

Lab Review

Zero Branch IT with Riverbed SteelFusion

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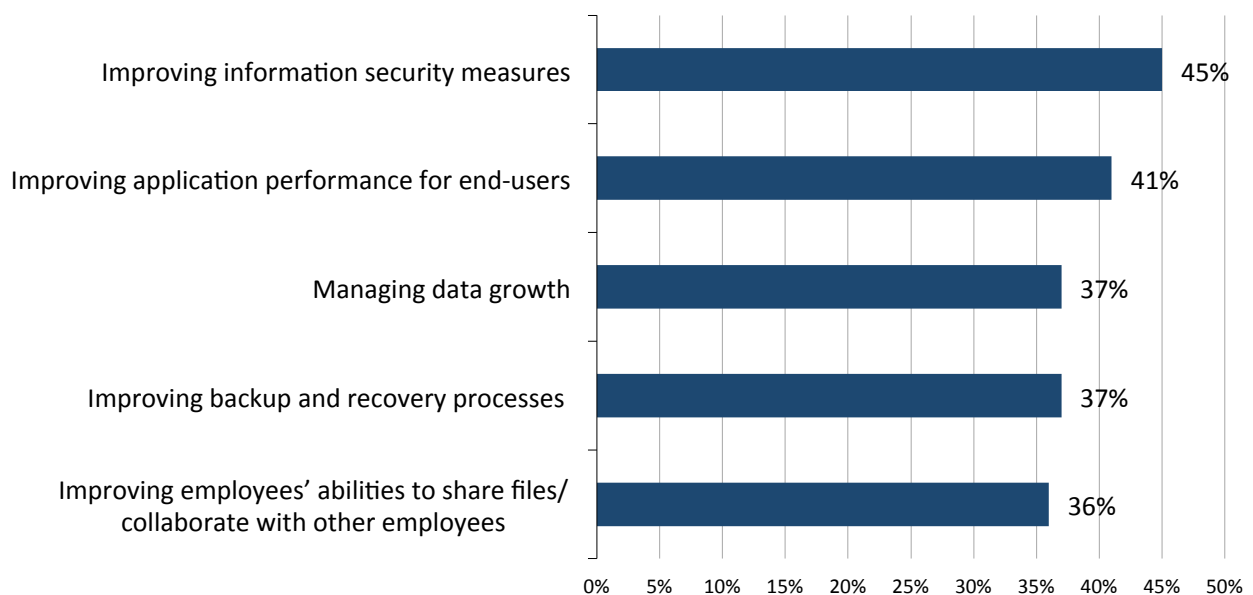
Abstract: This ESG Lab Review documents hands-on testing of Riverbed's SteelFusion appliance-based solution with a focus on validating the ways in which SteelFusion greatly simplifies the task of deploying, managing, and protecting remote office/branch office (ROBO) and branch IT locations while delivering continuous and high performance branch applications for end-users.

The Challenges

IT priorities and challenges are often addressed with data centers and other centralized corporate sites in mind. However, organizations often have distributed locations like sales offices, regional branches, and remote sites that generate significant revenue streams for the business, and that also have complex computing requirements. In fact, IT challenges are often exacerbated in remote/branch offices because of their sheer number, their distance from centralized sites such as corporate data centers, and their frequent lack of onsite IT resources.

FIGURE 1. Top Five ROBO IT Priorities

Which of the following would you consider to be your organization's top IT priorities with respect to supporting ROBO locations? (Percent of respondents, N=347, seven responses accepted)



Source: Enterprise Strategy Group, 2016

ESG recently conducted a survey of 347 IT professionals and respondents were asked about their top IT priorities for remote office/branch office (ROBO) locations. As shown in Figure 1, nearly half of respondents (45%) identified improving information security measures as one of their top priorities related to supporting ROBOs.¹ This is consistent with a separate ESG research survey in which 37% of IT decision makers identified cybersecurity as one of their most important overall IT initiatives for 2016.² In fact, three of the top four most common responses in the ROBO study mirrored those found in ESG's list of top overall (i.e., not ROBO-specific) IT priorities, with 37% of organizations identifying the management of data growth and/or improvement of backup and recovery processes. Rounding out the top five ROBO IT priorities were employee-centric initiatives, including improvements to application performance (41%) and accessibility (36%) for end-users, as well as better collaboration capabilities between employees (36%).³

These priorities are motivating organizations to centralize certain corporate applications and IT services, and deliver them over the WAN to ROBO locations. This can serve to extend the benefits of technologies and processes normally reserved for the data center to remote sites. Since few organizations have the means to staff all—or even many—ROBO locations with dedicated IT staff, hosting applications on centralized servers becomes even more significant.

