Transform Video Delivery at the Edge for Superior QoE

Meet dynamic bandwidth demand with Broadpeak Containerized CDN functions running on VMware

AT A GLANCE

By leveraging Broadpeak Advanced CDN technology running on VMware Telco Cloud Platform™ with VMware Tanzu™ Standard for Telco, the interoperable solution enables CSPs to transform their video delivery.

• Deliver both on-demand and live TV with the highest possible quality of experience in the most cost-effective manner.

• Automate the deployment and life cycle of CDN caches to meet the fluctuating demand and compute/storage resource availability in a network.

• Maximize resource utilization while maintaining the best possible quality of experience.

Introduction

As video consumption changes, with viewers increasingly streaming content to various devices in their home or on the go, communications service providers (CSPs) are under pressure to meet the unfaltering demand for streaming video.

This appetite for streaming both for video on demand (VoD) and live content drives huge volumes of traffic through the CSP networks. The rise of live sports events only available on streaming is also driving the peaks of demand to new heights.

With quality paramount in video streaming, CSPs are looking for ways to deliver an outstanding quality of experience (QoE), and one way to do that is by distributing video delivery functions further inside networks and closer to subscribers.

VMware and Broadpeak are working together to transform video delivery into a scalable network function, so capacity can be adjusted dynamically. VMware Tanzu Standard for Telco amplifies the flexibility of the Broadpeak Content Delivery Network (CDN), which allows dynamic deployments of the CDN capacity as a containerized function, so operators can deliver the compelling experiences customers expect.
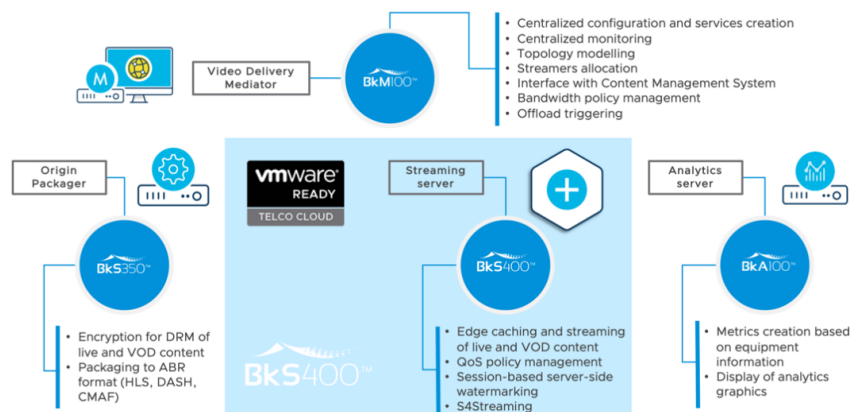

Figure 1: Broadpeak CDN components and VMware

Broadpeak develops software for CSPs, including ISPs, telcos, mobile operators, and cable companies, that are looking to deliver compelling streaming experiences to their end users. Broadpeak and VMware together can deploy streaming video solutions efficiently by virtualizing the content delivery network. Broadpeak provides the building blocks required to store and deliver video through networks with its Advanced CDN and nanoCDN™ technologies.

VMware Telco Cloud Platform enables CSPs to launch innovative services on consistent infrastructure, reducing operational complexity and radically improving agility. It combines several systems to deliver an end-to-end telecommunications solution for 5G and to address a range of use cases in core networks, edge sites, public clouds, radio access networks, and all points in between.

VMware Telco Cloud Platform - 5G Edition is powered by field-proven compute and networking of VMware Telco Cloud Infrastructure™ coupled with VMware Telco Cloud Automation™ and VMware Tanzu™ Standard for Telco, a telco-grade Kubernetes distribution.

VMWARE TANZU STANDARD FOR TELCO

VMware Tanzu eliminates the complexity of dealing with Kubernetes on a custom basis. Microservices, containers and Kubernetes help to free apps from infrastructure, enabling them to work independently and run anywhere.

With VMware Tanzu, developers can make the most of these cloud native patterns, automate the delivery of containerized workloads, and proactively manage apps in production.

Viewing patterns have changed

For many years, CSP networks have depended on their own CDN to bring content closer to the consumers, meaning that network capacity could be controlled, and quality protected at the same time.

CDNs are typically sized for peaks: the maximum audience dictates the CDN capacity that is deployed by the CSPs. It is a function of the service popularity and the number of subscribers. But it's inefficient to add excess capacity that is unused at off-peak times, and expensive to build out CDNs at the edge everywhere.
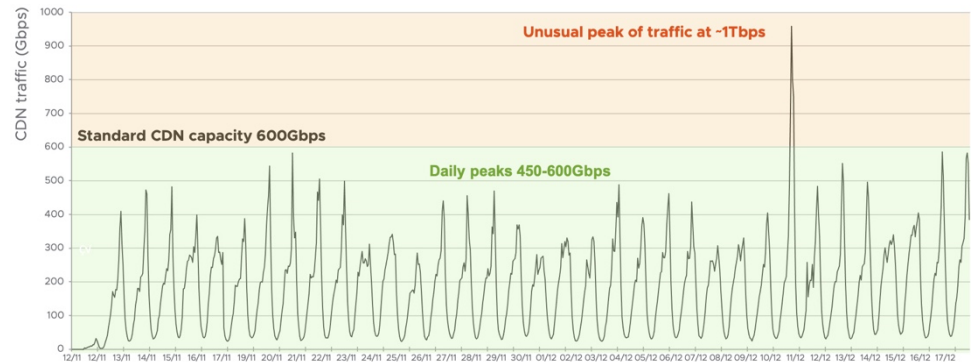

