PeerApp

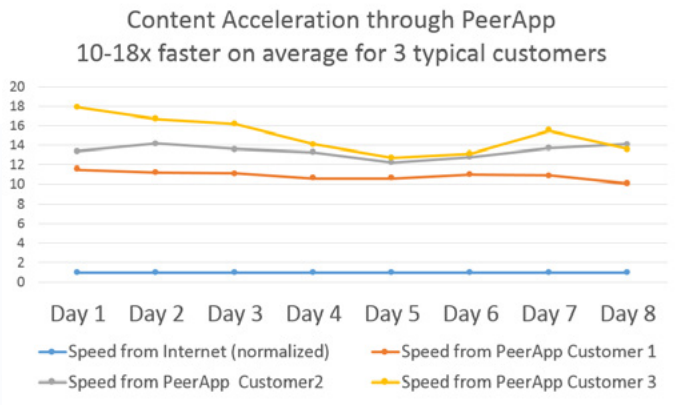
UltraBand® Content Caching

Market Challenge

The Internet has become a primary method of media and entertainment distribution as evidenced by the explosion of Internet content consumption, often called Over-the-Top or 'OTT'. Consumption growth has been driven by 'Over-the-Top' (OTT) services such as YouTube and Netflix, new direct streaming offers from CBS, HBO and ESPN. The proliferation of Internet-connected mobile devices and a personal preference for content 'anytime, anywhere' have also fueled Internet content consumption. This explosion is straining networks of all types – mobile, cable, telco/ISP and college/university, resulting in poor subscriber Quality of Experience (QoE) even in advanced broadband and 4G/LTE environments. In addition, dynamic events such as the World Cup and software updates, like iOS, or new game introductions, cause traffic spikes that also impact the subscriber experience, a key factor in customer retention.

PeerApp offers a solution

The following chart shows the increase in content delivery speed for traffic from PeerApp over traffic from the Internet. Data for 3 typical mobile customers is provided. Content is delivered 10-18x faster on average through PeerApp.



UltraBand Addresses Market Needs

PeerApp's UltraBand content caching augments operator networks of any type to accelerate delivery of OTT content to end-customers, improving QoE and decreasing costs. With UltraBand, operators have accelerated content delivery speeds by 12x or more, ensuring that their customers are able to watch video from services like Netflix and HBO Go on laptops, tablets and other devices - without experiencing buffering or stalling. PeerApp customers have also lowered bandwidth costs up to 50% and more.

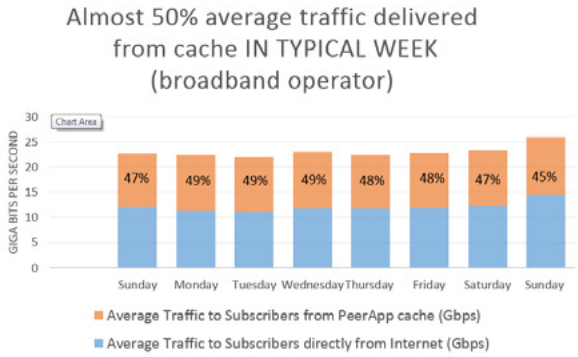
The PeerApp approach improves subscriber QoE by eliminating buffering or stalls, increases operational efficiency, and opens service delivery and monetization opportunities. With the move to 4K/Ultra-High Definition (UHD) video, the PeerApp solution becomes even more important for meeting subscribers' QoE Expectations.