While there are clear benefits to delivering applications over the WAN to ROBO locations, this strategy is not without its drawbacks. Network bandwidth limitations are core to the top challenges organizations have experienced when leveraging a centralized application delivery model, whether it involves slow file transfer speeds (36%), the cost of WAN bandwidth (32%), or too much data to move over the WAN (30%).⁴

The Solution: Zero Branch IT with Riverbed SteelFusion

Riverbed SteelFusion is a complete solution for distributed enterprises that allows organizations to leverage technological investments, advancements, and capabilities in their enterprise data centers, while also providing simple, agile, and cost-effective IT for branch locations in a unique “on-demand” manner similar to the way in which personalized cellphone software is deployed and recovered. Riverbed refers to this technology as “zero-branch” IT because it eliminates most of the hardware, software, management, and complexity of providing IT operations at branch locations.

The high level benefits of a SteelFusion deployment include:

- Single appliance at each branch location eliminates the need for separate servers, storage, WAN optimization, and backup software, appliances, or services.
- All branch locations are managed and backed up centrally by a single admin, eliminating the need for onsite IT at each branch.
- Branch security is improved as data is encrypted both at rest in the branch and in flight across the WAN, and all corporate data that is not immediately required at the branch is stored in the secure data center only.
- Near-instant provisioning and recovery of entire sites and applications requires less physical data movement.
- Organizations can leverage corporately standardized cutting edge data center technologies and extend the value across all branch locations, without the need to purchase hardware, software, or licenses at each branch.
- Organizations can continue to run and protect localized applications even after an appliance, branch, or WAN failure.

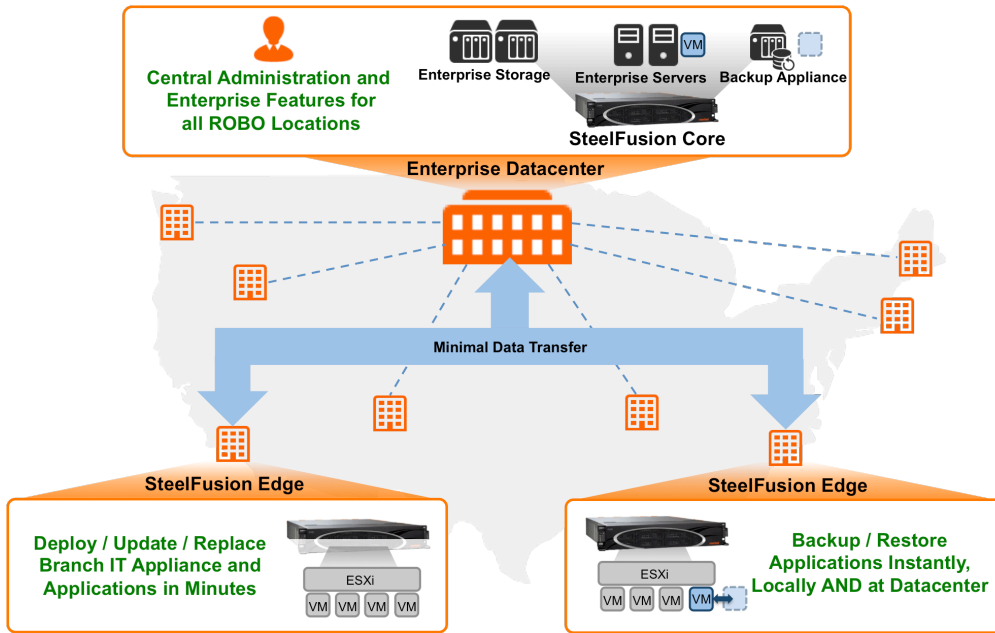
¹ Source: ESG Research Report, [Remote Office/Branch Office Technology Trends](#), May 2015.

² Source: ESG Research Report, [2016 IT Spending Intentions Survey](#), February 2016.

³ Source: ESG Research Report, [Remote Office/Branch Office Technology Trends](#), May 2015.

⁴ Source: Ibid.

FIGURE 2. Riverbed SteelFusion Zero-Branch IT



Increased Branch Agility

- Deploy, replace, restore, or re-purpose branch appliance and/or applications in minutes.

