



# Mobile Web Acceleration and Optimization

## Speeding up the Mobile Internet

Regardless of network generation, usage patterns, pricing plan or mobile device, Web access speed remains the defining characteristic of user quality of experience (QoE) and the overriding determinant of user satisfaction for mobile Internet services.

Even over high-speed 3.5G networks, market research has shown that slow connection speeds still negatively impact mobile Internet usage. Only one third of mobile Web users were found to be satisfied with the overall experience, with more than one quarter stating they would be unlikely to renew data service contracts because of their dissatisfaction with the experience.

For the 75% of users with Web access on their mobile device, and especially for users with advanced devices (iPhone or other smartphones) on which the majority of browsing is beyond the “walled garden,” speed is ranked the number one complaint.

At the same time, mobile network operators – from Tier-1 mobile ISPs to emerging market players – are battling network overload. As flat fee pricing plans become more pervasive, operators are experiencing explosive growth in data traffic – exhausting resources and slowing access. Meeting user demand for wireline-like mobile browsing, while keeping network OpEx and CapEx in check, has become mission-critical for mobile operators, and a key competitive differentiator.

### Acceleration and Optimization Solution

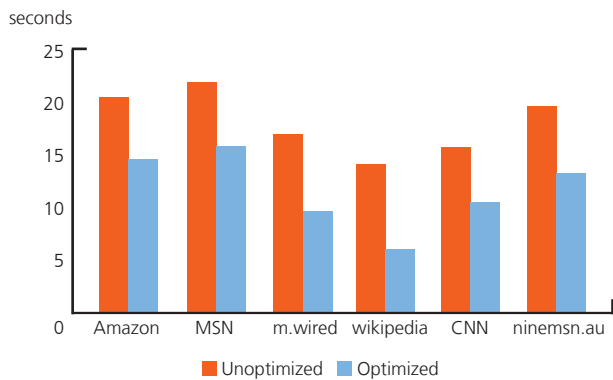
Flash Networks’ Mobile Web Acceleration and Optimization Solution enables operators to provide quicker, smoother, and more reliable mobile Internet browsing and downloading. Already operating in top-tier networks across the globe, Flash Networks’ solution improves average mobile access speeds by 50% and reduces data by a similar factor.

#### Fast Facts

- More than a quarter of mobile broadband subscribers are unlikely to renew their contracts, citing slow connection speeds and high prices as their main complaint. (YouGov)
- Only one third of mobile Internet users are satisfied with the user experience. Speed of response is the number one complaint. (Online Publishers Association)
- Over 70% of popular sites took more than 10 seconds to download over mobile networks, and when page download time approached ten seconds, over 80% of people abandoned the task. (User Analytics)

As a result, existing users spend more time browsing, purchase more content, and share their positive experiences, resulting in increased market share, stronger brand loyalty, better user satisfaction, and increased revenues and ARPU.

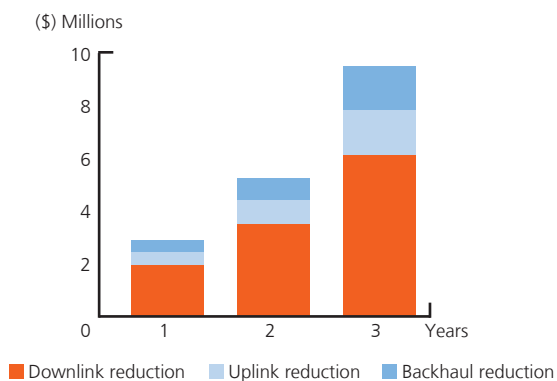
In addition to the benefits from increased data revenues, accelerating the mobile Internet results in improved network efficiency, reducing traffic as follows:



**With Flash Networks' acceleration solution, Optus' iPhone and other smartphone users are now enjoying a 10 to 50 percent improvement in web page download time.**

- Internet transit traffic – reduced by approximately 30%
- Downlink traffic in the RAN and mobile backhaul – reduced by up to 50%
- Uplink traffic in the RAN and mobile backhaul – reduced by 30%-50%

Flash Networks' optimization solution also reduces data for peer to peer (like eMule or uTorrent) and digital media (like YouTube) applications, which together account for about 80% of traffic. Such data reduction dramatically reduces operating expenses.



