

# Performance Brief: Web Applications

## Steelhead® Mobile Accelerates HTTP & HTTPS

Enterprises are utilizing HTTP and HTTPS for everything from e-commerce to mission-critical applications. It is the underlying protocol for all web-based applications used to communicate internally with employees, and externally with partners and customers. Because HTTP(S) are such important and widely-used protocols, it is vital to understand the many factors that can cause web-based applications to be slow and unreliable. Enterprises often unsuccessfully attempt to alleviate these problems by adding WAN bandwidth across their private clouds. However, adding more bandwidth does not fully address the problem, particularly for mobile workers who are often connecting over variable links that are not a part of an organizations network environment. Mitigating the impact of network latency, as well as intelligently reducing the size of data transfers are essential for accelerating HTTP(S) transfers over the WAN regardless of a users location.

## Steelhead Mobile Enhanced HTTP and HTTPS Traffic

Steelhead Mobile provides significant acceleration for HTTP(S) by utilizing the Riverbed Optimization System (RiOS) to simultaneously address bandwidth constraints and protocol inefficiencies. In addition to standard data streamlining and transport streamlining functionality, RiOS enables several mechanisms to further optimize HTTP(S).

For static web content, a “learning mechanism”, that allows Steelhead Mobile to track the objects that are requested for a particular web page, accelerates future requests by using the learned information and pre-fetching associated content. In addition, HTTP(S) leverages the learned information to send normally sequential data requests in parallel creating additional optimization benefits.

For dynamic web content, RiOS performs a parse-and-pre-fetch of embedded objects on dynamic web pages. When requests for dynamic content occur, RiOS parses the retrieved dynamic HTML page and immediately pre-fetches embedded objects to accelerate webpage load times. The net result is a significant reduction in roundtrips across the WAN for dynamic content that is often leveraged by web-based enterprise applications.

Another performance enhancing feature for HTTP(S) is the object prefetch table. This enables the Steelhead Mobile datastore to cache complete web page objects, allowing these to be served up immediately as a whole locally rather than reassembled from data references or transferred across the WAN. Unlike other cache approaches, consistency and “freshness” is maintained as RiOS will always still deliver the latest version of the object being requested.

RiOS accelerates HTTP(S) traffic further by also optimizing metadata through its 304 Fast Response capability. If Steelhead Mobile receives an “If-Modified” request within a specified expiration parameter, it will respond with a “Not Modified” response, and the client will retrieve the web content from its own local web browser cache. This eliminates roundtrips across the WAN and minimizes delay for end-users. This combined multilayer approach to HTTP(S) optimization delivers acceleration benefits to a range of web enabled applications.

## TEST RESULTS

- Up to a 60x performance increase for HTTP(S) transfers
- Up to 99% reduction in bandwidth utilization

## DEPLOYMENT BENEFITS

Deploying Riverbed with HTTP and HTTPS provides multiple benefits, including:

- **Accelerate web-based applications.** HTTP(S) transfers over the WAN can now be completed in dramatically less time. This provides end-users with greater productivity from faster access to applications and content.
- **Improve bandwidth utilization.** Because Steelhead Mobile removes all redundant traffic and greatly reduces round-trip times when opening large numbers of short-lived connections, WAN utilization is significantly improved and congestion is prevented.

## Performance Improvement

Riverbed Steelhead Mobile reduced the time to transfer files via HTTP(S), by up to 60x and reduced bandwidth utilization by up to 99%, dramatically freeing up WAN resources.

### Word: Firefox Open a 4.88 MB file – Time to Complete (sec)



### Word: Firefox Upload a 4.49 MB file – Data Transferred (bytes)



## TESTING SCENARIO

These tests were performed using Windows XP Professional and Windows 7 with Steelhead Mobile 3.0 as the client platform connecting to a SharePoint 2007 Server running on Windows 2003 R2. The browsers used for testing were Microsoft Internet Explorer 7.0.5730.11 and Firefox 2.0.0.16

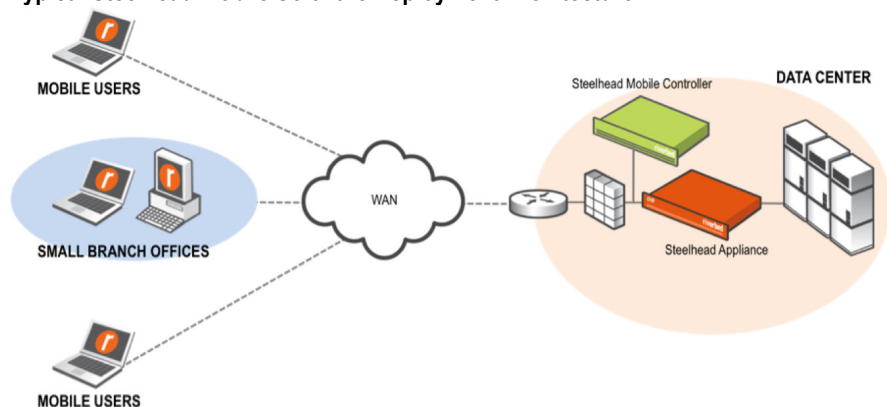
The applications tested included Microsoft PowerPoint, Excel and Word, using a variety of file sizes. Operations were performed using a SharePoint Team Web Site and included a set of common activities such as checking out, editing, and checking in modified files.

The performance tests were run on 256k and T1 WAN links with a latency of 100ms. The variables tested included the size and type of the file.

A "First Operation" is defined as a data transfer that has never been seen by the Steelhead Mobile client before (completely new data).

A "Subsequent Operation" is defined as a data transfer in which Steelhead Mobile has seen most or all of the data before (an incremental change or data that has been used by another application across the network).

## Typical Steelhead Mobile Software Deployment Architecture



## About Riverbed

Riverbed Technology is the IT infrastructure performance company. The Riverbed family of wide area network (WAN) optimization solutions liberates businesses from common IT constraints by increasing application performance, enabling consolidation, and providing enterprise-wide network and application visibility – all while eliminating the need to increase bandwidth, storage or servers. Thousands of companies with distributed operations use Riverbed to make their IT infrastructure faster, less expensive and more responsive. Additional information about Riverbed (NASDAQ: RVBD) is available at [www.riverbed.com](http://www.riverbed.com)



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