Executive Summary

LTE Broadcast is a prime candidate for both operators and content providers to address demands associated with the rise in mobile video consumption. While the application of LTE Broadcast is new, it continues to gain momentum with operators globally.

This White Paper outlines use cases of LTE Broadcast, associated benefits and how service delivery platforms, such as Quickplay’s managed service platform, can enable LTE Broadcast solutions.
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Introduction

Annual network traffic is set to triple from 2014 to 2019, with video to account for 80% of the total by 2019. The surge has been fueled by a number of drivers, most notably smartphone penetration, greater connectivity (driven in large part by machine to machine connections (M2M)), and accessibility to richer content. Compounding the demand is the associated growth for OTT video. Consider the following:

OTT video revenues are expected to reach US$19B by 2019 (up from $9B in 2014), the same year video is set to account for 80% of network traffic, indicating a tangible shift in how consumers will access and consume content.

By 2019, 14% of monthly global IP traffic will come from cellular connections and 53% will come from Wi-Fi connections, signaling a growing appetite for mobility (alongside video).

After content, consumers cite service availability and accessibility across platforms as key points of consideration when selecting an OTT service.

With consumption set to intensify, a surge in global video demand will present opportunities and challenges for operators. At present, video is delivered on a one-to-one basis. For each request put out to a server, an associated stream of content is delivered to the end user device. Multiplied across a greater base of users, the aggregate of all streams pose significant issues around network congestion and performance. Performance degradation in turn, impacts the overall experience, service quality, network access. This places limits on the ability to introduce Next Generation TV and Internet services, ultimately passing back onto the operator in the way of cost and churn.

Recently, the rollout of Long-Term Evolution (LTE) has brought light to LTE Broadcast as a viable solution and prime candidate to address challenges associated with the growth in video consumption. With the introduction of LTE Broadcast, operators unlock revenue generating opportunities and vastly improve network capacity, delivering higher quality video and reduced latency compared to unicast (one-to-one) delivery. As the global shift towards mobility and premium content continues to grow, these new capabilities expose several use cases and business models for operators to better monetize their network and content.

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What is LTE Broadcast / eMBMS?

Based on Evolved Multimedia Broadcast Multicast Service (eMBMS) standards, LTE Broadcast delivers the same stream of content to multiple users, eliminating network capacity constraints, delivering higher quality video and reduced latency compared to a unicast delivery. Current LTE Broadcast applications have been trialed in stadiums with live sporting events, among other activities, enabling large-scale audiences to view high quality video in real time.

LTE Broadcast can also extend into push video on demand (VOD) delivery, targeted advertising, and subscription-based services, thereby offering additional opportunities for operators who seek to monetize content.

The Global Mobile Suppliers Association (GSA) reports that LTE subscriptions continue to outpace other mobile communications system technology. Unlike 3G technology, the market for LTE already exists; at the end of 2015, LTE subscriptions will grow to 1B worldwide, indicating immense market potential for services like LTE Broadcast.

Benefits of LTE Broadcast

The initial benefit of LTE Broadcast is gains in efficiency. By ultimately increasing capacity, operators reduce costs and improve experience levels as network traffic intensifies.

**Single frequency network**

In an eMBMS broadcast over the 4G LTE network, many cells cooperate to transmit the exact same radio waveform at the exact same time, effectively creating one super-cell. This enables a device to receive the broadcast continuously over a wide geographic area without the need for handoff or service disruption. With this capability, LTE Broadcast provides the coverage of a large terrestrial broadcaster, with the added advantage of differentiated services.

**Dynamic bandwidth allocation**

While digital terrestrial broadcasting is not new, LTE Broadcast brings an entirely new approach: dynamic broadcasts. Rather than statically allocating a portion of spectrum to broadcasting, a mobile network operator can dynamically modify broadcasts by configuring both the geographic area as well as its bandwidth; even varying the bandwidth over time as the load on the network changes. LTE Broadcast has the capacity to reach an entire metropolitan area, country, or target a specific venue such as a stadium or travel terminal.

**Streaming video without network congestion**

The main benefit of LTE Broadcast is its ability to efficiently distribute media streams without overloading the mobile network. Instead of producing a copy of content for each device (unicast), a single copy of a media stream is multicast out to an unlimited number of receiving devices. This enables congestion-free content delivery: no drop-outs, stalls or buffering as network load increases.

**Media and data delivery**

LTE Broadcast provides a unified architecture for the delivery of all media and data formats including Dynamic Adaptive Streaming over HTTP (DASH) streams, discrete media (such as MP4) and raw data files.