Efficiency & Availability

- Move less data across the WAN
- Transfer only the blocks that are needed
- Local performance with global efficiencies
- Compression / Deduplication
- Lower RTO and RPO

Lower Costs

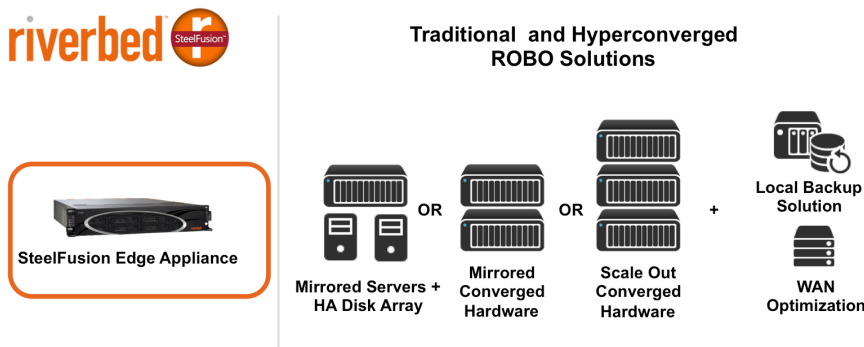
- Buy and manage less hardware at branches
- Leverage enterprise investments at scale
- Eliminate backup licenses at the branch

Source: Enterprise Strategy Group, 2016

The Riverbed SteelFusion Core can be deployed as a physical or virtual appliance and is located in the centralized data center behind a Steelhead WAN optimization appliance and in front of any enterprise storage and backup infrastructure. The SteelFusion Core appliance manages the entire infrastructure from a central location and facilitates the deployment and movement of branch IT data and applications, as well as the backup and restore of virtual machines, applications, and files between the data center and branch offices. The SteelFusion Core can also connect with data center backup infrastructure to consolidate backups for remote office/branch office sites in the central data center. SteelFusion also supports the integration of cloud gateways so that distributed enterprises have the choice of leveraging cloud-based storage for storing data and backups without the need to manage cloud connectivity at each branch location.

SteelFusion Edge can be deployed as a single appliance or in a locally protected dual-appliance HA configuration at each branch location. The appliance leverages the latest high performance compute and storage technologies to provide all of

FIGURE 3. Riverbed SteelFusion Edge Hardware versus Traditional ROBO Deployments



Source: Enterprise Strategy Group, 2016

As shown in Figure 3, a single SteelFusion Edge appliance can greatly reduce the amount of hardware, software, licensing, and management complexity when compared with traditional and hyperconverged branch IT solutions.

of the compute, memory, virtualization, storage, and backup requirements for each branch location. All data stored and transferred between the data center and branch locations is compressed, deduplicated, thin provisioned, WAN optimized, encrypted, and analyzed to make sure only the necessary chunks of data are transferred. Since SteelFusion extends the capabilities of all hardware in the data center to the branch locations, expensive features need only be licensed for storage in the data center.

Agility and Performance

To get started, ESG Lab began by validating how easy it is to deploy a new branch location using SteelFusion. A Virtual SteelFusion Core 1500L virtual appliance running on an enterprise virtualization platform along with block storage provided by a storage array from a leading enterprise storage vendor was used to simulate an enterprise data center. WAN connectivity was simulated through a Steelhead WAN optimization device across a 10Mbps link with an injected latency of 50 ms to simulate typical WAN connectivity to a branch location over distance. A new SteelFusion Edge 2100 appliance was then connected in a few clicks from the SteelFusion Core console.

