Overview of Mobile Web and Video Optimization
Competitive Assessment (1Q 2015)

This competitive assessment examines the value propositions of video and data optimization vendors in this market segment. ABI Research considers the total value proposition that a vendor brings to an operator, i.e., if an operator should select a certain vendor platform, then what other network elements and features are likely to be considered. Here are the relevant factors ABI Research considers:

**Implementation**

**DEPLOYMENTS.** This is a measure of the total installed base of unique operators. Consideration includes the range of deployments from small (S) with 1 million or fewer subscribers to extra large (XL) with over 100 million subscribers.

**INTEGRATED SOLUTIONS.** This is a measure of additional value-adding elements available once an operator buys-in to a vendor’s platform, and is a measure of the breadth of the vendor’s technology.

**NFV / CLOUD.** This is a measure of suitability and readiness for virtualization, with vendors having virtualized solutions available now rating the highest.

**STAND-ALONE OPERATION.** This is a measure of the vendor’s solution for stand-alone operation, allowing an operator to select for best of breed, and is typically a purpose-built hardware solution.

**Innovation**

**MEDIA BREADTH AND DEPTH.** This is a measure of video and audio optimization and management features, including common features of buffering, caching, and transcoding, to the more elaborate means of modulating encrypted adaptive bitrate streams, forcing the streaming source to adapt to operator network control.

**DATA BREADTH AND DEPTH.** This is a measure of TCP and other optimization and management features, including bump- in- the- wire solutions and proxies that manage the traffic and signaling between mobile devices and TCP / IP services.

**SUBSCRIBER FOCUS.** This is a measure of subscriber interface features that benefit user experience, and are native features that equip an operator to provide prompts, reminders, offers and similar to encourage data use and provide incremental revenue.

**MONETIZATION FOCUS.** This is a measure of monetization features to assist operators grow revenues, including, but not limited to, turnkey marketing tools and promotions, elaborate marketing campaigns, or supporting interface to third-party BSS and policy solutions.

**ANALYTICS FOCUS.** This is a measure of big data and analytic capability available as part of the vendor’s solution, an add-on, or interface to third-party analytic engines.

This assessment covers eleven vendors, including independent software only firms, hardware specialists in the Gi-LAN space, and large infrastructure vendors. In the final assessment, ABI Research finds Citrix ByteMobile claims overall value proposition leadership with its Adaptive Traffic Management solution and corresponding virtual editions.

<table>
<thead>
<tr>
<th>Company</th>
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Overview of DPI and Traffic Management Competitive Assessment (4Q 2014)

Vendor Matrix Results

This competitive assessment focuses on key elements of an operator's Gi-LAN, which is the network that is between the Packet Gateways (PGW, GGSN) and the IP services and Internet, including Deep Packet Inspection (DPI) technology, Policy and Charging Enforcement Function (PCEF), and Traffic Detection Function (TDF). No one buys just DPI technology, but rather, DPI is used to generate many functions in many locations throughout the network. ABI Research looks at the total value proposition of vendor supplied DPI technology and, specifically, what other things are available as part of the solution. Here are the relevant factors ABI Research considers:

Implementation

DEPLOYMENTS: HOW MANY UNIQUE OPERATORS. This measure considers market share represented as how many unique operators are supported.

DEPLOYMENT RANGE: S, M, L, AND XL. This measure considers the vendor’s delivery to the full range of operators, from small (S) with 1 million or fewer subscribers to extra large (XL) with over 100 million subscribers.

PURPOSE BUILT HARDWARE: NPU, ASICS, OR OTS. Consideration is given for the use of purpose built hardware in addition to the x86 architecture.

PLATFORM BREADTH: BLADES, APPLIANCE, AND VIRTUAL. A wider solution portfolio, with products ranging from appliance platforms to blade servers to virtual machines and a rich granularity of power and performance score higher.

Innovation

ADDITIONAL ELEMENTS: FUNCTIONS THAT RUN ON THIS PLATFORM. As basic functions become commoditized, this measure considers the extra value adding features that an operator can also deploy as an integrated solution from the vendor.

MONETIZATION FOCUS: BEYOND BASICS. This accounts for a vendor’s richness and depth of features that assist an operator to monetize its network assets.

SDN / NFV SOLUTION: VIRTUALIZATION STRATEGY. As virtualization gains traction, this metric examines the vendor’s status or plan for the SDN / NFV architecture.

BIG DATA ANALYTICS: INTERNAL OR THIRD-PARTY. This competitive assessment is for capability in analyzing, reporting, extracting, and delivering actionable insights to the operator, natively with the solution and/or to third parties.

CUSTOMER EXPERIENCE MANAGEMENT: DEPTH OF FOCUS ON CUSTOMER EXPERIENCE MANAGEMENT (CEM). This considers the aggregate experience presented by the vendor solution to the end user, and to the operator regarding network operations.

In this competitive assessment, Sandvine and Allot share the highest implementation rating. Citrix ByteMobile scores the highest innovation rating.

