

Wi-Fi: Value-Add and Advertising

The Evolution of Wi-Fi Advertising and Location Service



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Wi-Fi Value Add & Advertising Introduction and Overview

Across the retail, hospitality, service, leisure, and transport sectors, Wi-Fi has been deployed by venue and network owners as a means of improving the customer experience and increasingly, driving customer engagement and behavioural insights.

The reach of Wi-Fi into high footfall public places gives it potential as an enabler of location-targeted advertising. The unique advantage of public Wi-Fi is its ability to deliver beacon-style proximity capabilities at a scale which cannot be replicated by similar technology such as Bluetooth beacons.

This paper provides an overview of business opportunities, ecosystem, market, technology, potential use cases, current relevant work within various organizations, and the potential gap items and issues that the industry needs to address

1 Background

Operators are continuously looking for new opportunities that are fundamentally tied to the network. Today, there are opportunities for operators to become increasingly involved in the Wi-Fi location-based retail market as well as location-based analytics, initially through proximity-based programs using network-based technologies.

As they move toward Wi-Fi, there is a huge opportunity to provide accurate location and other services. It is helpful to try and understand the value add potential of Wi-Fi as an advertising mechanism in the context of the wider mobile advertising ecosystem.

Some of the facts that back up the need for good targeted location based contact can be found in the Location Based Marketing Association (LBMA) semi-annual Global Location Trends Report which pointed out that company usage of location-based marketing to target customers is on the rise in most countries and Social Location Services and Location Based Advertising were the top areas of interest by the marketing decision makers (LBMA, March 2017). Forbes reported that physical stores are still dominant in the retail market *Five Signs That Stores (Not E-Commerce) Are the Future of Retail (JUN 27, 2017)*

1.1 Wi-Fi Advertising can be bigger than Venue Brands

Consumer engagement through Wi-Fi has been driven largely by venues looking to interact with their own customers. This remains a very important use case. But there are many other brands that want to engage with customers in multiple locations, and many that want to understand customer behaviour, including footfall, at multiple venues. Venue brands themselves benefit from being able to advertise to consumers outside their own locations. It is important to understand this type of financial model rarely stacks up without large

volumes (in the millions per month) and this model is often inhibited by venue owners who don't want to give access to brands other than their own.

1.2 Where Wi-Fi and Mobile come together to create the Value package

A study shows mobile location-based marketing creates deeper relationships with customers. According to the Location Based Marketing Association (LBMA) semi-annual Global Location Trends Report, it revealing huge trends in usage and investments regarding location-based marketing and projections for implementing relevant technology in 2017. It shared that location is an increasingly critical element of digital marketing for brands and enterprises

This report found that a major increase in our deterministic proximity data being used for enhanced attribution and targeting.

- Countries are spending more of their marketing budgets on LBM
- About 25% of major corporations' marketing budgets are allocated to location-based marketing
- More than 50% of companies say they use LBM to target customers
- Wi-Fi/GPS on smartphones are the most commonly used LBM technology because it's the easiest way to gather accurate data

The use of mobile for gathering information on customers is the secret to accurately gathering and using proximity data.

1.3 Geo-Target with Reminders

According to Harvard Business School, an increase in customer retention by just 5% can lead to an increase in profits by 25% to 95%. Reminder alerts can help drive customer loyalty.

For example, Cancer Research UK location based mobile advertising to engage in the run-up to World Cancer Day 2017 to increase supporter engagement across a range of high-footfall retail and transport locations by ensuring that promotional messaging was relevant and engaging.

2 Proximity / Location

Proximity marketing is currently showing to be stronger than location based advertising. Advertising brands are focused on improving the targeting of their mobile advertising.

Messages must be relevant to be effective, and location information (historical as well as present) is one of the most effective means of delivering relevance.

Data is Golden

Brands need to measure the effectiveness of their advertising. The availability of high quality data is central to their ability to establish attribution, and to deploy re-targeting campaigns.

Having invested in physical equipment to provide locations with Wi-Fi coverage and to facilitate wireless users to get onto Wi-Fi, service-providers can take advantage of the unique data that they thus gather, regarding consumers' location, wireless usage [Wi-Fi, mobile and other], quality of experience of wireless service, movement and other behaviour patterns, within their re-targeting campaigns. And this data, in and of itself, has a marketable value in helping service-providers and others analyse their consumers' service-usage, to improve their business. These improvements may include changes in wireless access policies, to improve consumers' experience and make the service-provider stickier. In addition, retailers, mall-owners, etc. pay for insight on consumers' physical movement around the Wi-Fi venue.

The data can be analysed to provide deeper insight into smaller sub-categories of consumers than the traditional, rather blunt, demographic breakdowns of consumers and their predicted behaviours. And so, retailers can conduct much more targeted and effective marketing, based on actual consumer behaviour.

With sufficient volumes of data from sufficiently large consumer sample-sizes, predictive analysis can be used create new revenues or prevent customer churn.

Consumer Data can be Monetised, but Terms and Conditions Apply

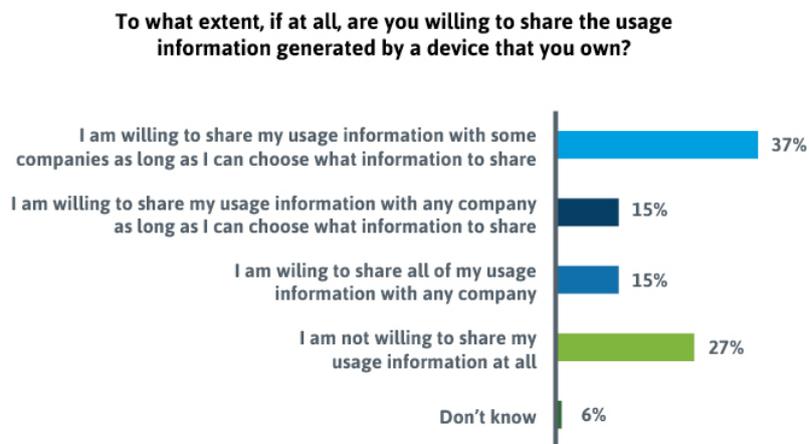
There is a growing awareness and acceptance by consumers that they need to share some of their personal information, to enjoy services as “Free Wi-Fi”. As the USA edition of the Deloitte Global Mobile Consumer Survey, August 2016, has found:

...Our phones ... not only house a large amount of personal data, but they are also the conduit for transmitting much of that information. That makes security and privacy high priorities for mobile devices.

One of the outcomes of consumers’ online activity—and often a prerequisite for its many benefits—is the sharing of personal information, from name and contact information to browsing history and location. Consumers are not necessarily averse to sharing information. In fact, their willingness to do so has increased since last year, particularly among younger consumers. But they want to be the ones to determine what information gets shared.

While only a small percentage of younger consumers are not aware of sharing any information, this number increases to one in three for the 55+ year olds.

