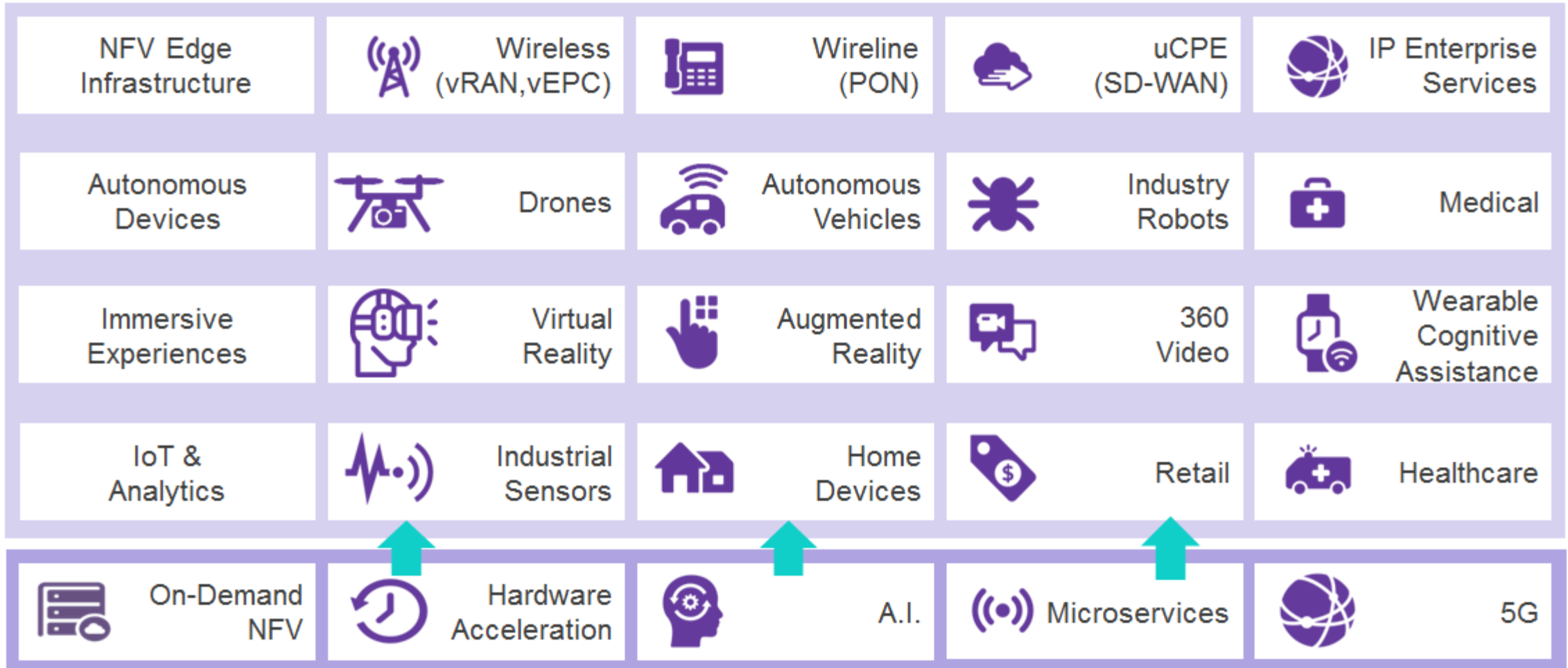# Radisys

Akraino Use Case Proposal
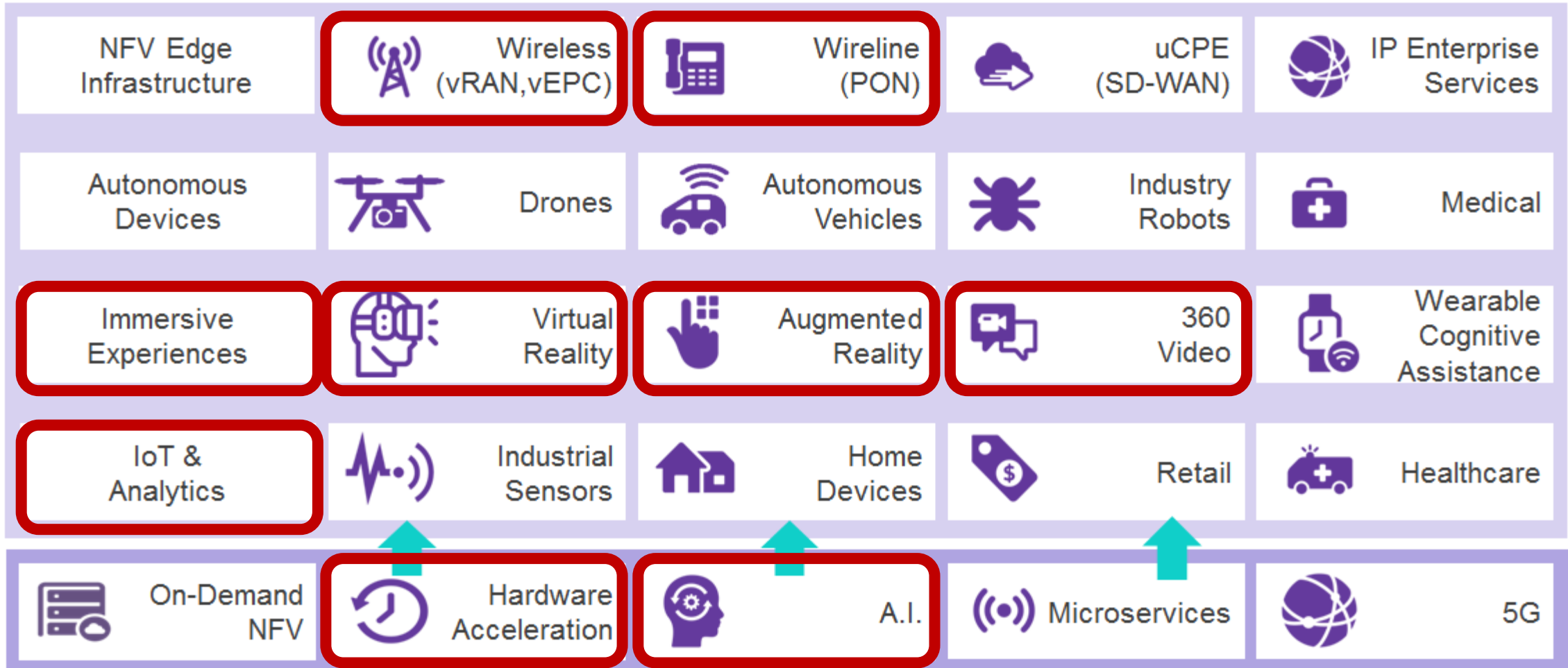
Edge Media Processing

Prakash Siva & Adnan Saleem

psiva@radisys.com,
asaleem@radisys.com

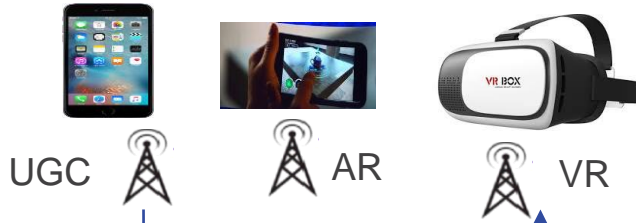**Ultra Low Latency & Backhaul Optimization**

Ultra Low Latency & Backhaul Optimization

UHD Multiparty

STB

Mobile & Wireline

UGC AR VR

IoT
CAT M1
VoLTE Video

Akraino Edge Stack

