/17	12/31/17				
Haverhill	26	8/20/17	8/20/17	10/27/17	12/8/17	12/22/17				
Newburyport	29	8/20/17	8/20/17	12/17/17	3/13/18	3/27/18				
Rockport	18	8/27/17	8/27/17	12/27/17	4/13/18	4/27/18				
							4/27/18		5/12/18	
Worcester	45	9/13/17	9/13/17	3/13/18	5/24/18	6/7/18				
Needham	8	9/13/17	9/13/17	3/13/18	3/24/18	4/7/18				
Stoughton	5	9/13/17	9/13/17	3/27/18	4/2/18	4/16/18				
Forge Park	26	9/13/17	9/13/17	4/4/18	5/15/18	5/29/18				
Middleboro	30	9/19/17	9/19/17	5/9/18	6/26/18	7/10/18				
Kingston	21	9/19/17	9/19/17	5/16/18	6/18/18	7/2/18				
Greenbush	20	9/19/17	9/19/17	6/13/18	7/15/18	7/29/18				
Providence	33	11/11/17	11/11/17	6/13/18	8/4/18	8/18/18				
								8/6/18		8/18/18
328										



Proposed Public Benefits of a Trackside Network/CR Wi-Fi

- **For Commuter Rail passengers:**
 - Materially higher data speeds projected to be at least 100+ Mbps (up from current speeds of approximately 0-200 Kbps).
 - Reliable connectivity and coverage across all Commuter Rail lines.
 - Wi-Fi connectivity at all stations and parking lots.
 - Improved communications options can have emergency and public safety benefits.
- **For communities along the MBTA right of way:**
 - Each monopole will provide new and/or enhanced cellular coverage (up to 1.5 miles in all directions).



Concerns Raised By the Public

- Poor communication about project by the MBTA and/or BAI.
- Insufficient public notice and process regarding monopole locations
- Potential for technology to become obsolete/Availability of other options to provide Wi-Fi to commuter rail customers
- Aesthetic and other adverse impacts of monopoles



Next Steps

- Extend review period to August 14th to further review and evaluate.
- Obtain additional information requested.
- Return to the FMCB on August 14th with an update.



Appendix



Current Wi-Fi/Cellular Strength Along Commuter Rail Lines

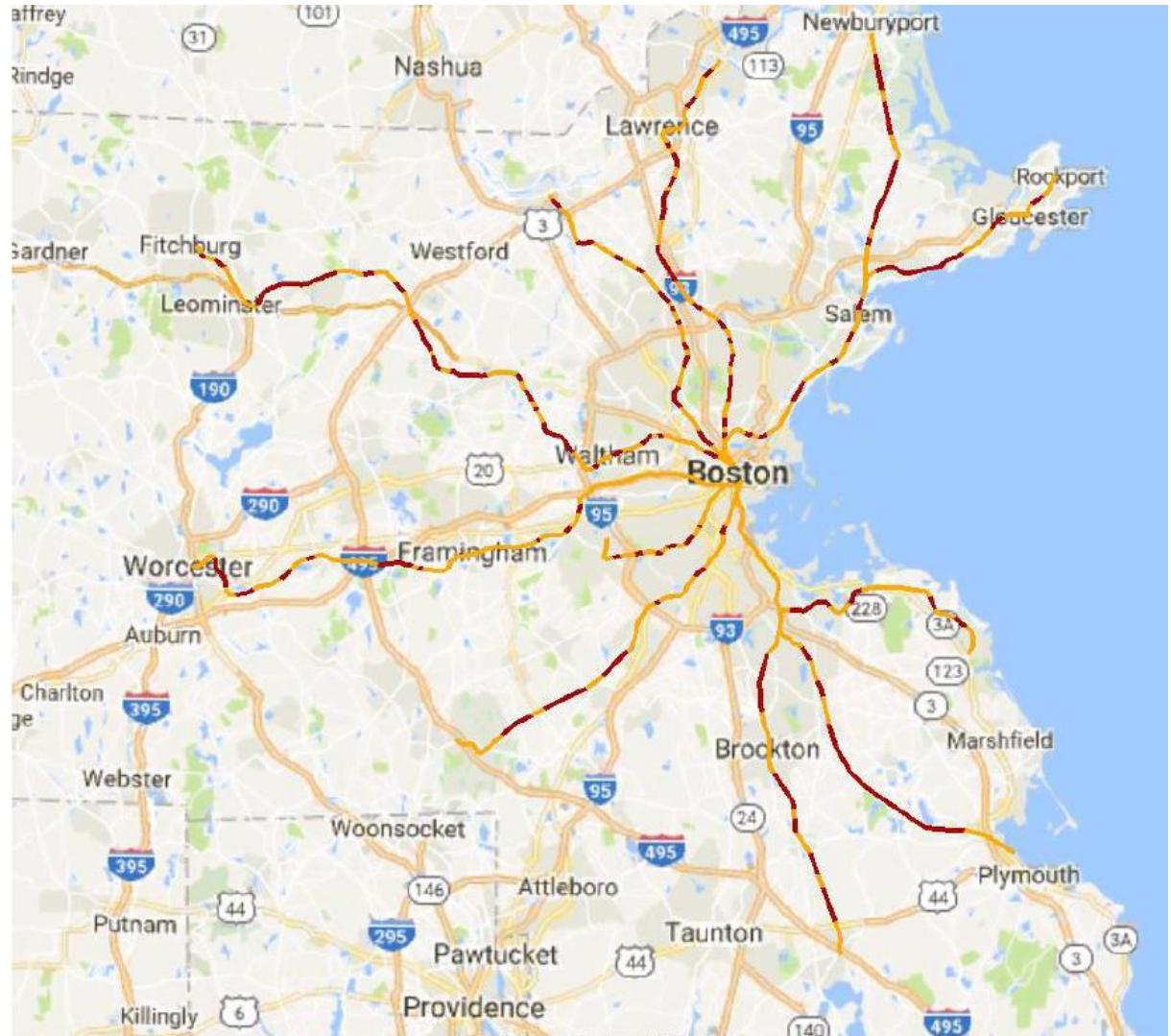
- As cellular companies have removed 3G (the current MBTA Wi-Fi) from their networks to add more LTE 4G, the MBTA on-board Wi-Fi has become less and less reliable.
- The resulting double jeopardy to the current MBTA on-board Wi-Fi system is: 1) ever increasing poor service; and 2) no or painfully slow connections that don't support current apps or usage, let alone a significant number of users.