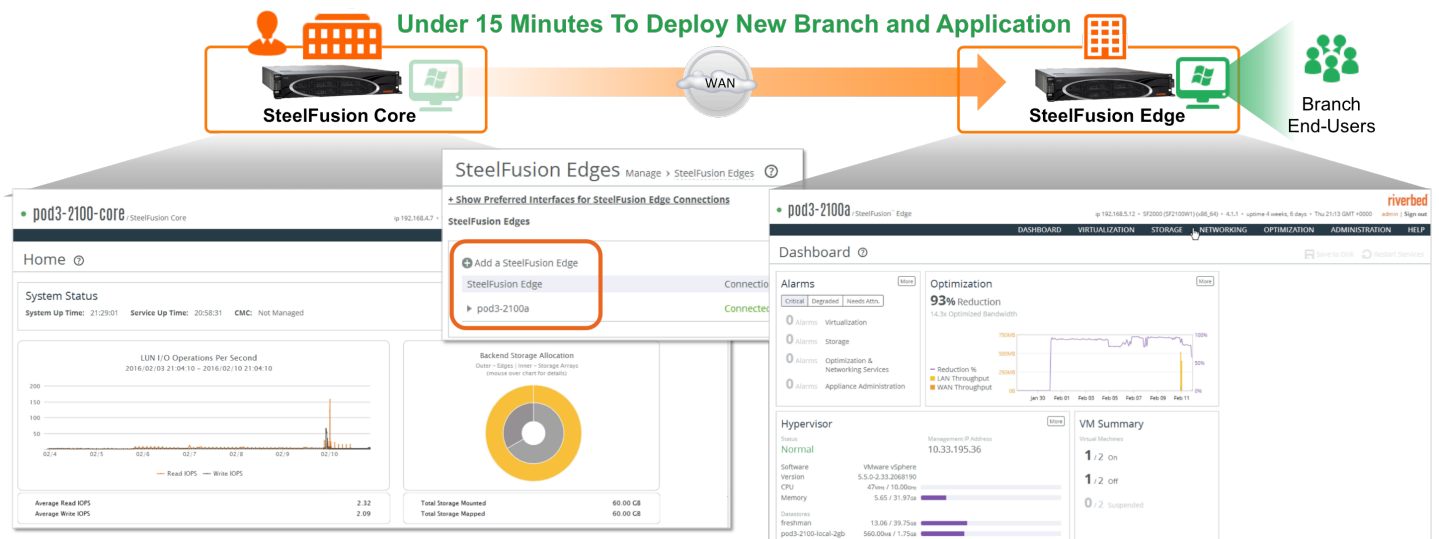
Deploy Branch IT Like a New Phone

ESG Lab validated that a new Riverbed SteelFusion branch can be deployed in a matter of minutes by quickly pushing out only the most critical data required from a centralized data center image. Less important data was delivered as needed, getting the branch applications up and running in a matter of minutes rather than the hours or days required for traditional branch IT solutions.

ESG Lab then created a clone of a LUN containing a Windows 2012 Server VM and file sharing application on the storage array and mapped it to the SteelFusion Core. In a few simple clicks, the LUN was projected through the SteelFusion Core and mapped to the SteelFusion Edge appliance. Using the vSphere client to manage the ESXi hypervisor on the Edge appliance, the LUN was mapped as a datastore, and the VM was added to the inventory and started up. Since all of the data was compressed, deduplicated, WAN optimized, and cached with Riverbed's patented predictive block prefetch, it took only about 8 minutes for the 40GB VM to be made available and started up at the branch office over a simulated distance link. ESG Lab

estimates that without SteelFusion, simply copying the 40GB VM over the slow link before starting the VM could take over 9 hours! With SteelFusion, in under 15 minutes with under 500 MB of data transfer, the branch had been deployed, and the fully configured file server application could be used by end-users.

FIGURE 4. Deploying a Branch Location and Application in Under 15 Minutes with SteelFusion

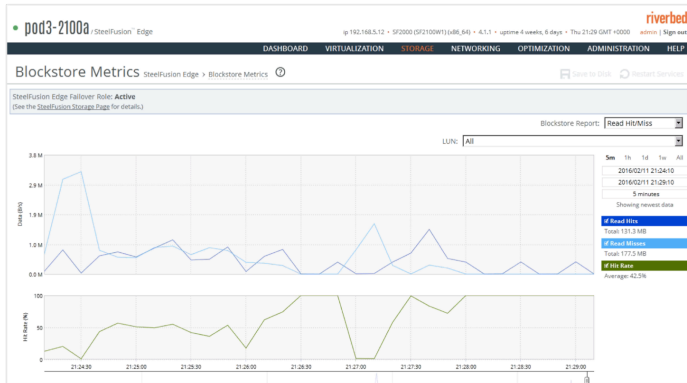


Source: Enterprise Strategy Group, 2016

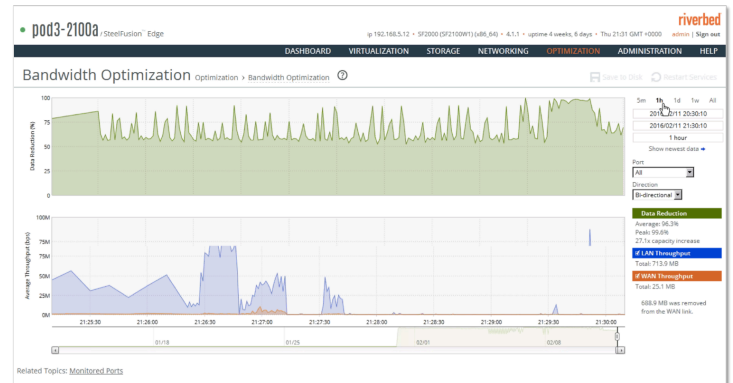
ESG Lab validated that SteelFusion could be used in a variety of flexible ways to help extend the value of investments made at scale in the enterprise data center out to the branch offices while avoiding the cost and complexity required to provide these capabilities at every branch location. One key to this agility lies in the ability to quickly and efficiently identify the characteristics of activity (i.e., booting up, launching an application, or opening a document), and then quickly predict and move first only the minimal required amount of data to the branch locations at any time. As data is needed or modified, it is cached and protected at the branch. Using the SteelFusion management interface, we could see the amount of data that

had been moved to and from the branch, and monitor the cache hit ratio of the block store to make sure that local branch performance was optimized. ESG Lab was also able to “pin” LUNS to the branch cache, ensuring that the most critical applications provided the best possible performance for end-users. The SteelFusion management interface provided a large amount of other useful and customizable real-time monitoring options for such elements as storage capacity, data reduction, and network traffic, allowing us to monitor every aspect of the distributed enterprise from a single interface.