**Data reduction significantly lowers total cost to operator in downlink, uplink and backhaul.**



## Mobile Internet Services Gateway

Flash Networks' Mobile Web Acceleration and Optimization Solution is rapidly and seamlessly integrated into the operator's network separately or as part of the Harmony™ Mobile Internet Services Gateway, in a clientless or client-server configuration. Harmony is a Telco-grade solution that empowers enhanced subscriber quality of experience, reduces operational expenses and helps operators manage and monetize access to the open Internet by applying best-in-class services to mobile data traffic. Harmony enables operators to consolidate several detached network services into a single gateway with unified business logic, making the network more uniform and simpler. Strategically positioned in the network, Harmony efficiently manages all types of network traffic, applying a diverse range of services based on user profile, current activity, and network conditions.

## End User Benefits

- Faster browsing and downloads
- Smooth, uninterrupted browsing
- Easy access to rich mobile Internet services
- Wireline-like experience on mobile device

## Operator Benefits

- Increased adoption, mobile data usage, revenues and ARPU
- Improved network utilization due to reduced load
- Stronger operator brand and image
- Enables mobile broadband offering as replacement or supplement to fixed ISP

## Solution Highlights

Placed at critical junctures in the network, Flash Networks' Acceleration and Optimization Solution monitors, collects and processes data directly from the network's traffic flows. Then, it applies powerful data optimization techniques based on information about users, devices, network bearers, and real-time network conditions. Flash Networks' solution adjusts TCP parameters, eliminates HTTP inefficiencies, optimizes content presentation, and more – providing a more consistent, richer, and more satisfying browsing experience.

### TCP Optimization

Overcoming inherent protocol inefficiencies, Flash Networks tweaks TCP parameters and adjusts transmission rates based on real-time bandwidth availability monitoring. Unique to Flash Networks, TCP adjustment enables download acceleration of up to 30%, even for non-compressible files. Multiple server connections are treated as a group for more efficient processing. In client-server implementations, TCP is replaced with a specialized transport protocol, resulting in up to 95% utilization of available bandwidth.

### HTTP Optimization

To reduce communication chatter during Web page downloads, several techniques are implemented to minimize the number of transactions over the network, increasing the number of parallel communication connections for these transactions. Based on real-time network and bearer conditions, Web page objects are logically grouped to further consolidate browser requests. Flash Networks also modifies the HTTP protocol to support multiple connections with simultaneous transactions.

### Data Reduction

Downloading today's media-rich Web pages can result in inefficient network resource usage. Advanced and selective data compression and reduction methodologies from Flash Networks significantly reduce data quantity and transmission time without sacrificing QoE. Compression can be performed on chunks of data, frequencies and colors of images, and animated files.

### Smart Caching

Since data can be requested more than once, repetitive content fetching and optimization is a common network burden. To mitigate this burden, Flash Networks stores optimized content on the optimization server for repeat requests - lowering processing time. For quick retrieval, content is stored per device format and in full compliance with guidelines defined by the application.

### Session Continuity

Insulating client applications from network inconsistencies, Flash Networks' solutions improve the Web application usage experience - masking service interruptions, link disconnections, and communication errors resulting from dead spots, fading, or poor handoffs.

## About Flash Networks

Flash Networks is a global provider of intelligent mobile Internet solutions that enable operators to improve quality of experience, reduce network operational expenses, and manage and monetize the mobile Internet. Providing a faster, safer, richer, and more personalized user experience, Flash Networks' Mobile Internet Services Gateway helps operators achieve significant cost savings through intelligent data traffic optimization and applies intelligent policies for targeted marketing and charging.

With offices in Europe, Asia, and North America, Flash Networks' installed base of top-tier mobile carriers includes O2, Orange, SingTel Group, T-Mobile, Telefonica, Telenor, Verizon Wireless, Vodafone, and Wind. For more information, please visit [www.flashnetworks.com](http://www.flashnetworks.com).

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