The current status

Red – No Wi-Fi availability or unusable Internet connectivity resulting in speeds of 0 – 250 Kbps.

Orange – Very poor Internet connectivity with speeds of 250 – 500 Kbps.

Green – Good Internet connectivity with speeds sufficient to offer Wi-Fi to many concurrent users.





Current Wi-Fi performance on Newburyport / Rockport Lines

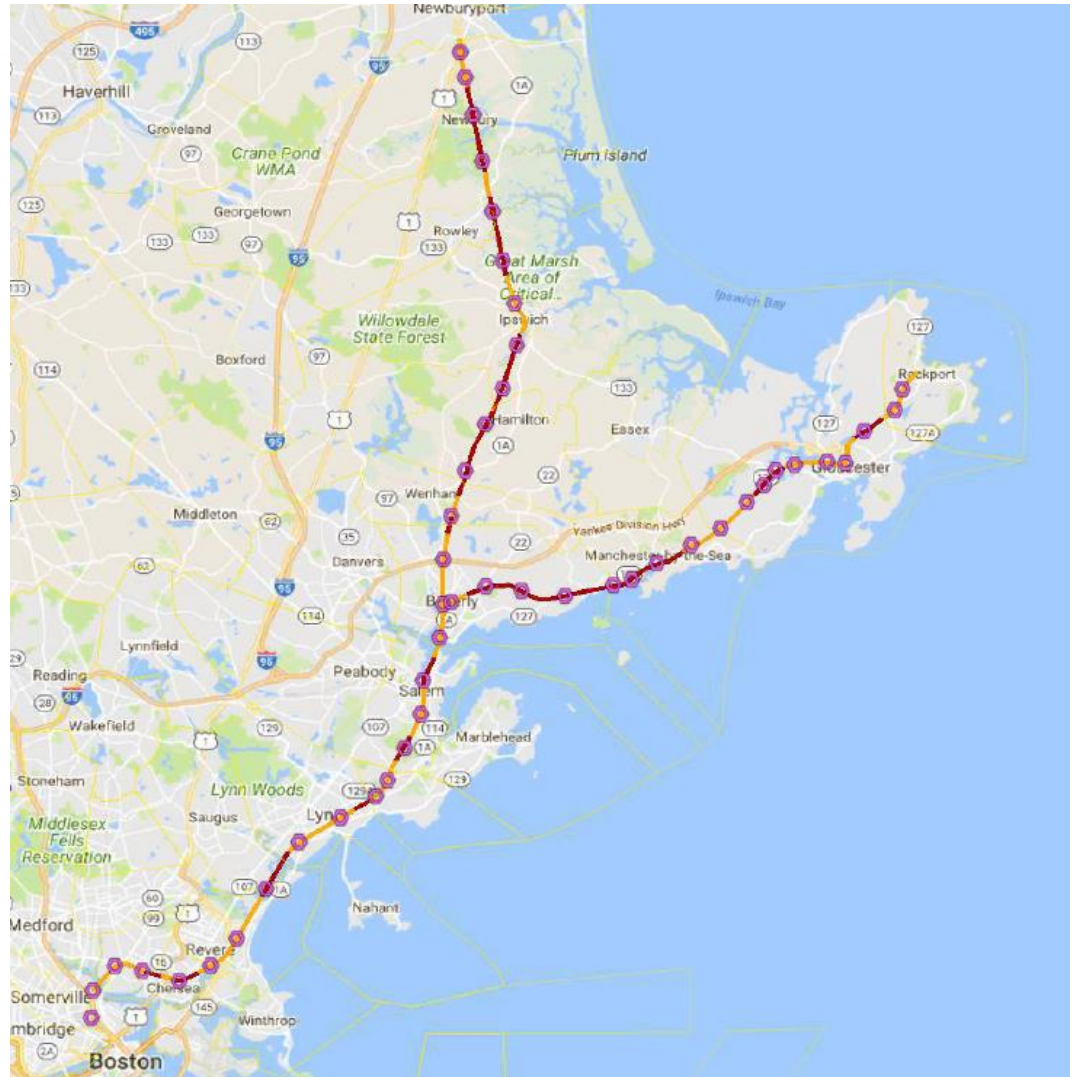
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 Locations of BAI poles and radios dedicating up to 500 Mbps to passing trains enabling broadband Wi-Fi services.





