

Intel® Processors Power Software-Defined Broadcasting

A homogeneous platform architecture with Intel® Xeon® Scalable processors powers a virtualized live broadcast workflow at the Olympic Games Paris 2024 and Winter Youth Olympic Games Gangwon 2024.

Introduction



Traditionally, broadcasters rely on proprietary applications running on fixed hardware, including outside broadcast (OB) vans and flight packs to control every part of live broadcast workflows, from capture to distribution. Though costly, inflexible, and difficult to scale, this approach has been the industry standard for years. However, as competition increases and profit margins tighten, media providers must find new ways to optimize cost efficiency while meeting rising consumer demand for high-quality live productions.

Intel and partners are addressing these needs with an end-to-end, software-defined live broadcast workflow—from content capture devices to over-the-top distribution—built on a homogeneous platform architecture and deployed at one of the world's largest live sporting events: the Olympic Games Paris 2024 and Winter Youth Olympic Games Gangwon 2024.

Enabling an end-to-end, software-defined broadcast workflow

At Paris 2024, Olympic Broadcasting Services (OBS) manages the software-defined live broadcast workflow—including production, highlight tagging and creation, encoding, and distribution—on a common platform architecture enabled by commercial-off-the-shelf (COTS) Intel® Xeon® Scalable processors. The end-to-end workflow featuring virtualized OB van servers is used to produce four live sporting events and deliver content to the International Broadcast Centre (IBC) for distribution to media rights holders in more than 200 countries and territories.

The solution builds on a successful proof of concept at the Olympic Winter Games Beijing 2022. At Beijing 2022, OBS set up a virtual OB van and ran it successfully throughout the two-week curling competition, with production applications optimized to run on a common base platform, including COTS Intel® Xeon® Scalable processors and Intel® FPGAs.

The Paris 2024 deployment leverages the power of Intel® Xeon® Scalable processors to expand on the earlier virtual OB van solution and go live with an end-to-end workflow. Intel® Xeon® Scalable processors, combined with an optimized ST2110 media library,¹ deliver the high throughput, low latency, and power efficiency necessary to produce live sporting events in 4K HDR. The platform also leverages Ethernet speeds of up to 100 Gbps to support ultralow-latency video transmission² as well as the Intel® Data Center GPU Flex 140 Series to increase stream density per server³ and Intel Agilex® FPGAs to accelerate video processing.⁴

Delivering new levels of cost efficiency and flexibility

Taking advantage of virtualized applications running on COTS Intel-based hardware can help broadcasters maximize cost efficiency and flexibility while retaining the performance and reliability that demanding video production workloads require.

The solution helps give broadcasters and other media providers the ability to quickly and cost efficiently scale

their production environments to meet shifting demands—and they can repurpose the COTS infrastructure either as common IT servers or for other use cases when events are not taking place. By resourcing COTS Intel® Xeon® processor-based servers locally, media providers can also potentially help reduce the cost and emissions associated with shipping equipment to event venues.

Key benefits

COST EFFICIENCY

With COTS Intel® Xeon® Scalable processors, potentially help reduce transport, setup, and maintenance costs normally associated with proprietary, monolithic broadcast equipment.

NEW REVENUE OPPORTUNITIES

Repurpose Intel® Xeon® Scalable processor-powered infrastructure when events are not taking place to make use of compute resources that would otherwise be idle.

SUSTAINABILITY

Potentially help reduce carbon footprint by resourcing COTS Intel® Xeon® Scalable processor-based servers locally, reducing the need to ship equipment, including OB vans and flight packs, to event venues.

FLEXIBILITY AND SCALABILITY

Avoid vendor lock-in with solutions optimized for Intel® Xeon® processors, and quickly and easily scale up production environments with virtualized resources.

REDUCED CABLING

Deploy this Intel® processor-based workflow in combination with Intel-enabled private 5G technology platforms to enable wireless UHD video transmission and help reduce the cost and effort of running miles of cabling to venues.

FAN ENGAGEMENT

Use Intel-enabled private 5G technology platforms to help fans receive updates on the action, even for venues where a wired connection isn't feasible, such as the Opening Ceremony on the River Seine or Marina Marseille.