APIs

Real-time Edge Media Applications

Akraino POD

Local Content Store / Cache

Real-time Media Applications

1. *RAN Aware Bandwidth Optimization*
2. *Edge Video Conferencing*
3. *Media Transcoding & Adaptation*
4. *Video Analytics / Meta Data*
5. *Video Quality Metrics KPIs*
6. *User Generated Content Upload Optimization*
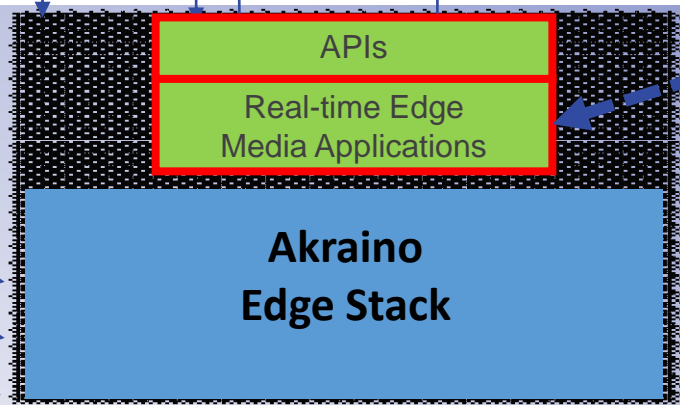7. *GPU Acceleration (4K, 8K) & AI / ML Analytics*