Current Wi-Fi performance on Haverhill Line

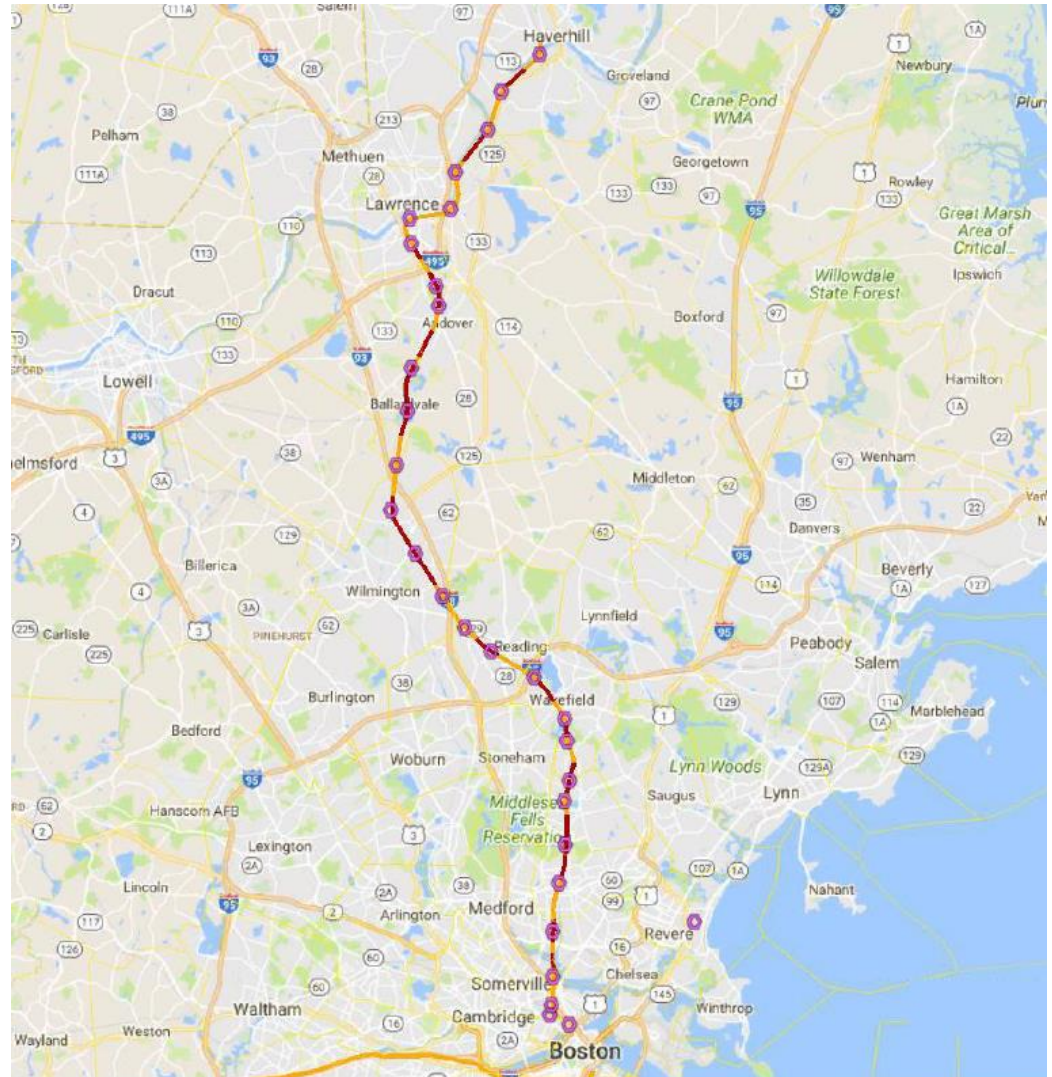
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Current Wi-Fi performance on Lowell Line

