

End-to-End Unified Communications Visibility for Microsoft, Cisco, and Avaya Environments

Riverbed SteelCentral for
Unified Communications



Introduction

Unified communications (UC) is undergoing dramatic changes with the advent of video conferencing, adoption of softphones and cloud-based services.

Products such as Microsoft Skype for Business and Cisco Spark are disrupting the industry with the easy to use, all-in-one applications that allow users to communicate however and wherever they want.

These expanding capabilities are driving increasing demand for visibility into how these systems are being used and performing. Similarly, moving to the cloud often drives business to make more investment in visibility tools and information sharing between the IT organization and their service provider. Otherwise, when the quality of these services degrades, the IT organization is the first to be blamed and has less ability to identify and resolve the issues.

To deal effectively with these new challenges, IT organizations have begun to realize they need to break down interdepartmental barriers and converge previously siloed network, telecom, and desktop support teams. In turn, converged teams must operate across multiple disciplines and base decisions on a common set of facts from a unified performance management platform and move away from point product investment in most cases.

Only by adopting Riverbed SteelCentral, which offers the complete suite of critical visibility components spanning the application, infrastructure, and network aspects of UC, can IT organizations scale to adapt to this evolving management challenge.

This paper illustrates the struggles faced by the IT organizations trying to scale their organizations to address the adoption of complex, highly interdependent, UC applications.

Only Riverbed offers a comprehensive suite covering network, infrastructure and application visibility all in a single solution:

- A single source of truth about UC availability and performance that is easily shared among teams
- Lifecycle management capabilities that cover all primary use cases from cradle to grave for UC applications
- Simple troubleshooting workflows suitable to all users' level of experience
- Business perspective views on usage and adoption for senior management and lines of business
- An extensible solution that can grow to accommodate expanding business requirements

Managing UC Performance in Today's Enterprise

The complex world of today's UC environment is often made up of multiple vendor products that need to interoperate effectively with one other using a shared data network to provide always-available, high-quality service to end users. As new capabilities arrive to help businesses increase productivity and reduce cost, the resources needed to managing these technologies has grown rapidly and caught many IT organizations by surprise. Additionally, the adoption of cloud-based services reduces control and visibility, yet IT staff remain ultimately responsible for maintaining high service levels and performance.

As a result, IT organizations are turning towards increased automation and visibility tools to help them get ahead of the curve and scale their teams to meet these new challenges. In the assessment of tool vendors, it is critical to first understand what needs to be monitored, how best to accomplish it, and finally deciding who needs to consume the information in what format.

Lifecycle management suggests that the management strategy must apply to all phases of an IT application from planning, deployment, operations, and eventual replacement. After interviewing and working with many partners and customers for more than a decade, Riverbed identified the four common pillars, illustrated in Figure 1, or sets of capabilities are essential to provide lifecycle management for UC applications. They include configuration management, automated testing, remote troubleshooting, and performance monitoring.

Configuration Management

One significant difference between today's UC systems and legacy solutions is the complex and sensitive call routing logic that must be configured and maintained. Even minor changes can impact the usability of the solution for hundreds or hundreds of thousands of users.

In legacy solutions, configuration changes were infrequent, localized to the system and implemented by only one or two administrators. Today, configuration changes can be made almost daily and by a broad assortment of IT individuals, including desktop managers, network engineers and telecommunication professionals to a wider array of areas, including routers, switches, call server applications, client software, and desktop configurations.

Automated Testing

Early on in the first deployments of IP Telephony, IT and engineering organizations recognized the importance of automating user acceptance testing. After skipping or only spot check testing certain users or sites, IT groups were caught off guard with user complaints after cutover into production. Investment in test automation soon became a top priority to enhance coverage without adding cost. Only by attempting to make and receive calls using the deployed endpoints, could they ultimately determine if service would be available to the end users after cutover.

Today, Riverbed offers fully automated testing capabilities that remotely instruct endpoints to place and receive calls, and perform more complex multi-party functions, such as conference and transfer. This sophisticated automation of call generation, originally designed to automate user acceptance testing, has found its way into operational use cases commonly known as 'Proactive Monitoring'. Enterprises learned early on that only by generating regular test calls using real phones are they truly able to proactively detect outages before users are impacted.

