

CALLING ALL STATIONS

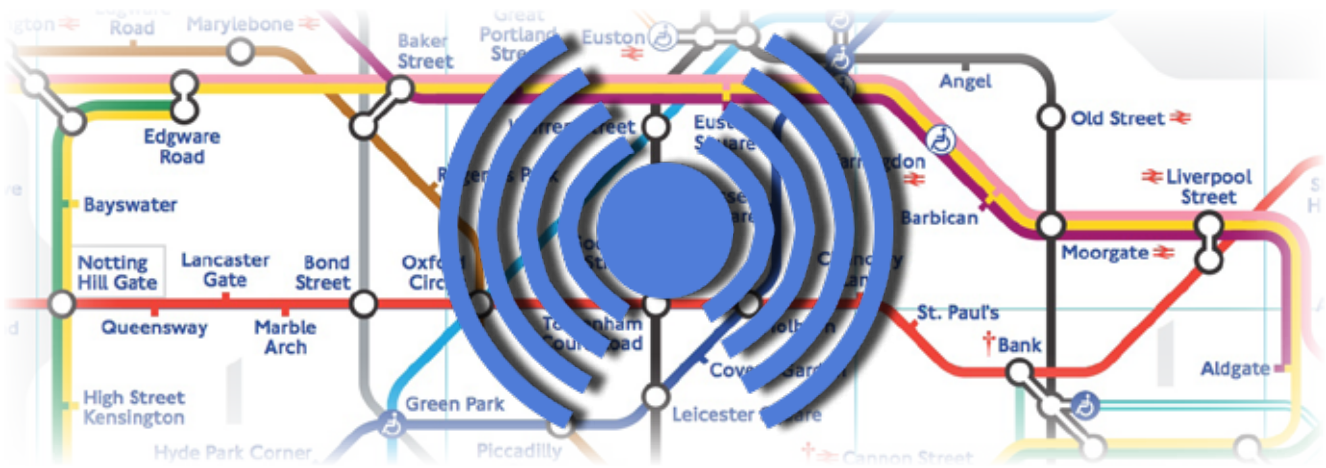
MOBILE CONNECTIVITY
ON THE LONDON
UNDERGROUND



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INTRODUCTION

London's Underground is missing out on one of the most important modern technologies: mobile communication. The Underground facilitates no voice or SMS communications and recent steps to add Wi-Fi to 92 of the 260 stations, and not the tunnels, are not enough to reap the benefits of a full communications network. The technology to have a full network exists and many other cities are using it now. London is missing out on the many benefits a mobile communications system provides and may be losing out on much more. Transport for London (TfL) could connect the Tube with voice, SMS and modern 4G data with minimized delay and at a low cost to Londoners.

THE TECHNOLOGY

Wi-Fi

Wi-Fi only allows for data (or internet connections) and is available on modern laptops and most smartphones, but not on older phone handsets. Though Wi-Fi excels with data speeds compared to 3G, it is a static technology and not very good for passengers on the move, due to reconnecting times. Wi-Fi is on the Tube currently and services 92 station platforms. This service was free through the Olympics and will become pay to use at the end of January 2013 but

also free to subscribers of Virgin, Everything Everywhere, and Vodafone.

Mobile connectivity

For the purposes of this report mobile connectivity will be a blanket term for mobile voice communication (GSM Voice), Text communication (SMS), and mobile data (Third Generation or 3G data, and the newer faster 4G data). The Tube currently does not have any access to this technology.

VISION

A modern reality

It's said by some that Londoners want peace and quiet on the Tube. This is a novel concept but flawed. Ignoring the fact that the Tube is not particularly quiet¹ or that the Tube has reception in certain over-ground areas already² this is a matter of competitiveness as a world-leading city. Of the ten largest underground systems (by track length and station numbers) London is the only city without mobile phone connectivity on at least some

1. After recording 6 trips on the Northern Line with a sound level meter a recorded average 60db while the train was travelling between stations, which is the equivalent to a running vacuum cleaner.

2. Only 45% of the Tube is in tunnels that means a majority is not completely underground, but does not specifically mean it has radio access <http://www.tfl.gov.uk/corporate/modes-oftransport/londonunderground/1608.aspx>

underground station platforms.³

There was a time when many people did not want the hassle of having a phone with them at all times, but it has become a necessity in modern competitive business. If London wants to attract new business it needs to facilitate modern business with complete high-speed connectivity, and no matter what London's feelings are on this new communications culture, 24/7 connectivity is a modern reality that needs to be addressed on the London Underground.

Feasibility

Large wireless communications overhauls were carried out on the Tube network with the Airwave radio network.⁴ This can feasibly be done again. Two common excuses for why the Tube does not have mobile connectivity are that no underground system is as old, and the Underground's tunnel size cannot accommodate the technology. Both excuses can be refuted. First, though no other underground system dates to the age of the Tube's oldest lines⁵ there are still many newer lines without the mobile connectivity that are of a comparable age to systems with the technology such as the Paris Metro.⁶ Secondly, though the classic Tube shape of the deeper-cut lines leads to small tunnels, the subsurface lines are much closer to standardized train and tunnel sizes such as the Berlin U-Bahn.⁷ If these technological barriers on

age and size actually exist, then a line without these technical issues could be the first to trial mobile connectivity, such as the DLR.