The Deloitte 2016 survey results are summarised as follows:



Source: USA edition, Deloitte Global Mobile Consumer Survey, August 2016
Base: Those who use or are interested in using smart devices 1386

Figure 1 Deloitte 2016 Survey Results

The survey highlights that the willingness to share data is significant and growing. But it also makes clear that consumers want control over what information is shared. Implicit in this is another key requirement: consumer data that is sensitive or seen as private to them must not be directly given to others. So, anonymised consumer data, and/or summarised consumer data may be marketable, but not individuals’ data that cannot be compromised. Indeed, should service-providers share too much individual information, this would prove counter-productive: consumers are actively turned off by re-targeted service or other

promotions that “spookily” betray undue knowledge of information that consumers hold as private. There are many cases where services have become notorious for their intrusive use of consumer data.

And legal jurisdictions and regulators are increasingly tackling the issue head-on. For example, in the UK, the Information Commissioner’s Office offers the following guidelines to the Privacy and Electronic Communications (EC Directive) Regulations 2003¹, in the areas of:

- Marketing by electronic means, including marketing calls, texts, emails and faxes. See the **Electronic and telephone marketing** section of this guide for more information
- The use of **cookies or similar technologies** that track information about people accessing a website or other electronic service. See the Cookies and similar technologies section of this guide for more information
- Security of public electronic communications services. See the **Security of services** and **Security breaches** sections of this guide for more information
- Privacy of customers using communications networks or services as regards traffic and location data, itemised billing, line identification services (e.g. caller ID and call return), and directory listings. See the **Communications networks and services** section of this guide for more information

So, it is clear that consumers are getting more sophisticated in realising that “Free Wi-F” is paid for by data on their location, movement, behaviour, and to a certain extent, even their identity, being shared and sold to advertisers and service promoters. They are agreeable to this compact, as long as their personal data is treated as valuable, private information and as long as they have knowledge and control over how this data is shared.

2.1 Location Based Service (LBS) technologies

LBS technologies have evolved at an incredibly rapid pace, their adoption across major verticals is leading to new services and revenue opportunities.

LBS over Wi-Fi technology offers a number of business opportunities to service providers and other players in the ecosystem.

Location information can be turned into “Monetised” / “Value Add” services in many different ways, such as:

¹ <https://ico.org.uk/for-organisations/guide-to-pecr/what-are-pecr/#1>

- Tracking of people movement within a coverage area. This data provides a venue owner the opportunity to turn this into a customer value-add. One example is in retail, where knowledge of how people roam and spend time in a store can be directly utilized by that business to target the displays and potential high earning goods by placed them more advantageously. This kind of automated tracking does not require the mobile device to do anything other than have the Wi-Fi turned on. ABI Research's report of March 2014², "Indoor LBS: Applications, Advertising, and Revenues", forecasts that analytics revenues will initially drive growth, creating a platform on which to build future LBS opportunities
- To help users navigate their way through indoor buildings, with navigation capabilities over Wi-Fi similar to GPS. This type of service overcomes the limitation in satellite GPS technology that requires the mobile device to have a clear line of sight to satellites. With LBS over Wi-Fi, users can find their way around venues such as airports, sporting arenas and shopping malls. Navigation will quickly become a must-have feature inside many venues as a way to offer a more compelling user experience.
- To address the needs of the emerging mobile device-enabled shopper. LBS can be easily deployed in phases, with leading applications (e.g. in-store navigation, analytics) driving initial investment in infrastructure that will also support incremental capabilities to enable venue owners and retailers to better reach their customers (e.g. targeted in-store offers, hyper-local search, in-application advertising)
- For location-based advertising over Wi-Fi, where ads are directed at users based on their physical location within a Wi-Fi coverage area. This kind of hyper-local and highly targeted advertising is potentially very profitable, because the ad can be directed at an individual who is able to take immediate action
- To offer an even better customer loyalty program such as those found in the hospitality industry. Now a hotel can be made aware when a valued customer is about to walk into their building. This enables the hotel to provide individualized services designed to improve the customer's stay

Wi-Fi location services can leverage the currently available infrastructure put in place to provide Internet connectivity. There is no need to install a separate overlay network just for location or positioning. This location information can then be sent to a server that locates the user on an indoor or outdoor map. Third-party applications can then take this information and use it further to provide additional value to the customer.

² <https://www.abiresearch.com/market-research/product/1018076-indoor-lbs-applications-advertising-and-re/>

Clearly much of the value here relates to providing location services for businesses of all types including carriers, small-to-medium businesses, enterprises, brick and mortar stores and public venues. These organizations see Wi-Fi as strategic, but don't always have the expertise to deploy and operate a network, or they recognise the value in their end-users enjoying connectivity as they move into or out of the location of their business. So, they would look to the SP for a managed Wi-Fi service, or a service that offers connectivity beyond their particular location. In almost all cases, location-based services are a very high priority. Managed services come in many different forms and with many different monetization formulas. Much of the value in Wi-Fi location services also applies to infrastructure builds.

3 Operator Monetization Use Cases

3.1 Cancer Research UK Harnesses Power of Proximity to Drive Donations on World Cancer Day

3.1.1 Target Market & Business Model

As one of Britain's leading charity brands, Cancer Research UK (CRUK) is continually searching for innovative and effective ways to engage the public.

The success of any charity outreach campaign depends on the charity's ability to first maximize visibility, and then to take each prospective supporter on a journey from awareness, through engagement, and ultimately to donation/action.

Face to face engagement through cash collection at high-footfall public locations is highly effective at generating spontaneous action, but restrained by availability of volunteers and locations. Online engagement, meanwhile, offers far greater accessibility but requires that supporters are driven to the charity's website in order to take action.

What is required, therefore, is a means of generating spontaneous engagement from members of the public at a far wider range of popular locations than can be staffed by volunteers.

Cancer Research UK used Devicescape Engage to boost visibility and greatly extend the reach of spontaneous engagement, while also driving increased traffic to the charity's website. In the run-up to World Cancer Day, CRUK used Engage to deliver location-specific messages to consumers' smartphones across a very large footprint of high-footfall retail, service, leisure, and transport locations.

Devicescape Engage messages appear as notifications on the smartphone lock screen, offering far greater visibility than traditional mobile advertising formats. The CRUK messages contained links which brought consumers to the Cancer Research UK website where they were encouraged to make donations.

High Level Architecture

Devicescape Engage enables brand to deliver targeted proximity marketing message to consumers, in-venue, at unprecedented scale. It uses Devicescape’s huge Curated Virtual Network of existing Wi-Fi access points in popular consumer destinations to deliver proximity engagement, replicating the Bluetooth beacon functionality and experience.

Because it requires no new hardware to be deployed, nor any existing equipment to be modified, the solution makes proximity messaging possible across an enormous and highly diverse footprint.

