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# Browser-Based eCDN Solution for Scaling Live and On-demand Video with Microsoft Teams and Stream

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## An Integrated Part of the Riverbed SaaS Accelerator Service

This document is for IT administrators and other technical professionals who are evaluating the Riverbed® SaaS Accelerator service as an enterprise content delivery network for video distribution. It describes technical aspects of, and addresses questions regarding the solution specific to its eCDN (enterprise content delivery network) functionality. The document first outlines the benefits of the solution and then describes the installation requirements and footprint on the desktop, introduces its components and their interactions, and details its built-in security features.

## Business Problem

The problems that arise from running live video events impacts many areas of the organization:

### The Corporate Communication Challenge

- Meeting deadlines for live events
- Difficulty in achieving global reach—every office and employee
- Meeting employee quality expectations
- Availability of real-time and historical analytics showing event success
- Visibility around content resonance

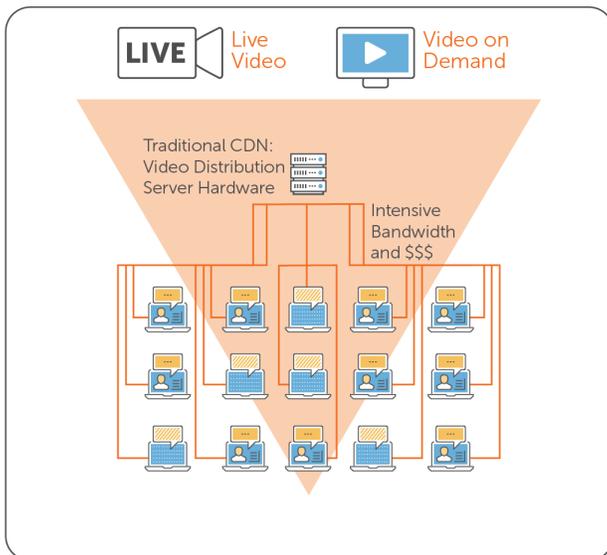
### The Technical Challenge

- Aggressive deadlines and demands for live events
- Network impact of high bandwidth, high definition Live Events with many concurrent users
- Ability to measure and prove the specific network impact of live events
- Constraints of security and compliance in achieving goals

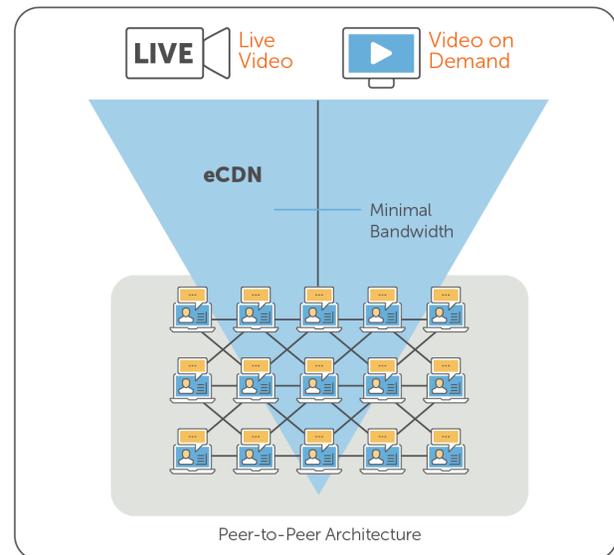
# The Riverbed Solution

The Microsoft collaboration suite enables simple communication within organizations that scales to thousands of users for live or on-demand content. Live video events in Microsoft Teams and Stream offer a seamless, easy to engage solution with no hurdles for your IT teams or employees. The browser-based peering solution built on the Riverbed SaaS Accelerator service scales these communications across your network, allowing you to achieve 100% delivery at a fraction of the bandwidth. With the Riverbed SaaS Accelerator service you achieve the following benefits:

- Flexibility to accelerate other enterprise collaboration apps at a moments notice, as desired across the enterprise (Microsoft O365 for SharePoint, OneDrive and Office, Microsoft Dynamics CRM, Salesforce, ServiceNow, Box, Veeva and more)
- Easy install: no requirement to add hardware or increase bandwidth
- Self-service integration of the SaaS Accelerator service with Microsoft Teams and Stream through a flexible Cloud architecture and browser-based delivery model for easy deployment of live video across your enterprise
- Utilize innovative peering technology to reduce the bandwidth required to deliver a high-quality Microsoft Teams/Stream viewing experience to every user
- All network topologies are supported, including wireless, VPN, and MPLS and there is no significant incremental load on machine resources beyond what is required to render video
- Real-time analytics provide feedback about content consumption and user-experience with visibility into associated network usage, from which informed decisions can be made



**Figure 1:** Many users connecting simultaneously to live events saturate enterprise networks, resulting in a poor user experience



**Figure 2:** The browser-based peering solution built on Riverbed SaaS Accelerator reduces bandwidth requirements by distributing the content within the network