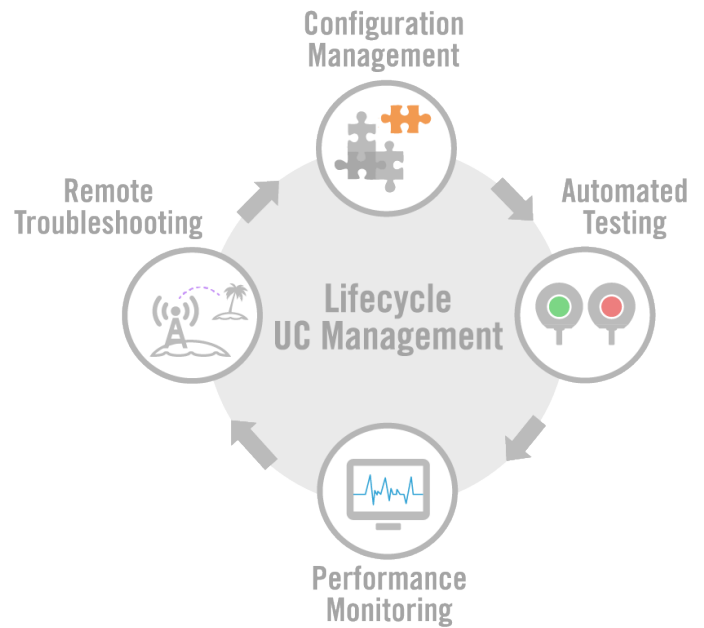
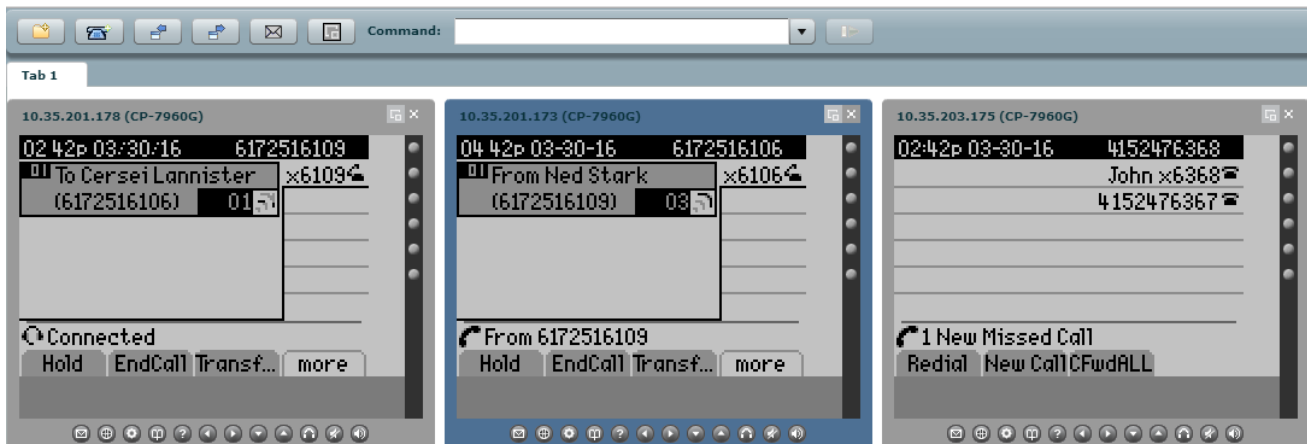


Figure 1: UC lifecycle Management

Remote Troubleshooting

A common goal for all IT organizations over the years has been to improve the efficiency of their support desk and make them more self-sufficient in resolving complaints without escalation. With each escalation, the cost to resolve a ticket and impact on end user productivity grows significantly. In addition, allowing support staff to remotely resolve problems enables them to be more responsive and reduce the involvement from the end user during the troubleshooting process.

Today, for any desktop application issue reported, it's nearly guaranteed that a support engineer will request to share your screen and remotely try to both reproduce and resolve your issues.