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Individual Company Assessment: Citrix and Citrix ByteMobile

Vendor Matrix Results

Citrix is a California-based publicly traded firm with $3.14B in 2014 revenues. Citrix acquired the privately held ByteMobile and its flagship Adaptive Traffic Management (ATM) solution in 2012. The ByteMobile ATM solution performs real-time traffic management based on conditions in the RAN and core networks, encompassing functions such as web and video optimization, content caching, DPI and policy enforcement. When used in conjunction with a PCRF, the platforms function as a PCEF.

The ATM solution consists of a number of modules:

**BYTEMOBILE T3100 ADAPTIVE TRAFFIC MANAGER:** Integrated DPI, optimization, and network intelligence. The T3100 runs on a NEBS-compliant x86 blade server that can keep pace with the x86 IT cadence when new blades are available.

**BYTEMOBILE VIRTUAL ADAPTIVE TRAFFIC MANAGER:** Offers, in virtual form, the same software functionality as the T3100.

**BYTEMOBILE T1000-SERIES TRAFFIC DIRECTOR:** A family of one- and two-rack-unit x86-based application delivery appliances derived from the Citrix NetScaler line used to provide load balancing for the ATM installation. There is also a virtual edition.

**BYTEMOBILE T2000-SERIES VIDEO CACHE:** A family of two-rack-unit cache devices.

Key features include global traffic management, multi-layer DPI, upstream / downstream load balancing and traffic steering, distributed smart caching with CDN support, selective video and web optimization, and user experience analytics. Additional features and capabilities include:

- Pacing for just-in-time delivery
- Transcoding based on device and network conditions
- Bandwidth shaping to match video bitrate to available channel capacity
- Video caching at the core edge
- Streaming video and audio policy control
- Download policy control
- Content filtering, quota management, and OTT partner mediation
- Internet radio optimization
- Auto-update
- WAP gateway
- TCP optimization

Additional total-value services include:

**NETSCALER APPLICATION DELIVERY CONTROLLER:** A full line of software-based physical (x86) and virtual appliances designed to support a range of user- and control-plane applications inside and outside the S / Gi-LAN, including IPv6 migration, CGNAT and Diameter, and DNS load balancing.

**BYTEMOBILE INSIGHT:** A subscriber analytics platform designed for use by operator marketing and customer-care organizations. This big data analytics platform yields business intelligence in the form of “insights” that are used by line-of-business managers in their own business processes, including subscriber segmentation, campaign targeting and measurement, churn prediction, care operations (customer usage and device diagnostics), and third-party monetization.

**SUBSCRIBER ENGAGEMENT SUITE:** Customer engagement tools for the operator. This includes a self-care module that includes engagement tools for voice, data, and video plans and usage, top-up and service package self-selection, proactive notifications, promotions (opt in / out), and configurable device toolbar. Advertising support via operator-maintained subscriber data for additional value and revenue streams, including analysis and business intelligence.
Citrix ByteMobile has long been the largest player in video optimization, as its solutions have been deployed at over 140 mobile and wireline vendors worldwide, across operators of all sizes. The platform’s optimization solutions can deploy as a highly integrated all-in-one or stand-alone-focused product. The commercial x86 architecture NEBS-compliant platform is suitable for many network architectures. A distributed network like 3GPP LTE with many Internet points of presence (POP) opens more opportunities for comprehensive solutions like the ByteMobile ATM solution.

- The ATM is an automated architecture that scales from Small to Extra Large deployments at Tier One operators, handling up to 1 Tbps of data traffic.
- Citrix ByteMobile maintains a globally distributed professional services and technical support teams provide in-country installation and maintenance services.
- For Mobile Web and Video Optimization, Citrix ByteMobile gains three top scores for implementation: Deployments, NFV / Cloud focus and Stand-alone capability.

**Innovation**

- The Citrix ByteMobile ATM’s adaptive nature, which is responsive to upstream / downstream traffic conditions, is noteworthy. It can operate as a DPI / TDF / PCEF function and can interface with a PCRF. Not surprisingly, ByteMobile is Citrix NetScaler ready, providing additional pull-through for the vendor.
- Notable innovations include a history of firsts: first video optimization (2009), first single index of user experience (2012), first Internet radio optimization (2013).
- ByteMobile leverages Citrix in-house technology expertise in virtualization and orchestration, and demonstrated the NFV implementation of the Adaptive Traffic Management (Mobile World Congress 2014).
- For Mobile Web and Video Optimization, Citrix ByteMobile gains a top score for Media Breadth and Depth of solutions.
- For DPI and Traffic Management, Citrix ByteMobile rates highest for virtualization and NFV capability. The company also takes first place with the additional value adding elements that deploy on its platform, shares first place with virtualization and NFV readiness, and shares first in big data analytics and CEM.

For questions on this research, please contact ABI Research. Visit our website at www.abiresearch.com for contact details.