- The end user enters a location (e.g. shop, restaurant, airport, bus, arena...)
- Engage client software (SDK embedded in popular consumer apps) establishes smartphone presence at the location based on proximity to access points within the location
- If an advertising campaign is live in that location, Engage serves a location-relevant lock screen notification to the device
- The notification points to a branded online advert, offer, or coupon
- Devicescape Engage does not depend on the device being connected to the Wi-Fi at the target location



Figure 2: Lock Screen Notification

Engagement Results

“Working with Devicescape meant we could target locations where we knew audience exposure was high — near shopping centers, through our shops, or corporate partners on the high street, and in transit locations — meaning we could optimize the CTR by ensuring that messaging was relevant and engaging to them. Ultimately we see this as having the potential to become another important channel within our integrated approach.” Sam McAllister, Cancer Research UK

Public response to Cancer Research UK’s World Cancer Day proximity engagement campaign was extremely positive, delivering an overall click through rate of more than nine per cent.

- The campaign returned extremely high levels of engagement across transport networks. Seven of the top ten performing location types were in the transport sector, with Heathrow Airport topping the CTR table at 17.8 per cent
- Intercity coach operators Megabus and National Express saw strong CTRs, as did a number of top public transport brands, including Arriva, ScotRail, Great Western Railways, Stagecoach and First Buses
- Passengers in Addison Lee taxis, who returned a CTR of 8.5%, showed that it is not only on mass transit that consumers are willing to engage with compelling messages
- Among retailers Waterstones emerged as the clear leader, with customers returning a CTR of 15.5%, with Boots and John Lewis also making a strong showing
- Customers of high street banks were also keen to engage with the campaign. Natwest led the field with 12.8%, closely followed by HSBC and Barclays

| Location | CTR (%) | Location | CTR (%) |
|------------------|---------|-------------|---------|
| Heathrow Airport | 17.8 | Wahaca | 8.6 |
| Waterstones | 15.5 | GWR | 8.6 |
| Megabus | 13.8 | Stagecoach | 8.6 |
| Natwest | 12.8 | John Lewis | 8.5 |
| Arriva | 11.5 | Addison Lee | 8.5 |

| | | | |
|-------------------|------|--------------------|-----|
| National Express | 10.8 | Prezzo | 8.4 |
| ScotRail | 10.7 | First Bus | 8.4 |
| Oxford Bus | 10.4 | Go Buses | 7.7 |
| HSBC | 10.4 | Chiltern Trains | 7.5 |
| Edinburgh Airport | 10.3 | Marston's Pubs | 7.4 |
| Heathrow Express | 10.1 | Game | 7.1 |
| Barclays | 9.7 | Tesco | 5.5 |
| Starbucks | 9.0 | Jamie's Italian | 5.3 |
| Boots | 8.8 | Luton Airport | 4.7 |
| Gatwick Airport | 8.6 | St Pancras Station | 4.5 |

Figure 3: Engagement across sectors

4 Wi-Fi Monetization Via the Boingo Media Platform

4.1 Introduction

Boingo acquires long-term wireless rights at large-scale venues, such as airports, builds networks at those venues, and then monetizes the networks with a variety of products and services. One of the ways Boingo monetizes its networks is through advertising. At many of Boingo's airport venues, Boingo utilizes a proprietary advertising platform to serve ads to consumers in exchange for Wi-Fi access. Consumers watch an ad in a pre-authorization environment and do not get online until the ad is complete. They are a "captive" audience, meaning they can't access online content, check emails, post to social media, etc., until the ad is complete.

Brands advertising across Boingo networks get a focused consumer engagement from this captive audience, which drives the value of the brand in a way that traditional out of home or digital out of home venue advertising cannot. A Boingo user ad engagement entails a consumer watching a branded video or experiencing branded content, then taking a specific action based on what they have just experienced, ultimately choosing whether

they go online to learn more about the brand at its website, or just go online to do their own thing.

Boingo can target consumers by the user's location, and more granularly within a specific terminal, by time of day, device operating system, or device language selection. This is extremely valuable to advertisers seeking engagement with travellers in specific designated market areas, at specific airports, in terminals for specific airlines, or traveling to specific destinations.

Brands pay Boingo for every user who clicks one of the ad's two call-to-action buttons. If the user terminates the ad experience in the middle of the process, the engagement is deemed incomplete and the brand does not pay Boingo.

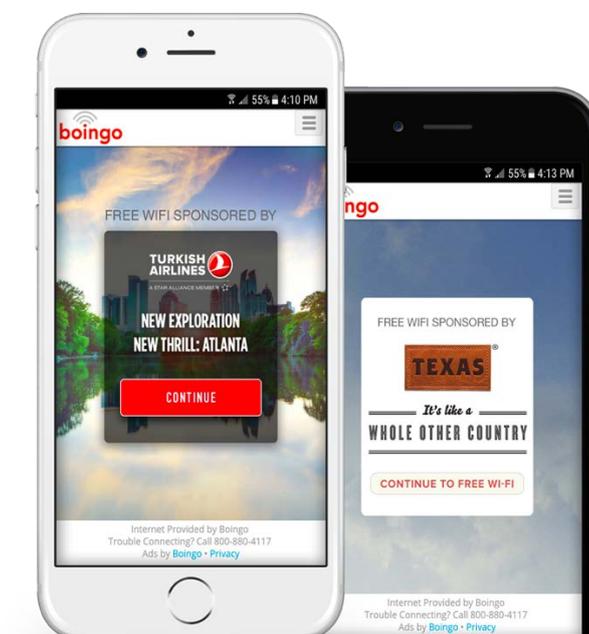


Figure 4: Ad's Call-to-action buttons

All Boingo's advertising products comprise a multi-part ad experience that provide multiple touchpoints to drive a brand's messaging. Boingo ad products include:

- **App Download** – A brand promotes their app by directing consumers to the app store where they can download a brand's app and run it at the venue
- **Video Ad** – With a main goal of brand awareness, this ad type runs a 15- to 30-second video before authenticating the user to the Wi-Fi network
- **Click-to-Visit** - A static ad with a call to action that sends user to advertiser's website for more information

- Email/Data Collection** - Captures relevant, optional information such as email addresses or phone numbers from users for advertisers, or polls users to Boingo’s ads are extremely effective. In comparison to other publishers’ and portals’ pre-roll video average numbers³, Boingo far outweighs the competition in viewability (Boingo is 100% viewability vs. 43% other publishers), video completion rate (85% Boingo vs. 72% other publishers) and click-through rate (3 – 5% Boingo vs. 0.6% other publishers)