2: SteelCentral UCExpert Remote Phone Control "Remote Hands"

Figure

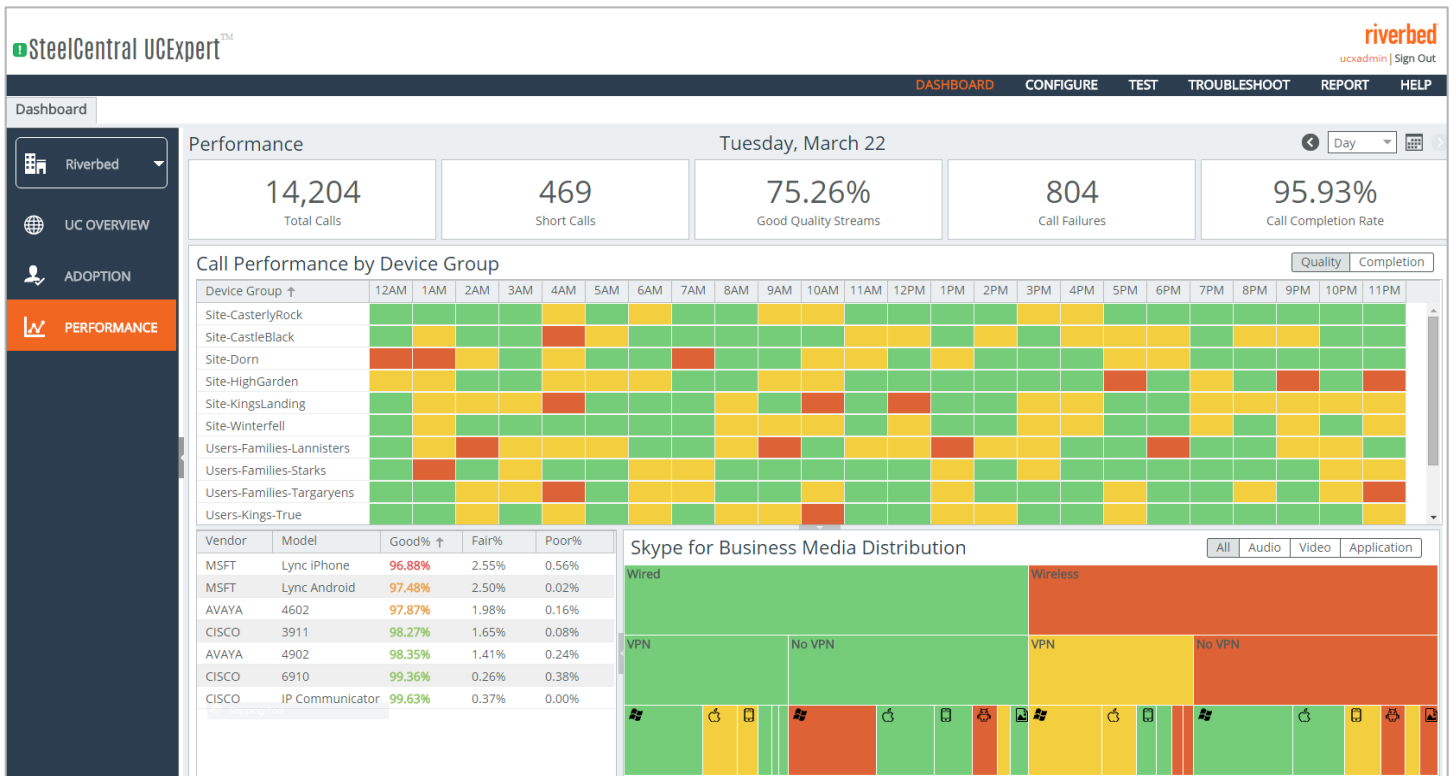


Figure 1 SteelCentral UCExpert Performance Dashboard

This same remote viewing and control capability is needed for troubleshooting phones or other UC user problems. Troubleshooting poor quality calls requires essential capabilities such as remote phone control, access to user device configuration, recent call history, and quick comparisons to reference and historical configurations.

Performance Monitoring

Establishing robust performance monitoring capabilities is by far the most challenging pillar to address when it comes to unified communications. Performance monitoring requires proper real-time, measurement of key performance indicators including infrastructure health, trunk utilization, call completion, and media quality. Instrumentation of both the endpoint and network to identify and isolate quality issues can be complex and needs a well thought out strategy on how and where to position tools.

Three Critical Measures

As performance monitoring is a complex topic, often the biggest question is “Where do I begin?” Instrumenting everything is both costly and confusing.

Many key performance indicators (KPIs) are important to collect and monitor for a holistic management solution. Riverbed suggests starting with three of the most critical measures to monitor availability and overall end user experience: endpoint registration, call completion rate, and media quality.