APIs

Core Media App

MOBILE BACKHUAL

Core Network

INTERNET
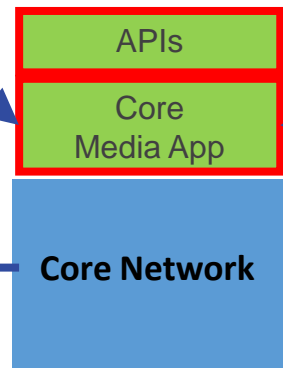
Pre-recorded or Live Content

Operator Content Store
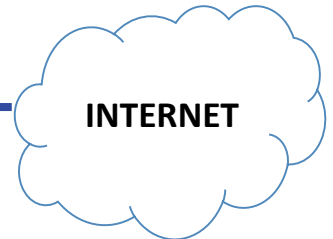
Public / Enterprise Content Store

Akraino POD
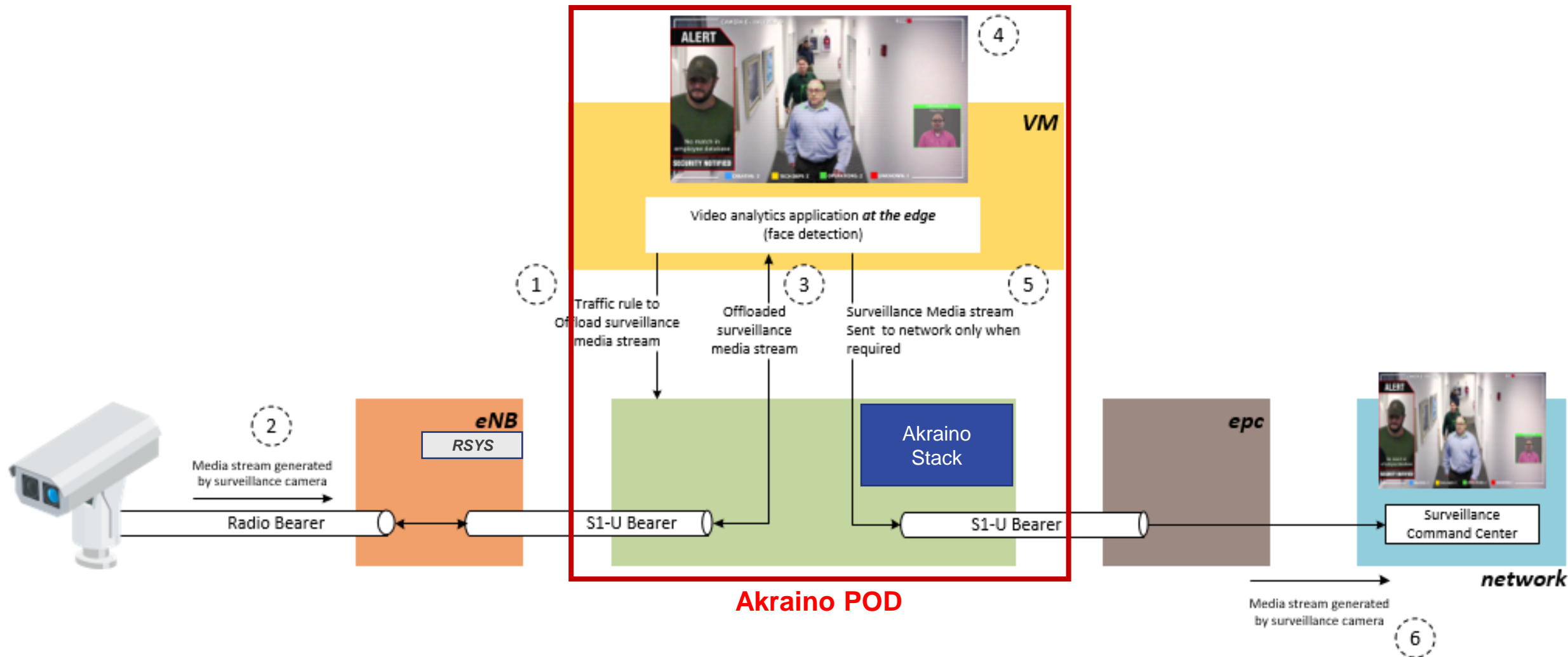
- Local Breakout @ Edge - *Backhaul savings* Continuous Surveillance Feeds
- *Real time traffic steering* on Intrusion Detection (eg: face anomaly detection) @ Feed to Core