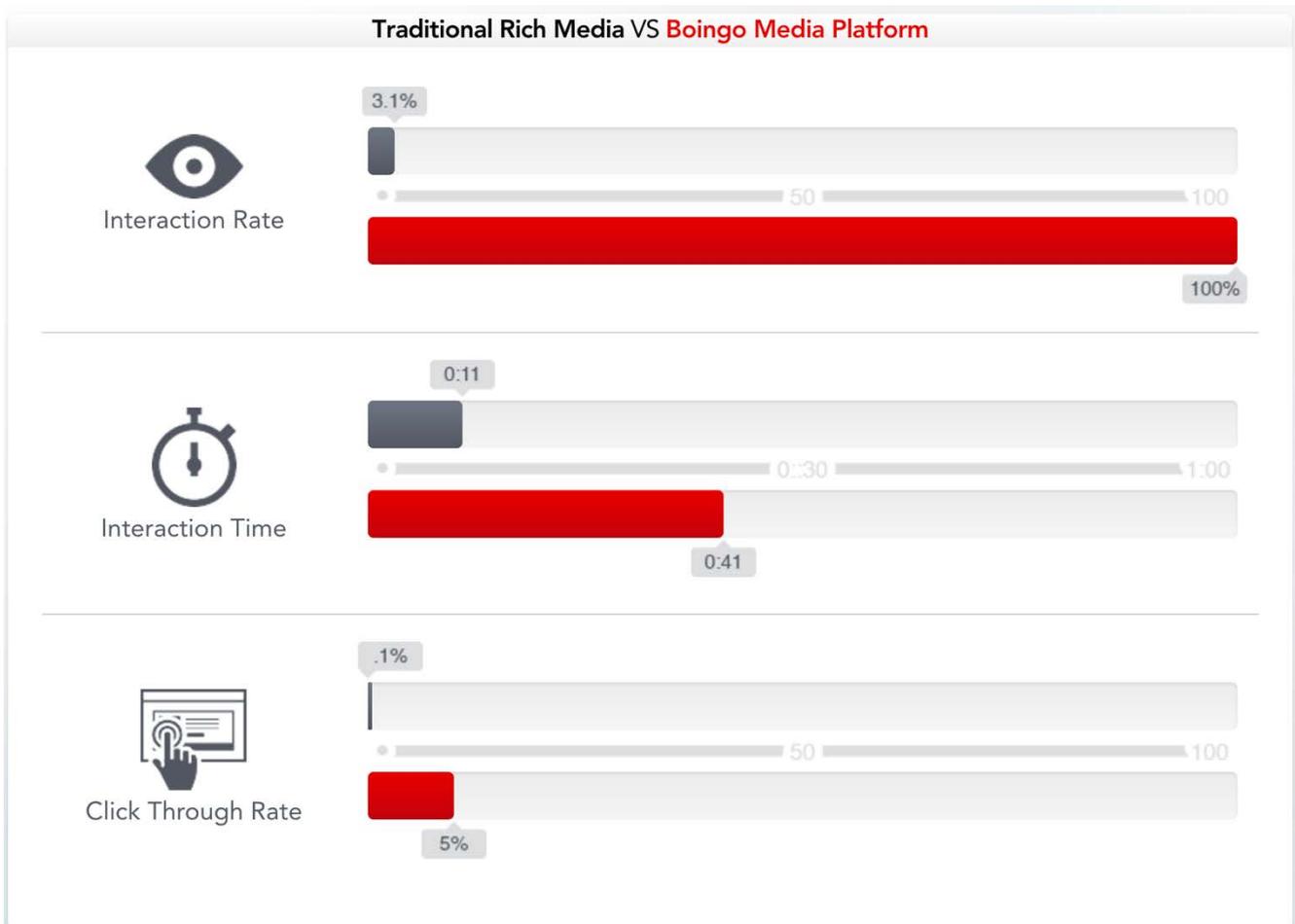


Figure 5: Traditional Rich Media vs Boingo Media Platform

Boingo History

Boingo’s ad platform was acquired with the purchase of Cloud 9 in 2014, the platform was originally built from the ground up from the concept of a captive portal. While Boingo

³ IAB.com 2016 Global Video Benchmarks, Feb 2016

serves ads in venues where Boingo manages the networks, the Boingo Media product can be implemented regardless of whether or not Boingo has built or manages the network.

Boingo's Audience

Core Boingo Wi-Fi Audience

| | | |
|--|---|--|
|  <p>Business Decision-Makers</p> <p>Business decision makers and influencers who rely on their devices to stay connected and informed.</p> |  <p>Jet-Set Leisure Travelers</p> <p>Affluent, globe-trotting leisure travelers with high-end tastes in fashion, technology and travel experiences.</p> |  <p>Tech-Savvy Millennials</p> <p>Reach this desirable demographic, from students studying in cafes to young families traveling in hotels and at airports.</p> |
|--|---|--|

Boingo's airport audiences are made up of business decision-makers, jet-set leisure travellers and tech-savvy millennials. They use more handheld devices than laptops, so all Boingo's interfaces require a mobile-first approach. In fact, Boingo venues show 93% of total Wi-Fi connects are via mobile devices, while only 7% are via laptops or tablets. And 72% of the Wi-Fi connects are via iOS