For those who think mobile connectivity will undercut the current Tube Wi-Fi profitability it is important to note that many consumers are conscious that Wi-Fi is better for data, hence O2⁸ and other carriers use of BT Openzones⁹ in conjunction with mobile phone data connectivity. Also the competition of services may help keep costs down, particularly considering Virgin Media is charging £15 a month for this service,¹⁰ which is comparable to the price of a monthly mobile phone package.¹¹

This is not a cost-prohibitive upgrade to the Tube as this technology has the potential of being self-funding. There have been several rumoured costs of installing voice and 3G communications on the Tube (Most recently £100m¹² of which Huawei would have provided an estimated £50m of the infrastructure¹³) but those were early estimates. A system of comparable size to the London Underground, the New York Subway, is currently going through the installation of mobile connectivity, costing £127 million to outfit 271 stations,¹⁴ of which a third-party company, Transit Wireless, is installing for the Metropolitan Transit Authority (MTA).¹⁵ Transit Wireless is going to cover the complete cost and will share the profits equally with the MTA to which it promises at least £2.1 million a year.¹⁶ The costs will likely be high to outfit

3. New York (some stations platforms connected, more in progress), Seoul (full connectivity), Paris (full voice/text, with 3g coming), Madrid (station/passageway connectivity), Shanghai (full coverage), Beijing (station coverage, with near full tunnel coverage), Berlin (full connectivity), Mexico City (partial station coverage), Moscow (partial station coverage), Tokyo (full coverage)

4. <http://www.tfl.gov.uk/static/corporate/media/newscentre/archive/3318.html>

5. Hammersmith and City (1863), Metropolitan (1863), District (1868), Circle (1884), Northern (1890)

6. Some lines that have the technology are over 100 years old (Line 1, 2 and 3)

7. The U-Bahn has been outfitted since the late 1990s <http://www.bvg.de/index.php/en/17103/name/Underground.html>

8. http://service.o2.co.uk/IQ/SRVS/CGI-BIN/WEB CGI.EXE?N ew,Kb=Companion,T=vanillaCase,VARSET_COBJID=41902, Problem=Obj%2841902%29,question=ref%28User%29:str%28Mobile%29

9. <http://www.btwifi.com/>

10. <http://my.virginmedia.com/wifi/faqs.html>

11. <http://www.virginmobile.com/vm/paymonthlySimOnly.do>

12. <http://www.ft.com/cms/s/0/b1ca3800-3cf0-11e0-bbff-00144feabdc0.html>

13. <http://www.google.com/hostednews/afp/article/ALeqM5j-3s85GwwwDIq1VWveIGqVN7aSzDQ>

14. <http://www.mta.info/news/stories/?story=400>

15. <http://www.transitwireless.com/>

16. <http://www.mta.info/news/stories/?story=400>

the London Underground but as with most of the mobile communications industry there is great potential for profit to whoever has the initial capital to invest.

BENEFITS

Traffic

One part of Mayor Johnson's Transport Manifesto is a 30% reduction in Tube delays through various methods¹⁷ and Communications will aid this goal. If there were mobile connectivity in the tunnels, commuters would be able to truly reroute themselves on the go; Passengers would see line delays and closures without having to leave their carriage, allowing a passenger to continue past a traffic bottleneck. The current station Wi-Fi permits passengers to see these updates on the platform, but only for those with carrying Wi-Fi enabled devices. Passengers without smartphones could benefit from mobile connectivity with subscription-based SMS travel updates provided by TfL. Over time, this investment would pay for itself by avoiding passenger delays with smarter traffic management.

Safety

The reality is that Tube staff cannot be everywhere at all times, but passengers are. Connected passengers can provide real time coverage of incidents; unconnected passengers are forced to seek Tube officials or use an emergency contact point they may not be familiar with, slowing response times.

Alternative revenue sources

Though TfL may wish to own the communications infrastructure and gain revenue from licensing access to the system, there are other potential revenue streams. The London bus

network is moving to using near field communications (NFC) payments, and this will be extended to the Tube.¹⁸ NFC permits for payments with a card or with phones capable of using the technology. Without data connectivity, NFC with a mobile phone is relatively limited, and this might limit the use of this new technology in which TfL is investing. With mobile payments within the Tube commuters could top up Oyster cards on the go, have ticketless journeys that could be modified during travel, or pay for TfL assisted services that could be ready for passengers upon exiting the Tube such as a hot breakfast or a ready taxi.

A CITY WITH OPTIONS

TfL ownership

It's been rumoured that TfL has pursued mobile communications solutions for the Tube,¹⁹ but none have come to fruition during the 20-year life of this technology. This may be due to the type of ownership TfL expects, i.e. a system that would give TfL ownership of the infrastructure and the profits from licensing. Unfortunately, TfL has not made this a priority and there exists little room in its budget for mobile communications.²⁰ It would be optimal to profit from the licensing of the communications network to mobile operators, but without available capital progress might be delayed.

