



Enhancing experience with 5G edge computing platform by leveraging OpenNESS

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Agenda

- 1 Challenges in managing experience**
- 2 5G Architectural tenets towards quality estimate**
- 3 Wipro's solution approach**
- 4 Conclusion**

Challenges in managing experience

1. User expectations
2. Service provider challenges



User expectations

- Immersive Experience
- Real time Interaction
- Buffer-free Experience
- Downloading larger files faster

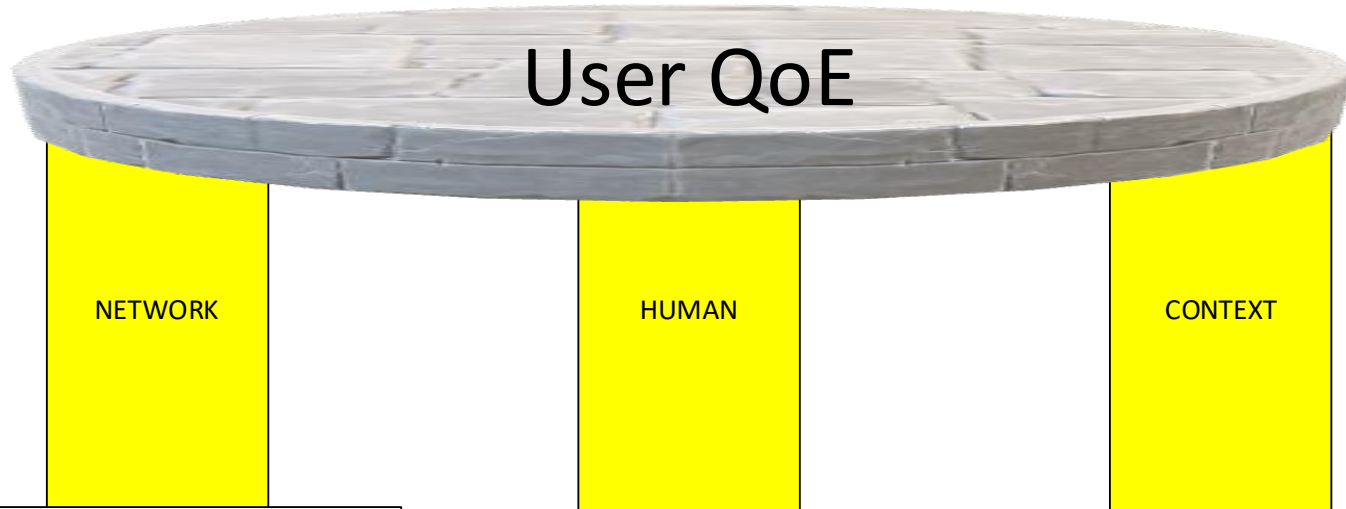
Service provider challenges

- Application servers hosted on the Cloud
- Bandwidth intensive multimedia sessions congesting the backhaul network
- Network used as a mere transport pipe with no service intelligence

Challenges in delivering latency sensitive applications

- Distance between client and server
- Network traffic conditions outside the control of the service provider

Characterizing QoE



NETWORK

- QoS, GoS
- User mobility
- Transient loss of connectivity
- Session establishment delay
- Accessibility & Coverage
- Device battery consumption
- Security & Privacy
- Network heterogeneity