## On-boarding

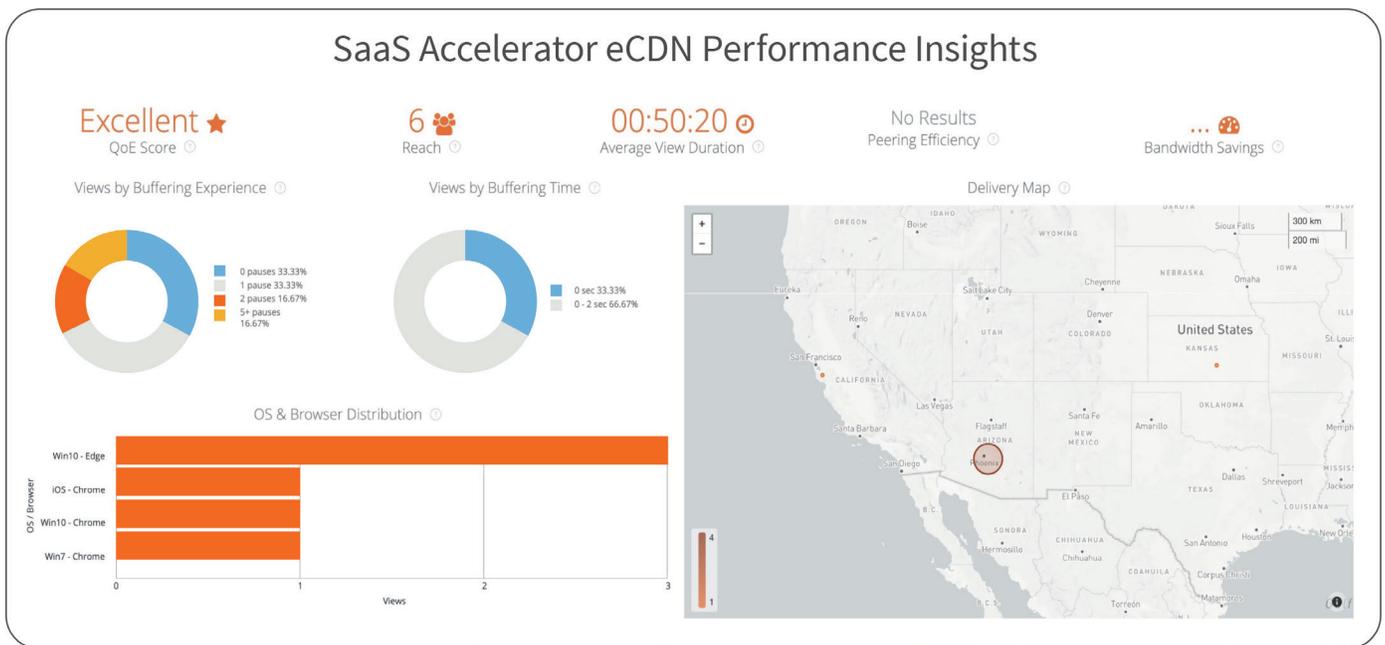
Once O365 is authorized to communicate with the Riverbed eCDN, the administrator will enable Microsoft Teams and Stream and select the number of users that have been purchased. The admin will then go to the Microsoft O365 dashboard to configure and enable the service.

## User-Experience

The Riverbed eCDN peering service built on SaaS Accelerator is designed to be transparent to users and simple to install by technical stakeholders. The browser-based delivery solution is built on standard web technologies already approved in the enterprise with the Microsoft Teams client and WebRTC enabled browsers. If users are running legacy browsers or unable to peer, content will be sourced directly from the Azure CDN.

## Intelligence and Insights

The Riverbed SaaS Accelerator Manager (SAM) provides real-time business intelligence and insights for live events using pre-configured and customizable dashboards. These provide the key stakeholder metrics for live events including reach, quality of experience, user experience and network distribution to provide a well-rounded view of your communications events. SAM provides trend and drill-down functionality allowing you to perform trend analysis and additionally get into the details of individual events for deeper insights analysis down to user level.



**Good** ★

Avg Quality of Experience

**27** 👤

Total Reach

**41%** 🔄

Avg Peering Efficiency

**15%** 📉

Bandwidth Savings

Recent Activity

Title	App Name	Reach	Play Duration Avg	Qoe	First Start Time	Last End Time
Popeye for President (1956)	microsoft.stream	6	00:50:20	Excellent	2020-06-02 20:46:45	2020-06-03 01:24:22
no SaaS accel	microsoft.teams	2	00:10:02	Excellent	2020-06-03 00:12:32	2020-06-03 00:51:06
Streamin...	microsoft.stream	3	00:06:48	Bad	2020-05-29 23:59:28	2020-06-02 20:58:05
Event - VLAB clients	microsoft.teams	4	00:28:55	Fair	2020-06-01 21:35:23	2020-06-01 22:32:46
jstream	microsoft.stream	1	00:00:25	Bad	2020-05-22 23:21:48	2020-05-29 23:47:28
Test Demo Live	microsoft.teams	2	22:20:15	Excellent	2020-05-27 23:45:31	2020-05-29 20:25:45
Test Demo Live	microsoft.teams	3	00:03:41	Excellent	2020-05-28 01:17:53	2020-05-28 01:22:50
Test Demo Live	microsoft.teams	2	00:05:02	Excellent	2020-05-28 01:05:35	2020-05-28 01:10:31
Test Demo New	microsoft.teams	2	00:03:10	Excellent	2020-05-28 00:48:54	2020-05-28 00:52:14
New Demo	microsoft.teams	2	00:04:39	Excellent	2020-05-28 00:19:40	2020-05-28 00:27:20
Test Demo	microsoft.teams	2	00:07:37	Excellent	2020-05-27 10:39:19	2020-05-27 10:47:14
MS Teams Demo	microsoft.teams	3	00:07:10	Excellent	2020-05-27 08:10:29	2020-05-27 08:19:01
MS Live Event	microsoft.teams	2	00:05:17	Excellent	2020-05-27 07:27:08	2020-05-27 08:07:58
test MS Teams Live	microsoft.stream	2	00:01:12	Excellent	2020-05-27 01:58:56	2020-05-27 02:36:39
Stream	microsoft.stream	1	00:00:03	Fair	2020-05-22 23:21:39	2020-05-22 23:21:45
test	microsoft.teams	1	00:34:43	Excellent	2020-05-22 08:11:18	2020-05-22 08:46:06