In the case of the Tube Wi-Fi programme, TfL paid to install and own the infrastructure, which they license to mobile/broadband carriers.²¹ The programme has been imple-

17. http://www.backboris2012.com/system/storage/60/11/7/1499/Boris_Johnson_2012_Transport_Manifesto_Final.pdf

18. <http://www.tfl.gov.uk/tickets/26416.aspx>

19. <http://www.ft.com/cms/s/0/b1ca3800-3cf0-11e0-bbff-00144feabdc0.html> and <http://www.google.com/hostednews/afp/article/ALeqM5j-3s85GwwwDIqIWveIGqVN7aSzDQ>

20. <http://www.tfl.gov.uk/assets/downloads/2012-13-budget-tfl-march2012.pdf>

21. The licensees do have a small amount of install cost covered/owned <http://www.tfl.gov.uk/assets/downloads/foi/wifi-enabling-agreement.pdf>

mented and is running successfully on 92 Tube platforms. Wi-Fi implementation was a much smaller and simpler programme compared to adding mobile phone/data connectivity throughout the entirety of the Tube network. Adding the technology for use in the tunnels might require new rolling stock or adapting current rolling stock,²² which would be an even larger investment. This ownership was possible with the less complex and expensive station Wi-Fi, but full Tube mobile connectivity will probably be prohibitively expensive for TfL alone.²³

Private Ownership's Success

The private sector has provided many successful large-scale investment programmes in London's history, including the PFI funding of the £2 billion cost of the Underground's Airwave Network over the initial 20 years of operation.²⁴ Full or near-full sponsorship deals might be arranged, as was the case with the New York City Subway, which even maintained a part of the licensing profits.²⁵ Ownership could be secured after a period of time if a mobile company were granted a limited exclusivity contract on licensing, to incentivize funding installation costs, as was done with the Glasgow Underground (SPT)²⁶.

Some might be concerned with the organization of a communications monopoly, but there are alternatives. If TfL made a small investment in the infrastructure with a mobile company funding the rest, they could enter into a non-exclusive contract,

as was the case with 3G/4G connectivity on the Paris Metro with SFR²⁷. Another option in order to avoid a communications monopoly on the Tube might be to follow the example of the Rome Metro with five mobile operators jointly contracting CommScope Inc. in the provision of a joint infrastructure²⁸. This was also the case with the Channel Tunnel mobile connectivity, sponsored by three French mobile companies with Alcatel-Lucent providing the installation²⁹. This solution would appear to be the most sensible option for TfL, a large communications partnership making a multiyear deal to ensure Londoners are provided with mobile coverage in the future without burdening TfL's budget.

CONCLUSION

As observed above, London lags behind in terms of connectivity underground: Even though it is currently feasible on at least part of the Underground it has not emerged. With the success of Wi-Fi on the Tube, it should be a natural progression for TfL to take the next step. The financial challenges of the project appear to be the real stumbling block, and they shouldn't be. Other cities have made concessions to see mobile communications roll out and TfL should consider being creative to make sure London does not fall any farther behind.

22. TrackTalk, *Unleashing 4G issue*, (Alcatel Lucent) December 2012

23. As discussed the estimated cost was £100m, with TfL's debt at £6.4b in 2012, there is little room for investment in non vital resources <http://www.tfl.gov.uk/assets/downloads/moodys-credit-opinion-feb-2012.pdf>

24. <http://www.tfl.gov.uk/static/corporate/media/newscentre/archive/3318.html>

25. <http://www.mta.info/news/stories/?story=400>

26. <http://news.o2.co.uk/?press-release=o2-is-first-uk-mobile-network-to-access-subway>

27. http://www.ratp.fr/en/ratp/r_69335/ratp-and-sfr-to-roll-out-3g-and-4g-services-in-the-metro-and-rer/print/

28. <http://commscope.newshq.businesswire.com/press-release/carrier-wireless-market/commscope-and-italian-operators-make-rome-metro-phone-call-and>

29. http://www.alcatel-lucent.com/wps/portal/!ut/p/kcxml/04_Sj9SPykssy0xPLMnMz0vM0Y_QjzKLD4w3M-fQFSYGYRq6m-pEoYgxbxjgiRIH1vfV-P_NxU_QD9gtzQi-HJHR0UAAD_zXg!!/delta/base64xml/L0lJayEvUud3Qn djQSEvNEIVRkNBISvNI9BX0U4Qs9Ib193dw!!?LMSG_CABINET=Docs_and_Resource_Ctr&LMSG_CONTENT_FILE=News_Releases_2012/News_Article_002681.xml

RECOMMENDATIONS

We recommend that TfL:

- 1. Accept that mobile connectivity is not only a modern convenience, but also a requirement in top tier transport systems.**
- 2. Seek to include this technology in any new investments.**
- 3. Consider the benefits of mobile connectivity in the Tube beyond merely benefiting from the licensing fees from mobile operators.**
- 4. Look to the private sector to provide a reasonable funding solution to implement mobile connectivity on the Tube as soon as possible.**



FEEDBACK

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