Large-scale video production and distribution on common architecture

At Paris 2024, virtual OB van servers, powered by Intel® Xeon® Scalable processors, run preferred software for video switchers, replay, audio, and multiviewer applications on COTS hardware to produce live events in 4K HDR format. Feeds from the produced live events are transmitted to the IBC for content encoding, transcoding, tagging, postproduction, and highlights creation. The IBC then distributes this content to media rights holders and fans around the world.

Additional technologies, including Intel Agilex® FPGAs and an advanced video processing library, accelerate encoding and transcoding where low latency and deterministic performance are necessary. The Intel® Data Center GPU Flex 140 Series increases the density of streams that can be supported per server without compromising video stream quality, which is a top priority for media rights holders.

AI platform-enabled highlights clipping and tagging bring action closer to the fans

Intel is also helping bring the best of the Olympic Games to fans more efficiently. As live feeds of events are processed through the software-defined workflow, an AI platform trained using the Intel® Geti™ application enables media

rights holders to generate clips and highlights quickly and efficiently. Media rights holders can then post this content to their social media feeds to engage fans directly while reducing the manual effort to sort and format content for multiple distribution channels.

Private 5G technology platforms help fans stay connected to catch more can't-miss moments

Intel® Xeon® Scalable processors also power private 5G technology platforms at key events during the Opening Ceremony on the River Seine, Marina Marseille, Accor Arena, and Arena Défense et Stade de France (SDF). These private 5G technology platforms work in conjunction with the software-defined broadcast workflow to enable wireless video transmission.

As a result, OBS can capture footage of events in venues where a wired connection is difficult or infeasible, such as for boat racing. Media rights holders can also avoid the high cost and effort involved with deploying miles of cable to and from venues. Fans can catch more of the action of their favorite events with access to footage and experiences that might otherwise not be available with wired-only connectivity.

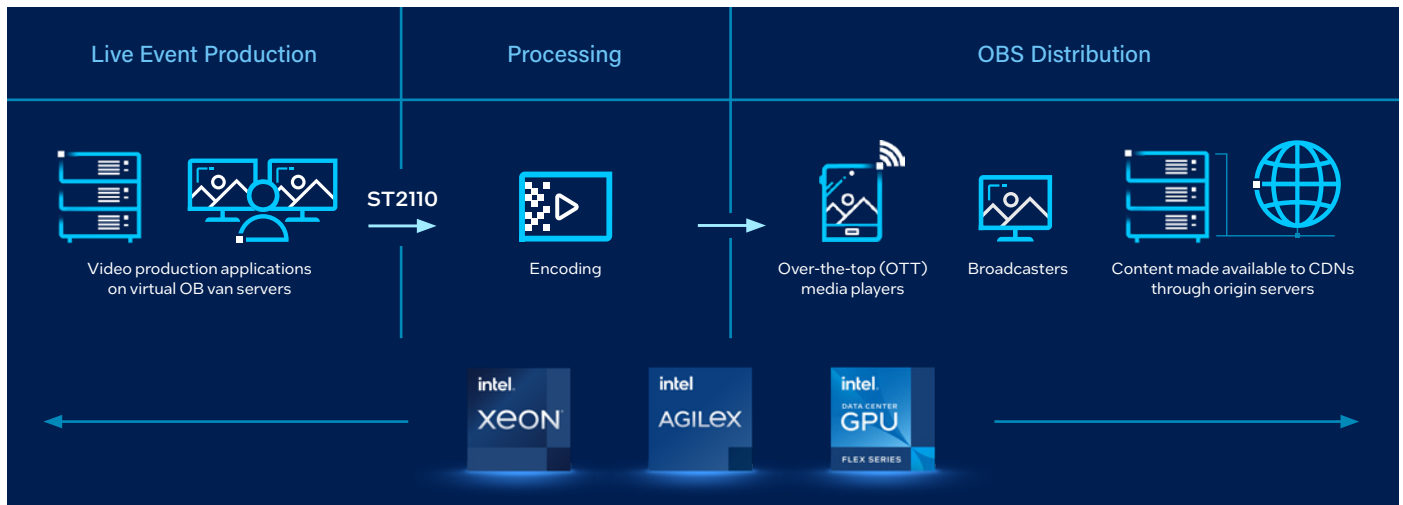


Figure 1. The workflow runs on a common platform powered by Intel® CPUs, GPUs, and FPGAs.