## Technology Architecture

The eCDN built on Riverbed SaaS Accelerator is a cloud-native service built on the following standards:

- Global, low-latency architecture
- High availability and fault tolerant built in Microsoft Azure
- CloudFlare global network security and reliability
- Automatic and elastic scaling
- Regional failover
- External monitoring of all core services
- Advanced telemetry of all systems and proactive alerting

## Operation

Functionality is implemented at the edge to support peer-to-peer delivery utilizing a javascript SDK plugin which is the integration point for Teams, Stream or other integrated platforms. As an example, the plugin is activated on the initial Teams Live Event connection and automatically enables eCDN delivery within the Teams client or browser; no pre-installed software is required. The plugin incorporates the following stages:

### Publishing

- The administrative integration enables event publishing within the Riverbed SaaS Accelerator cloud to enable peer-to-peer distribution of content. Within Microsoft Teams this is a server-side publish, cloud-to-cloud whereas Microsoft Stream utilizes the SDK via the first user.

### Peering

- Registration: The process by which every node communicates with the cloud to determine which peering cluster the node belongs to and at which tier the node sits within a peer cluster. As peers join the cluster, they automatically order themselves into an optimum configuration for content delivery.
- Peering Protocol: Each peering node communicates with other nodes to determine and request the required data from the available peers. WebRTC is used as the communication channel.
- WebRTC: WebRTC is supported natively by the Teams client or compatible browser. The SaaS Accelerator service leverages this capability to enable a communication channel between peers using the WebRTC data channel as the transport mechanism.
- Ingest: The first user in the mesh will source content directly from the Azure CDN
- Adaptability: Peers can join or leave the mesh without impact to other users. If a peer leaves the mesh, others will simply adapt and reposition themselves within the mesh, all without impact to the user experience of other viewers

### Telemetry

- The plugin reports in near real time on viewership with user and network performance metrics

## Cloud Services

When a user connects to a live event, background connectivity to the Riverbed cloud enables the efficiencies of browser-based peering.

The Riverbed Cloud services include:

- Registration and Signaling (HTTPS): provides the registration process including information about available peers
- Content Distribution (HTTPS): hosts the browser plugin
- Statistics and Telemetry (HTTPS): used by the player to send telemetry to Kollektive IQ analytics
- Content Security (HTTPS): provides content metadata and authentication controls to ensure the user is authorized to receive the requested content
- Peer communication, (WebRTC): used as the transport network between user machines

## Security

The eCDN built on SaaS Accelerator is secure by design and was architected using standard web-based protocols with all data transfers encrypted and signed:

- TLS 1.2 with authenticated tokens is used for communication to cloud services
- Communication between peers uses WebRTC (DTLS/SCTP)
- All communications between peers and cloud services are encrypted and signed
- Video traffic is firewall and web-proxy compatible without additional configuration required
- Integration with Microsoft Teams and Stream is implemented securely using a standard JSON Web Token mechanism to ensure that only authorized users have access to the requested data
- The service is multi-tenant environment with logical isolation of customer data. Access to other tenant is not possible
- All application code is scanned for vulnerabilities through several industry standard best practices and third-party auditing tools
- All application code is independently verified prior to deployment in a production environment
- Penetration scans are run weekly with additional ongoing vulnerability detection using automated tools

## Data Compliance

Hosted within Microsoft Azure the solution automatically inherits certifications of the Azure cloud such as ISO27001, refer to <https://azure.microsoft.com> for details.



Riverbed enables organizations to maximize performance and visibility for networks and applications, so they can overcome complexity and fully capitalize on their digital and cloud investments. The Riverbed Network and Application Performance Platform enables organizations to visualize, optimize, remediate and accelerate the performance of any network for any application. The platform addresses performance and visibility holistically with best-in-class WAN optimization, network performance management (NPM), application acceleration (including Office 365, SaaS, client and cloud acceleration), and enterprise-grade SD-WAN. Riverbed's 30,000+ customers include 99% of the *Fortune* 100. Learn more at [riverbed.com](https://riverbed.com).