Real-time eXtended Reality Multimedia

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Overview

What is Real-time eXtended Reality Multimedia?

RXRM offers 360° video and 3D spatial audio delivered with near-zero latency for new and existing use cases in industrial, entertainment and commercial areas.

Increase the accuracy of what you see and hear – and the speed at which you experience it – with a level of immersion that optimizes the user experience and improves efficiency.

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Key benefits

Enhanced high-quality real-time situational awareness to improve operational efficiency, employee safety and productivity

Multi-screen user experience including immersive HMD solution

Mobile capability; constant video stream over wireless connectivity (even when cameras move between cells)

Features

Reduced bandwidth needs by as much as 90% (compared with traditional 360° - video setup)
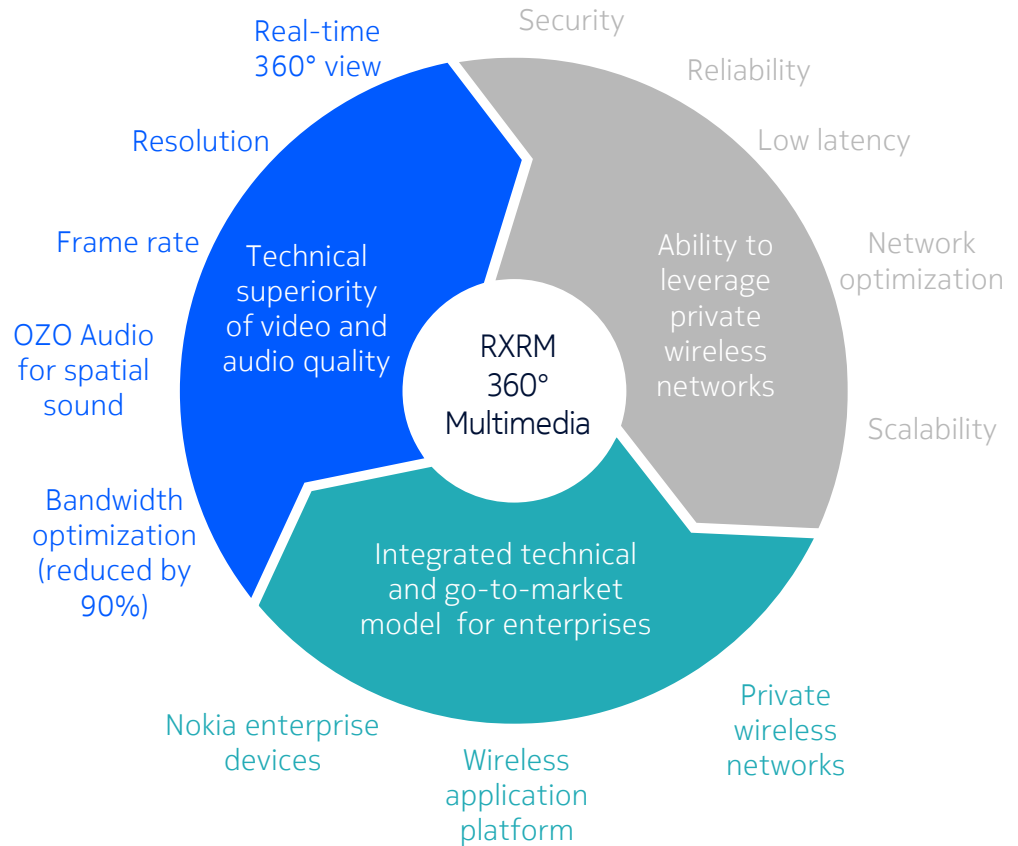
Multiple 360° streams from same video and audio to different devices

Flexible setup that scales depending on your needs. Add new cameras & microphones and new users

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What RXRM brings to enterprises

RXRM opens up the possibilities of 360° video and audio capture to industrial and commercial applications.

Increase the accuracy of what you see and hear – and the speed at which you experience it – with a level of immersion that optimizes the user experience and improves efficiency.