Figure 2: Peak CDN throughput over time

The traditional approach, based on deploying dedicated servers to meet a maximum peak demand, doesn't meet the scalability and flexibility needed by CSPs. It is not economically viable for a CSP to permanently mobilize hardware resources for an event that might happen once a year, last a few hours, and potentially drive an audience of millions of viewers.

With streaming now being the dominant way of consuming video, the pressure is on CSPs to carry video that was previously delivered through broadcast networks.

More flexibility in video delivery functions

CSPs must find innovative solutions and new collaborations to decrease their costs of delivery, while ensuring high-quality video experiences. Consequently, CSPs need content delivery solutions that can quickly and easily adapt to changing consumption patterns.

What is needed is a more dynamic approach: with CDNs deployed deeper inside the CSP networks, the deployment offered by VMware Tanzu Standard for Telco enables the Broadpeak CDN to adapt to high streaming demand. With the VMware Telco Cloud orchestration capability, CSPs can automate deployment and/or re-assignment of CDN capacity to meet fluctuating demand. This maximizes network resource utilization while providing quality of experience.

The concept is to simply instantiate CDN caching capacity dynamically when needed and where needed in the CSP networks. This way CSPs can avoid sunk investments in legacy CDN solutions with costly dedicated servers. The CSPs deploy Broadpeak Advanced CDN for any content (their own video service or a third-party provider's), delivered over unicast or multicast, and on any IP network (cable, telco or mobile).

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ABOUT BROADPEAK

Broadpeak offers advanced video distribution technologies that are used by large content providers and communication service providers to deliver their video services. Customers include HBO, Astro, Orange, T-Mobile, Megacable and Telstra.

Broadpeak designs and manufactures video delivery components for content service providers deploying IPTV, cable, satellite, OTT, and mobile services. Its portfolio of solutions and technologies powers the delivery of movies, television programing and other content over managed networks and the Internet for viewing on any type of device.

The company's systems and services help CSPs increase market share and improve subscriber loyalty with superior quality of experience. Broadpeak supports all its customers worldwide, from simple installations to large delivery systems reaching capacities of several million simultaneous streams.

Broadpeak's solution provides a full CDN infrastructure that unifies video delivery to all screens.

Use Case: Streaming live sports

Live sports is a category where a popular event can generate high peaks of traffic for a short time. Audiences for international football (soccer) historically watched championship matches on broadcast television. Currently fans watch the same games live, but the content is streamed over IP networks rather than being broadcast. While the technology is different, the fans expect the same high-quality experience: when they consume sports content, they expect a fast start time, crisp picture quality, no frozen screen, lagging or delay to the action due to latency issues

Now, when a fan watches a match through a streaming service, it's typically delivered using HTTP adaptive bit rate over unicast. This means that when a million people tune into a game, the CSP needs to have the capacity to deliver the video stream one million times, effectively using numerous CDN servers for the task. In the traditional CDN model with dedicated servers, this huge peak of demand means the CDN resources are over-provisioned—they typically barely use more than a few hours a week.

Instead of relying on large CDNs to be always available, the Broadpeak solutions can leverage VMware Telco Cloud Platform to containerize CDN functions that cache the content and instantiate the caching capacity as needed.
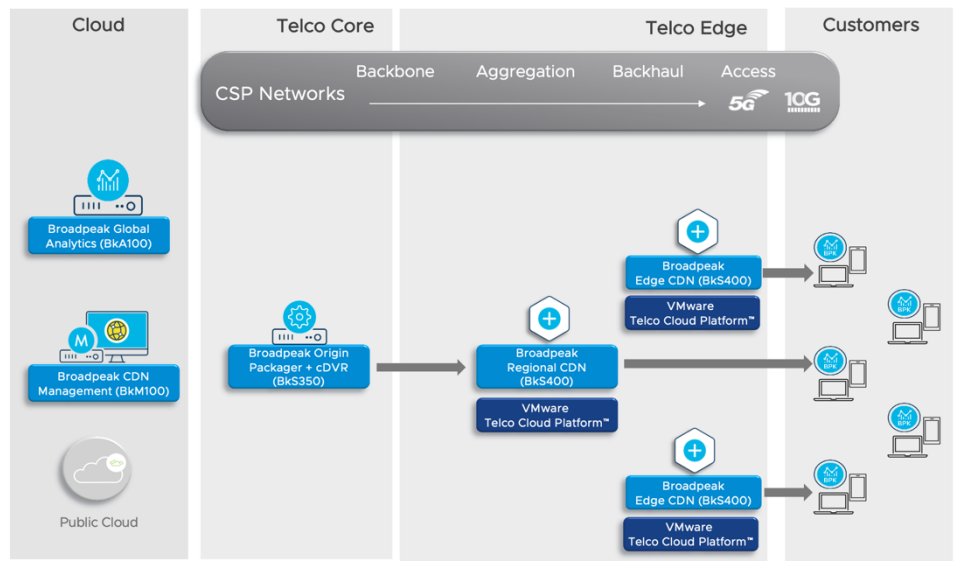

