

Intel + Olympic Winter Games Beijing 2022



WORLDWIDE PARTNER





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Raising the bar on wonderful with new technology at Beijing 2022

At the Olympic Winter Games Beijing 2022, the latest Intel® processors, technologies, and platforms delivered deeper levels of connectivity and interaction to fans around the world.



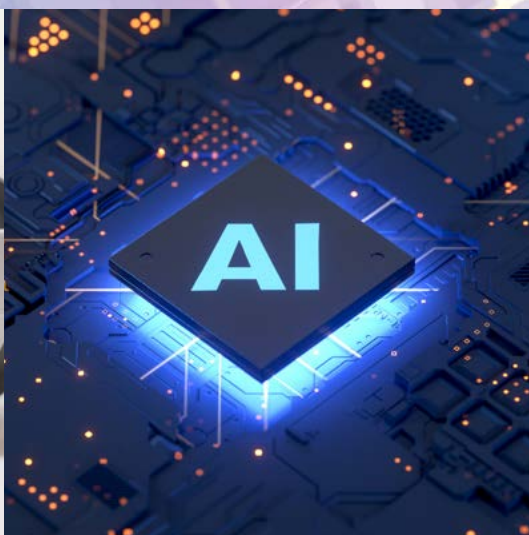
Product Categories



Processors



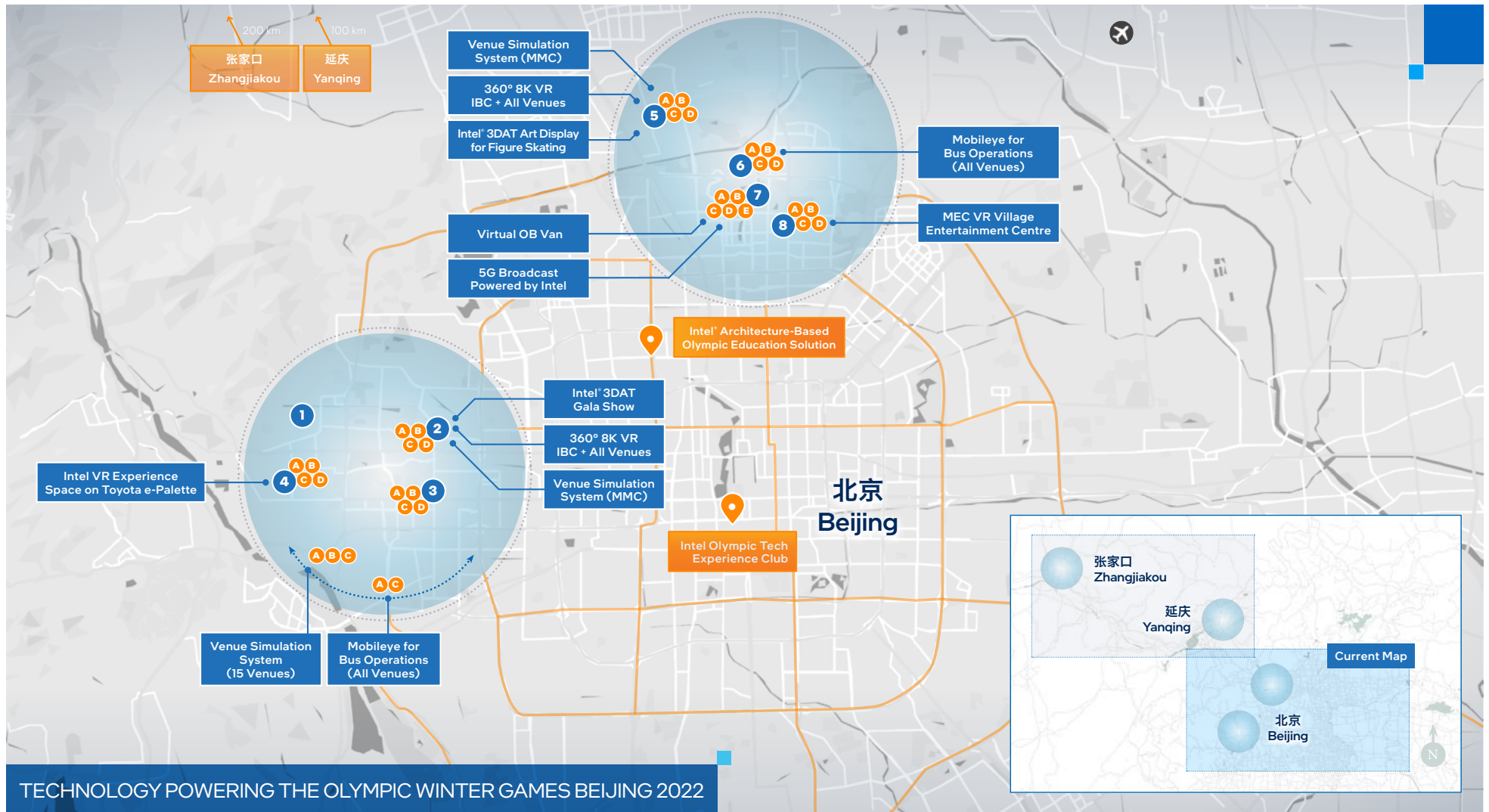
VR, 3D, and 360°
Content Development
Platforms