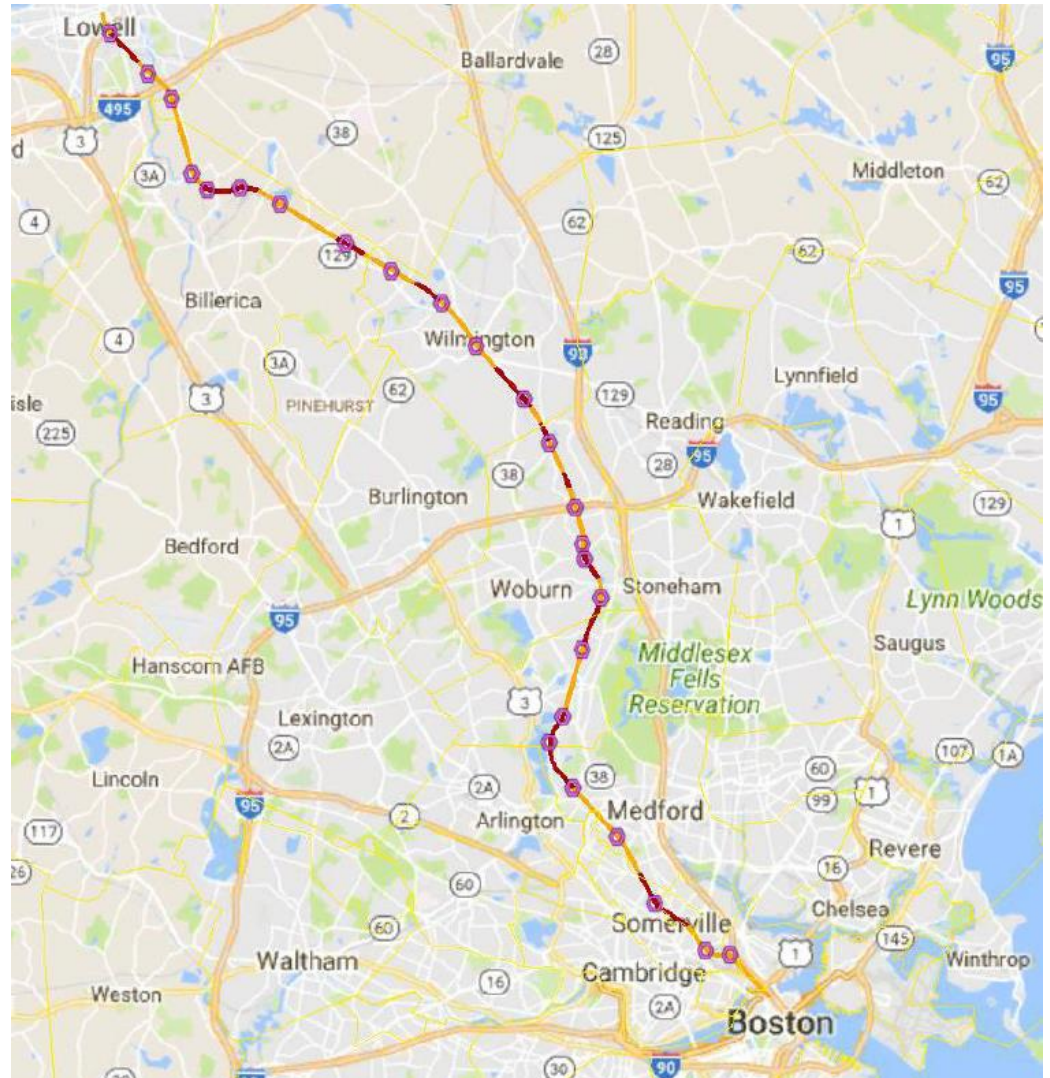
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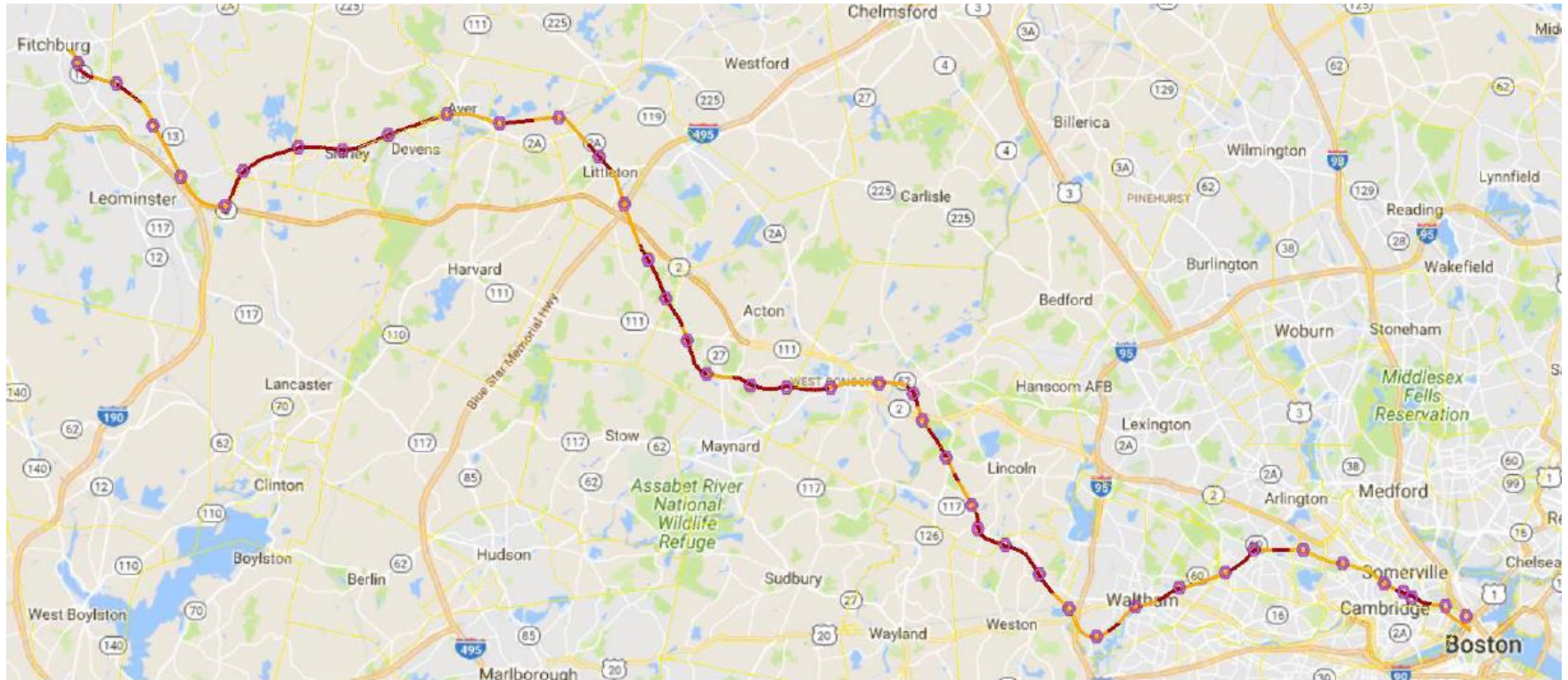
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 Locations of BAI poles and radios dedicating up to 500 Mbps to passing trains enabling broadband Wi-Fi services.