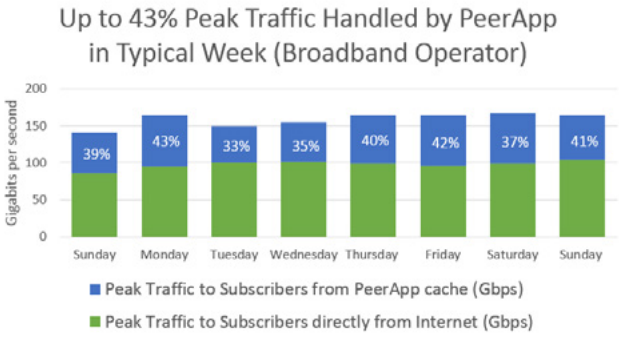
Beyond video, UltraBand is able to cache a wide range of content types. In fact, UltraBand's caching engine is organized around content classes, rather than on specific services, sites or originating URLs.As a result, UltraBand is extremely resilient to service changes, knows how to handle dynamic URLs, and facilitates rapid adoption of new content formats and protocols that are constantly emerging and changing.

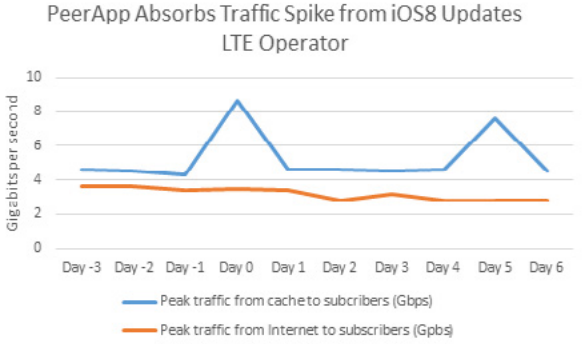
Sample Supported Content Classes

Content Class	Examples
Progressive Download / Progressive Download / HTTP Chunk-Based Streaming	YouTube video, pandora, dailymotion, todou, youku, msn movies, veoh, yahoo video, metacafe, aol video, divx
Adaptive Bitrate (ABR) Video	Microsoft Silverlight HSS, Netflix, HLS
HTTP File Sharing	RapidShare, Dropbox, PutLocker, DLFree
Web Browsing	HTML, style sheets, javascripts
Software Update Services	Windows Update, Apple Software Update, anti-virus updates
Content Downloads	iTunes, App Stores, eBooks, Ringtones
Web Application Data	Google Maps, Farmville, Flickr, Tumblr, gaming
Peer-to-Peer File Sharing	BitTorrent, eDonkey, Gnutella

The chart below shows the average total traffic and peak traffic to end subscribers for a typical week of a PeerApp customer. Cached traffic reached almost 50% of total traffic delivered, saving bandwidth and speeding delivery. During peak times, PeerApp handled up to 43% of total traffic to end subscribers.







The chart on the left shows traffic during the iOS8 update event. As software update traffic spikes, the PeerApp cache absorbs that spike (blue line), eliminating most of the potential network impact of the update event (traffic from the internet – orange line – remains relatively flat).

The UltraBand system comes in a variety of configurations to meet each operator's unique needs. Regardless of the configuration, UltraBand consists of three major components:

- one or more transparent cache engines that detect popular (repeatedly-requested) content and then copy and retrieve that content to and from cache storage;
- storage, ranging from appliances with self-contained storage to external arrays holding tens of terabytes;
- a management system that supports system configuration, management and reporting.

Transparent Caching

UltraBand's transparency means that the system never interferes with the business logic of any Internet application or service, and guarantees that content served from cache is always up-to-date. This enables full compliance with legislation for service provider liability protection, as defined in "safe harbor" provisions in the US (DMCA 1998), the EU (E-Commerce Directive 2000) and in other countries as inherited through free trade agreements. UltraBand does not expose a public IP address to subscribers, to HTTP services, to peer-to-peer networks or to third parties. Practically, UltraBand is invisible to network subscribers and content servers as it operates as a Layer-2 appliance that does not have an IP address. This means that the cache does not change anything (beyond the speed acceleration the cache provides) relating to servers' or subscribers' application logic or user experience.

UltraBand features a unique cache policy engine that identifies a number of pre-defined content "classes" with associated delivery attributes and requirements. Operators are provided the flexibility of managing cache behavior in several ways, for example: controlling the way in which caching and system resources are used among the different content classes. Once initially configured, UltraBand adapts to changes in the content mix automatically, without requiring operator intervention. Alternatively, the operator can make direct adjustments at its discretion.