**Hyperlocal services**

One of the promises, and challenges, of mobile applications is delivering hyperlocal services – services that are specific to a very small geographic area, such as a concert venue, airport terminal or commercial setting. With LTE Broadcast, simply entering a geographic area with your mobile phone in hand can activate a host of new features: promotions for a nearby product or merchant, push updates or alerts.

LTE Broadcast is capable of targeting a broadcast to an area as small as one specific cell in the 4G LTE network. Only devices physically located in that cell could receive that broadcast, thus providing an effective way of delivering a service to a specific location, and only to that location.

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6 Ibid.
Defining the Use Cases

LTE Broadcast offers a number of critical capabilities for powering new services, making existing services more efficient and allowing for non-conventional business models and revenue generation.

In-venue Services

Today, while many service providers are offering mobile viewing of live events, the ability to view inside the venue itself is “blacked out”, or not accessible due to network capacity constraints. There is almost universal agreement that LTE Broadcast can bring immense benefit to in-venue services, particularly with live linear video. Take for example, the ability to watch performers up close and on stage or the ability to follow your favorite player in a match on your own personal device, as the event occurs.

LTE Broadcast is the only viable solution because it enables simultaneous steams content to be delivered to the end user. Broadcast delivery enables a single copy of a video stream to be consumed by thousands of devices, making in-venue video a reality. The vast majority of LTE Broadcast field trials conducted to-date have featured an in-venue experience covering a wide array of events including football, soccer, cricket and auto racing.

Mobile TV Services

LTE Broadcast can be used to power enhancements to a TV Everywhere solution, or as the foundation of a complete premium television offering with wireless content delivery. If a service provider has an existing TV Everywhere solution in-market, LTE Broadcast provides the foundation to deliver enhanced viewing experiences with live events (similar to in-venue services). The value add for the end-user is the ability to access real-time premium content that would have otherwise not been accessible - delivered in HD quality directly to the home. The experience might include multiple angles of an event or custom news feeds delivered directly to the second screen, in parallel to a main event on the first screen.

The ability to switch between unicast and multicast helps to optimize mobile network usage with alternatives such push VOD and subscription services. Unlike unicast services, increased consumption does not lead to increased cost for the end user. LTE Broadcast also enables both operators and content programmers extended reach; for areas where broadband internet is not readily available - LTE Broadcast can be used as an alternative way to deliver content. Whether the content is live or generated by complex playlists (e.g. Originated Channels), LTE Broadcast can also support the business case for HD delivery by bringing costs down.

Digital Signage and IoT

4G LTE networks are poised to power explosive growth of machine-to-machine (M2M) services, also commonly referred to as Internet of Things (IoT). Mass data distribution such as digital signage, firmware or OS updates and real time news alerts can be delivered seamlessly over LTE Broadcast. With the ability to target, this can be applied to a model like subscription based services.

Choosing the Right Platform

Many mobile network operators are rolling out LTE Broadcast as part of an upgrade of their networks to LTE Advanced. However, enabling LTE Broadcast capability in the network is only the first step. Critical to leveraging the investment in LTE Broadcast is a proven service delivery platform. While not as mature as TV Everywhere and OTT video services, one of the key advantages to LTE Broadcast is that an integrated ecosystem is in place to bring together eMBMS infrastructure and devices to trial and commercialize the technology. Mobile network operators might consider a managed end-to-end solution to leverage the market, reduce complexity and carry out the transition to Next Generation services; one that includes the following key components:
Video on Demand, Live Linear and Live Events
With video services already dominating mobile network traffic, it is no surprise that LTE Broadcast is being deployed primarily to optimize video services and enable new ones in a network-efficient manner. Live linear video channel management, as well as VOD content, should be the first to be integrated into any service delivery platform over LTE Broadcast.

Differentiated Turnkey Services
To justify investment, multi network operators (MNOs) will look to deploy additional broadcast-enabled services beyond live linear video. While LTE Broadcast is ideally suited for streaming live TV channels, it can be used to power numerous services. For example, it can power a push VOD service for catch-up television viewing, in which episodes of popular TV shows are pushed out to devices and cached until subscribers are able to view them. This form of content delivery offloads data traffic from the mobile network that would otherwise have occurred as streaming video sessions at peak hours.

