Connecting ideas, anticipating the future:
collaborative innovation for 5G and 6G networks.

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AI-RAN, open and disaggregated networks and the evolution towards 6G

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EMBRAPII CPQD Excellence Centre in Open Networks (EXCCON)

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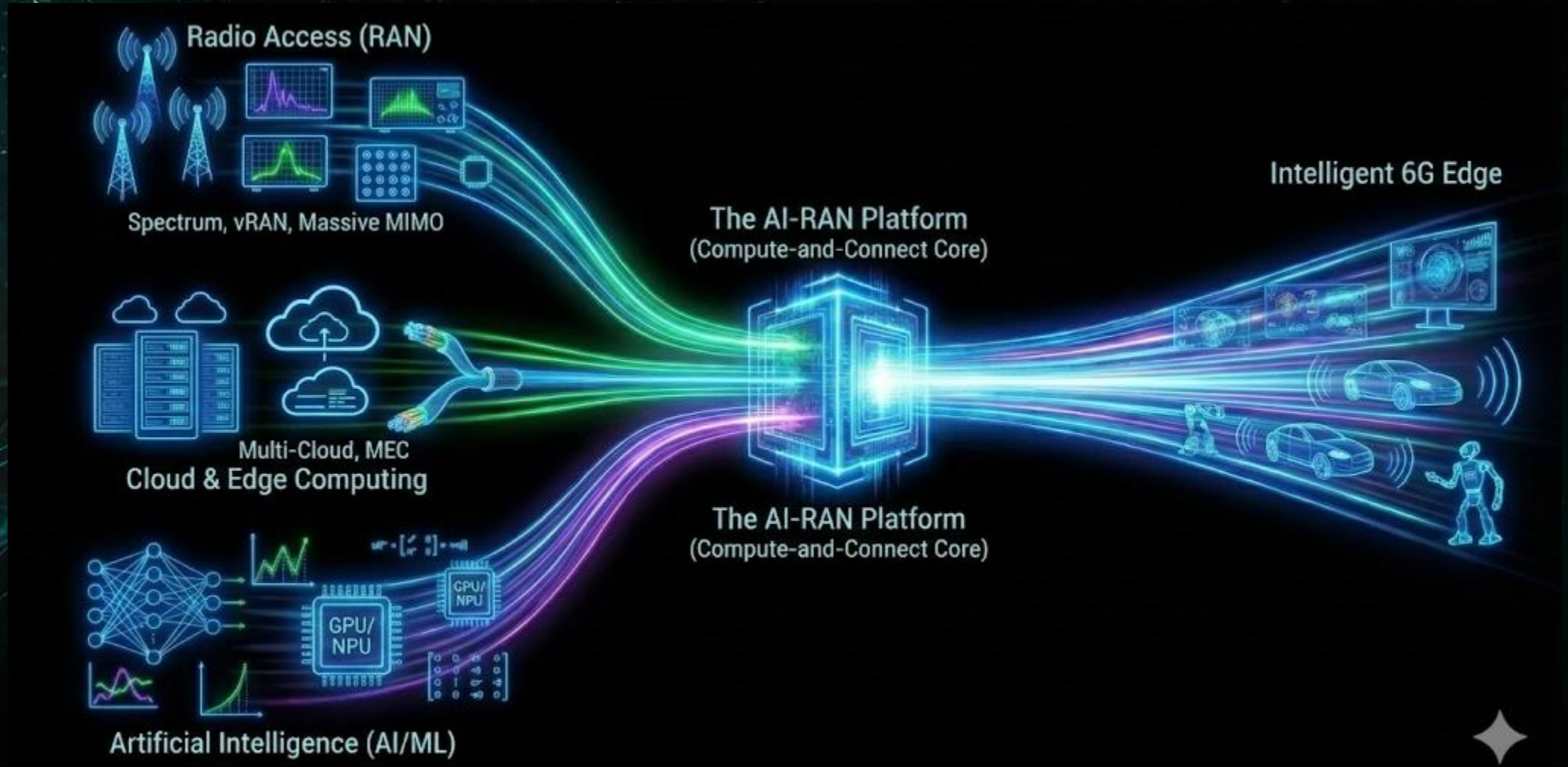
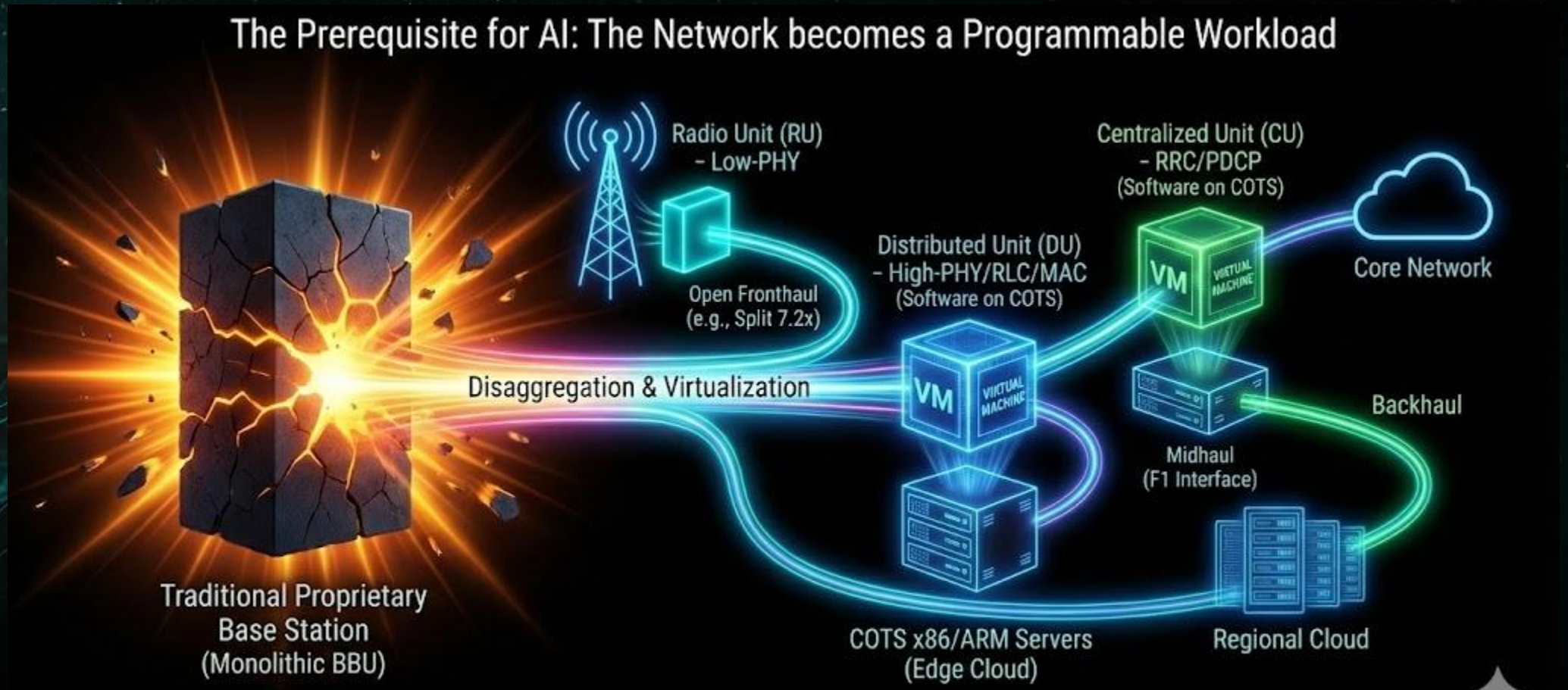
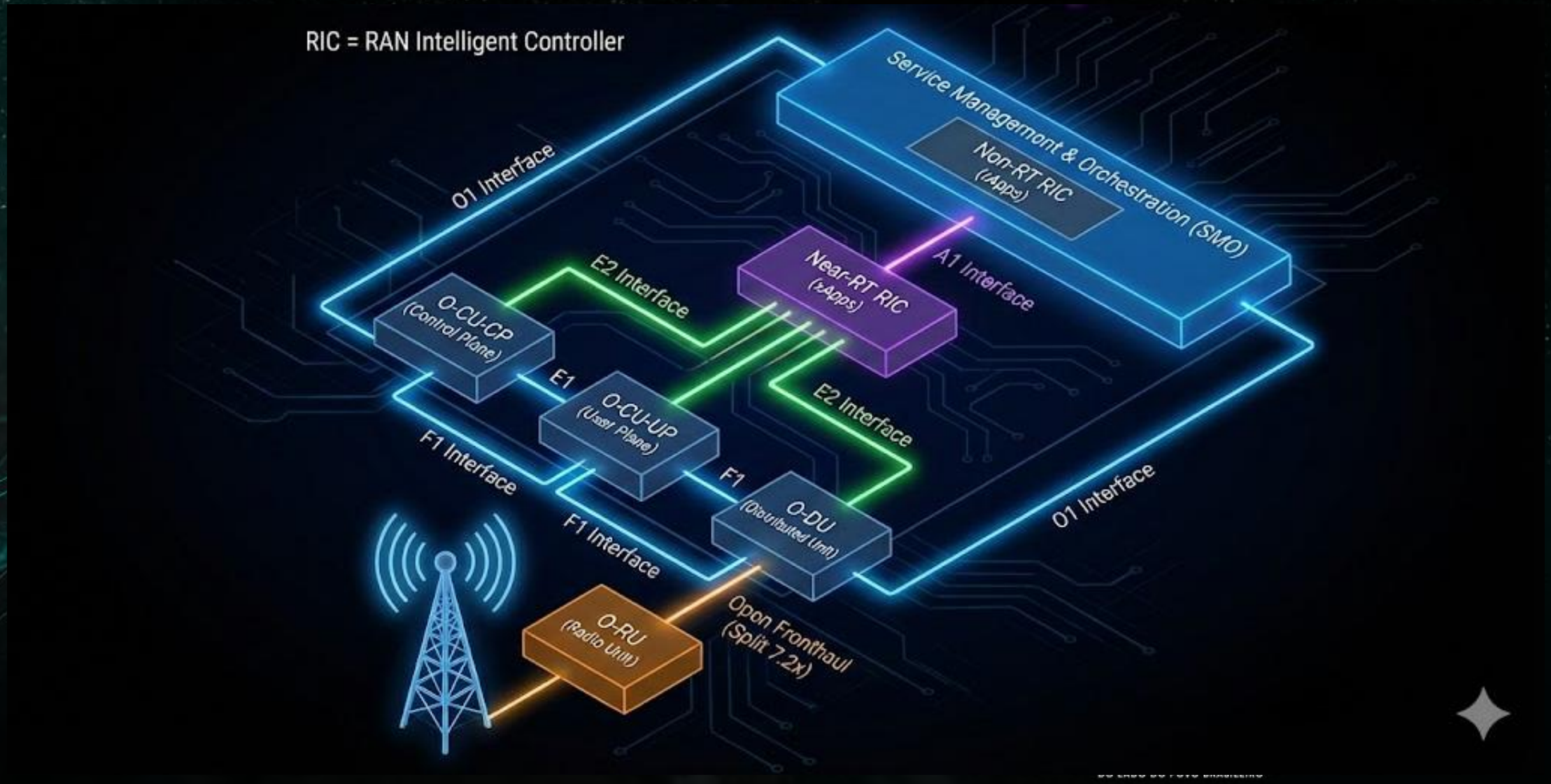