Current Wi-Fi performance on Fitchburg Line



The current status

Red – No Wi-Fi availability or unusable Internet connectivity resulting in speeds of 0 – 250 Kbps.

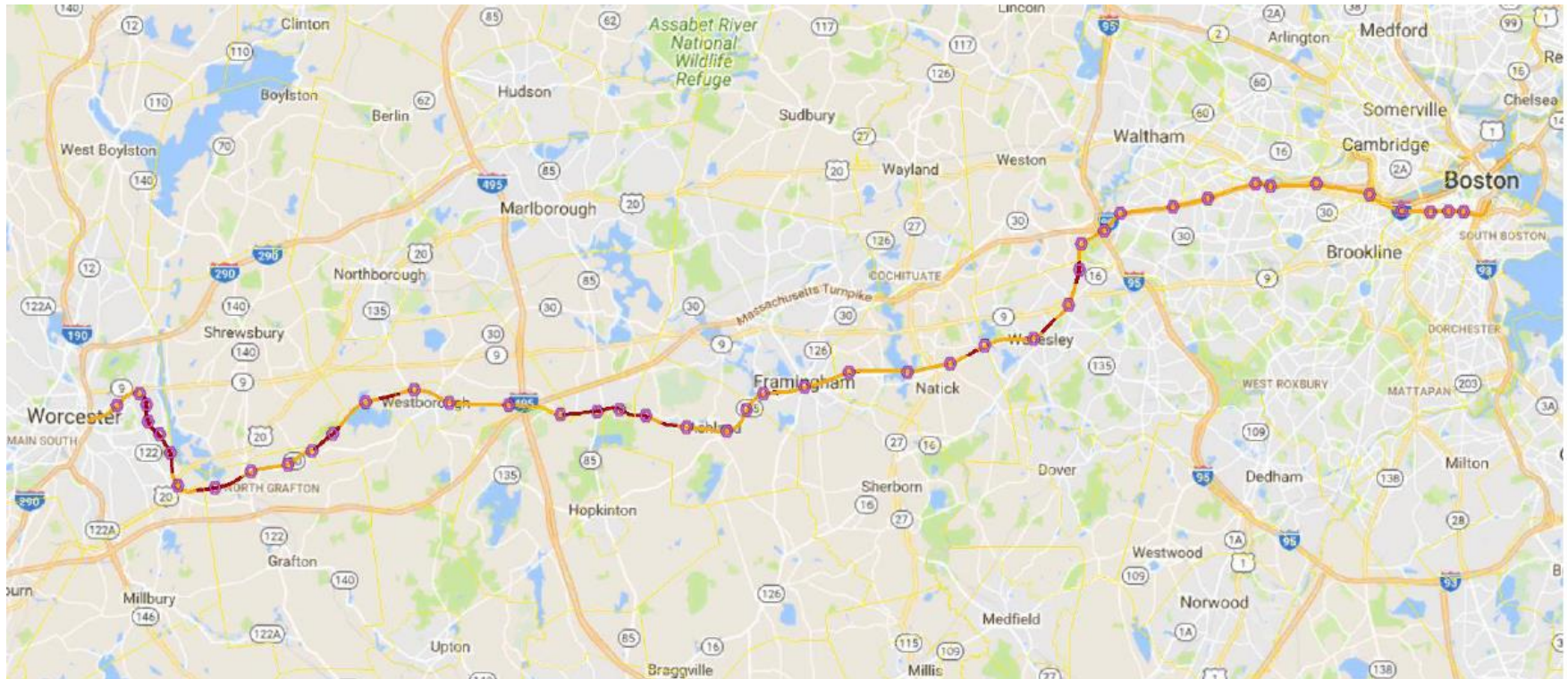
Orange – Very poor Internet connectivity with speeds of 250 – 500 Kbps.

Green – Good Internet connectivity with speeds sufficient to offer Wi-Fi to many concurrent users.

 Locations of BAI poles and radios dedicating up to 500 Mbps to passing trains enabling broadband Wi-Fi services.



Current Wi-Fi performance on Worcester Line



The current status