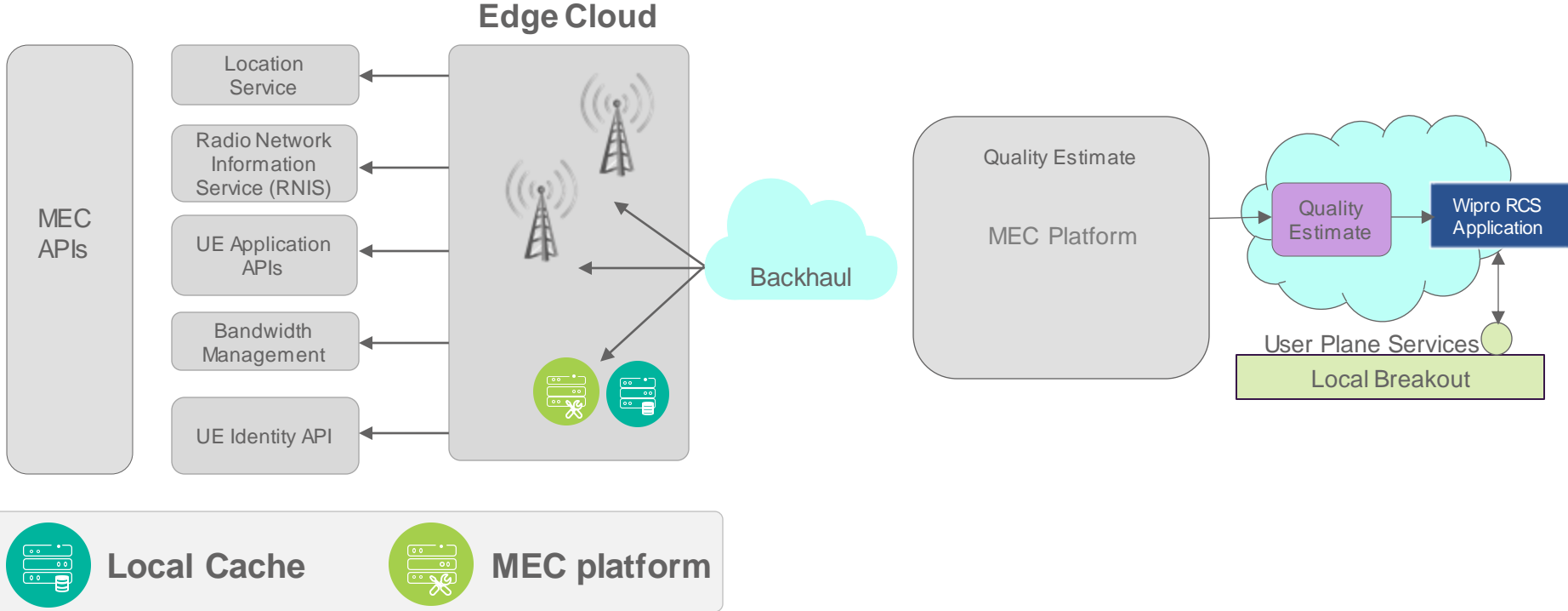
HUMAN

- Realization and Perception – Sound/ Image
- Interpretation, reasoning, judgment, information processing
- Experiences and Expectations
- Influenced by the spatiotemporal environment