Endpoint Registration: This metric monitors the availability of the endpoint, whether it is a hard phone or other mobile device running a softphone application.

For dedicated devices (e.g., desk and conference room phones), it is important to monitor their registration status and report immediately when there is a significant bulk loss, especially in one particular location. For mobile devices that appear and disappear from the network throughout the day, identifying registration problems preventing users from connecting to the network on a whole is more useful than tracking individual device registrations.

Call Completion Rate (CCR): This metric monitors the ratio of attempted calls that succeed divided by all attempted calls.

Clearly, the higher the number the better! When you see a decrease in CCR, it is important to quickly characterize the nature of failures and identify the root cause before business continuity is impacted. It is important that typical user mistakes and normal outcomes (user not answering, line busy, misdialing) are not included in the failure counts. That is only possible when call detail records are processed against a known set of normal disconnect codes.

Media Quality: This metric monitors the perceived end user experience.

The most challenging problems to troubleshoot, isolate, and resolve are related to audio or video media quality. When a user experiences sufficiently poor quality, he

is unable to continue the call and often resorts to using alternative methods that cannot be accounted for a typical problem is the increased usage of cell phones to work around quality issues. The cost to the business is hidden initially as cell phone expenses rise over time and the adoption of this corporate UC technology dwindles over time. Furthermore, logs and records of calls made between employees and customers, prospects, and partners are not tracked and are unavailable to help guide business decisions. Should a sales person leave the company, their contacts go with them and it is very difficult to transition accounts to the new account manager.

UC Monitoring Technologies

Monitoring media quality and UC performance in a way that allows you to identify and resolve problems can be very challenging. IT organizations often miss vital information and tickets go unresolved or are passed back and forth between network and UC teams.

This challenge is due primarily because none of the teams has a complete view into how both the network and endpoints are operating. Most solutions on the market are based on one or more of following approaches:

Endpoint Telemetry: Most UC vendors instrument their endpoints and provide media reports back to a central collection server. These reports include performance metrics (jitter, packet loss, MOS) about the inbound media stream received by that endpoint. Typically, these reports are available at the end of the call and are incorporated into a form of Call Detail Record (CDR).

Network Probes: Probes are high-performing, packet-capture appliances deployed strategically throughout the

network. Probes process media packets, produce quality metrics for a particular media stream, and roll-up to summary-level performance KPIs for their assigned location.

NetFlow: NetFlow (version 5 or 9) reports summary information about a flow (communication between source and destination IP & ports) at a particular location including bytes transferred and associated DSCP markings. When combined with deep packet inspection, richer metrics may be available using the templating capabilities available in NetFlow version 9.

SNMP: Simple Network Monitoring Protocol (SNMP) is useful to monitor the overall health and performance of nodes (routers, switches, gateways) in your network. When devices are polled using SNMP, they provide a number of metrics regarding the current state. When applied to troubleshooting VoIP, it can provide essential forensic data when the root cause turns out to be interface errors, CPU or other resource deprivation on the device.

A Multi-Point Approach is Essential

As each monitoring approach has pros and cons, only a multi-point approach that includes data from a variety of sources and blends them together will help you both detect and isolate the root cause of performance problems.

Endpoint telemetry provides a global, 360-degree perspective of end user experience regardless of their