The Great Convergence Towards an Open, Intelligent and Efficient 6G



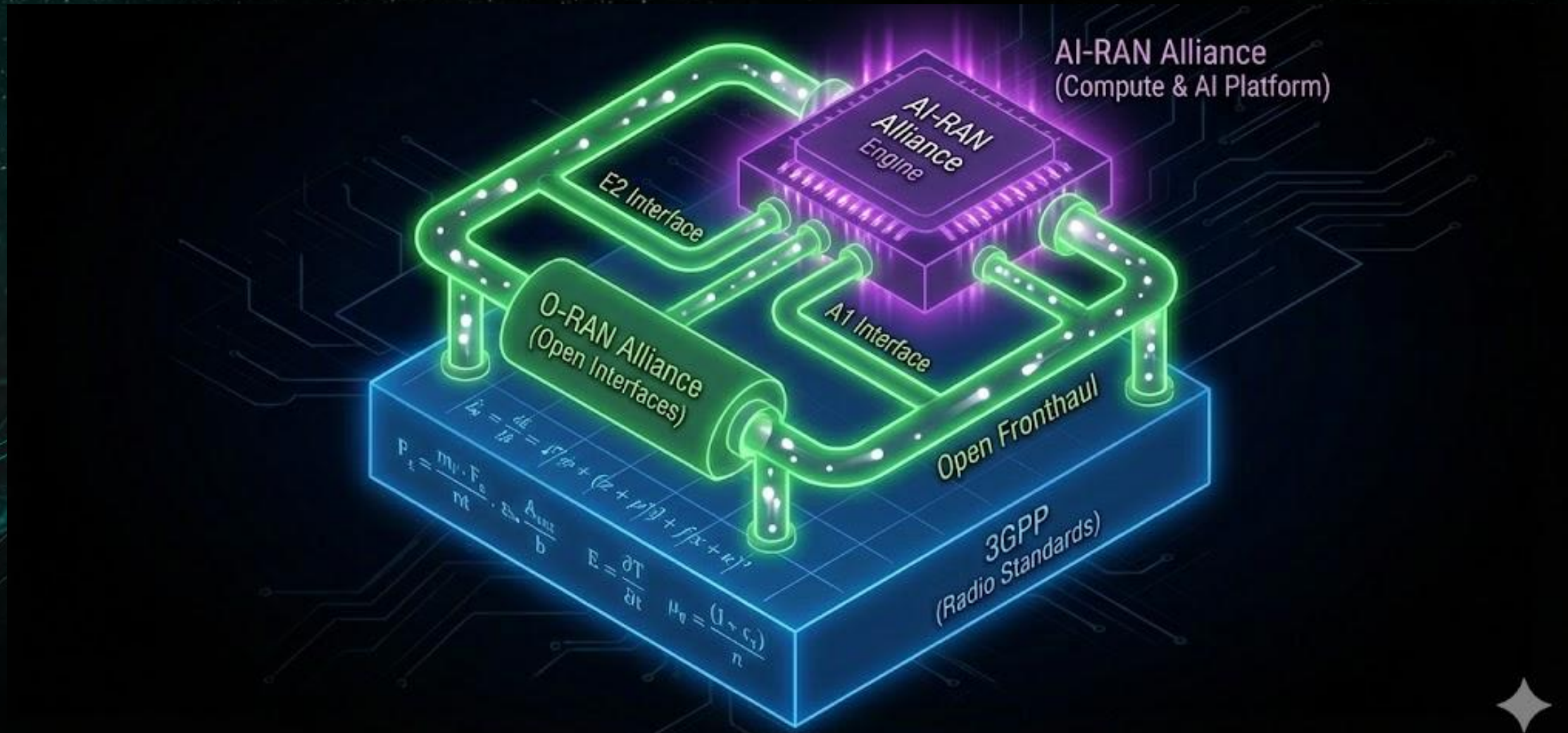
But First, Deconstruct the Monolith!