FIGURE 5. Consolidated Monitoring and Tuning of SteelFusion Edge for Optimal Local Branch Performance



SteelFusion Edge Performance and Caching



SteelFusion Data Reduction and Network Throughput

Source: Enterprise Strategy Group, 2016

Large amounts of archival data, backup copies of data, and infrequently accessed datasets were stored economically at scale in the data center and rarely needed to be moved to the branch. In fact, ESG Lab also saw how SteelFusion could be used to provide a controlled strategy for taking advantage of cloud economics by leveraging the Microsoft StorSimple cloud gateway in the data center to tier data between the data center and Azure cloud storage. This provided the benefits of cloud economics to the business, while eliminating the need to manage cloud connectivity and data movement strategy at each branch location.



Why This Matters

ESG research reveals that 45% of organizations deploy dedicated remote branches for better application performance and overall end-user experience.⁵ However, deploying new branches for a distributed organization is complex, expensive, and time-consuming. Speed of deployment was an issue faced by 35% of respondents and each branch site requires dedicated hardware software, licenses, and, quite often, a dedicated IT administrator.

ESG Lab validated that once a single SteelFusion Edge appliance was installed onsite, a branch office could be fully deployed, configured, and begin serving an end-user file server application in less than 8 minutes. The amount of data that must be transferred to the branch was greatly reduced, allowing the agility to deliver applications where and when they are needed, and all branch locations could be managed and monitored from a single pane of glass by an administrator in a centralized data center. SteelFusion greatly lowers both CapEx and OpEx by eliminating branch office hardware, software, licenses, and dedicated branch management resources.

⁵ Source: ESG Research Report: [Remote Office/Branch Office Technology Trends](#), May 2015

Resiliency and Data Protection

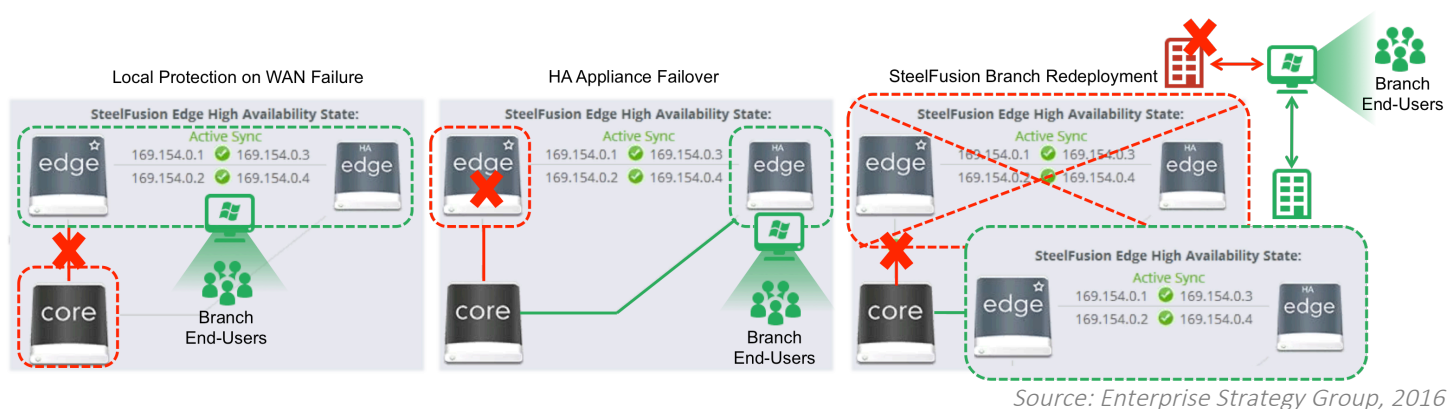
SteelFusion was designed with a goal of minimizing disruptions to branch location activity, even in the event of unforeseen difficulties. ESG Lab validated the ways in which a SteelFusion HA deployment continues to allow localized branch applications to run, even in the rare events that connectivity to the WAN, SteelFusion appliance, or entire branch location is lost. To test this, two SteelFusion Edge appliances in an HA configuration were used to deliver a file server application whose associated LUN had been pinned into the cache. With the file server application running, ESG Lab injected a simulated failure of the WAN connection and verified that the WAN link was shown as down with the SteelFusion management interface. We then verified that the file server application continued to run by accessing files, creating a new folder, and modifying files. Once WAN connectivity was reestablished, all newly created and modified files were synced to the data center.