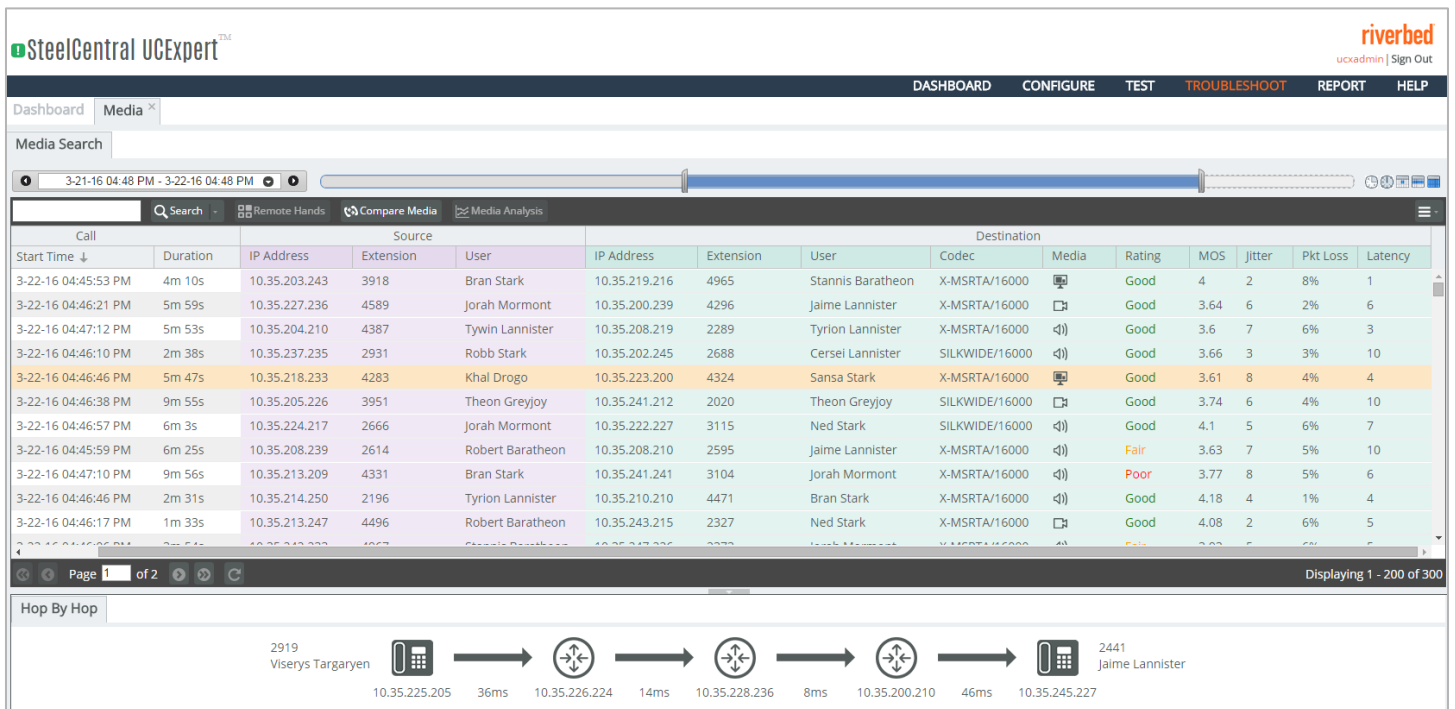


Figure 4 SteelCentral UCExpert Media Analysis

location and even includes remote users. Using this data, you will know: a) if the network is potentially causing a problem and b) where to expend additional resources. For example, users connecting over Wi-Fi from outside the corporate network may be designated unsupported/best effort. Additionally, for certain UC vendors, telemetry includes endpoint configuration information. With Microsoft Lync/Skype for Business, configuration data reveals whether the end user was using the proper headset or, accidentally, the laptop built-in microphone.

In a very complementary way, NetFlow and network probes provide real-time quality metric along the path. NetFlow helps identify the path and identify DSCP mismarking. Deep packet inspection and associated packet analysis can help identify the location along the path where degradation was introduced.

After having narrowed down the path and identified a location with packet loss, there are number of possible causes. Loss could be due to traffic congestions, a malfunctioning or misconfigured network device, or overflowing QoS queues on an inbound routing interface.

The solution here is to introduce SNMP-based infrastructure monitoring and store the health as long as needed to correlate later with problematic media streams.

The truth is that each technology provides some insight into your media performance but none can fully help you diagnose and resolve problems on its own. Only by adopting a comprehensive, multi-point approach that leverages all technologies will you be able to detect, troubleshoot, and resolve media quality problems.

Why Riverbed SteelCentral?

Riverbed SteelCentral combines all the necessary ingredients into a single visibility and troubleshooting platform. The SteelCentral solution can be expanded over time as your visibility needs increase.

Our foundation UC product, SteelCentral UCExpert, maximizes visibility by combining global reporting on all users, everywhere to help you understand if, where, and who is being impacted by poor UC performance, and if the network is at fault. SteelCentral UCExpert interfaces natively with vendor supported UC application APIs and scales so well that a single server can satisfy most environments up to 100,000 users. Installation is simple, scalable and efficient. Most installations take under an hour to complete and start providing you meaningful real-time performance metrics within a matter of minutes.