Artificial Intelligence
Platforms



5G Technology
Platforms



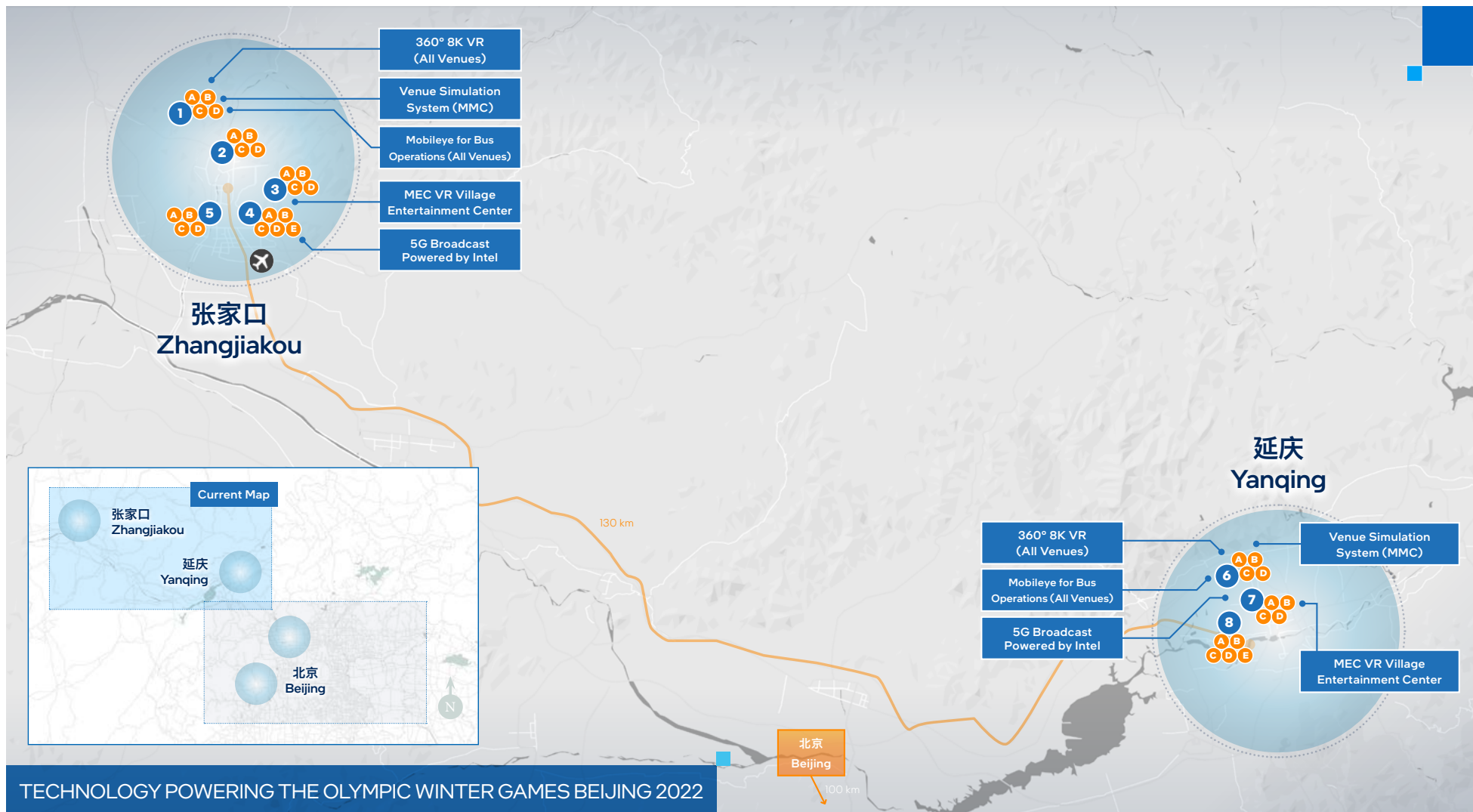
- 1 WINTER TRAINING CENTER OF GENERAL ADMINISTRATION OF SPORT OF CHINA
- 2 CAPITAL INDOOR STADIUM