Akraino POD
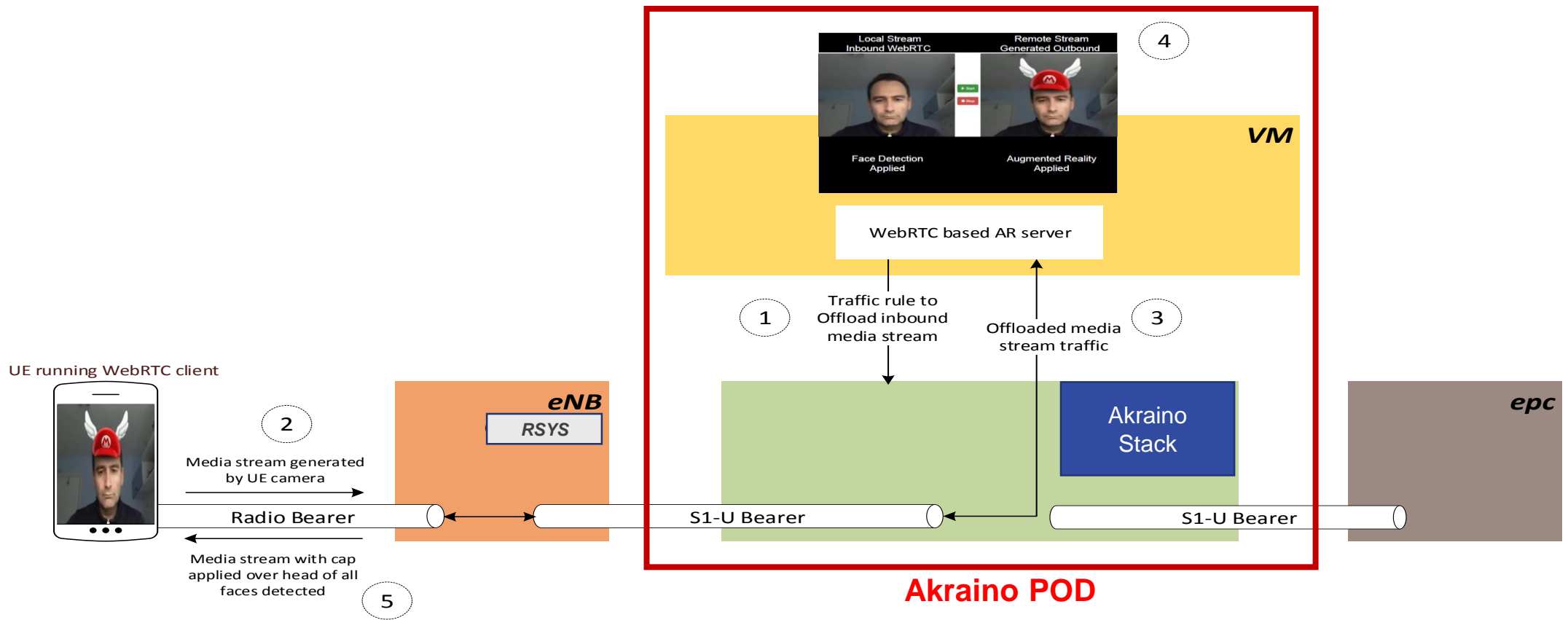
Backhaul Savings and URLLC

- *Differentiated media processing* (trans-rating) applied to ongoing user data stream based on *real time channel quality* reported by the MEC platform.