CONTEXT

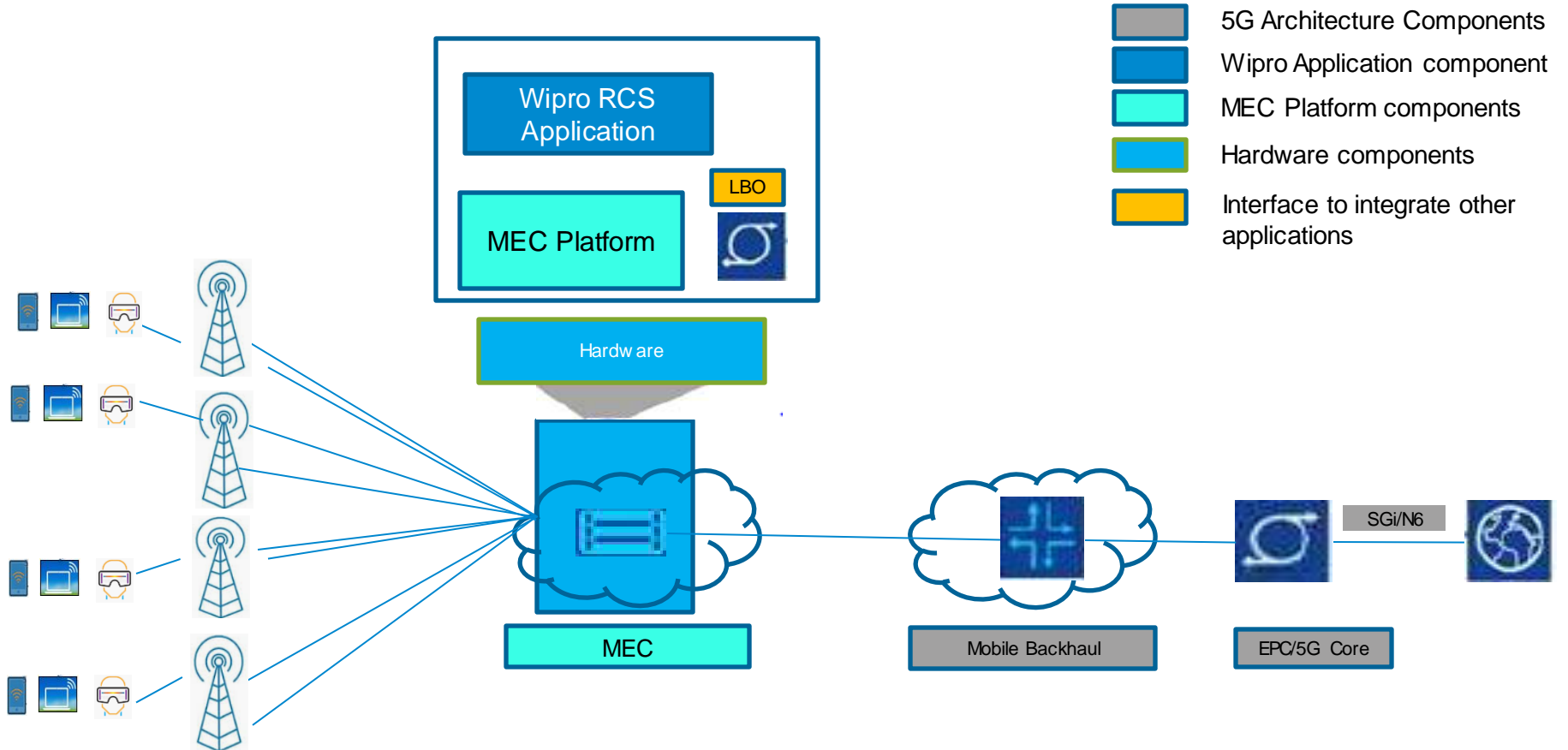
- Device type & capabilities
- Quality assurance guarantees
- Location
- HW & SW, OS
- Ease of services setup
- Customer Care
- SLA