Real-time 360° view

Security

Reliability

Resolution

Low latency

Frame rate

Technical superiority of video and audio quality

Network optimization

OZO Audio for spatial sound

RXRM 360° Multimedia

Ability to leverage private wireless networks

Bandwidth optimization (reduced by 90%)

Integrated technical and go-to-market model for enterprises

Scalability

Nokia enterprise devices

Private wireless networks

Wireless application platform

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How RXRM compares with traditional video setups

Truly mobile: Portable 5G-enabled cameras and microphones can be placed on vehicles, drones and robots, or can be carried by the user.

Spatial experience: 3D head-mounted displays afford a fully immersive experience with authentic situational awareness.

Cost savings: Multiple simultaneous users (including those on traditional screens).

Unparalleled accuracy: Low latency and increased clarity.

Optimized for wireless: For 5G and beyond.

Flexible architecture: Opportunity for local implementation, private or public cloud.
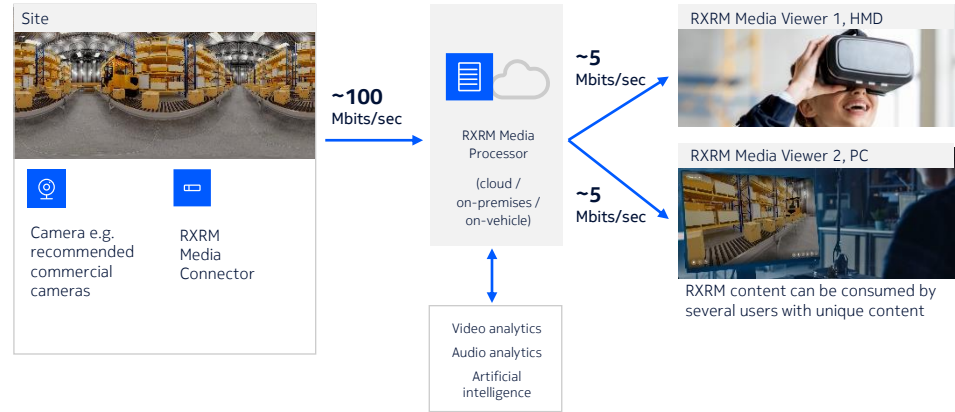
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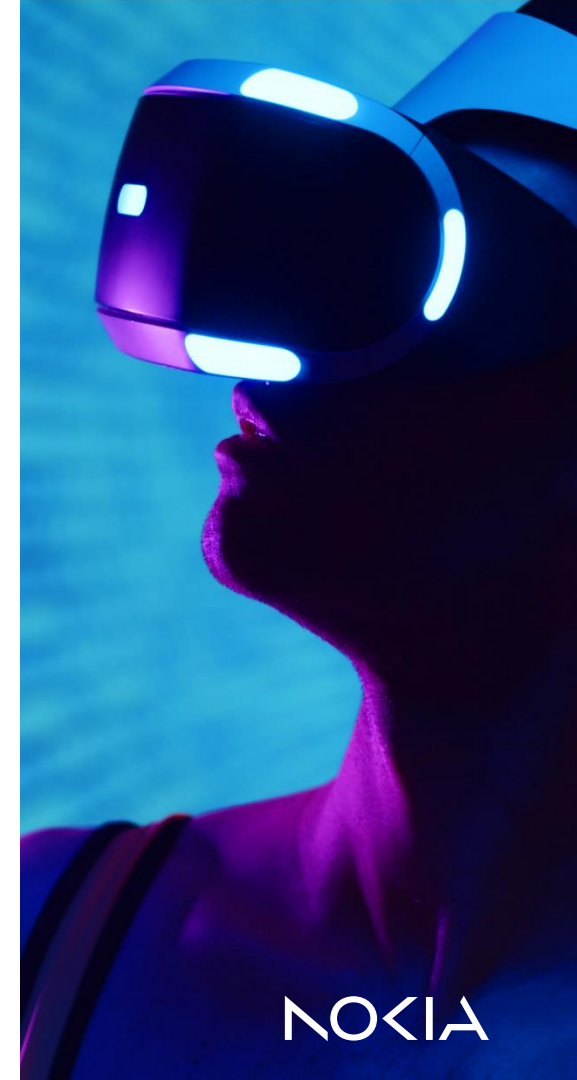
Real-time eXtended Reality Multimedia RXRM

Increase the accuracy and speed of what you see - and hear - to a fraction of a second

RXRM is a software solution that opens up the possibilities of 360° video and audio capture to industrial and commercial applications. With RXRM, enterprise can drive further efficiencies, improve productivity and employee safety, and harness new revenue streams.

