FAQ SHEET: TANGIBLE RESULTS FOR CONTENT DELIVERY NETWORKS (CDNS)

Q **Why are CDNs crucial for Communications Service Providers (CoSPs) offering Visual Cloud services?**

A Consumers expect web and video content anytime, anywhere and on any device. And as this content continues to get richer, more localized, personalized, interactive and immersive, the pressure is on for CoSPs to deliver more than just "media" content to their customers; they must deliver Visual Cloud experiences. CDNs enable CoSPs to deploy these services at the edge of the network – which means they can deliver richer content to widely distributed, and often mobile, consumers. CoSPs need a strong network of CDNs to keep ahead of consumer expectations in the next era of media and 5G.

Q **What industry trends are driving the Visual Cloud?**

A Visual computing workloads are growing exponentially. Experts forecast strong growth in all internet and managed IP video-related sectors between 2017 and 2022. Global CDNs are expected to carry 72 percent of all internet traffic (up from 56 percent in 2017) and consumer video-on-demand (VoD) traffic will nearly double by 2022.[1] While traditional appliance-based CDN models could not cope with this type of growth, operators are increasingly turning to cloud-based CDN models for better scale and agility. Beyond that, the Visual Cloud can help operators monetize and deliver new CDN-type services.

Q **How can my CDN keep up with all this data and still provide a high-quality user experience?**

A As video traffic continues to grow exponentially, CDN service providers need to do more with less. Content is becoming richer, interactive and immersive—all of which needs high bandwidth, low latency and in some cases additional technology building blocks. A broad portfolio of Intel® technology can help reduce latency while making solutions more affordable with higher density. Here are the fundamentals of a modern CDN platform:

- **Memory and bandwidth.** The second-generation Intel® Xeon® Scalable processor's architecture supports demanding CDN workloads, with two sockets with 48 cores and 12 memory channels per socket, high-speed interconnect and cache optimizations.
- **Innovative memory and storage.** New memory and solid state drive (SSD) technologies from Intel are ideally suited for CDN workloads.
- **Edge performance.** High-density accelerators can help to maximize performance on edge nodes. This includes crypto/compression workload acceleration with Intel® QuickAssist Technology (Intel® QAT) and transcode acceleration with Intel® Visual Compute Accelerator 2 (Intel® VCA 2).

CDN operators seeking to offer adjacent services like live transcoding, targeted advertising insertion and cloud digital video recording (DVR) need their CDN to be scalable, flexible, virtualized and cloud-like.

Q What's the best way to get started?

A Replace inflexible dedicated network appliances with infrastructure elements that can capitalize on network function virtualization (NFV), software-defined networking (SDN) and software-defined infrastructure (SDI). Build a network that can intelligently decide where to process workloads (the network edge, the cloud, or the core data center) based on customer, use case or business requirements. Choose from a broad portfolio of tools and technologies from Intel that let your solution architects design and deploy high-performance, scalable, yet cost-effective CDN solutions.

Q As I transform my CDN, how do I keep total cost of ownership (TCO) down?

A Some recommended best practices include:
- Choose a scalable platform to accommodate growth and highly dynamic needs.
- Deploy software solutions that are optimized for your hardware (providing the best performance possible).
- Reduce overall hardware platform costs by implementing industry-standard hardware – it's energy-efficient, simple to deploy and easy to maintain.
- Avoid costly license fees, such as those associated with graphics processing units (GPUs), by choosing CPU-based solutions.[2]
- Increase server density and overall resource utilization (the more workloads your servers can run, the more value they provide).
- Choose open source-based solutions that are characterized by a broad supporting ecosystem to gain flexibility in sourcing and access to the most diverse set of innovation and capabilities.
- See solution list for specific Intel technologies that can help reduce TCO for CDN operators.

Q What are other organizations doing to transform their networks?

A A leading CoSP built a virtual CDN (vCDN) that supports a new portfolio of on-demand service offerings. The solution uses powerful Intel Xeon processors and Intel® Ethernet Adapters. With its new vCDN, the CoSP expects to achieve increased agility, low costs and more rapid service deployment.[3] Also, Silicom* demonstrated the performance advantage of Intel® Xeon® Platinum processors, which feature Intel QAT. In transport layer security (TLS) handshake tests, Intel QAT helped increase speed.[4]
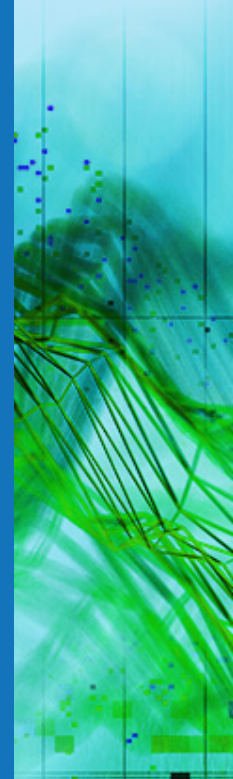
Q: What specific technologies can help me modernize my CDN infrastructure?

A: Intel offers comprehensive, interoperable end-to-end media solutions powered by the new Intel Xeon Scalable processor. These solutions can help you better serve your existing customers, as well as extend your CDN to support emerging edge cloud use cases such as virtual reality (VR) 360, gaming and media analytics. Specific Intel enabling technologies include:

- Intel Xeon Scalable processor: Network-optimized SKUs are available that offer Intel® Speed Select for TCO and priority-based frequency.
- Intel QAT: Bulk encryption and decryption, public key exchange and compress-and-verify hardware acceleration.
- Intel VCA 2: Equips Intel Xeon Scalable processors with Iris® Pro graphics and Intel® Quick Sync Video media transcode capabilities.
- Intel® Ethernet Ports: 700 series (10G/25G/40G) and dual-port 25G VirtIO vSwitch acceleration.
- Intel® Optane™ DC persistent memory (DIMM form factor): Provides a bigger memory footprint at a lower TCO and faster access to storage by bringing data closer to the CPU. This technology is best suited for live streaming, and can offer substantial savings compared to DRAM.
- Intel® Optane™ SSD: Provide extremely high reliability and performance compared to hard disk drives (HDDs) and standard SSDs. These drives are best suited for hot content use cases.
- Intel® 3D NAND SSD: Ideally suited for high-capacity, high-volume use cases such as VoD and cloud DVR.
- Software technology building blocks, such as Scalable Video Technology (SVT) for HEVC and AV1.
- Intel® Select Solutions for Visual Cloud Delivery Network.

¹ Cisco, November 2018, "Cisco Visual Networking Index: Forecast and Trends, 2017–2022." https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white-paper-c11-741490.html
² GPU compute instances typically cost 2-3x that of CPU compute instances. Source: https://www.datascience.com/blog/cpu-gpu-machine-learning
³ Intel, April 2018, "Orange* Builds and Tests Virtual Content Delivery Network." https://www.intel.com/content/www/us/en/communications/nt-orange-case-study.html
⁴ Intel, April 2018, "Silicom* Boosts TLS Speed with Intel® QuickAssist Technology." https://builders.intel.com/docs/networkbuilders/silicom-boosts-tls-speed-with-intel-quickassist-technology.pdf