Red – No Wi-Fi availability or unusable Internet connectivity resulting in speeds of 0 – 250 Kbps.

Orange – Very poor Internet connectivity with speeds of 250 – 500 Kbps.

Green – Good Internet connectivity with speeds sufficient to offer Wi-Fi to many concurrent users.

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Current Wi-Fi performance on Needham and Franklin Lines

The current status

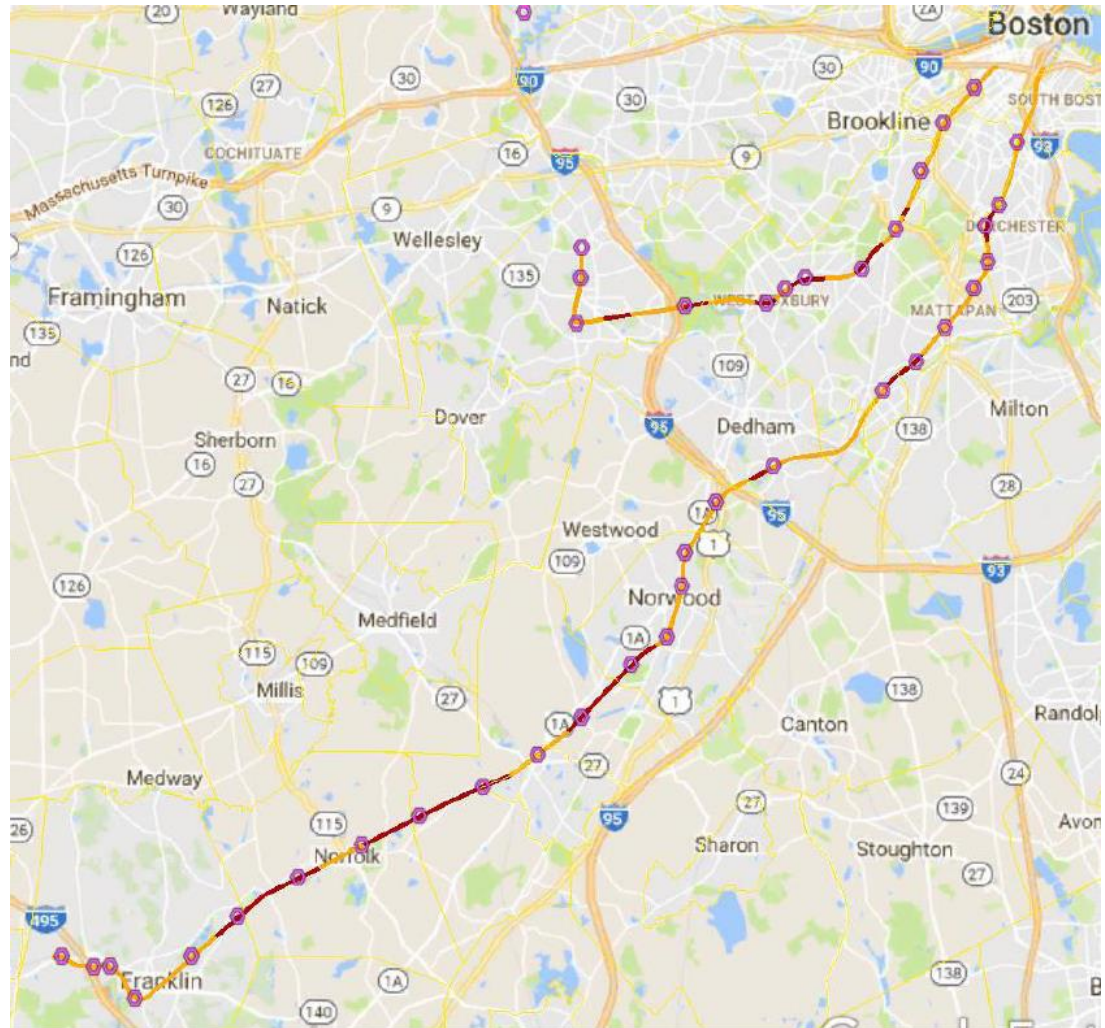
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Locations of BAI poles and radios dedicating up to 500 Mbps to passing trains enabling broadband Wi-Fi services.





