

COLLABORATION SYSTEMS GROUP LLC

“TIME IS MONEY”

- BENJAMIN FRANKLIN -

EXECUTIVE OVERVIEW



It is our belief that you are looking for any way possible to **reduce cost** and **increase efficiency** during these tough economic times. Riverbed Steelhead devices provide a superb hardware/software platform - that when combined with our expertise in the world of digital design - can provide a solution for your organization that no one else can offer.


Traditionally, we've not been able to consolidate hardware in remote offices - let alone remote users attempting to "share" work with remote users. This is due primarily to our Wide Area Network (WAN) connections. Adding bandwidth alone, in an effort to address the speed problem, does nothing to address the real issue - latency, and the way that the transmission protocol (TCP/IP) is designed.

Research has indicated that over 60% of firms using Revit as their BIM tool of choice have between three to five offices involved in each project and that their dispersed design teams are between fifty and five hundred miles apart. Unless collocation is an option, providing a cohesive, effective, and efficient mechanism for team members to share their work is of paramount importance. Un-optimized WAN speeds do not provide for the adequate delivery of the Revit Models and associated worksets to any of the remote users

Riverbed Steelhead devices are an enabling technology that supports the dynamic change in the way that your organization will conduct business in the future. It is a technology that will provide you and your organization with a distinct competitive advantage.

How would the introduction of Riverbed reflect positively on your organization and what hard dollars could be attributed to this increase in productivity? If we concentrate solely on the time savings related to working within the Revit environment, with a dispersed team, we can show significant hard dollar savings.

Take the time not lost figure and multiply that by the number of team members working on a given project. For a smaller project - probably three to five, for a larger project - probably six to eight (\$ 294 to \$ 784). Now take that number and multiply it by five (\$ 1,470 to \$ 3,920). Now let's take that weekly number and multiply by 4.2 to see the impact on our monthly savings. - (\$ 6,174 to \$ 16,464).

Can you really afford not to be using  Steelhead?

COLLABORATION SYSTEMS GROUP LLC

“TIME IS MONEY”

- BENJAMIN FRANKLIN -

The majority of organizations working within the AEC marketplace have remote offices and/or project personnel located in trailers on-site. It is our belief that you are looking for any way possible to **reduce cost** and **increase efficiency** during these tough economic times. Collaboration Systems Group (CSG) would like to introduce you to a technology that allows you to look at Remote Office Collaboration, and possibly Consolidation, in a new light.

riverbed Steelhead devices provide a superb hardware/software platform - that when combined with our expertise in the world of digital design - can provide a solution for your organization **that no one else can offer**. Numerous design and construction firms - large and small, some of which you may already be working with - have recognized significant improvements in their digital communication capabilities with the use of Riverbed. Although, just as BIM has been adopted throughout the AEC industry with differing degrees of success - successful integration of the Riverbed solution varies based on the implementation scheme.

Federated modeling tools such as **Revit, SmartPlant, PDMS, PlantSpace** and **PDS** pose unique challenges when attempting to "share" the work. Each vendor of these model centric solutions has developed their own schema for sharing the model. In most cases a form of model check-out is used to parse out portions of the model to individual users. In Revit this is done with "Worksharing" and the creation of "worksets."

The schema provided by Autodesk to accomplish Worksharing is well defined and when used correctly ensures that conflicts within a project do not occur. This schema works well when all project participants are located within the same office and connected to the Central File via a LAN connection. Severe performance issues arise when attempting to incorporate Remote Users into the Workshare of a project.

Traditionally, we've not been able to consolidate hardware in remote offices - let alone remote users attempting to use the Autodesk Workshare schema. This is due primarily to our Wide Area Network (WAN) connections. The speed of these connections has simply been too slow. WAN speeds do not provide for the adequate delivery of the Revit worksets, and the "Save to Central" and "Reload Latest" functions add to the dilemma. **Adding bandwidth alone, in an effort to address the speed problem, does nothing to address the real issue - latency, and the way that the transmission protocol (TCP/IP) is designed.**

**ENHANCE EFFICIENCIES
450 TO 600%**

The below tables provide a summary of just how well Riverbed optimizes WAN connections so that Remote Offices and Collaborative Partners can work with the Revit Central File using the standard Revit work processes.

The testing simulates two Revit users working on separate local workstations. Each workstation has the Revit Architecture 2008 software installed. Each user opens a common Central File on a server located across a WAN, saves a Local copy to their computer, performs some work (which involves getting permissions and borrowing elements from the Central File), and then publishes their changes to the Central File. The tests use a custom API tool (WorkScheduler.exe) so that the Saves to Central are near-simultaneous, simulating typical real-life Central File conflicts.

The simulation of the two users is done using a script provided by Autodesk. The script directs each of the two users perform the following six operations. Operations one and five do not access files across a network, resulting in consistent times for all the tested topologies.

1. Save as Local File User
2. Make some changes to User local file
3. User - Save to Central
4. User - Reload Latest
5. Make some changes to User Local File
6. User - Save to Central

The WAN environment used in this case is a simulated T1 with 100 ms of latency. A baseline test was run without any Steelhead appliances, and then with the Steelhead appliances, and finally with the Steelhead mobile client software.

The server and workstations were running Windows XP with service pack 2 as the OS. The client workstations are running the June 2007 release of Revit Architecture 2008.