Client SDK and Client Applications
LTE Broadcast is not a service in itself, but is a service enabler. As service providers add broadcast delivery to existing services, it is essential to make the integration into existing services as seamless as possible. Support for LTE Broadcast into client software is necessary to accelerate integration efforts into existing applications and to enable new applications to be brought to market quickly.

Access from All Devices
Since LTE Broadcast requires an LTE Advanced modem chip, existing devices may not have the capability to directly receive an LTE Broadcast. To address this challenge, device manufacturers are producing personal Wi-Fi routers capable of receiving the broadcast and relaying it over Wi-Fi to any capable device. A client SDK should support such architecture, ready to power broadcast-enabled applications on a wide range of smartphones and tablets.

Reporting and Service Quality
Service providers know that it is essential to track the quality of experience (QoE) for their services. When broadcast delivery is included in the mix, it becomes more challenging. By its very nature, content delivery over LTE Broadcast is unidirectional and does not afford the delivery platform a view into how effectively content was delivered. Per-device reporting is therefore essential to measuring quality of service for individual streams and ensuring overall QoE.

Recommended First Steps
Prove the concept
A tried and true practice is to get the basics working, and build from there. Build and deploy, in a lab or across a campus with a basic system validating the flow of content from its source to the mobile application. Quickplay offers an existing LTE Broadcast proof-of-concept platform that can support a number of different use cases, including mobile TV, in-venue live events and digital signage. The PoC system provides a number of live video channels, file delivery capability as well as ready-to-use reference application for Android smartphones and tablets.

Build the business case
Critical to any service launch is building a strong business case that will achieve the objectives for the service, whether it be a new revenue stream, incremental revenue or cost savings. In lieu of an evolving market, rather than build the platform themselves, mobile network operators can look to external video specialists to improve the ability to get to market quickly and cost effectively. Doing so not only enables savings in capital and operational expenses, but allows the operator to enter new business discussions that focus on leveraging assets more efficiently.
**Trial the service**

The added benefit to managed services is the ability to leverage expertise while trialing services. Mobile network operators are partnering with leading providers to validate the core technology and test LTE Broadcast services, globally.

**Managed Services**

A managed service model can yield a number of benefits. Partnering with a specialist leverages the strength of an experienced ecosystem with the added advantage of best practices from the field. A true managed service model should cover all the components related to video delivery while enabling enhanced, differentiated viewing experiences.

For over a decade, Quickplay has powered premium viewing experiences for operators across OTT, Originated, and Broadcast channels with a service based platform that ingests, transforms, manages and distributes content for a unified solution across all platforms and networks. Quickplay, alongside a set of industry partners, is in advanced stages with several leading operators around the world who are trialing LTE Broadcast with in-venue live events, live linear TV channels, mobile applications and OS updates.

**Quickplay Managed Video Platform**

[Diagram of operations and service management process]

*Source: Quickplay*
Conclusion

Globally, mobile network operators are in the process of enabling their networks for LTE Broadcast; infrastructure vendors and modem chip manufacturers have developed LTE capable products and are undertaking interoperability testing. LTE adoption is outpacing any other mobile communications technology. Combined with the anticipated growth for video, the market is signaling immense potential LTE Broadcast services.

While still in its early stages, LTE Broadcast will be a critical enabler to the next wave of Next Generation viewing experiences and Internet services. What makes it distinctive is the new business models and applications that it can enable (digital signage, push VOD, in venue applications for example), which is critical to monetization, user engagement, and commercializing non-conventional business models that are capable of leveraging current OTT and TV Everywhere investments.

To take hold of the opportunities associated with LTE Broadcast, both operators and content programmers must pursue the right approach and consider all the steps necessary for robust service delivery. Partnering with an experienced video delivery provider can not only yield benefits associated with time to market, limited risk and lowered costs. Doing so also opens up new avenues for revenue generation, while leveraging the knowledge gained through multiple deployments and trials globally.
About Quickplay

Backed by a decade of experience, Quickplay is the global expert in powering TV over any device, allowing premium video service providers to focus on growing their business. Quickplay’s proven services leverage an open platform, cloud economics, and best-of-breed partners so providers can move faster, operate leaner, and offer the best TV experience anywhere. With facilities and experts in Toronto, San Diego, Singapore, Chennai, and Frankfurt, Quickplay enables 700 million people around the globe to fast forward to a next generation of TV with over 700 live channels, 4,000 live events each year, and 2 million securely managed premium content assets. Quickplay has successfully launched multiscreen video services for the likes of Verizon, AT&T, AccuWeather, Bloomberg, Rogers, Bell, TELUS and Singtel.

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