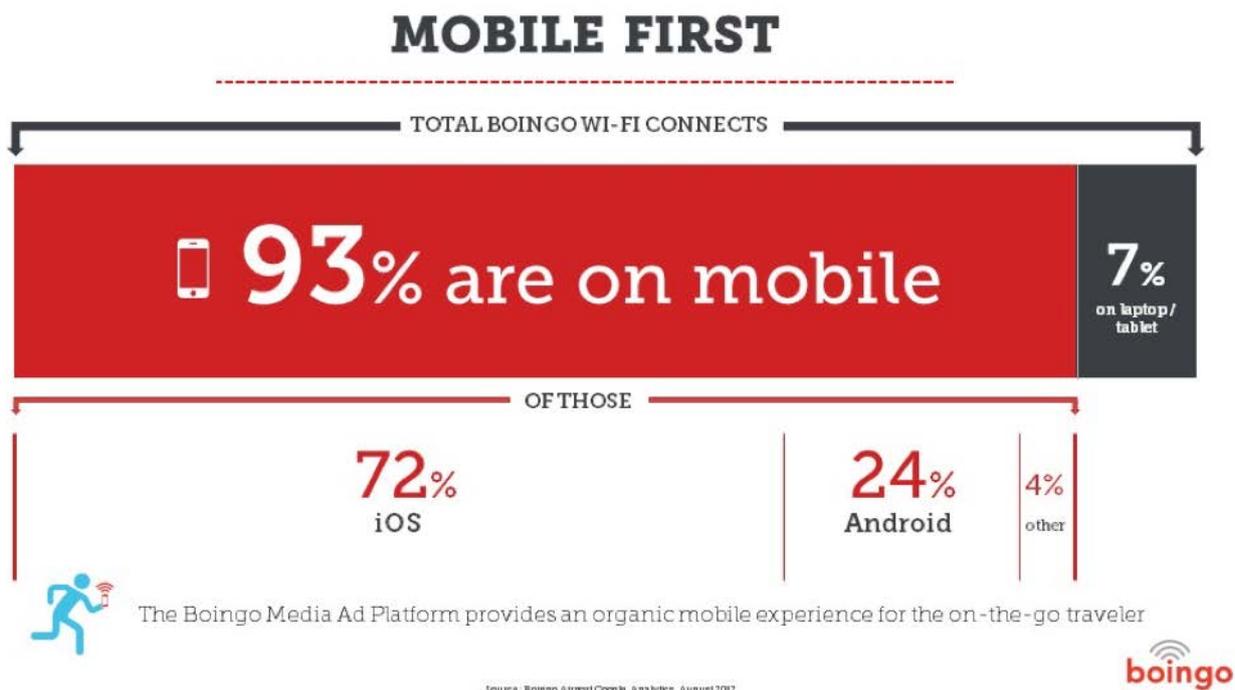


Figure 6: Total Boingo Wi Fi Connects

4.2 Success Stories:

4.2.1 Liquor Brand

- A well-known liquor brand wanted to reach leisure travellers during several weeks around Father's Day in 2017 to drive awareness of the brand and promote an exclusive offer
- The brand chose a video ad with a message on the call-to-action module directing consumers to the nearby Duty-Free Store
- They targeted the ad to JFK Airport's Terminal 4 because that's where the Duty-Free stores are located
- To make sure they had the best plan to drive consumer sales, they brand further targeted to only mobile devices rather than laptops or tablets, the reasoning being that if a consumer views the ad on their phone, they might be more likely and willing to head over to Duty-Free immediately, whereas someone viewing the ad on a laptop or tablet might be less likely to shut down what they're doing and go buy something in Duty-Free
- They created ads in English, Spanish and Chinese, because Terminal 4 has great numbers of English, Spanish and Chinese speaking passengers
- The brand included a special Father's Day message in English, Chinese and Spanish to promote the liquor brand on Father's Day as a great gift for Dad
- The liquor brand saw triple digit growth in sales at the Duty-Free Store for the liquor brands with the exclusive offer, and double-digit sales growth for the brand overall at the Duty-Free Store

4.2.2 Airline Brand

- A well-known airline brand wanted to drive awareness and capture email address opt-ins for their brand newsletter
- They served ads across all terminals in all U.S. national airports, across all mobile, laptop and tablet devices
- The ad generated more than 15,000 email opt-ins, and a 9% click-through rate to the brand site (well above the industry average of .6%)
- The brand also saw a 22% increase in brand favourability, and a 52% increase in a consumer's likeliness to fly with the brand

4.2.3 Telecom Brand

- One of the big four telecom brands wanted to reach holiday travellers during the busy Thanksgiving travel period
- Knowing travellers were in for a stressful, possibly delayed travel experience, the brand bought out all Wi-Fi sessions on the day before Thanksgiving
- The brand chose a video format, served across all mobile, tablet and laptop devices, to drive awareness, and customized their call to action to include in-airport giveaways to the harried travellers
- The successful campaign generated goodwill for the brand, delivered an average 17% click through rate to the brand website, increased the brand's favourability by 43%, and increased likelihood to recommend the brand's services to family and friends by 26%
- The brand considered the campaign to be such a success that they bought Wi-Fi sponsorships for the two years succeeding their original campaign

5 Value Add Rationale Example

To explore this in more depth, consider the example of a new family movie release and the ecosystem of venue and product brands which convene around it with the shared aim of engaging the consumer:

The Cinema Chain

- The cinema wants to sell tickets to the movie — it wants to drive footfall
- It wants to engage consumers in catchment areas for its cinemas, to showcase the movie and persuade them to visit the cinema / buy tickets in advance
- It is particularly interested in engaging consumers who are known cinema goers
- This is a family movie so it needs to target a family audience

The Movie Studio

- The studio wants consumers to go and see its movie, across a range of cinema chains
- It wants to promote that movie to known cinema goers in the build-up to the release
- It wants to target a family audience for the movie
- It wants to engage consumers in catchment areas of relevant cinemas
- It wants to engage movie-goers who are at cinemas, ahead of the release

The FMCG Brand

- The FMCG brand wants to ensure its snack / confectionary / drinks products are chosen by movie-goers but is not necessarily concerned with where those products are purchased
- It wants to engage consumers as they enter the cinema to promote its products
- It may also want to promote its products at grocery or convenience outlets close to cinemas, perhaps timed to coincide with cinema schedules
- It may want to engage customers who are known cinema goers with offers for its products to be used on a future cinema visit

The Grocery Chain

- A grocery chain is selling merchandise relating to the movie
- It wants to promote that merchandise to consumers in its own store
- It wants to promote the merchandise to consumers who are at the cinema, or who have recently visited the cinema
- It may want to advertise the merchandise within a catchment area of certain stores

Food and Drink Outlets

- Restaurants, QSR, coffee shops, pubs, and bars want to capture footfall associated with the cinema visit
- They want to offer incentives to movie goers at the cinema to visit them afterwards
- They want to engage known movie-goers within a catchment area of cinemas at certain times of day to offer deals for that evening
- They want to offer incentives to consumers in their own premises who they know have visited nearby cinemas in the past month, to drive future traffic

6 Proximity Trigger Use Case

6.1 Universal Pictures UK Uses Devicescape Engage 'Nearby' To Promote Fast and Furious 8

6.1.1 Target Market & Business Model

In Spring 2017 Universal Pictures UK created an exciting experiential installation to promote the eighth film in the hugely successful Fast and Furious franchise. A replica of a Dodge Charger car featured in the film would appear at high footfall locations, including the concourses of Britain's two busiest railway stations; London Waterloo, and

London Victoria. When visiting the installation, members of the public could participate in a range of multimedia activities relating to the film.

Universal Pictures wanted to alert travellers coming through the stations, as well as consumers in the local area, to the experiential event to help maximize visits.

Because both Waterloo and Victoria stations process a huge volume of through traffic each day - with thousands of people arriving by one mode of transport and leaving by another - it was important to be able to tell people that there was something special to see at the stations themselves.

Universal Pictures UK used the 'Nearby' configuration of the Engage solution to message consumers in the vicinity of each site, informing them about the events and activities relating to the movie and encouraging them to book tickets to a screening.

'Nearby' allows Devicescape Engage customers to deliver proximity-triggered messages to consumers at locations within a given radius of a target destination; in this case Victoria and Waterloo stations.

Transport locations, including Wi-Fi enabled buses, taxis, and the London Underground were key to capturing incoming footfall for the Fast & Furious 8 campaign, while retail, service, and hospitality venues within the area ensured consumers within easy walking distance of the event were aware of what was happening.

Messages were also delivered on the station concourses themselves.