Revit 2008 Results Summary

	Total Data Transferred	Total Time to Complete	Data Reduction	Time Improvement	Time Reduction
Baseline	396.2MB	68.0 minutes			
Steelhead Cold	76MB	20.0 minutes	80.8%	3.4x	71%
Steelhead Warm	8MB	14.6 minutes	98.5%	4.7x	78.5%
SH Mobile Cold	166MB	28.9 minutes	58.1%	2.4x	57.5%
SH Mobile Warm	8MB	14.8 minutes	98%	4.7X	78.5%

Testing was also performed with Revit 2009 and Steelhead appliances to ensure continued interoperability between the two products. During the initial testing of Revit 2008 it was mentioned by several Revit customers that the average size of a shared Revit file is 150 MB, so testing was modified to use a 200 MB file to simulate a more real life environment. Testing was performed with a simulated 5mb link with 100 ms of delay. The testing with Revit 2009 was streamlined to test only the operations that are WAN intensive, namely, Save to Central and Reload Latest.

Revit 2009 Results Summary


	Total Data Transferred	Total Time to Complete	Data Reduction	Time Improvement	Time Reduction
Baseline	200MB	23.5 minutes			
Steelhead Cold	20MB	5.7 minutes	90%	4.2x	75.7%
Steelhead Warm	4MB	3.9 minutes	98%	6.0x	83.3%

You can grab a copy of the complete report [HERE](#) so you can view the associated graphs and the details of the performance results.

Research has indicated that over 60% of firms using Revit as their BIM tool of choice have between three to five offices involved in each project and that their dispersed design teams are between fifty and five hundred miles apart. Unless collocation is an option, providing a cohesive, effective, and efficient mechanism for team members to share their work and the information that their models contain is of paramount importance.

As stated earlier, un-optimized WAN connection speeds do not provide for the adequate delivery of the Revit Models and associated worksets to any of the remote users. Beyond the initial movement of the models, the recommended work process associated with Revit requires an interaction with the Central Model during the course of daily design activities. These "Save to Central" and "Reload Latest" functions add to the dilemma of attempting to share models in a collaborative design environment. As can be easily discerned in the test results the use of Riverbed technology can significantly reduce the "wait time."

"LOST TIME IS NEVER FOUND AGAIN"
- BENJAMIN FRANKLIN -

 is an enabling technology that supports the dynamic change in the way that your organization will conduct business in the future. It is a technology that will provide you and your organization with a distinct competitive advantage. It is extremely difficult to place a dollar amount on competitive advantage – that is a nebulous figure that can only be determined by you and your associates. However, stop to consider the other "soft" dollar savings that are available.

- Allowing remote office talent to work on a local project without moving data, or moving people.
- Removal of FTP as a means of data distribution.
- Faster access for secure, web-based hosted applications (Sharepoint, ProjectWise, and Deltek, for example).
- Savings associated working within a true collaborative engineering environment as your organization moves toward Integrated Project Delivery (IPD).
- The value of the "client" experience (both internally and externally).

"Soft" dollars can add up quickly and make a sizeable contribution to your organizations bottom line. As Mr. Franklin so eloquently stated - Time is Money – and the advantages you gain with a Riverbed solution equate to an increase in operational efficiency and a decrease in overhead.

Bottom line – reduced cost for your operation and an increase in profit . . . for the project, the team, and the company.

How would the introduction of Riverbed reflect positively on your organization and what hard dollars could be attributed to this increase in productivity? If we concentrate solely on the time savings related to working within the Revit environment, with a dispersed team, we can show significant savings. Since the work process associated with Revit differs from organization to organization (how often is a Save to Central and Reload Latest mandated) it is difficult to provide a standard dollar amount that can be saved. However, if we make some general assumptions we can provide some guidance.

- Opening the Model will be done twice a day by each user – once in the morning and once in the afternoon.
- Reload Latest will be done twice a day by each user – once in the morning and once in the afternoon – prior to executing the Save to Central function command. By doing the Reload Latest prior to the Save to Central we will eliminate the need to bring down the data that we already have.
- Save to Central will be done four times a day by each user – twice in the morning and twice in the afternoon.
- You are using Revit 2009, which has time improvement over the 2008 version, and the file has grown to 200MB of data/design.
- The design team has an average operational burden factor of \$ 70.00 per hour per individual.

Open the model twice per day – Riverbed reduces the execution time from 23.5 minutes to 3.9 minutes for a savings of 19.6 minutes per execution multiplied by two (x 2) for a total of 39.2 minutes not lost.

Save to Central four times a day – Riverbed reduces the execution time from 12.02 minutes to 2.45 minutes for a savings of 9.57 minutes per execution multiplied by four (x 4) for a total of 38.28 minutes not lost.

Reload Latest twice a day – Riverbed reduces the execution time from 3.72 minutes to .45 minutes per execution for a savings of 3.27 minutes per execution multiplied by two (x 2) for a total of 6.54 minutes not lost.

Total time not lost (to never be found again) equals 84.02 minutes per day.

84 minutes equals \$ 98.00 – based on a \$ 70.00 per hour burden.

Take the time not lost figure and multiply that by the number of team members working on a given project. For a smaller project - probably three to five, for a larger project - probably six to eight (\$ 294 to \$ 784). Now take that number and multiply it by five (\$ 1,470 to \$ 3,920). Now let's take that weekly number and multiply by 4.2 to see the impact on our monthly savings. – (\$ 6,174 to \$ 16,464).

Can you really afford not to be using **riverbed** Steelhead?