- 3 WUKESONG SPORTS CENTRE
- 4 BIG AIR SHOUGANG
- 5 NATIONAL SPEED SKATING OVAL

- 6 NATIONAL STADIUM
- 7 NATIONAL AQUATICS CENTRE
- 8 BEIJING OLYMPIC VILLAGE

- A AI TECHNOLOGY PLATFORM
- B VR TECHNOLOGY PLATFORM
- C PROCESSOR

- D SPORTS PERFORMANCE TECHNOLOGY PLATFORM
- E 5G BROADCAST POWERED BY INTEL® TECHNOLOGY



- 1 GENTING SNOW PARK
- 2 ZHANGJIAKOU OLYMPIC VILLAGE
- 3 NATIONAL BIATHLON CENTRE

- 4 NATIONAL CROSS-COUNTRY SKIING CENTRE
- 5 NATIONAL SKI JUMPING CENTRE

- 6 NATIONAL SLIDING CENTRE
- 7 YANQING OLYMPIC VILLAGE
- 8 NATIONAL ALPINE SKIING CENTRE

- A AI TECHNOLOGY PLATFORM
- B VR TECHNOLOGY PLATFORM
- C PROCESSOR

- D SPORTS PERFORMANCE TECHNOLOGY PLATFORM
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8K Virtual Reality

Helping to deliver the world's greatest global event in 8K virtual reality (VR) for the first time

At the Olympic Winter Games Beijing 2022, the world's first fully produced 8K virtual reality feed was made available to broadcasters around the world. The end-to-end 8K VR solution incorporated Intel® technology from content-capture to terminal, including 8K stitching with 11th Gen Intel® Core™ processors and a video IP network powered by Intel® Tofino™ Ethernet switches.

To create an extraordinary viewing experience, the live 180-degree VR production included up to six content-capture devices shooting at 8K 60fps, 8K graphics, and integrated broadcast audio and video. The 8K encoders and 8K cloud transcode were powered by Intel® Xeon® processors, providing optimal performance with Intel® SVT HEVC encoding library.

Additional feature production using 360-degree content-capture devices shooting in 8K provided on-demand coverage throughout the Olympic Winter Games. With the power and performance of Intel® processors and technology, live and on-demand videos were encoded as “tiled” video

streams based on the omnidirectional media format (OMAF). This encoding format enables delivery of ultrahigh-resolution 8K video streams to viewers' headsets with maximum efficiency and at global scale.

Intel processors and technology were used in features recorded before the Olympic Winter Games, livestreaming of the Opening and Closing Ceremonies and marquee sports (ice hockey, curling, figure skating, short track speed skating, freestyle skiing, and snowboarding), cutting-edge video-on-demand coverage, and three concurrent virtual backdrop feeds.