Technical superiority of video and audio quality:

- Truly wireless and mobile experience
- Real-time 360° view
- Very low latency
- Resolution up to 8K
- Frame rate up to 60 fps
- Bandwidth optimization of 360°-video (reduced up to 90%)
- OZO spatial audio for industrial sensing

Site

Camera e.g. recommended commercial cameras

RXRM Media Connector

~100 Mbits/sec

RXRM Media Processor

(cloud / on-premises / on-vehicle)

Video analytics
Audio analytics
Artificial intelligence

~5 Mbits/sec

~5 Mbits/sec

RXRM Media Viewer 1, HMD

RXRM Media Viewer 2, PC

RXRM content can be consumed by several users with unique content

Industrial use cases: Situational awareness, remote technical support, safety and security, industrial automation and teleoperations
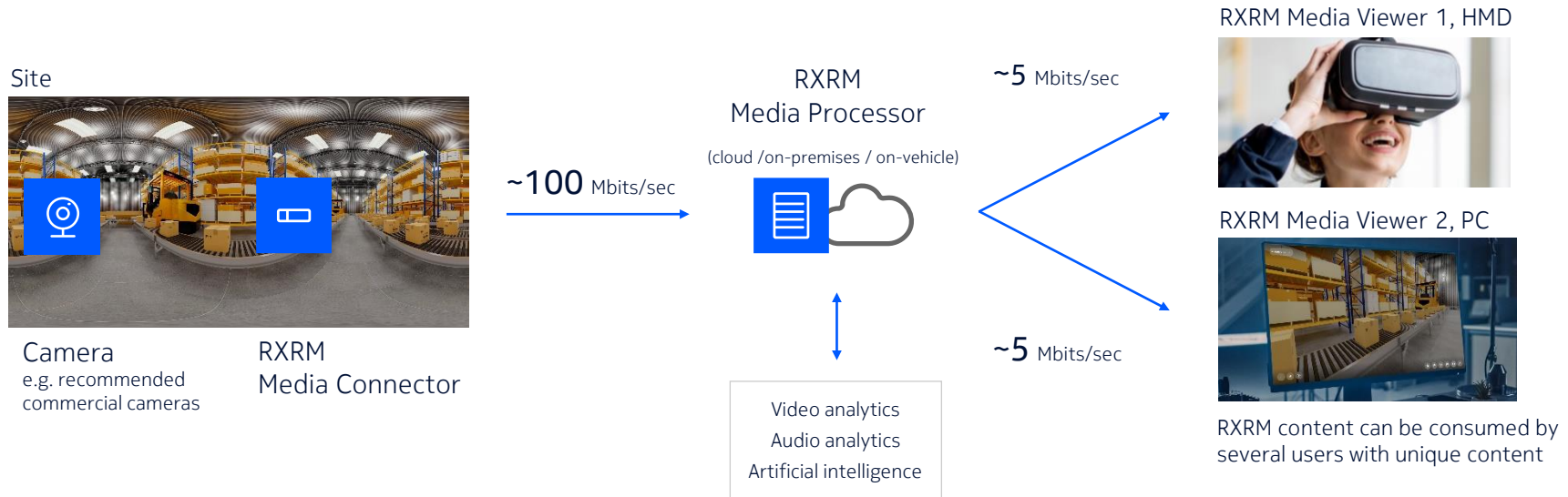
Entertainment use cases: Immersive media experience at event venues, media broadcasting to remote participants