High Level Architecture

Devicescape Engage enables brand to deliver targeted proximity marketing message to consumers, in -venue, at unprecedented scale. It uses Devicescape's huge Curated Virtual Network of existing Wi-Fi access points in popular consumer destinations to deliver proximity engagement, replicating the Bluetooth beacon functionality and experience.

Because it requires no new hardware to be deployed, nor any existing equipment to be modified, the solution makes proximity messaging possible across an enormous and highly diverse footprint.

- The end user enters a location (e.g.: shop, restaurant, airport, bus, arena...)
- Engage client software (SDK embedded in popular consumer apps) establishes smartphone presence at the location based on proximity to access points within the location
- If an advertising campaign is live in that location, Engage serves a location-relevant lock screen notification to the device

- The notification points to a branded online advert, offer, or coupon
- Devicescape Engage does not depend on the device being connected to the Wi-Fi at the target location

The 'Nearby' configuration of Devicescape Engage allows the advertiser to create an engagement zone within a specified radius of the target destination or destinations. Advertisers can then message consumers at Engage network locations within that zone

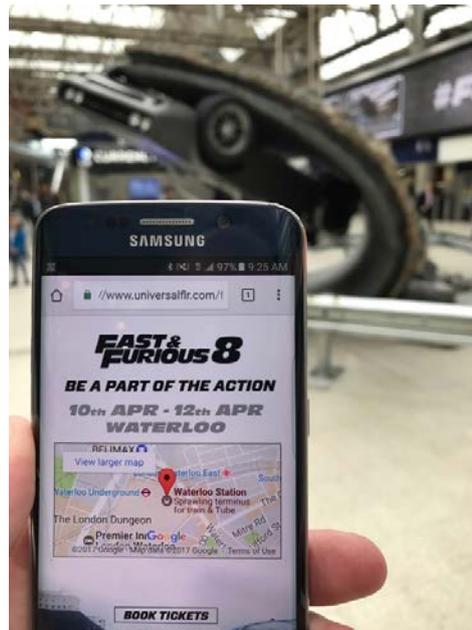


Figure 7: Message at Engage network locations

Engagement Results

- Consumer engagement for the Waterloo and Victoria campaign was very high, with Click Through Rate averaging in excess of 12% across all locations
- Engagement on London Underground was strong, with an average CTR of more than 15%, hitting 17.8% on one day of the campaign
- CTR on other transport was 16.9% at Victoria and 9.9% at Waterloo
- Engagement on the station concourses themselves was 14.2% at Victoria Station and 12.5% at Waterloo Station

7 Wi-Fi: The Common Factor

There are many ways in which each of these players can try and achieve their goals, including out of home advertising, Bluetooth beacons, mobile network geo-fencing, direct marketing, and more. But the presence of Wi-Fi in each of the venues in this scenario is a common factor which greatly improves the opportunity for success.

- In-venue Wi-Fi installations can be used to establish the presence of a device at a location
- They can be used to trigger messages to devices based on their presence in particular venues
- The widespread availability of public Wi-Fi enables a geo-fence capability, allowing brands to message consumers at venues within a certain catchment area of a target location
- An understanding of historical presence information can enable brands and venues to message consumers based on past location visits
- It can also be used to infer certain demographic characteristics to further improve engagement targeting

Examples

- Hyper location beacon
- Virtual beacons
- Advertising based on proximity

While there is a lot of enthusiasm around the capabilities, it has not scaled up and now Wi-Fi being widely available has opened up the door to new opportunities and revenue streams.

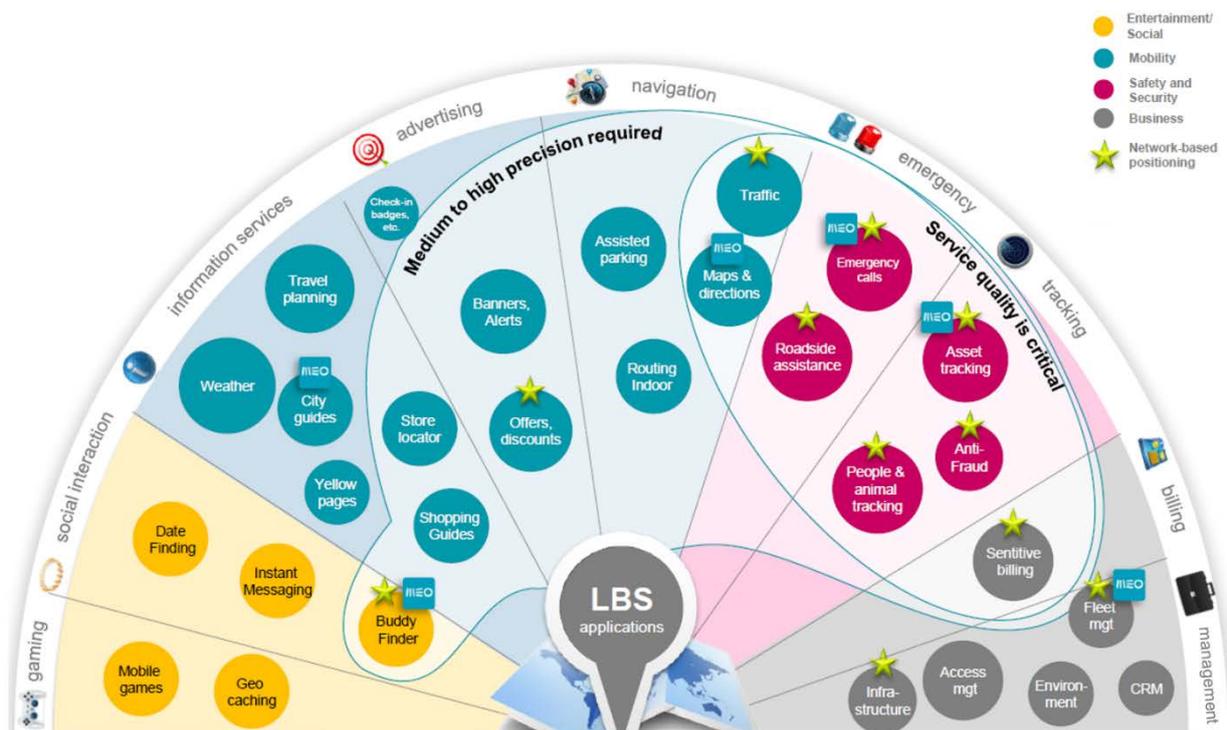


Figure 8: Spectrum of location-based applications (Source: Portugal Telecom – MEO)

8 Value Add Use Cases

All use cases assume that the venue has installed Access Points (APs), usually multiple, and infrastructure as required.