Figure 3: Deploying a virtualized Broadpeak CDN with VMware

To meet fan expectations when it comes to streaming quality, video content must be delivered as close as possible to where it is consumed: in the video world quality comes with proximity. The ability to deploy the CDN capacity at the edge of the networks (whether it is fixed line or mobile) is a great way to ensure a consistent QoE, even at the busiest hours.

In effect, the VMware Telco Cloud Platform is the enabler to multiply the number of CDN locations, so content doesn't have to travel far to get to the viewer. This dramatically reduces the risk of network problems and makes video delivery more deterministic. With more reliable delivery, it then becomes possible to deliver the low-latency video services that consumers want.

BROADPEAK SOLUTION

Broadpeak CDN is made of the BkM100 to manage video delivery and BkS400 to deliver content to the end consumer. As the BkS400 is the delivery function, it scales with the demand from consumers. As CDN demands fluctuates through the day, and the delivery is a distributed function, BkS400 is the right element to deploy dynamically as either a VM or a container.

In addition, Broadpeak nanoCDN enables live ABR video distribution over multicast either all the way to the subscriber's home, or as a contribution to CDN edge caches.

Today the Broadpeak portfolio can be deployed in virtualized and containerized environments like VMware Telco Cloud Platform (TCP) version 1.0 and version 2.0.

Combining Broadpeak CDN and VMware Telco Cloud Platform

As video content is now being offered by various OTT providers, the solution can be used to deliver the CSP video offering and third-party video services. CSPs can deploy a single Advanced Broadpeak CDN with VMware cloud-native capabilities, for all the content delivered, thus avoiding sunk investments in multiple siloed CDN solutions.

With the Broadpeak containerized CDN functions being certified for VMware Ready for Telco Cloud, CSP can confidently adopt the containerized approach to automate the deployment of CDN caches. VMware Tanzu can automate the selection and deployment of the appropriate infrastructure instances, enabling unprecedented deployment flexibility.
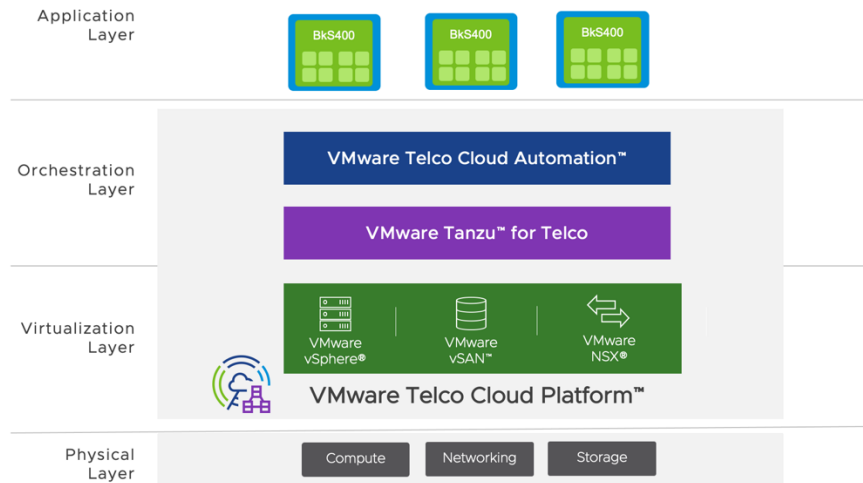

Figure 4: Broadpeak CDN on VMware Telco Cloud

While this interoperable solution benefits all CSP networks, it will be most advantageous for mobile networks as their subscribers roam while consuming video content—and the consumption of video on mobile devices continues to further increase with the adoption of 5G. This is where the flexibility of the containerized Broadpeak CDN solution can enable an efficient video distribution infrastructure all the way through the mobile edge. CDNs can be deployed side by side with other network functions like the user plane function for IP connectivity on the VMware Telco Cloud Platform.

Delivery of linear TV channels can be scaled further by leveraging the Broadpeak nanoCDN technology. Based on multicast ABR, the concept is to encapsulate the linear ABR content into IP multicast data streams that can either be distributed to a CPE device in a home network, or to feed CDN caches at the edge of the network if multicast isn't available inside access networks.

The next move

Broadpeak coupled with VMware Telco Cloud enables networks to deploy CDN as a network function, capable of caching and distributing video. Whether it's a live event or on-demand show, Broadpeak and VMware provide the tools in the network to deliver the best possible experience at the lowest possible cost. With caching embedded in the edge infrastructure, CSPs can deliver more throughput to the consumer and virtually eliminate network congestion. Going forward, this approach can be augmented by using multicast ABR to feed the edge CDN caches and enable a truly premium experience at scale.