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Business Drivers

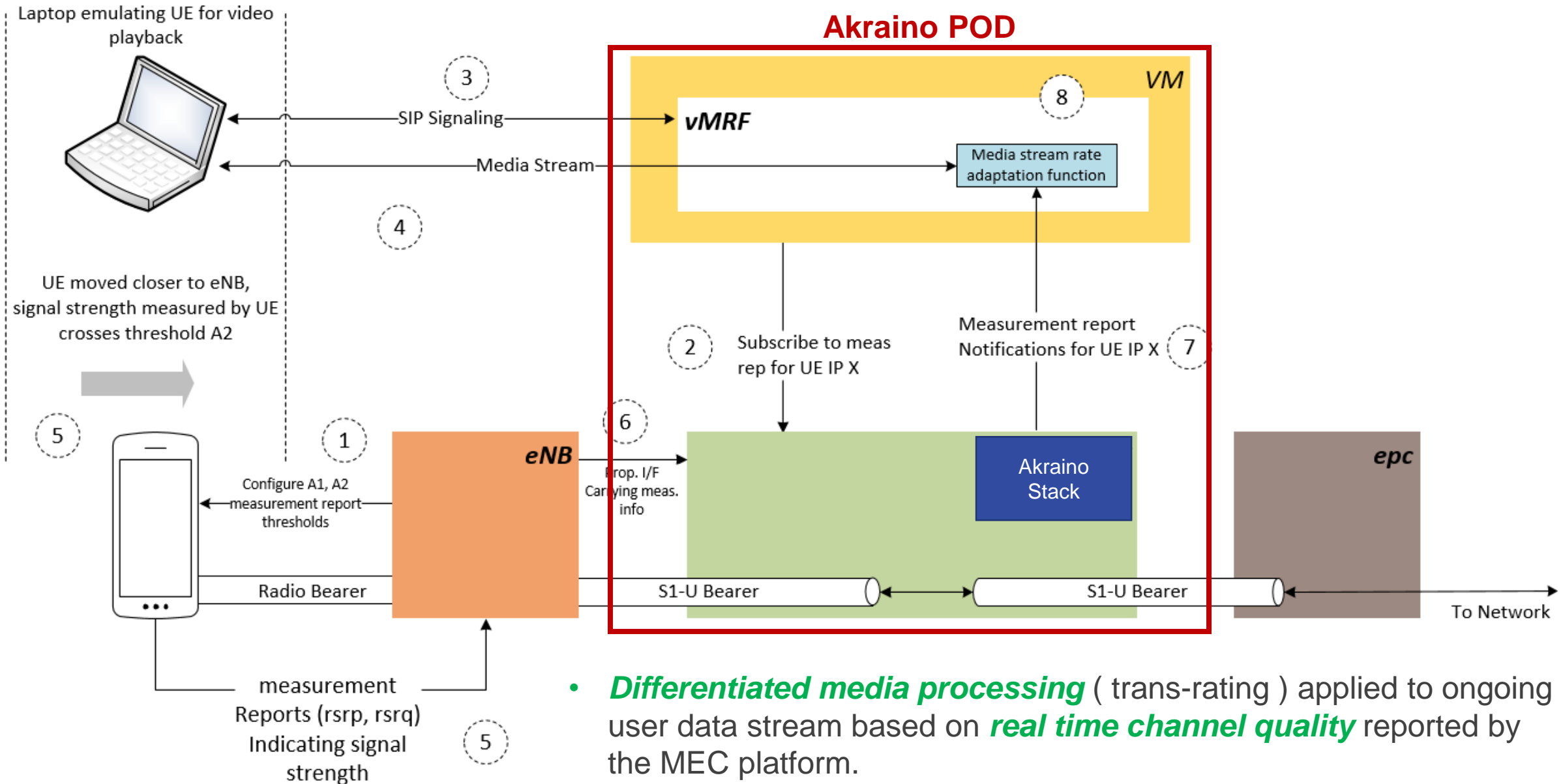| Use Case Characteristics	Network Cloud (Real Time Edge Media Applications)
Business Need	Enabling new applications requiring distributed edge deployments. Low Latency & Bandwidth Optimized Real Time Media Processing and Edge Media AI Analytics.
User Experience	HD and UHD real-time media content, contextual media processing, low latency Zero touch provisioning and automated remote deployments
Cost Of Solution	Low Cost with Virtualization and Open HW Range from small footprint SW solution to large scale deployments with HW acceleration for advanced high density AI based media processing
Scale	Highly Scalable Fully virtualized with low footprint (<4 compute servers) to high density for supporting large scale user services (100s of sites with optionally HW accelerated compute nodes)
Applications	Within the real time edge media processing and analytics (audio / video) domain Real time HD video processing / transcoding Augmented and Virtual Reality (BW optimized) IoT initiated audio and video stream processing / recording Media Analytics (AI and ML based), speech & video
Power restrictions	TBD