5G Architectural Tenets for Improving User Experience

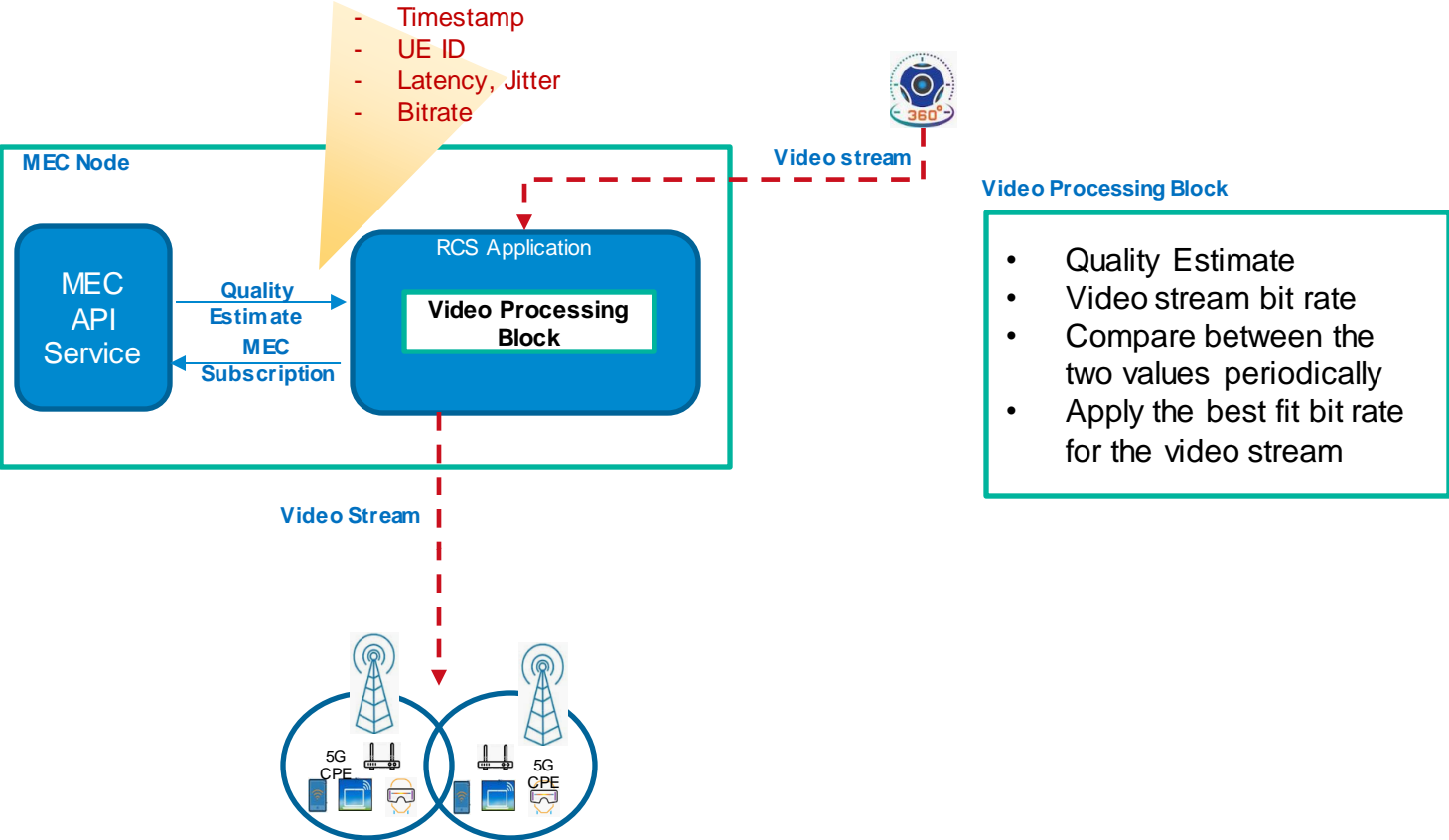


Note: Based on ETSI MEC standard