Another key advantage of SteelCentral UCExpert is the way in which it normalizes data across multiple UC vendors and standardizes troubleshooting workflows. Operators do not need to have specialized knowledge of the vendor-specific terminology to understand call

performance and monitor user experience by time, location, and endpoint type.

Using common troubleshooting workflows operators can:

- View performance dashboards showing a breakdown of what locations may have been experiencing problems at what point during the day
- Drill-down or perform ad-hoc searches for calls, media, or phones across any vendor and time range
- Sort, filter and group by or across vendors to help isolate similar characteristics of failed or poorly performing calls
- View hop-by-hop graphical paths to see the media path taken through your network. Easily compare data side by side to quickly identify what is different between similar calls, media streams or phones to speed root cause analysis
- Find the details you need to properly characterize the problem source—not just point the finger somewhere else

As you enhance SteelCentral UCExpert with our deep network forensic capabilities, you will be able to isolate performance problems down to the segment, device interface, application traffic, and ultimately root cause. SteelCentral NetProfiler collects flow information and offers centralized reporting and dashboards for all application traffic, QoS markings and utilization across critical paths.

If you elect to deploy one of our packet capture components, flow data will be enriched with layer 7 application identification and real-time call quality measurements for all media streams captured. Rather than seeing just the high level protocols (UDP, TCP), you will be able to identify precisely which applications are causing congestion on the network. In addition, any signaling problems are easily remedied by viewing SIP, H.323, and SCCP ladder diagrams.

Finally, SteelCentral offers infrastructure discovery and monitoring for all nodes in your network to provide rich statistics on interface saturation, queue overruns, and recent router/switch configuration changes that may be affecting call quality.

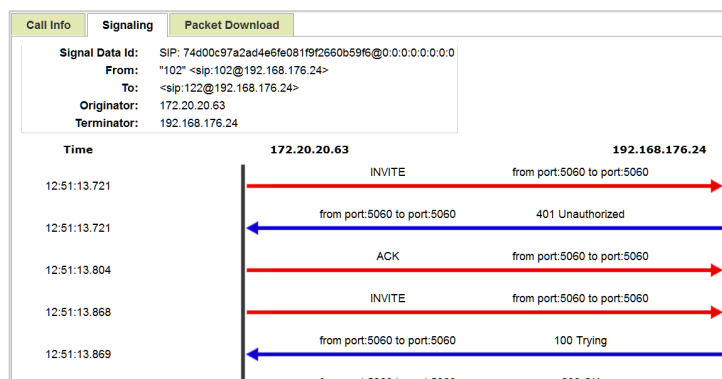


Figure 5 SteelCentral AppResponse Signal Ladder Diagram

Conclusion

Only Riverbed offers a platform offering all the capabilities an IT organization needs to allow teams to converge and scale to meet the new challenges of the modern unified communications environments and help you fully realize the benefits of UC adoption.

The Riverbed SteelCentral platform combines end-point telemetry with network forensics to deliver true visibility into UC operations and empirically assess end user experience. The insight gained allows customers to improve call quality by continuously detecting and correcting performance issues before users complain.

SteelCentral UCExpert makes it possible to consolidate support services and improve productivity and efficiency of existing staff by offering comprehensive approach to UC lifecycle management. Operators do not have to have deeply specialized domain knowledge or the need to use multiple point-solution tools to solve most common problems in a multi-vendor UC environment. By leveraging built in workflows, operators can quickly and easily find the information they need.

SteelCentral's deep, network monitoring capabilities, when combined with end user telemetry, uniquely provide customers with the only true end-to-end platform on the market. Year after year, Riverbed is ranked as a leader in the Gartner Magic Quadrant for Network Performance Monitoring and Diagnostics (NPMD).

About Riverbed

Riverbed, at more than \$1 billion in annual revenue, is the leader in application performance infrastructure, delivering the most complete platform for the hybrid enterprise to ensure applications perform as expected, data is always available when needed, and performance issues can be proactively detected and resolved before impacting business performance. Riverbed enables hybrid enterprises to transform application performance into a competitive advantage by maximizing employee productivity and leveraging IT to create new forms of operational agility. Riverbed's 27,000+ customers include 97% of the *Fortune* 100 and 98% of the *Forbes* Global 100. Learn more at riverbed.com.

The Riverbed logo consists of the word "riverbed" in a lowercase, bold, orange sans-serif font.