Management System

The UBView™ web-based management interface provides a comprehensive view of the UltraBand system and its components. SNMP-compliant alerting and alarming provide real time insight into system performance and health.
UBView reports incoming and outgoing traffic for each protocol, as well as overall cache productivity. Upstream and downstream data can be displayed for day, week, month or year periods. The average traffic for selected periods as well as minimum, maximum and current snapshot traffic is displayed. UBView provides key indicators for QoE, cache performance and other traffic statistics. Cache Detail Reports (CDRs) can be exported for use with third-party management and accounting systems. In environments with multiple UltraBand systems, CDRs can be fed into the PeerApp UBInsight content analytics platform.

Easy, Right-Sized Deployments

The UltraBand platform can be deployed in a wide range of configurations – starting at under 1Gigabit per second (Gbps) traffic handling capacity to almost 150Gbps capacity in a single system. This allows an operator to find a 'right-sized' solution to its traffic management needs. Of course, multiple systems can be deployed to meet large-scale needs. PeerApp supports multiple Tier 1 operators with deployments in the 300Gbps to 500 Gbps range.
UltraBand integrates with existing operator networks in a variety of ways. Policy-Based Routing, DPI redirection, or direct 'in line' deployment are all possible, depending on each individual operator's unique business needs or preferences. In any deployment method, there is minimal change to operator network configuration and traffic flow.

Key Features and Benefits

Dramatic Quality of Experience (QoE) Improvement

Accelerates streaming and download content up to 12x or more for flawless media delivery. Optional UBWeb module accelerates web page load times by for a delay-free web browsing experience.

Network Cost Savings

Offloads 50% and more of network traffic to reduce costs of IP transit bandwidth and infrastructure upgrades.

Broadest Content Support to enable broadest caching coverage

Concurrently caches a wide and growing set of services including adaptive bit rate (ABR) video, flash, streaming video, web-based and peer-to-peer file sharing, software update services, mobile-specific services and HTTP downloads. This broad coverage widens the opportunity for QoE improvements and cost savings.

Transparency / Legal Compliance

Full transparency preserves application logic for HTTP services and peer-to-peer networks. UltraBand fully complies with the procedural "safe harbor" provisions set by US (DMCA 1998) and EU laws.

Operational Simplicity for Ease-of-Use

UltraBand dynamically processes all supported services and applications, and automatically detects content traffic pattern changes, content popularity changes, and flash crowd events. This eliminates the need to manually predict which services will drive the most content and statically allocate capacity to them.

Scalability for 'future proof' growth

Configurations range from entry-level appliance systems to large-scale systems with the highest caching capacities available in the industry. This means an operator can start with a configuration to meet today's needs with the confidence that the system can easily be expanded to meet future needs.

High Availability to meet demanding needs

Clustered system architecture with no single point of failure. Interface to the existing network is architected to ensure that network traffic is not interrupted even in the event of a caching system failure. Network, N+1, and switch redundancy options.