Allows both fully local deployment and cloud based, multitenant services
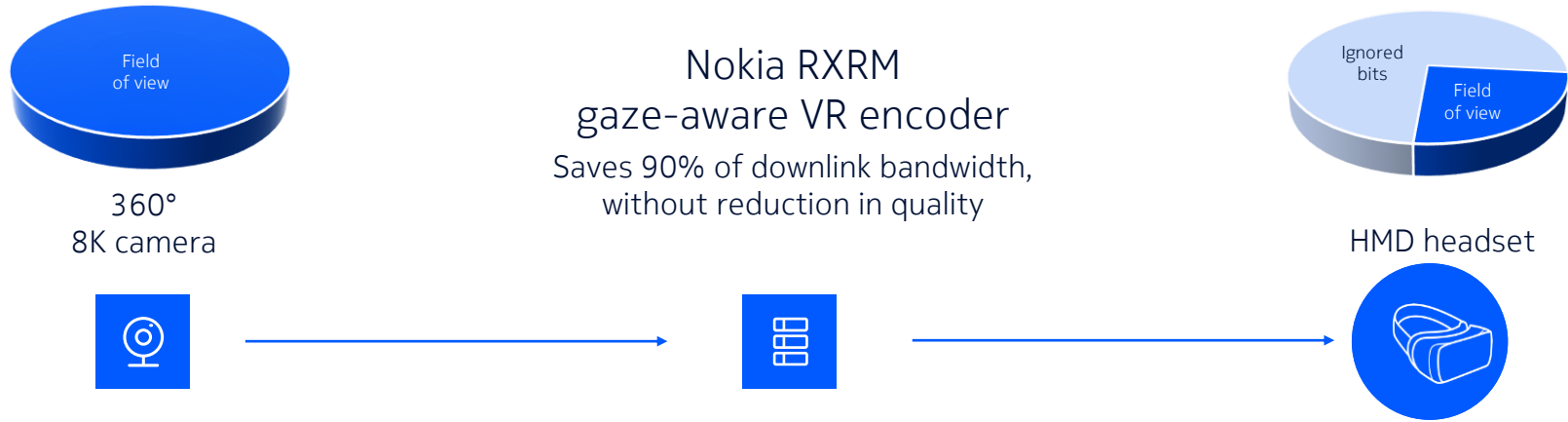
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How RXRM works

Real-time low-delay XR multimedia delivery with bandwidth optimization.

By only streaming the part of the 360° video that is visible to the viewer,
bandwidth requirements are reduced by up to 90% – for very low latency and no loss in quality.

RXRM Media Viewer 1, HMD

Site

Camera
e.g. recommended
commercial cameras

RXRM
Media Connector

~100 Mbits/sec

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(cloud /on-premises / on-vehicle)

Video analytics
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~5 Mbits/sec

RXRM Media Viewer 2, PC

RXRM content can be consumed by
several users with unique content

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How RXRM works

Field
of view

360°
8K camera

Nokia RXRM
gaze-aware VR encoder

Saves 90% of downlink bandwidth,
without reduction in quality

Ignored
bits

Field
of view

HMD headset

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Open API
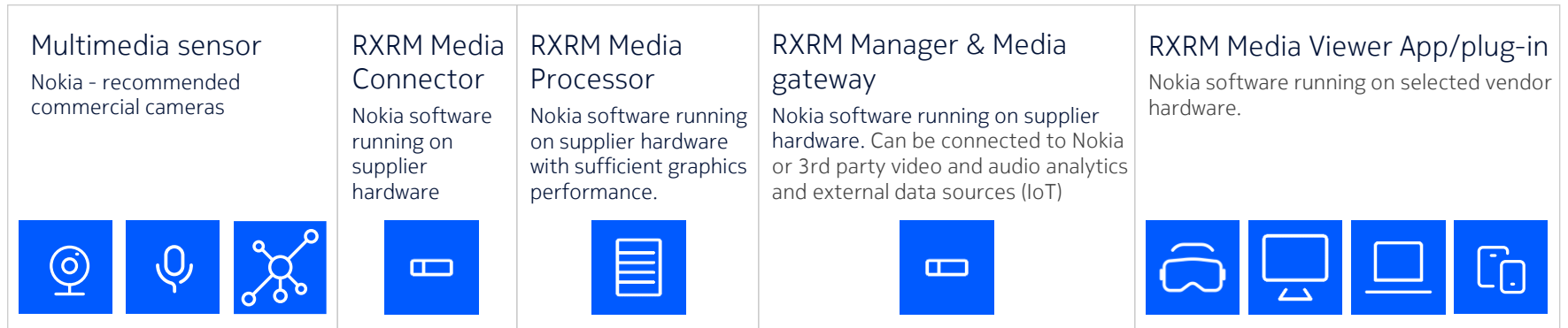
Integrating multimedia streams in a complex world

RXRM is open to third-party APIs, enabling different software systems and applications to communicate and integrate with RXRM. These systems include, for example, video and audio analytics, IoT data collection systems, and digital-twin solutions.

