intel.

Intel's Converged Edge Media Platform: Cloud-Native Media Services at the Network Edge

Intel's Converged Edge Media Platform is a reference architecture that provides container-based cloud-native foundational capabilities for providers to deploy multiple media services quickly, efficiently and cost-effectively to capitalize on fast-growing edge computing opportunity.

Converged Edge Media Platform targets the network edge today.

As network operators such as communication service providers (CoSPs) develop their infrastructure strategies for the coming years, the role of the network edge is unparalleled in scale. With the explosion of interactive and immersive media services that are latency-sensitive and bandwidth-intensive, there is a growing demand for specialized compute infrastructure closer to the end user at the edge. This edge computing market is growing from a total addressable market of $10 billion in 2020 to greater than $400 billion projected by 2030, dominated by media use cases such as cloud gaming, content delivery networks (CDNs) and media analytics.[1] This explosive growth creates an imperative for CoSPs, ISPs, CoLos and CDN providers with edge assets to broaden their media offerings in pursuit of new revenue streams.

The Converged Edge Media Platform, a media-specific vertical instantiation of Intel's Edge Platform, is a reference architecture based on Intel® Xeon® processors, the Intel® Data Center GPU Flex Series and Intel® Ethernet Adapters that can host and scale a wide range of media workloads at the edge in a cloud-native environment. It is a pre-validated, extensible set of hardware and software elements for solutions to be built upon, with various configurations for a combination of media workloads. The fundamental design pillars of the Converged Edge Media Platform include the following:

- **Designed to host multiple media workloads and services:** CDN, cloud gaming, media analytics, AI-enhanced media services, software-defined broadcast and more.

- **Able to host multiple services:** CPU or GPU-based, cloud-native, automated scaling, informed by robust network and platform awareness.

- **Built for the network edge:** Optimized for power efficiency and total cost of ownership for constrained network edge environments.

intel. XEON®

intel. DATA CENTER GPU FLEX SERIES

Opportunity	Solution	Benefits
New, edge-driven media revenue	Intel's Converged Edge Media Platform	Faster time to production and lower TCO

Streamlined media deployment at the edge with Intel's Converged Edge Media Platform.

Network Edge in Transition

The migration of media workloads to the network edge is accelerating, particularly for workloads requiring lower latency, those with large datasets and those requiring data sovereignty or high security. Migrating from the public cloud to the network edge is enabling many cloud gaming and CDN operators to maintain high service quality while avoiding high costs of moving large data sets in and out of the cloud. Additionally, moving applications from on-premises to the network edge (a current trend for AI Media Enhancements) avoids the need to over-provision on-premises compute resources.

The shift of service delivery to the network edge ushers in cloud-native practices, where service providers no longer must bear the expense and complexity of architecting a new siloed platform for each service deployment. Instead, the primary underlying architecture is defined once, and service providers can focus on creating value-added features and functionality. Cloud-native practices also provide the opportunity to introduce new business models such as infrastructure as a service (IaaS) and platform as a service (PaaS). Regardless of motivations and go-to-market models, all stand to benefit from the core mission of Intel's Converged Edge Media Platform: to onboard and deploy media-related services quickly, efficiently and cost-effectively.

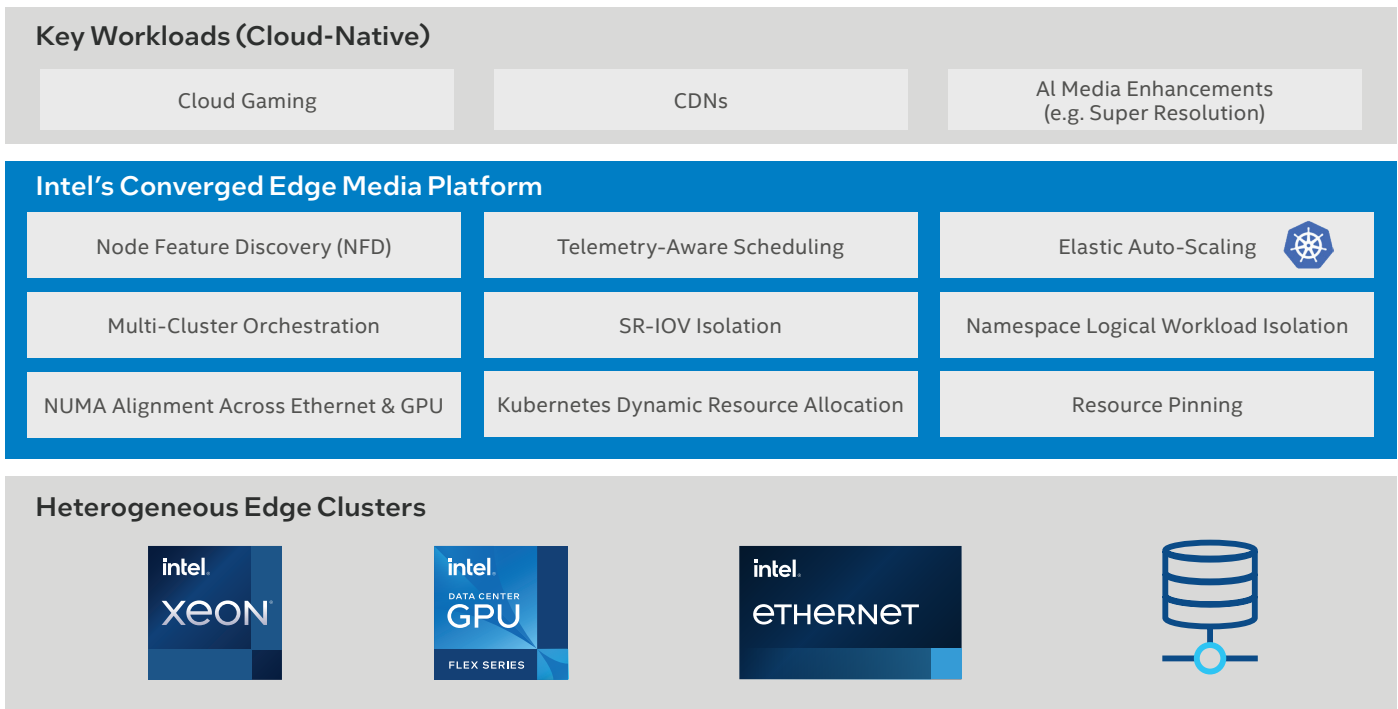## Intel's Converged Edge Media Platform: Cloud-Native Video Edge Architecture