8.1 Site Owner Driven Tracking

User Problem

Site owners need to locate mobile assets (such as wheelchairs) in real-time

User Experience

- The site owner attaches active Wi-Fi asset tags to mobile equipment
- LBS Analytics tracks the location of these devices in real-time, and presents them on a site map
- The asset owner can locate the nearest available asset to a point, or track down missing units
- The asset owner enjoys the benefits of greater efficiency in applying the mobile assets to their business

8.2 Venue Owner's Heat Mapping

User Problem

Gathering statistics on crowd sizes and behaviour is expensive and error prone

User Experience

- If a user is prepared to share information with a brand LBS Analytics can track their movement, pauses in movement and position of Wi-Fi devices relative to footpaths, queue locations and points of interest
- The site owner collects this information which can be used to:
- optimize advertising for travel paths, meeting points and rest areas
- provide users with queue wait time estimates
- align real estate values with travel path utilization

8.3 Museum

User Problem

A museum wants to provide information about the particular items to its customers close-by to improve the customer experience

An end-user wants timely information on the museum exhibits. Her mobile device has the ideal personal interface and display to provide her the information that she needs.

User Experience

- A museum enables LBS on its venue using Wi-Fi infrastructure
- A user with LBA enabled mobile device walks and starts looking at a famous painting
- The user wants to know more about it
- She pulls out her device and taps on to the LBS enabled app
- The device figures out its precise location and interacts with the museum LBS system to get more information about the painting
- The museum provides details on the painting over Wi-Fi
- The location-information is to an accuracy that allows the service to display the information about the painting directly in front of the end-user

8.4 Find friends

User Problem

Find friends in a crowded/popular location (e.g. shopping mall, stadium, night club, or entertainment park).

User Experience

- Users can announce themselves on the venue and look for friends
- Information on a real-time basis can inform you on your friends available at the same location
- Messages can be exchange between users and/or mapping to meet at a certain location

8.5 Emergency rescue / SOS

User Problem

Users need to be informed of an emergency at a certain venue and/or user needs immediate assistance at a certain public venue in a panic situation.

Note: users are not looking for Wi-Fi to be their sole emergency service, some backup / augment service is needed.

User Experience

- At a large venue emergency indications & instruction can be passed to the users
- Based on the location of the terminal a pathing and map is immediately sent to emergency services
- Integration with 3rd party emergency systems/rescue
- User can activate a call for help, emergency/rescues team can locate the user at a certain venue
- Panic button for elderly people

8.6 Push Notification

User Problem

The retailer wants to use on-line coupon offers to draw customers in to his store

The retailer needs to enhance their business with appropriate and timely promotional information, to the end-user as he moves around the mall.

User Experience

- When a customer is standing outside a store, he receives a coupon for purchases at the store on his smartphone
- The customer can browse from store to store in the mall, receiving information and promotional material in a timely manner, based on accurate location information. The Wi-Fi service provided by the mall offers a coherent and timely retail promotional service over Wi-Fi
- The retailers enjoy the opportunity to promote goods and services to end-users that have context wider than their own retail store location, within the mall

8.7 Shopping Mall

User Problem

A shopping mall wants to advertise its services to the nearby people, and the people wants to know what services are available. The Wi-Fi – enabled mall information is more amenable than fixed, installed signage to providing accurate and changeable information to the end-user. The mall owner benefits from cost-efficiencies in delivering mall information to end-users

User Experience

- The shopping mall configures its APs with support for LBA and venue types and services enabled
- A user walks into the shopping mall with an LBA enabled device. He wants to know what services and offers are available in the shopping mall
- He taps on the LBA application
- Using Wi-Fi, the device discovers the services available in the shopping mall, and displays them to the user
- One of the stores available is Macys. The user selects Macys and the device displays details of the offers and services available at Macys

8.8 City Centre

User Problem

A user wants to find out what is available in a city centre

User Experience

- There are many venues in a city center with APs installed and operated by different owners
- The APs are configured by each venue with support for LBA support and venue types and services enabled
- A user comes to the city center and wants to know what services and offers are available nearby mall
- He taps on the LBA application
- Using Wi-Fi, the device discovers the services available in the city center by interacting with various APs nearby
- It aggregates the information on venues and displays it to the user

8.9 Venue and Customer Engagement

User Problem

A venue-owner wants to engage with the customers indoors and bring online experience to their customers in the venue

User Experience

- A department store enables its APs with LBA capability in the store and also installs analytics
- A customer with a Wi-Fi enabled mobile device enters a department store and starts walking around and checking out items
- The department store analytics through Wi-Fi may track movement of the customers and possibly interactions in the store
- The customer stops around the jewelry department and the department store sends an offer to the customer using Wi-Fi
- The store administrator can configure, within their own business-location, the location of departments, services, and promotional zones. They can administer policy rules to determine what end-users get what offers where and why

8.10 Search for a particular type of Venue or Service-Location

User Problem

A user wants to search for coffee shop nearby

User Experience

- A user of LBS enabled mobile device walks into a district and wants to know if there is any coffee shop nearby
- She pulls out her device and taps on LBS application
- The LBS application provides a search option
- The user enters “coffee”
- The device discovers the coffee shop within the proximity
- It displays it to user

8.11 Stadium

User Problem

A stadium wants to advertise services to the spectators in its venue

User Experience

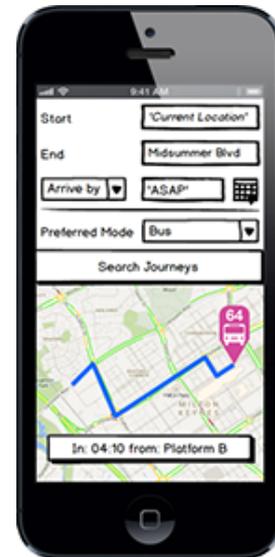
- A stadium enables venue based services over Wi-Fi such as watching the snippets of the current or past games, ordering food, and locating seat etc.
- A spectator wants to watch the replay of the score that her team got just a few minutes ago. Her mobile device discovers the stadium Venue-based Services over Wi-Fi
- She selects the game videos. Her mobile device connects to the stadium Wi-Fi network, if it is not already connected, and starts streaming the video snippet of the game

9 City Motion Map Use Cases

9.1 Milton Keynes City Motion map

Milton Keynes Council, MK:Smart is forecasted to make savings of 20% in water use, 3% in energy use, with 50% less traffic congestion, reduced fuel use and vehicle emissions over the planned period to 2026.

BT and partners have deployed a network of sensors connected via cellular, Wi-Fi and Low Power Wide Area Radio Network (LoRa), operating across the city to carry data to enable applications.



A key application has been the City Motion map, designed to work on most hand-held devices, providing travellers with information on busyness at their intended destinations and along the transport routes to those places. It feeds off data which comes from different sources including a comprehensive road traffic feed, plus a variety of bespoke feeds which measure pedestrian busyness in shopping/leisure areas, the availability of car park spaces, bus passenger occupancy, and detailed traffic movements on roundabouts and other junctions. This information is streamed to the MK:Smart Data Hub from where it is accessed by MotionMap.

The city has 20,000 parking bays and whilst at any one time around 25% are unused, drivers complain they are unable to park.