Benefits

World's first fully produced 8K livestream to global viewers provided to broadcasters for global audiences

Highest resolution possible on modern VR headsets—also available on web and mobile

Highly efficient media processing and encoding capabilities

End-to-end solution powered by Intel® processors includes capture, production, and distribution

5G Broadcast Powered by Intel® Technology

Enabling broadcast of live events worldwide with 5G technology

Benefits

Faster deployments without cabling and with reduced footprint

Greater flexibility in placement with wireless content-capture devices

Reduced costs

New opportunities for real-time streaming

For the first time at the Olympic and Paralympic Games, live sports events were transmitted over a 5G network powered by Intel® processors. Intel and its partners China Unicom and Olympic Broadcasting Services (OBS) teamed up to capture and transmit the events at ultralow latency.

In a successful pilot project at the Olympic Games Tokyo 2020, a 5G network was used to transmit nonlive event coverage. At the Olympic Winter Games Beijing 2022, a 5G network was again used for nonlive events, including figure skating, as well as for live sports events, including cross-country skiing, alpine skiing, and curling. The events were captured and transmitted at latencies equivalent to those of fiber-connected content capture devices.

The 5G content capture devices were powered by Intel® Celeron® processors and Intel® Arria® 10 Field Programmable Gate Arrays (Intel® FPGAs). Edge computing power was supplied by third generation Intel® Xeon® Scalable processors, which provided the high bandwidth and low latency necessary to compete with traditional wired content capture devices.

The live content was transmitted over China Unicom's 5G network, and OBS subsequently made the feeds available to Rights Holding Broadcasters (RHBs) for worldwide distribution.

Venue Simulation System (VSS)

3D models help event managers and broadcasters plan more efficiently

For the Olympic and Paralympic Winter Games Beijing 2022, 3D models were used as a standard method to plan events at 15 venues.

The Intel-powered Venue Simulation System (VSS), a 3D modeling simulation platform, enabled broadcasters and event managers to visualize venue interiors and exteriors and create detailed event plans in the weeks leading up to the Olympic Winter Games. By eliminating the need for personnel to travel to venues in person, VSS can significantly reduce the time and costs of event planning.

The VSS solution, deployed by Intel partner VORLID, relies on Intel® Xeon® processor-based servers and Intel® Graphics Processing Units (Intel® GPUs) to create 3D models of venue interiors and exteriors. The content can be viewed and edited on PCs or streamed smoothly over the cloud for broad distribution.

In the two weeks after the Olympic Winter Games, VSS was used to plan the transition to the Paralympic Winter Games. The solution made it possible to visualize different routes between locations and identify accessibility challenges, such as where ramps were needed for athletes with wheelchairs.

3D Models are a key building block of Intel's digital twin vision. Digital twins are virtual models of processes, products, and services that allow for data analysis and system monitoring to prevent problems before they occur. The successful deployment of VSS at the Olympic Winter Games illustrates the potential of digital twins to be used for crowd control, COVID-19 mitigation, and revenue-generating opportunities.

VSS use case examples

BROADCASTING

Placement of content-capture devices

Types of content-capture devices and lenses needed

Optimal cabling routes

SECURITY

Placement of security content-capture devices

Number and placement of security personnel

INDOOR FUNCTIONAL SPACE PLANNING

Placement of content-capture devices

Optimal cabling routes

Keeping an eye on bus fleets and driver performance

Launched in 1999, Mobileye believes that vision-safety technology will make our roads safer, reduce traffic congestion, and save lives. Mobileye has developed a range of software products deployed on a proprietary family of computer chips called EyeQ®.

At the Olympic Winter Games Beijing 2022, 569 buses were outfitted with one of two Mobileye solutions. The first, Shield+™, features one front-facing content-capture device and two others on the sides of the buses. Using computer vision and artificial intelligence (AI), the devices spot and identify nearby objects (pedestrians, bicycles, etc.), calculate how far each potential hazard is from the bus, and alert drivers of dangerous situations. The other solution, ME8, which was also deployed at the Olympic Games Tokyo 2020, features only the front-facing content-capture device.

For Beijing 2022, Mobileye's Fleet Management Telematics System was deployed for the first time at an Olympic Games for bus operations. The customized platform, integrated with the Olympic Transportation Control system, enabled bus operators to collect information about driver habits, such as speeding and crossing the center line. The data could then be used to evaluate driver performance and inform training and other corrective measures.