RXRM provides multimedia streams that can be consumed by third-party solutions. Information from these systems can then be utilized and visualized for the end user as overlays on top of a multimedia stream.

Software Architecture complies with existing infrastructure

Scalable architecture optimizes media delivery by bandwidth-efficient streaming.
It provides interfaces for easy integration of XR media, analytics and business workflows of the enterprise.

Multimedia sensor	RXRM Media Connector	RXRM Media Processor	RXRM Manager & Media gateway	RXRM Media Viewer App/plug-in
Nokia - recommended commercial cameras	Nokia software running on supplier hardware	Nokia software running on supplier hardware with sufficient graphics performance.	Nokia software running on supplier hardware. Can be connected to Nokia or 3rd party video and audio analytics and external data sources (IoT)	Nokia software running on selected vendor hardware.

Low-latency connectivity (LAN, 5G, LTE, WIFI) or TelCo network

Enterprise business workflow Integration (web services and APIs provided by customer, partners and RXRM)

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Spatial audio

Hear the difference in your processes

Spatial audio allows a remote operator or expert to distinguish the direction from which different sound sources originate. This allows, for example, teleoperation of equipment or accurate technical remote assistance.
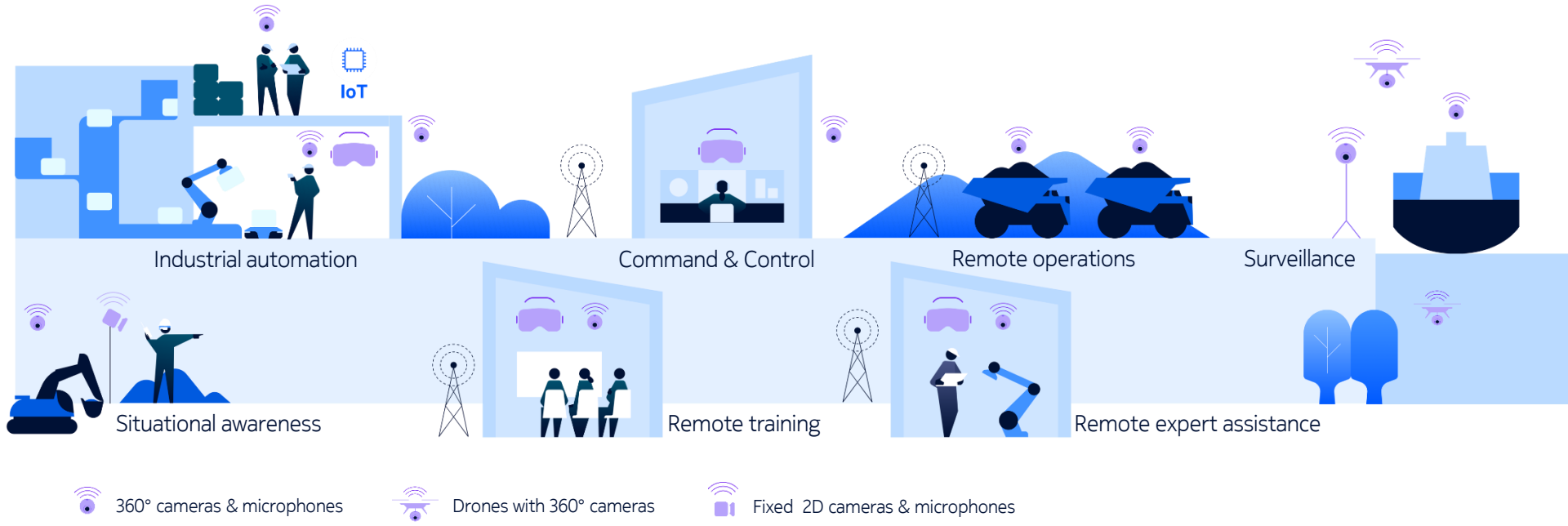
High-quality audio also enables accurate remote condition monitoring of equipment or remote quality inspection, based on sound in addition to video.

Audio from RXRM can be used for audio analytics that contribute to automated industrial processes, such as predictive maintenance.

Where RXRM is used

Any environment that can benefit from 360° multimedia streaming and spatial computing for operational efficiency, situational awareness and remote presence.