From Black Box to Software Components



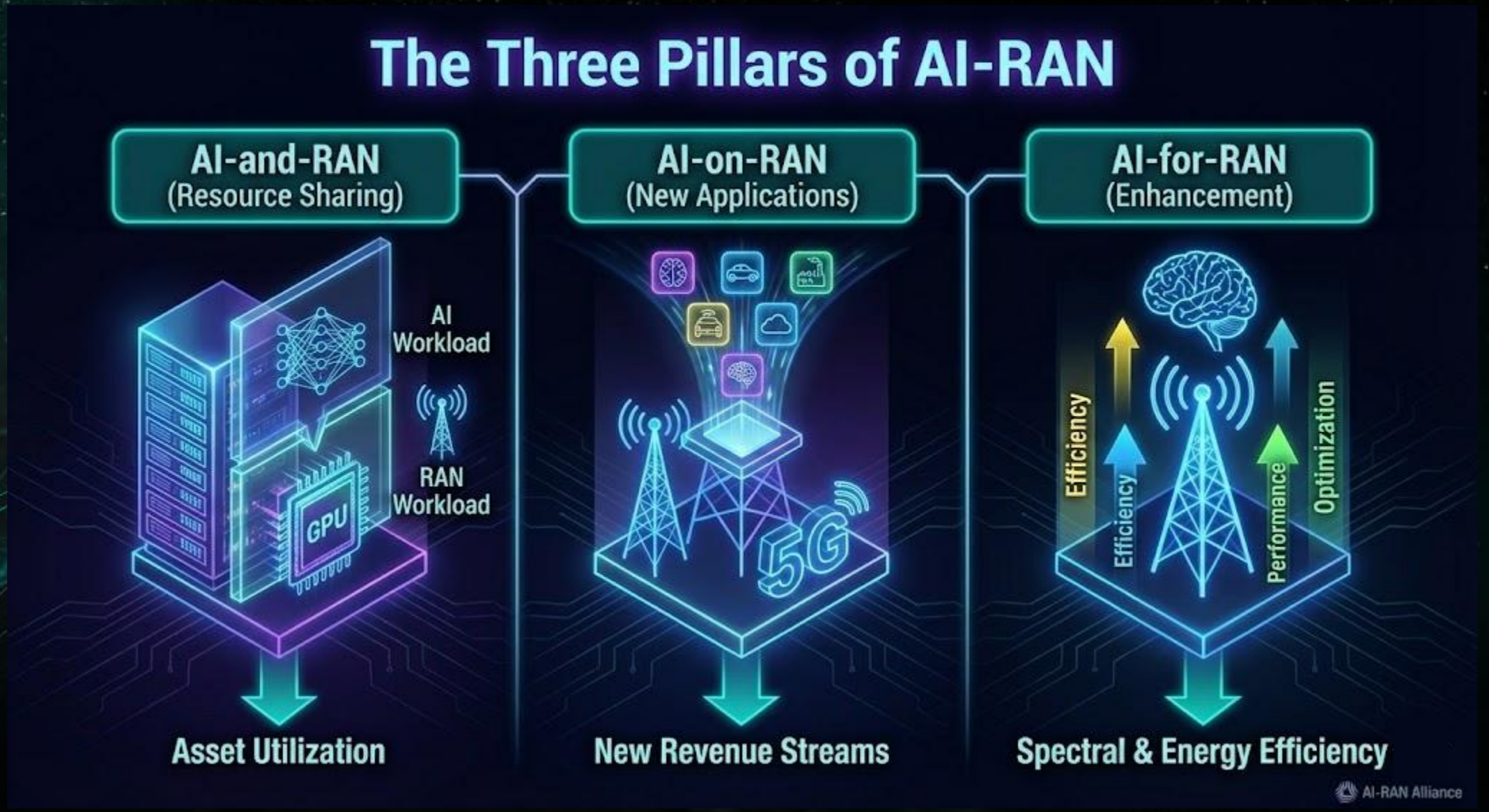
The Open RAN (O-RAN) Architecture



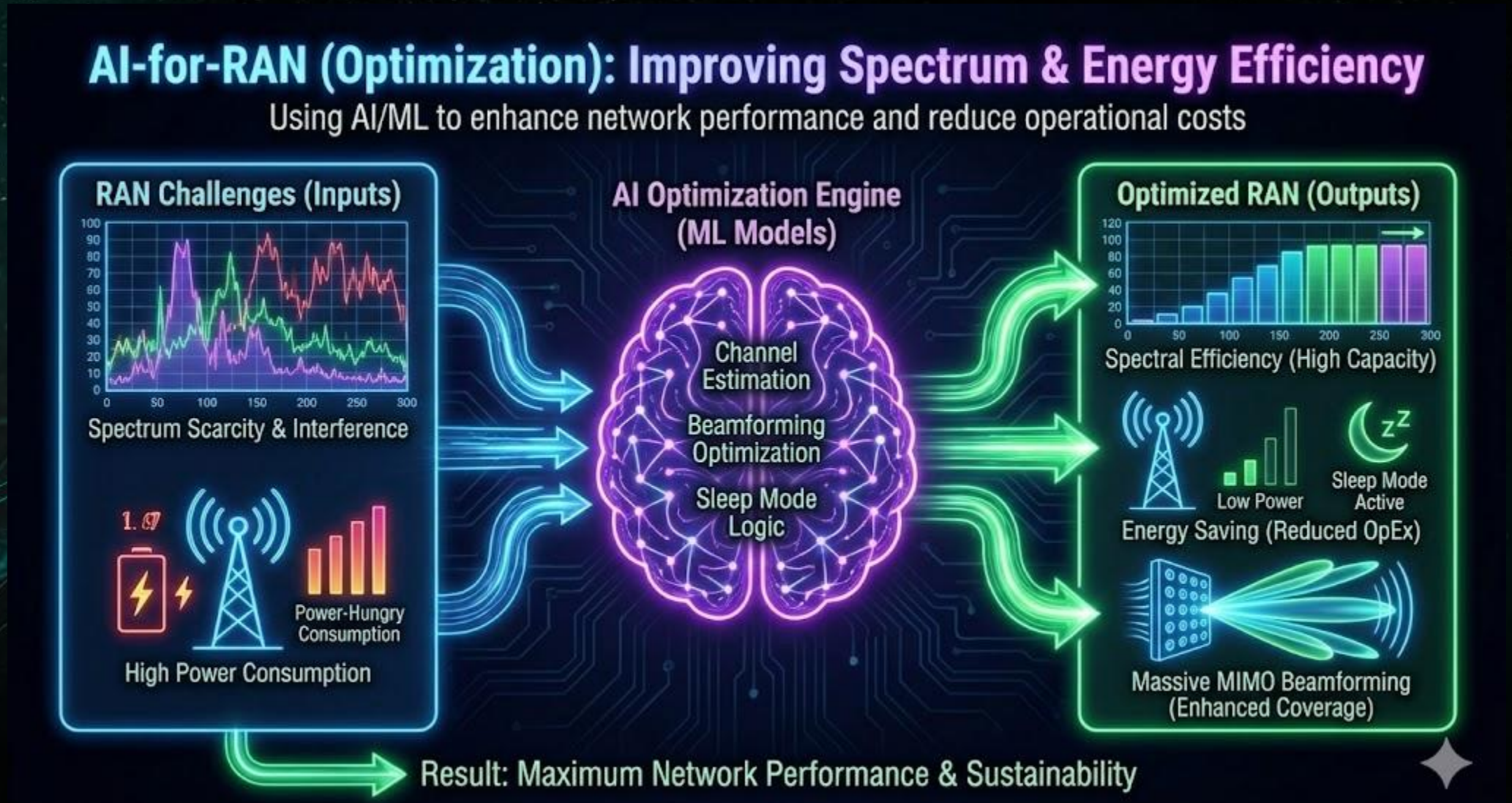