Next, ESG Lab simulated a failure of a SteelFusion appliance with an unplanned hard reboot of the appliance. After about 30 seconds, the standby appliance had taken control of all operations as the active appliance, and ESG Lab made sure that the file server operation was running and all necessary data was available for localized access by branch end-users. In an HA configuration, all of the data written to the active appliance is also written to the standby appliance simultaneously so there was no need to re-transfer any of the data from the data center. This ability to continue operations with only a single appliance, and then automatically resume HA operations, could also be representative of the controlled upgrade process for SteelFusion hardware.

ESG Lab then saw how easy it was to quickly re-deploy applications at another branch location in the event that the branch can no longer serve end-user clients. This situation could be representative of the planned closing of a branch, technical issues at a branch data center, the need to temporarily move particular applications to help handle a higher than average demand on a branch, or even a complete recovery after the loss of the branch location due to a natural disaster. ESG Lab used the GUI to see that there was a very low average commit delay of only 2 seconds. The commit delay indicates the time elapsed since the last sync of data to the data center and thus directly relates to the RPO of the branch location. This illustrates how SteelFusion can effectively bring data center grade RPOs to a ROBO location.

After disconnecting the core from the edge, the LUN that was once projected to the edge was shown at the core in a degraded state since the edge could no longer be contacted. In a matter of minutes, and with minimal data loss, ESG Lab was able to map the LUNs to a new edge appliance, push the data required by the application to the new edge, and start up the VM and application in under 15 minutes. Alternatively, applications could also be run in the local data center if needed. Depending on the situation, express service could deliver a new appliance to a location in under 4 hours, and in just a short time afterward, the branch could be up and running once again. With traditional branch IT, the branch could take days or weeks to get back to full operations, if it were possible at all. ESG Lab’s resiliency testing is shown in Figure 6.

FIGURE 6. Providing Localized Applications to Branch End-users in Failure Scenarios with SteelFusion



Data Protection

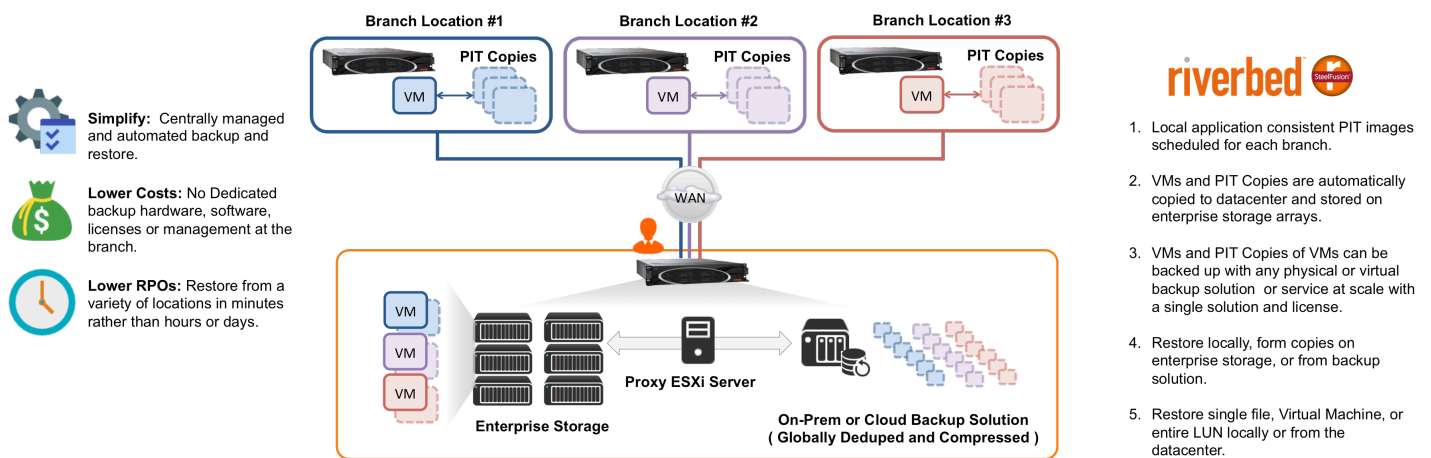
All data produced and stored at the SteelFusion Edge is protected locally at the branch, protected globally at the data center, and can then be archived on enterprise backup appliances and/or cloud storage. This means that organizations have great flexibility in how applications can be protected, restored, or re-deployed. ESG Lab validated how quick and easy it is to back up and restore VMs with SteelFusion while eliminating the cost and complexity of managing data protection operations at branch locations. SteelFusion snapshots can be easily scripted, scheduled with the full-featured backup scheduler that comes included with SteelFusion, and made to be application-consistent. To validate how SteelFusion snapshots work, ESG Lab created a manual snapshot of a Windows 2012 Server VM on the edge appliance and noted that the snapshot was automatically pushed to the data center so that the data center would have a full copy of all of the data and snapshot information contained at the branch. In many cases, the branch only must push the snapshot metadata back to the data center as all of the data written at the edge is always available back in the data center.