Industrial automation

Command & Control

Remote operations

Surveillance

Situational awareness

Remote training

Remote expert assistance

360° cameras & microphones

Drones with 360° cameras

Fixed 2D cameras & microphones

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What's new in RXRM v1.1

New UI experience, IoT data, recording and playback

- Standalone application with full user interface for multimedia consumption – user-friendly way to view 360° video and IoT content and experience 3D audio

- Visual overlays on top of the video stream. For example, sensor values from industrial automation systems for greater situational awareness

- Integrations to additional media sources, including IoT data and video-analytics solutions

- Recording and playback makes it possible to the track the causes of quality issues or safety risks.

- Permission and access control

- HMD application – support for Pico HMD

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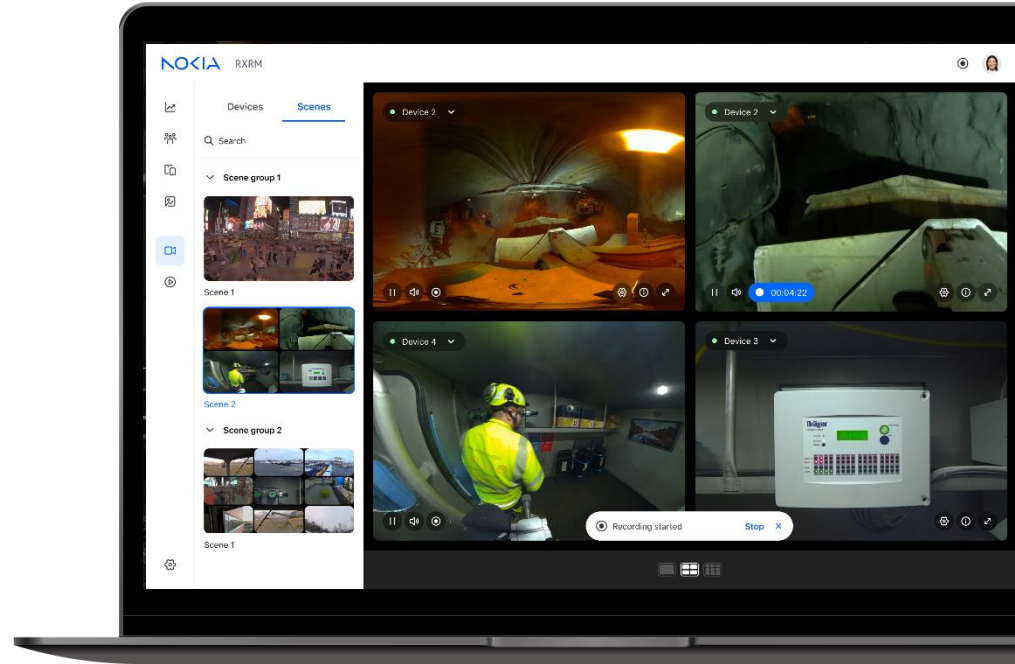
General RXRM use cases

RXRM's ability to increase efficiency and improve the user experience spans a broad range of use cases and industries.

If you think 360° live streaming and 3D audio could benefit a particular use case, then you're likely on the right track

Please contact us to explore how to make it a reality.

↓ Teleoperation

↓ Industrial monitoring

↓ Situational awareness

↓ Remote expert assistance

↓ Remote technical training

↓ Anomaly detection

↓ Digital Twinning

↓ Remote customer support

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Teleoperation

Safer working environments with remote control

Fully remote operation is enabled by the 360° video streaming and spatial audio delivered with ultra-low latency. This means machine operators can distance themselves from potentially hazardous or hard-to-reach locations, while still maintaining control.

Vehicles and machinery can be controlled from a remote location through instant and continuous dialogue with a local supervisor.