Benefits

High refresh rate:

Frequent, recurring surveys of road network and infrastructure to keep asset data up to date

Automated, fast, and mobile collection:

Fully automated, fast data collection through moving sensors

Objective and consistent inventory:

No human intervention for real, reliable inventory data across the entire road network

Data-informed driver training:

Easily identify which drivers could benefit from extra training and which might be rewarded for safe driving

Virtual OB Van

Making live broadcasts less expensive and more scalable

Traditionally, live media productions are expensive and difficult to scale, in part because outside broadcasting (OB) vans and flight packs rely on proprietary hardware and software solutions. The proof of concept at the Olympic Winter Games Beijing 2022 provided greater flexibility at a lower cost.

The proof of concept was run throughout the two-week curling competition. Olympic Broadcasting Services (OBS) ran media production applications in a virtualized environment across production pillars, including switching, routing, and replay.

Using Intel® reference architecture, the applications were optimized to run cost-efficiently on a common base platform featuring commercial off-the-shelf (COTS) Intel® hardware powered by Intel® Xeon® Scalable processors. The solution also featured Intel® Network Interface Cards, Intel® Field Programmable Gate Arrays (Intel® FPGAs), Intel® Optane™ memory, and Intel® Ethernet switches.

OBS set up and operated the virtual OB van in Beijing in parallel with the existing broadcast infrastructure. After establishing the solution's stability and viability, the product could scale to other live media productions worldwide. The eventual goal is for the full solution to be migrated to the cloud.

Benefits

REDUCED COST:
Reduce capital and operational expenses

FLEXIBILITY: Gain flexibility on workload deployment and vendor choice with a common platform

SINGLE NETWORK FOR CONTROL:
Consolidate control and streaming on the same physical network

REDUNDANCY: N+1 redundancy reduces costs and physical footprint

SCALABILITY: Scale quickly, at low cost

UNIFIED PLATFORMS: Simplify deployment and maintenance across business infrastructure

Intel® 3D Athlete Tracking Technology

Unlocking new opportunities in arts and entertainment

Intel® 3D Athlete Tracking (Intel® 3DAT) technology can be used to create stunning artistic displays, as demonstrated at the Opening Ceremony and the figure skating exhibition gala at the Olympic Winter Games Beijing 2022.

At the Opening Ceremony, Intel 3DAT technology and edge computing systems powered by 3rd Gen Intel® Xeon® Scalable processors were used to create two interactive programs in which snowflakes and other virtual elements interacted in near-real time with hundreds of performers.

In another innovative use case, Intel 3DAT technology was used to create an artistic, lifelike animation at the popular figure skating exhibition gala. Before the Olympic Winter Games, Intel 3DAT technology captured the skeletal points of figure skaters. Digital artists working on laptops based on the Intel® Evo™ platform used the skeletal models and data to create the one-minute animation, which was viewed by millions of people worldwide.

The deployments in Beijing took advantage of the Intel 3DAT software development toolkit (SDK), which is designed to enable developers to extract over 2,000 metrics related to human mechanics using 2D or 3D motion data gathered from one to eight cameras. To run AI models at optimal performance to cost, the platform is optimized using the Intel® Distribution of OpenVINO™ toolkit to take advantage of Intel® Xeon® processors.

The production-ready SDK runs in the cloud or at the edge, so developers can easily integrate AI models and metrics into applications for a wide range of verticals, including not only sports and fitness but also healthcare, entertainment, and broadcasting.

Benefits

Production-ready solution

Available in the cloud
or on the edge

Easy-to-use SDK

Run AI models at low cost to performance
with Intel® Xeon® processors

Learn more about Intel use cases at Beijing 2022

Learn more 

8K Virtual Reality

Learn more 

5G Broadcast Powered by Intel® Technology

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Venue Simulation System (VSS)

Learn more 

Mobileye, an Intel Company

Learn more 

Virtual OB Van

Learn more 

Intel® 3D Athlete Tracking Technology

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