MEC Deployment Topology with Wipro RCS application



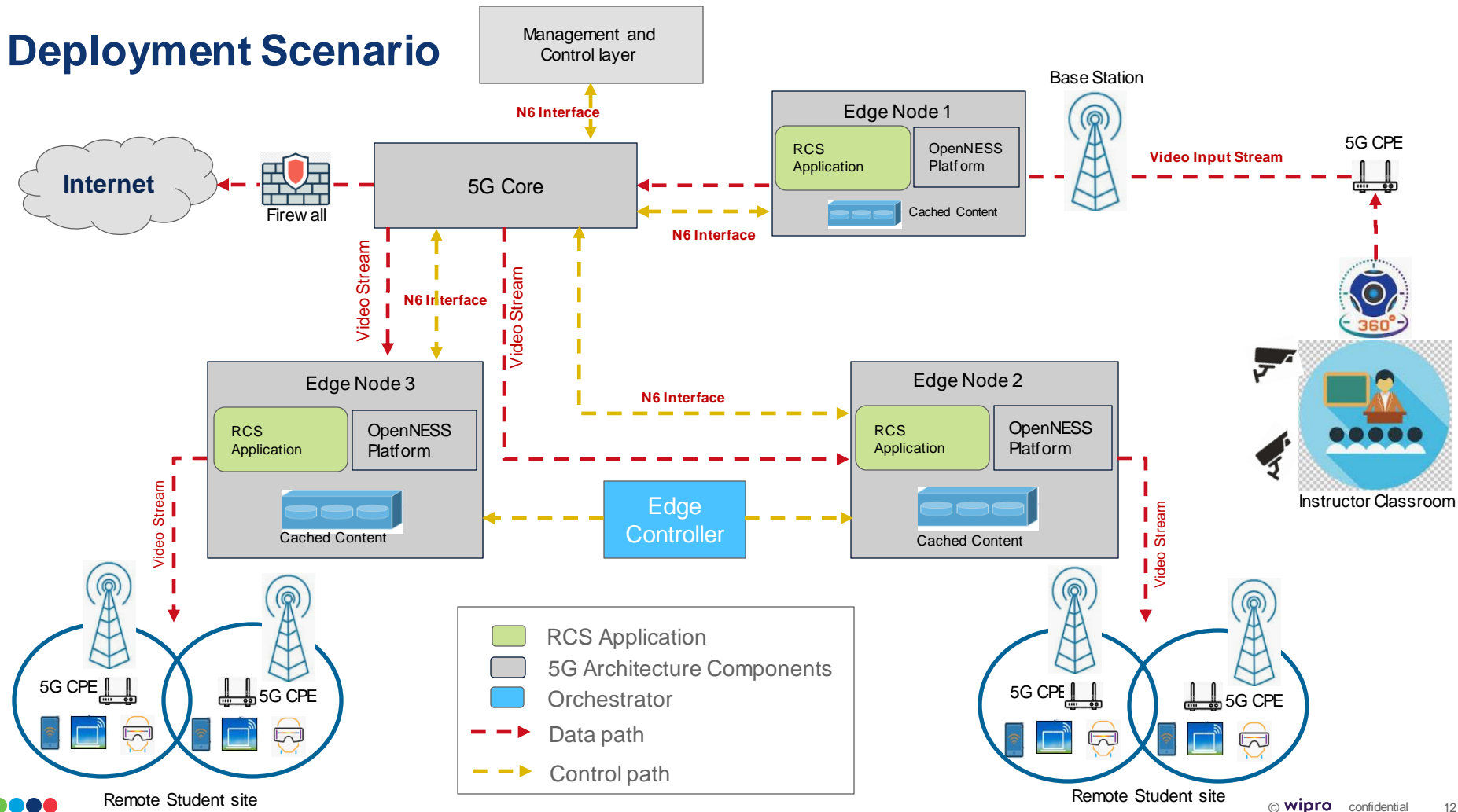
Leveraging quality analytics to enhance RCS application performance