Current Wi-Fi: Middleborough, Greenbush, and Kingston Lines

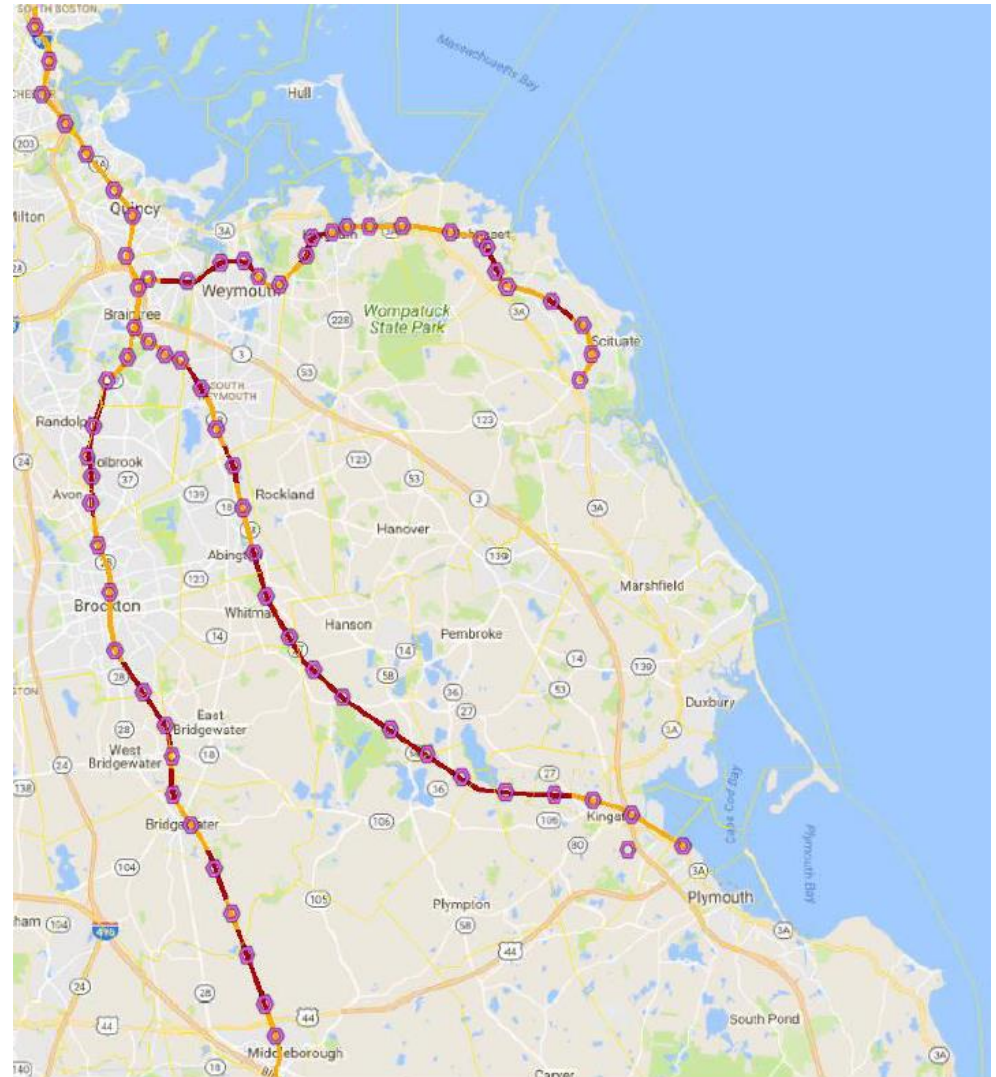
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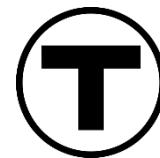