The VM was now protected both locally at the branch and remotely at the centralized data center. Then, with absolutely no intervention required at the branch, the snapshot in the data center was mounted to an ESXi proxy server that was connected to a Commvault backup appliance. The backup appliance then made a full VM-level backup of the VM using the PIT image of the LUN located on enterprise storage in the data center, without ever having to transfer data from the branch location. This would allow the organization to purchase and license a single backup appliance, while storing less total physical capacity through global deduplication across all branches, and allowing for management by a single administrator.

Rethinking Branch Data Protection

SteelFusion automatically protects data locally at the branch and globally at the data center, eliminating the need for backup infrastructure, licenses, and management at each branch. Files, VMs, and LUNs, or entire branches can be restored in seconds or minutes rather than hours or days, with minimal movement of data.

FIGURE 7. Using SteelFusion Backups to Protect Branch Locations



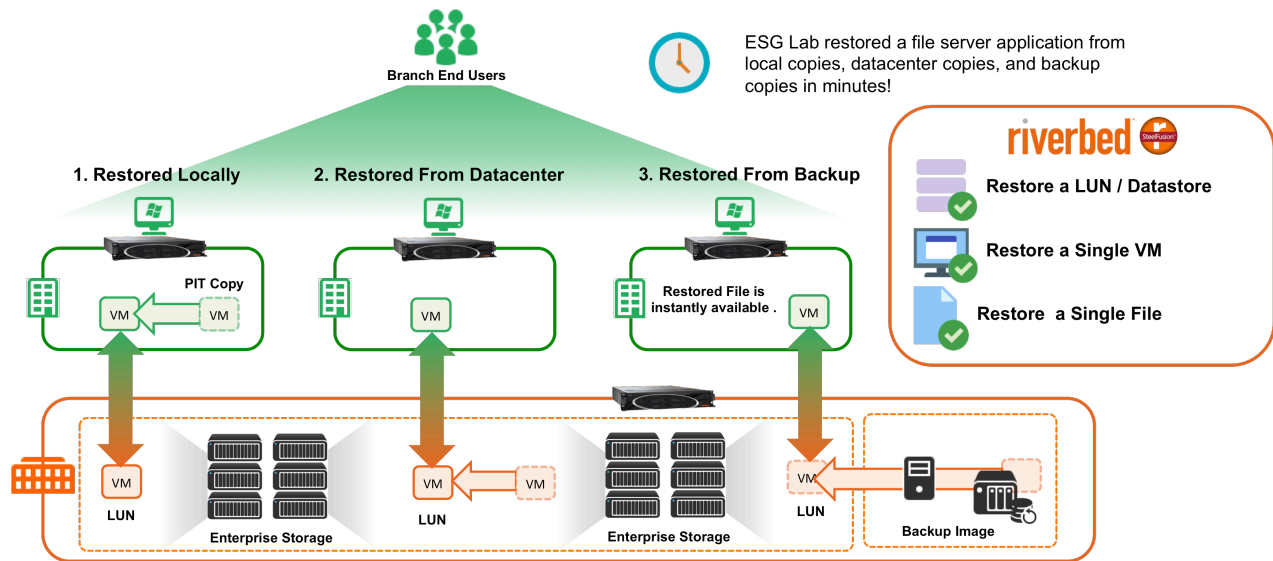
1. Local application consistent PIT images scheduled for each branch.
2. VMs and PIT Copies are automatically copied to datacenter and stored on enterprise storage arrays.
3. VMs and PIT Copies of VMs can be backed up with any physical or virtual backup solution or service at scale with a single solution and license.
4. Restore locally, from copies on enterprise storage, or from backup solution.
5. Restore single file, Virtual Machine, or entire LUN locally or from the datacenter.

Source: Enterprise Strategy Group, 2016

Restoring VMs with SteelFusion was just as easy, and there was great flexibility in the variety of options that were available when performing a restore. Organizations can choose to use SteelFusion to recover individual files, VMs, or full LUNs, and can restore from local copies, from copies in the data center, or from copies that have been archived to a backup appliance or the cloud. ESG Lab performed hands-on testing of each of these functions. First ESG Lab used a local PIT copy located on the branch Edge appliance to roll back a VM to an earlier state near instantaneously with just a few clicks. Next, ESG Lab performed a restore using a PIT image located on primary storage in the data center. Using this option, organizations can add improvements or apply patches to VMs and then push them out in minutes to replace the active application at every

branch. Next, we were able to load a VM from an image that was backed up to a Commvault backup appliance, place it on a LUN, and then project this LUN back to the branch in just minutes. Finally, using very similar methodologies with the flexibility to recover from copies stored in various locations, ESG Lab was able to restore a single file that had been deleted by mistake at a branch location. The process took only a few minutes, was very simple, and involved simply recovering the single file from the Commvault appliance across the WAN to the original VM running at the branch so that the file instantly appeared on the running VM at that branch.