Intel® Xeon® Scalable processors enable transition to a new age of video production

Live video production is transitioning from its traditional reliance on inflexible, costly proprietary standards and equipment to an open, IP-based model based on COTS hardware, which can deliver significant advantages in flexibility, scalability, and cost. The transition depends on performing live video production operations in near-real time with ultralow latency, which requires massive computational horsepower.

During Paris 2024, a common platform architecture powered by Intel® Xeon® Scalable processors will help OBS meet demanding processing requirements across an end-to-end workflow, from video production to content delivery. To enhance video processing workloads, the Intel® Xeon® Scalable processors feature powerful per-core performance, extensive memory and I/O, and [built-in accelerators](#)⁵ to help optimize video movement and enable more high-quality video streams per core.

Built-in accelerators for next-gen workloads

Intel® Accelerator Engines are purpose-built accelerators in select Intel® Xeon® Scalable processors that deliver performance and power efficiency advantages across fast-growing workloads, including AI, data analytics, networking, storage, and high performance computing (HPC). These integrated hardware accelerators can dramatically improve performance by offloading tasks from the processor cores to dedicated hardware resources, which also frees the processor cores for other work.

As a result, OBS can capture footage of events in venues where a wired connection is difficult or infeasible, such as for boat racing. Media rights holders can also avoid the high cost and effort involved with deploying miles of cable to and from venues. Fans can catch more of the action of their favorite events with access to footage and experiences that might otherwise not be available with wired-only connectivity.

The future: AI platform-enabled live video production

Broadcasters and streaming service providers are increasingly turning to AI-based solutions to enhance video quality, personalize content, and much more. The software-defined broadcast workflow deployed at Paris 2024 features Intel® AI Engines built into Intel® Xeon® Scalable processors to support existing and future AI-driven workloads. The accelerators can offer a simpler way to get the

performance required for AI workloads, without the added cost and complexity of deploying specialized hardware.

Future iterations of the Intel® Xeon® processor-powered live broadcast workflow are expected to incorporate new AI workloads. For example, AI could be used to automate and orchestrate production resource planning,

automatically determining the number of servers necessary to support an event at a given venue—a time-consuming task when performed manually. As these and other AI-enabled innovations become available, Intel® AI Engines can empower media providers to capitalize quickly and run their training and inferencing workloads on Intel® Xeon® processors.

Conclusion: Driving a new era of live event production

Intel has been working with OBS for years to develop and refine the software-defined broadcast workflow deployed at Paris 2024. The deployment highlights the competitive advantages of transitioning away from proprietary applications running on fixed hardware to virtualized production environments that can be more cost efficient, provide greater flexibility and creative

control, and can readily scale based on demand and workload. With a homogeneous platform architecture powered by Intel® CPUs, GPUs, and FPGAs, broadcasters have an opportunity to transform their video production workloads today and stay ahead of future demand for high-quality, AI-enabled live productions.



Learn more about Intel at Paris 2024

intel.com/olympics
intel.com/xeon
intel.com/graphics
intel.com/fpga

1. "Optimized Real-Time Video Transport using Intel® Data Streaming Accelerator," Intel, January 2023, networkbuilders.intel.com/solutionslibrary/optimized-real-time-video-transport-using-intel-data-streaming-accelerator.
2. Based on measurements performed by Olympic Broadcasting Services, Intel, and other suppliers. Results may vary.
3. "Intel® Data Center GPU Flex Series for Media Processing and Delivery," Intel, August 2022, intel.com/content/www/us/en/products/docs/discrete-gpus/data-center-gpu/flex-series/media-delivery-solution-brief.html.
4. "Intelligent Vision & Video," Intel, accessed June 2024, intel.com/content/www/us/en/smart-video/products/programmable/overview.html.
5. Availability of accelerators varies depending on SKU. Visit the Intel® Product Specifications page for additional product details.

Notices and disclaimers

Performance varies by use, configuration, and other factors. Learn more on the Performance Index site. Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See configuration disclosure for details.

Intel® technologies may require enabled hardware, software, or service activation.

No product or component can be absolutely secure.

Your costs and results may vary.

Intel does not control or audit third-party data. You should consult other sources to evaluate accuracy.

© Intel Corporation. Intel, the Intel logo, and other Intel marks are trademarks of Intel Corporation or its subsidiaries. Other names and brands may be claimed as the property of others.

0724/SK/CMD/PDF