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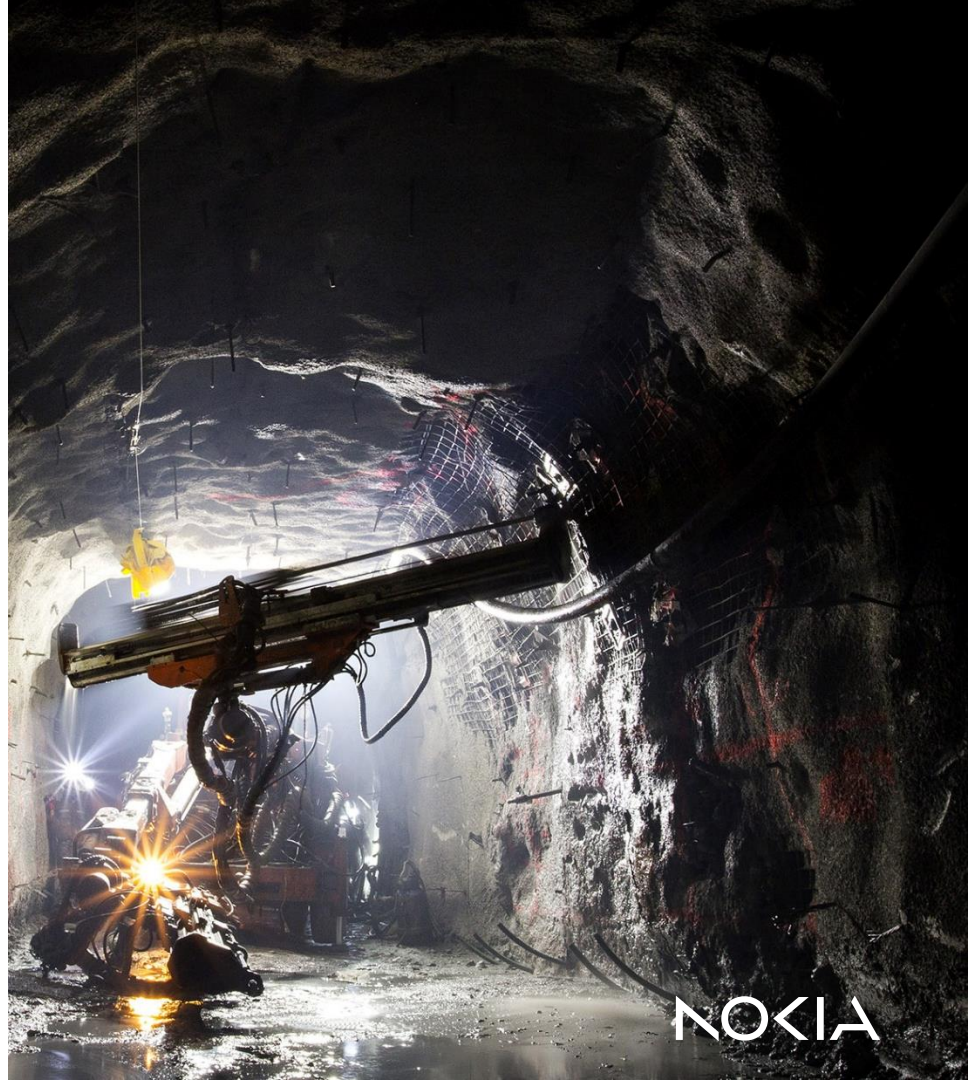
Industrial monitoring

Scalable multi-viewer access for a wide range of applications

Efficient 360° video delivery with minimal latency facilitates immediate responses in diverse scenarios – from single-view security to comprehensive monitoring of production plants and business parks. Video analytics enable functions such as vehicle/employee recognition, safety-zone monitoring and the detection of anomalies.

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Situational awareness

Immersive 3D experiences that enhance efficiency

When operating large machinery, a mere fraction of a millimetre adjustment on the control stick can be critical. Today's working world sees increasing use of remote operation, with new possibilities such as digital-twin technology propelling this shift. RXRM's near-zero latency is essential in providing unparalleled control.

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Remote expert assistance

World-leading expertise in seconds – wherever you are

Industrial environments are filled with complex systems, each requiring specialist technical knowledge. Having the right person physically available isn't always possible across large operating environments, which is why RXRM can prove invaluable.