Options

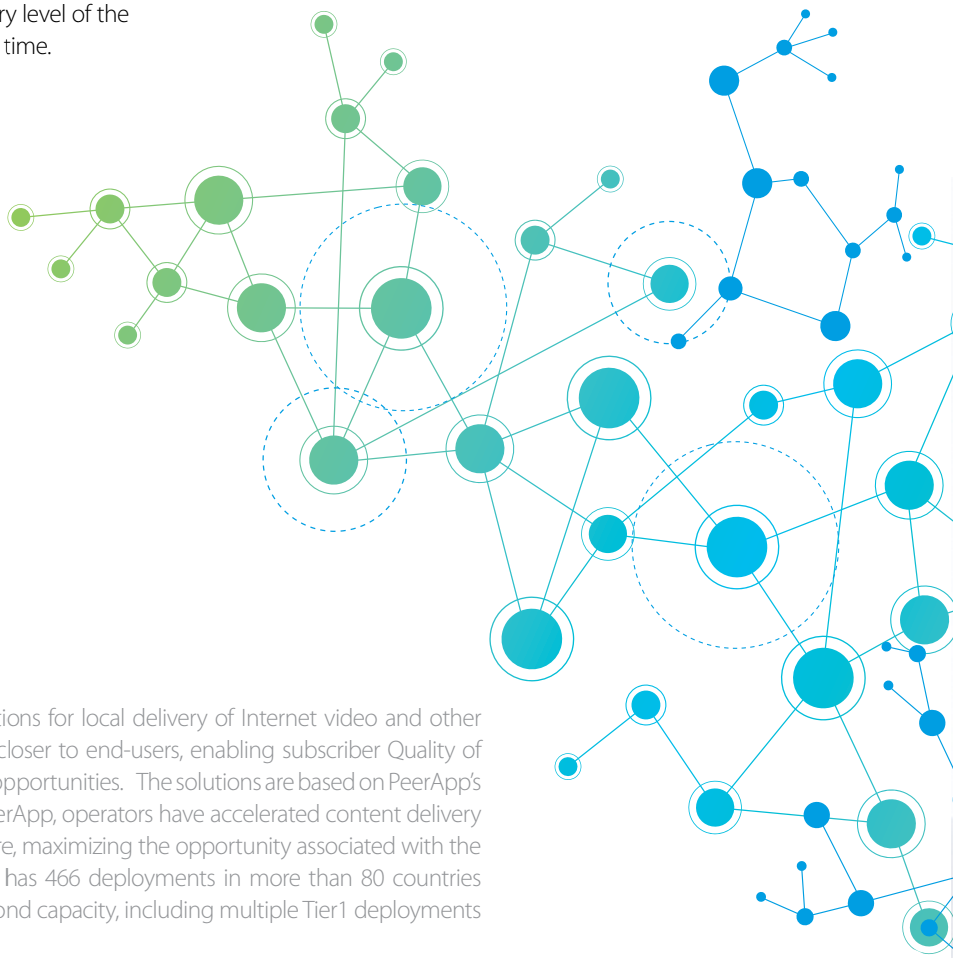
UBWeb Small-Object Web Acceleration

Web pages have grown in size and complexity, leading to slower page downloads and page rendering. Browsing is interactive, so each delay reduces the user's quality of experience (QoE). The UBWeb optional module reduces page load times by storing the many small objects that comprise a web page, and delivering them from cache in a fraction of the time required to deliver from the originating server.

Content Filtering

This optional module allows creation of definition, redirection and filtering policies for content via an optional module which is based on McAfee® SmartFilter that provides extensive content categorization, rating, and matching functionality for web content filtering. This option provides a single point in the network for media caching and content control. More than 92 standard filtering categories are provided and over 20 million web sites are categorized, with content being able to be blocked ore redirected in a customizable manner.

In addition, the companion **UBInsight®** content analytics product gives operators unique visibility into high value media content on their network. UBInsight leverages advanced data analysis tools for the visualization and reporting of key performance indicators (KPIs) and object level visibility from multiple UltraBand transparent caching platforms. Report packages tailor views for every level of the organization providing the right information at the right time.



About PeerApp

PeerApp delivers open, adaptable and virtualized solutions for local delivery of Internet video and other OTT content that speed delivery by bringing content closer to end-users, enabling subscriber Quality of Experience, lowering cost, and opening service delivery opportunities. The solutions are based on PeerApp's market-leading content caching and analytics. With PeerApp, operators have accelerated content delivery 12x or more, and reduced network costs by 50% or more, maximizing the opportunity associated with the explosion of Internet content consumption. PeerApp has 466 deployments in more than 80 countries managing an aggregate capacity of 4.1 Terabits per second capacity, including multiple Tier1 deployments on a 100-500Gbps scale.

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