Using data on parking utilisation, forecasting demand based on weather, road works and other impacts on traffic, information could then be presented to drivers on electronic road signs, internet sites and apps to help them optimise their search.

At the railway station car park, road based sensors in each bay monitor whether a vehicle is present and for how long. The sensor then connects wirelessly to a gateway that aggregates the data locally before sending to the hub. This has helped understand average stay length and inform decisions regarding free parking duration for station passenger 'pick up'. Data feeds from buses and trains to show their journey progress and "busyness" are now being incorporated.

30% of road traffic congestion is caused by drivers looking for parking. Providing data to driver of bay availability can potentially reduce congestion. Combining traffic and sensor

data with parking availability data, app developers could create a utility that will help increase parking bay utilisation and reduce traffic congestion.

In an environment where UK local government budgets are under increasing pressure, Milton Keynes had estimated a requirement to increase parking bays by 5,000 over the next few years. Using this application the council has been able to be more forensic about the likely scale and timing of this need. With the cost of a new parking bay estimated to £15k per space, this becomes a tool to manage costs and target supply where and when needed.

Similar applications will be deployed in the areas of environmental monitoring, waste management and even pest control to demonstrate the use of sensors to detect when a maintenance service is required thereby focussing the resource only on the specific facilities that need servicing.

The project has catalysed the implementation of a wider portfolio of smart services in the city, helping establish a national and international profile for innovation. The city now has the second highest concentration of digital and technology SMEs in the UK and a globally significant trial of autonomous transport.

To encourage interoperability between MK:Smart and other data hubs, BT has supported the use of the Hypercat specification for data presentation from ‘things’ to the network so that the data can be collected and stored in a predictable format and stored in a catalogue for future use. Removing data silos has been a key enabler for making sense of the data, combining it with other insights and effecting change to public services.

Critical to sustainable success will be to ensure the data platform is replicable, sustainable and scalable. In this regard MK:Smart is testing the commercial viability of making open data available and beginning to tackle issues around data provenance, ownership rights and commercial monetisation on a sustainable basis. In terms of replicability, BT is already taking lessons learnt from MK:Smart to other projects.

10 Conclusion and call for action

Monetizing Wi-Fi or turning into a “Value – Add” service requires innovative business models. Wi-Fi business models that can provide a reasonable return on investment (ROI). Some of these categories are well known and understood in the maturing Wi-Fi market place.

This paper has focused on the fourth category, below, the Value-Added service models. It is clear this a significant growth area and more work needs to continue to build on these potentially significant values to ensure the Wi-Fi community understands what is needed to support this emerging Value Add opportunity.

It is suggested that throughout 2017 / 2018 the WBA members work to produce an updated version of this paper.

Wi-Fi Value Add and Monetization Business Models

- 1) **Business Efficiency** uses Wi-Fi access networks to decrease operational costs and improve customer retention and service differentiation
 - Bundled Wi-Fi with other services such as broadband or mobile, typically at no additional cost to the consumer. Benefits include reduced customer churn and increased market share of core services through market differentiation.
 - Extended content delivery network (CDN). Deploys a CDN capability closer to access points (APs) to improve efficiency and customer experience, as well as lower overall content delivery costs. Alternative mobile access. Offloads cellular data traffic to Wi-Fi to help alleviate network congestion, lower network operating costs, and reduce (or defer) 3G and 4G capital expense (CapEx) investments.
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- 2) **End-User services** allow businesses and consumers to connect to the Internet via Wi-Fi using their mobile devices, including smartphones, tablets, and laptops.
 - Allow consumers / businesses to connect to the web via Wi-Fi using any of their mobile devices.
 - Premium hotspot provides end users with additional hotspot capabilities—including improved security and seamless content access—that enhance the customer experience. Benefits accrue from additional fees, greater customer retention, and service differentiation.
 - Turnkey business solution where SPs install and manage Wi-Fi access for business offices and campuses, and provide access to public hotspot networks outside the business location. Benefits include set-up fees, recurring fees, and up-sell and retention of fixed telecom services
 - Managed hotspots service for public locations that want to provide Wi-Fi to their customers and employees (e.g., coffee shops, hotels, airports, stadiums). Benefits include set-up fees, recurring fees, and up-sell and retention of fixed telecom services

- 3) **Inter-Carrier wholesale** models focus on agreements that allow SPs to sell capacity on their Wi-Fi networks to other telecom companies (for example, mobile network operators and other Wi-Fi providers) at wholesale prices.
- Cellular data offload sells Wi-Fi network access to mobile operators on a per-user or per-MB basis. This approach allows SPs to offload some mobile data traffic without needing to build a Wi-Fi network themselves
 - Hosted small cells co-locates small cells on behalf of mobile operators with Wi-Fi APs. SPs provide installation, management, and the supporting infrastructure, including backhaul, power, and security. This approach is analogous to the managed data centre space. SPs typically charge an installation fee, as well as monthly fees per node and backhaul.
 - Wi-Fi roaming allows SPs to sell Wi-Fi network access on a per-user or per-MB basis to other hotspot network operators, enabling customers to roam on their networks at no additional charge. This arrangement facilitates the virtual extension of domestic and international hotspot networks
- 4) **Value-Added service** models enhance basic Wi-Fi access with additional services and alternative funding that are typically paid for by third-party businesses
- Machine-to-machine. Connects nonhuman endpoints to SPs' Wi-Fi networks to enable services such as meter reading, digital signage, and other types of sensor-based applications. SPs charge a monthly subscription per machine endpoint or for the amount of data used.
 - Subletting provides public Wi-Fi hotspots in large venues such as stadiums and shopping malls that are paid for by retailers or vendors.
 - Advertising offers access to hotspots in public venues that are subsidized by revenue from advertising and sponsorships. Common locations for the advertising model include airports and stadiums.
 - Embedded connectivity allows SPs to embed free public Wi-Fi access in mobile devices, and charges the mobile-device manufacturer or content providers, rather than end users, for network access. This approach is similar to the built-in connectivity used in the Amazon.com Kindle model.
 - Retail store interactions combines the data from wireless access points (WAPs)—for example, location, usage, and presence—with specific customer data, including demographics and shopping history. This allows merchants to deliver targeted marketing offers to customers and enhance their in-store shopping experience.

Benefits include setup fees, consulting services, and monthly fees. Measuring Business-Model Impact Using economic modelling,

- The benefits fall into three categories of business value:
 - 1) Direct revenues to SPs, including revenues from access, services, and managed services
 - 2) cost savings
 - 3) indirect business value through improved customer retention and market differentiation

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ACRONYMS AND ABBREVIATIONS

| ACRONYM / ABBREVIATION | DEFINITION |
|------------------------|-----------------------------|
| WBA | Wireless Broadband Alliance |
| WGC | Wireless Global Congress |
| WWD | World Wi-Fi Day™ |

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