Near-zero latency ensures real-time responses, allowing expert advice to be implemented without unnecessary travel time or additional costs.
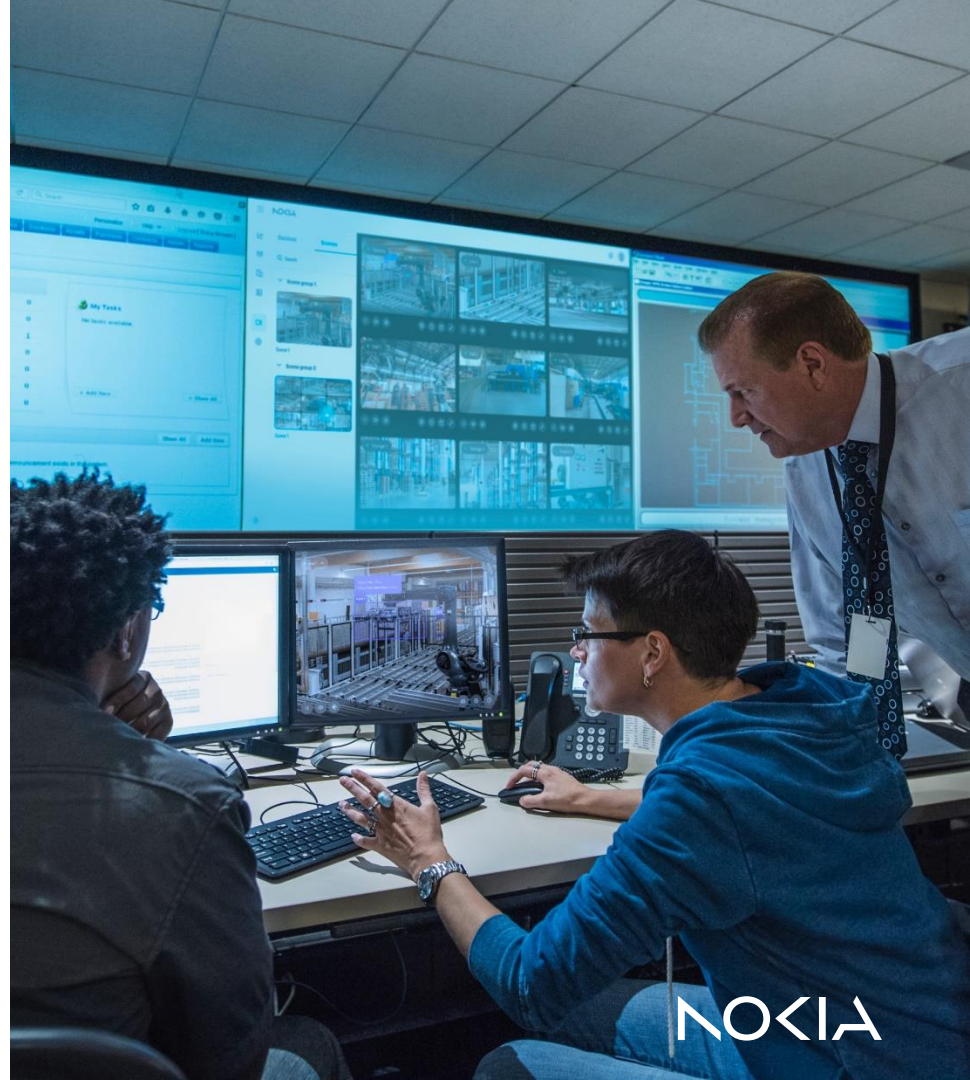
Remote technical training

Timely and cost-effective remote technical support

Remote technical training allows equipment vendors to maximize their customers' return on investment in a mutually beneficial manner. Vendors avoid unnecessary travel costs in sending experts out to customer sites for training sessions. Customers can swiftly and seamlessly implement newly purchased tools and applications, thanks to the technical instructor's increased time efficiency.

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Anomaly detection

Identify issues faster than the human eye

Within quality control processes, 360° video and 3D audio can function semi-automatically. RXRM enables video analytics to be monitored by data systems that can then alert a person when any anomalies or irregularities are detected.

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Digital twinning

Immersive 3D experiences that enhance efficiency

RXRM's 360° video and 3D spatial audio provide the platform that enables the creation of immersive experiences, replicating real-world environments in remote locations.

By integrating XR capabilities into product modelling and design processes, individuals can interact directly and easily without the need to be physically present – saving time and reducing travel costs.

Remote customer support

Better customer service with less resources

Equipment vendors can offer an enhanced level of aftercare to customers through remote maintenance and customer support. This approach results in savings on travel costs and accelerates response times, ensuring customers receive swift and specialized assistance.

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