FIGURE 8. Using SteelFusion to Recover Individual Files, VMs, and LUNs



Source: Enterprise Strategy Group, 2016



Why This Matters

Data protection at the branch is one of the most difficult challenges faced by distributed organizations today. Redundant servers, highly available storage, and remote replication and/or backup solutions or services must be deployed at each branch location, quickly ballooning IT budgets and greatly increasing the management complexity of the branch. Over time, each branch evolves into a distinct and non-uniform sub-IT environment.

ESG Lab validated how quick and easy it is to back up and restore branch locations with SteelFusion. VMs and LUNs and files were protected in seconds and data was backed up for all branches in the centralized data center using a scalable enterprise backup solution or cloud storage. Even better, files, VMs, and LUNs were restored to branch locations in seconds or minutes rather than hours or days with minimal movement of data. With SteelFusion, a distributed organization can greatly reduce both the cost and complexity of protecting data using tools already familiar to backup administrators, while also minimizing financial impact to the business by quickly and easily restoring data to recover from any type of unforeseen outage.

The Bigger Truth

IT organizations are constantly charged with the task of balancing business priorities with the technology investments required to achieve them. This often results in highly complex environments of point solutions characterized by application and infrastructure silos that lack integration within and among individual systems. This is especially true in ROBO locations, with large numbers of sites having widely varying application requirements, combined with their distance from corporate data centers and lack of onsite IT resources.

Riverbed SteelFusion is more than a hyperconverged appliance integrating compute, storage, networking, virtualization, and management; SteelFusion represents a change in the IT paradigm for ROBO IT. Taking a page from the cellphone industry, SteelFusion centrally automates server, data, and application provisioning, configuration, deployment, security, backup, and recovery. Like a new cellphone, the SteelFusion core appliance in the centralized corporate data center will automatically provision and configure a new SteelFusion edge appliance powered on in a ROBO location. The Edge appliance will fetch VMs, applications, and user data as needed, without IT staff intervention.

Extending the cellphone paradigm, SteelFusion decouples storage from compute; all data lives in the core at the data center, yet can be locally accessed at the edge, even with a WAN outage. The edge is fully content-aware—it caches the most critical data, and continuously backs up data to the core. Recovering from disaster is as simple as powering on a new edge appliance, which then automatically fetches the latest configuration, applications, and data. All data is encrypted both in flight and at rest, enhancing security.

ESG Lab validated and was very impressed with SteelFusion's unique capabilities for greatly simplifying virtualized application management and data protection in ROBO locations. Through a single hyperconverged appliance, SteelFusion provides businesses with an easy way to rapidly deploy virtualized computing resources into ROBO locations. The appliance provides all of the application performance, infrastructure scalability, and high availability requirements that are needed in branch offices, while enabling centralized IT administrators to manage and centrally back up and protect the critical business data residing on remotely located applications. Through SteelFusion, branches can be spun up, spun down, moved, backed up, and restored amazingly fast all from the central data center, and now conveniently in the cloud, without requiring assistance from operational staff in the branch. SteelFusion helps businesses meet the variable application performance requirements of their ROBO locations while reducing complexity and mitigating risk. One SteelFusion customer who previously struggled with confidence in his ROBO backup strategy explained that he now sleeps better at night because he no longer has to worry about it.

Providing a distributed enterprise with dedicated IT and services at branch locations is complex, costly, and extremely inefficient. Riverbed greatly simplified these challenges by rethinking the way a distributed organization operates rather than simply reengineering the hardware at branch locations. Because Riverbed is introducing a new paradigm for how distributed organizations provide branch IT, it is difficult for end-users to comprehend the benefits until they see it in action and are able to gauge the improvement for themselves. The flexibility provided by SteelFusion may make it sound complex, but in reality, Riverbed has greatly simplified operations, while also allowing a broad range of options that allow an organization to choose the method that will make things as simple as possible for them and ultimately save them the most time. If your organization would benefit from a lower cost, complete distributed enterprise solution that is quicker to deploy and easier to manage and maintain, with increased agility, flexibility, and end-user application uptime, then ESG Lab suggests you seriously consider Zero-Branch IT with SteelFusion from Riverbed.

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