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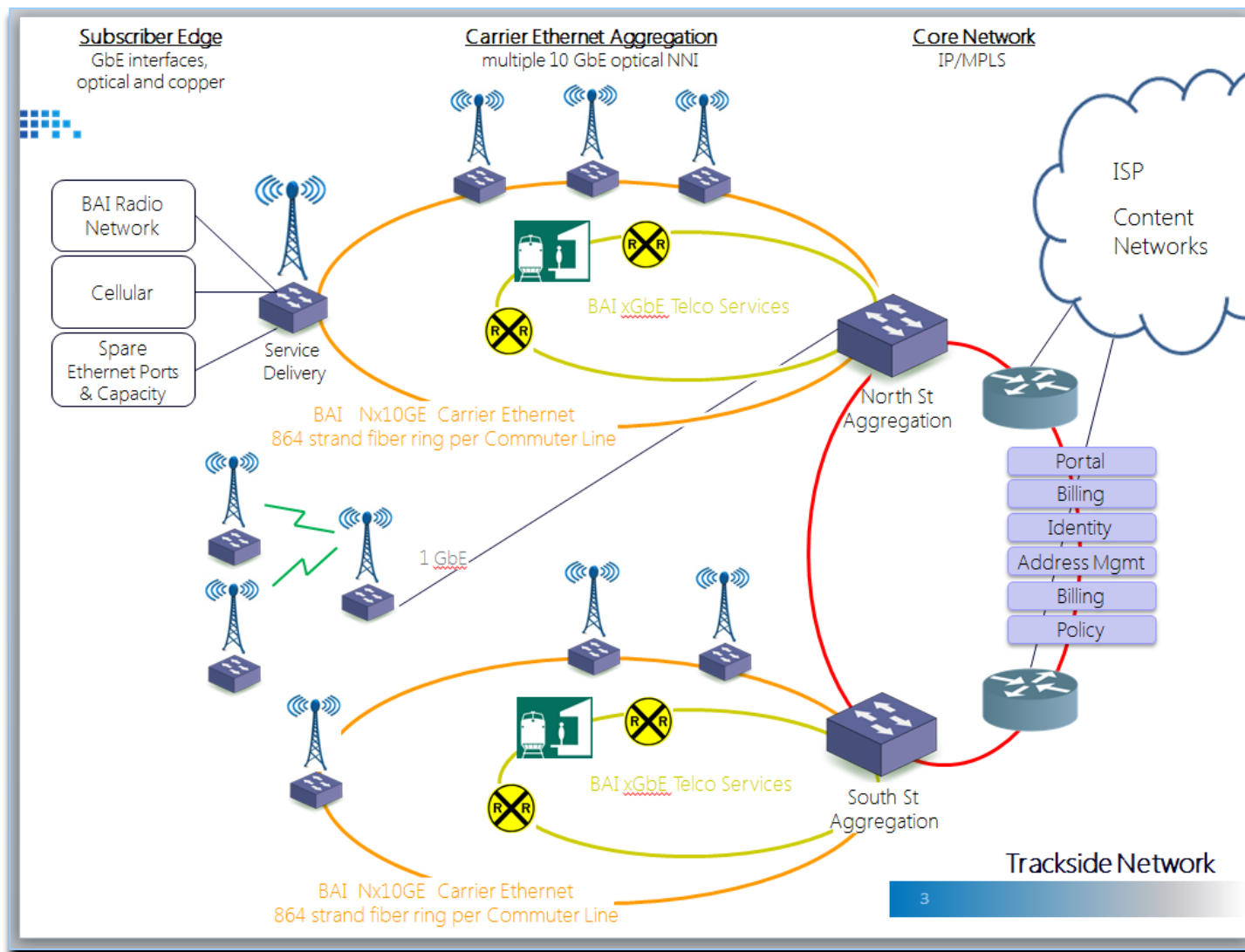
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BAI Trackside Network Design





BAI Dynamic Link Bonding Architecture Concept