Converged Edge Media Platform is a container-based, extensible foundation of hardware and software elements for media solutions to be built upon, streamlining workload deployment and optimizing hardware utilization to help reduce total cost of ownership. As an example, Converged Edge Media Platform defines how GPU-centric use cases such as cloud gaming and analytics can coexist with storage-centric use cases such as CDNs. The platform's cloud-native edge infrastructure is built to handle continually changing combinations of workloads, with elasticity to address fluctuating traffic levels and support diverse service level agreements.

The Converged Edge Media Platform incorporates a range of software innovations that will evolve and grow over time. CEMP adds media specific workload enhancements to Kubernetes platforms through different plugins that are evolving and will grow over time. Node Feature Discovery (NFD) makes CPU, GPU, NIC and storage capabilities visible to the cluster scheduler to support resource-aware orchestration. Device telemetry provides status and related insights that also help the scheduler place workloads more effectively. Elastic auto-scaling interacts with the scheduler to govern resource availability and reduce contention. Ongoing ecosystem development is improving multi-cluster orchestration, to adapt workloads to the multi-cluster environment. Converged Edge Media Platform is capable of isolating workloads in hardware using SR-IOV, resource affinity pinning and providing namespaces for logical workload isolation.

Engineered explicitly for extensibility, Intel's Converged Edge Media Platform accommodates various combinations of workloads and services. For example, the platform roadmap includes creating a solution blueprint to define optimal hardware and software configurations for hosting CDN and cloud gaming together, a combination of interest to CoSPs. CDNs and AI media enhancements are another combination of services on the Converged Edge Media Platform reference architecture roadmap, which is of interest to CDN providers.

The underlying foundation for building and deploying applications with Intel's Converged Edge Media Platform is powered by a Kubernetes cloud-native stack.

Key Workloads (Cloud-Native)

Cloud Gaming	CDNs	AI Media Enhancements (e.g. Super Resolution)

Intel's Converged Edge Media Platform

Node Feature Discovery (NFD)	Telemetry-Aware Scheduling	Elastic Auto-Scaling
Multi-Cluster Orchestration	SR-IOV Isolation	Namespace Logical Workload Isolation
NUMA Alignment Across Ethernet & GPU	Kubernetes Dynamic Resource Allocation	Resource Pinning

Heterogeneous Edge Clusters

intel. XEON   intel. DATA CENTER GPU FLEX SERIES   intel. ETHERNET

Key capabilities of Intel's Converged Edge Media Platform.

Growing Momentum for Engagement

Intel's Converged Edge Media Platform will deliver a roadmap of full reference architecture and solution blueprints for specific use cases and will include hardware specifications and configuration information as well as links to all necessary software components. These resources will enable ISVs, SIs and OEMs to build and bring products to the market. New media capabilities developed for Intel's Converged Edge Media Platform will be delivered through Open Visual Cloud and/or open-source projects.

As service providers expand the role of the network edge in the delivery of video services, Converged Edge Media Platform provides a ready foundation that streamlines implementation. Using Intel's Converged Edge Media Platform, providers can build flexible environments that provide fluid support for changing combinations of requirements within constrained edge environments, helping contribute to compelling ROI.

Learn More

Blog: Jump-Start Your Edge Computing Journey

Intel® Visual Cloud and Edge Technologies

intel.