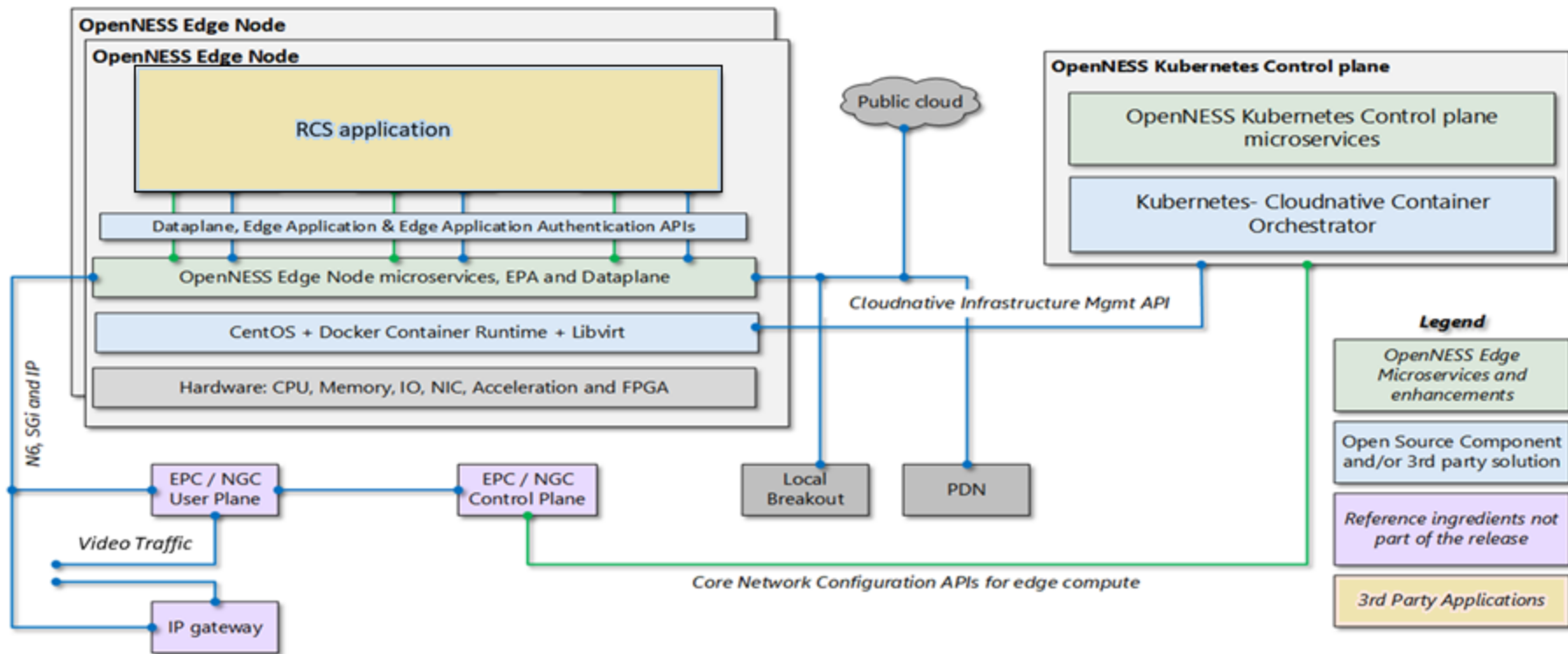
RCS application approach

- For each user session –
 - RCS application subscribes to quality estimate function from the MEC
 - The time stamp and the quality estimation parameters are stored in database.
- A video manipulation engine converts the video stream into a compatible format.
- Adaptive Bit Rate (ABR) is calculated for the video stream.
- This value is sent back to Video processing block
- Video processing block renders the video to the end user.

Deployment Scenario



Reference Architecture of Intel OpenNESS with Wipro's RCS application



Value Add and Key Features of Wipro RCS application

360 degree live streaming to VR Headset

Effort and cost saving on media manipulation

- No requirement of a media player application at the receiver.
- Wipro's solution is agnostic to VR headset.
- Intelligence built into the Edge without using online services for media manipulation

Viable solution for price sensitive markets

Scalability of remote classroom experience from VR to phones

- Immersive Experience without the need of VR Headsets/360-degree cameras
- Generating immersive content by stitching of planar camera streams
- Selective stitching of video streams based on subscription

Content Caching at the Edge

Reduced network latency and improving redundancy

- Faster rendering of the video content to the user
- Real-time content archiving at the receiver Edge based on user request.

Real-time Augmentation

Improved learning experience with no impact to quality

- Content augmentation at the Edge node to enhance the learning of remote students with dynamic content support

Network Optimization

Reducing bandwidth needs for content transport

- Immersive content generation at the consuming Edge to save backhaul network consumption

Real-time interaction

Engaging experience through video conferencing

- Video conferencing feature where registered teacher/students have voice/video/text-based interaction

Wipro RCS Demo

References

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Demystifying Quality of Experience: Getting Inside your Customer's Head

<https://www.wipro.com/engineeringNXT/demystifying-quality-of-experience--getting-inside-your-customer/>

Quality of Experience Management in Mobile Cellular Networks: Key Issues and Design Challenges

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Conclusion

- A solution to provide enhanced learning experience
- Seamless 360 degree live content streaming
- Video analytics offloaded to edge compute nodes
- Orchestration can be leveraged to replicate the solution and scale it across multiple edge instances
- Fast, immersive and easy learning environment for students at remote locations