Attributes	Description	
Type	New	
Industry Sector	Telco Carrier Networks and Enterprises	
Business driver	Vast amounts of mobile/wireline data (predominantly video) is expected to continue to grow, particularly with 5G and IoT. Low latency, backhaul bandwidth restrictions/cost, and real time edge media analytics require media processing at network edges versus transporting all media to network core. Without the ability to process real time media at the network edges a number of new advanced applications would not be possible nor economically viable.	
Business use cases	1.Edge deployments at enterprises, entertainment venues, factory automation plants, public facilities where real time media processing required 2.Edge media applications include multi-party conferencing, gaming, surveillance, IoT generated content, AR and VR applications 3.Edge media applications requiring low latency and to overcome backhaul BW availability and costs being prohibitive 4.Real time media analytics with AI and ML based applications for high value and media monetization applications	
Business Cost - Initial Build Cost Target Objective	Initial build requires a small footprint POD with minimal fabric and management switch, 4+ compute nodes with optional GPU acceleration, local storage node(s), PSUs, rack, typically under $100K with SW	
Business Cost – Target Operational Objective	1.Low operation cost, with support for remote FCAPS management, and ONAP based zero-touch resource and service orchestration 2.Typical 16U height OCP rack with similar power consumption, with minimal footprint of 2 compute nodes. 3.Edge Media solution shall support POD level consolidated management (OSAM) and service level orchestration and LCM via ONAP. 4.Zero touch provisioning, upgrades, fault and performance management KPI, and auto-scaling and auto-healing capabilities	
Security need	POD platform SW and application level security vulnerability scanning and automated patching capabilities required Media content security and user access authentication capabilities required	
Regulations	Depending on type of Edge Media application GDPR or other regulatory requirements may be applicable. NEBS may be required depending on deployment location and carrier network requirements	
Other restrictions	Depending on deployment location, a single half-height rack to multiple full-height racks at Edge DC or Edge CO locations may drive power and cooling requirements	
Additional details	Edge Media solution shall enable support for high density media processing via GPU or FPGA acceleration for advanced high density AI and ML applications and shall scale from single site to 100s in regional deployments to 1000s globally Additional details on architecture and use cases documented in supplementary PPT	

Case Attributes	Description	Informational
Type	New	
Blueprint Family - Proposed Name	Network Cloud, RT Cloud	
Use Case	Real Time Edge Media Processing	
Blueprint proposed	1.Unicycle POD (4-6 servers, single 16U rack configurations) 2.Tricycle POD (16U or 42U rack configurations, multi-rack) 3.Cruiser POD (Multi-rack Core Network Configurations, with spine leaf fabric and ToR switch)	
Initial POD Cost (capex)	Estimates (TBD) 1.Unicycle POD (< 100K) 2.Tricycle POD (< 200K) 3.Cruiser POD (< 300K)	
Scale	1.Unicycle POD – 1 rack with < 6 servers 2.Tricycle POD – Multiple racks, each with < 24 servers 3.Cruiser POD – Multiple racks, each with < 96 servers	
Applications	Edge Virtual Function Applications (reference) 1.Edge deployments at enterprises, entertainment venues, factory automation plants, public facilities where real time media processing required 2.Edge media applications include multi-party conferencing, gaming, surveillance, IoT generated content, AR and VR applications 3.Edge media applications requiring low latency and to overcome backhaul BW availability and costs being prohibitive 4.Real time media analytics with AI and ML based applications for high value and media monetization applications	
Power Restrictions	TBD	
Preferred Infrastructure Orchestration	OS – CentOS or similar Linux, KVM Under Cloud – Airship OpenStack – VM Orchestration Docker + K8S - Container Orchestration VNF Orchestration - ONAP	
SDN	OVS-DPDK, SR-IOV	
Workload Type	VMs, Containers	
Additional Details	Edge Media solution shall enable support for high density media processing via GPU or FPGA acceleration for advanced high density AI and ML applications.	

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Thank You