The AI-RAN Alliance Vision



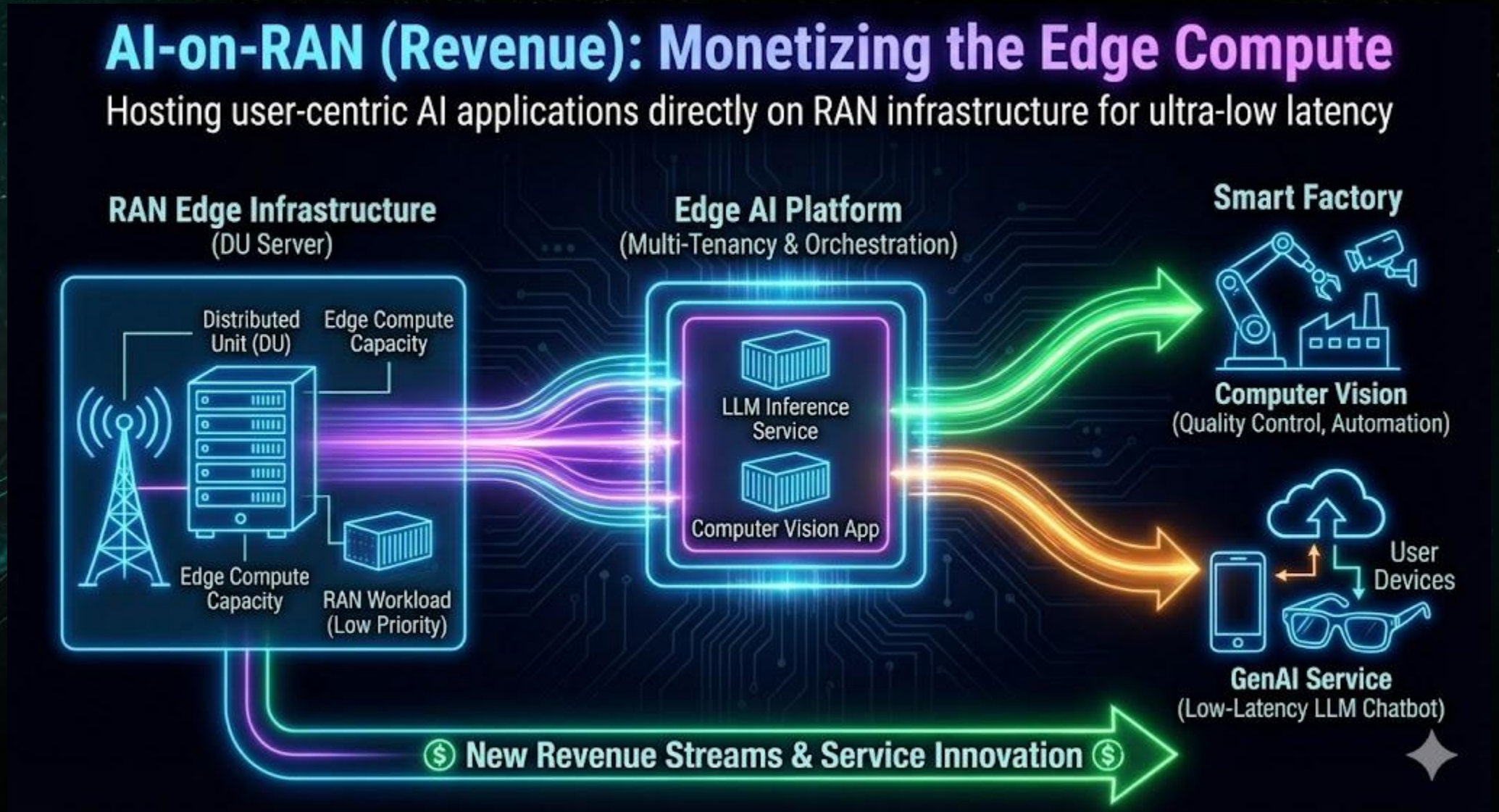
The 3 Pillars of AI-RAN Vision



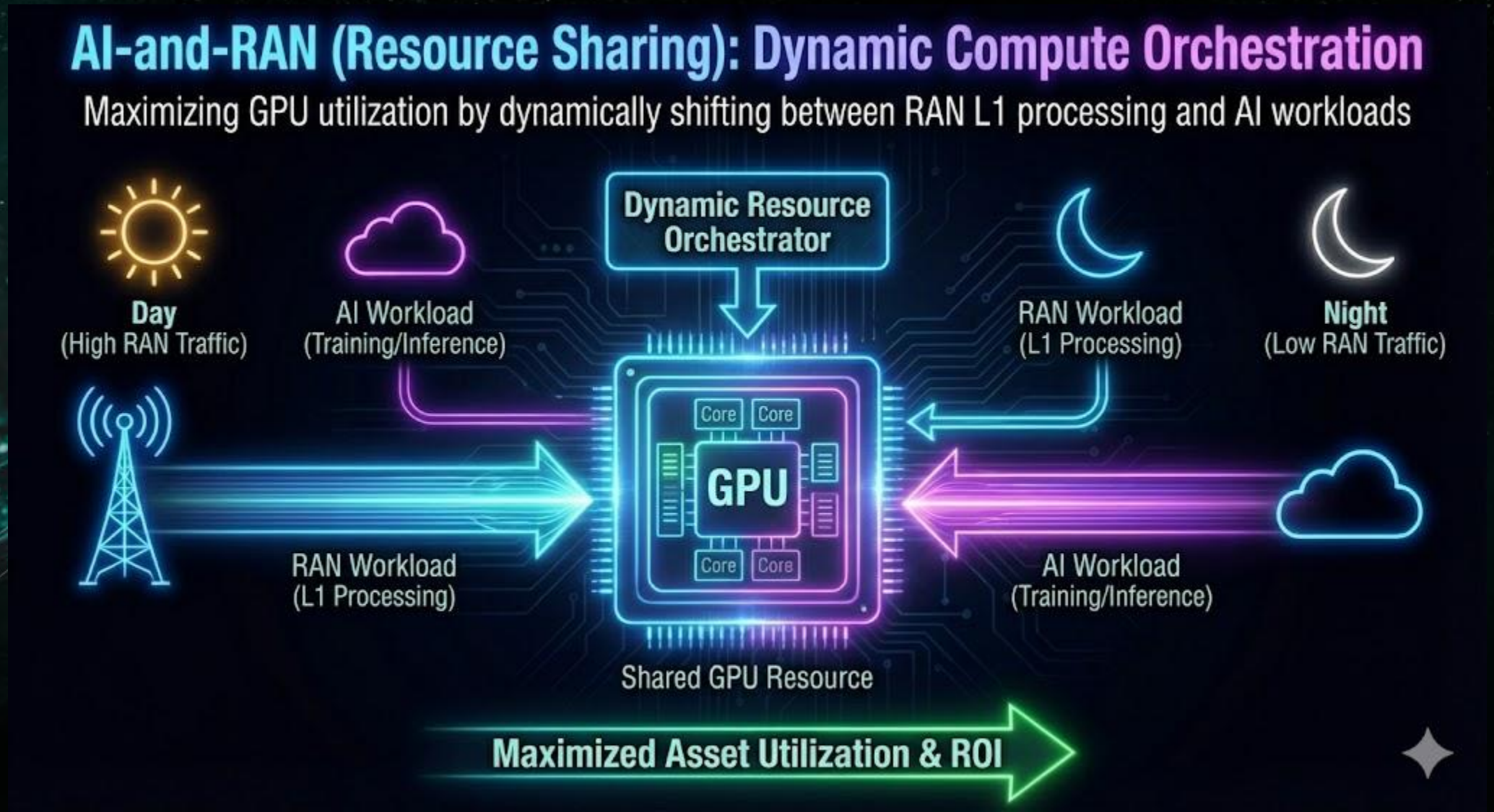
AI-for-RAN


AI-for-RAN (Optimization): Improving Spectrum & Energy Efficiency
Using AI/ML to enhance network performance and reduce operational costs
RAN Challenges (Inputs)
Spectrum Scarcity & Interference
Power-Hungry Consumption
High Power Consumption
AI Optimization Engine (ML Models)
Channel Estimation
Beamforming Optimization
Sleep Mode Logic
Optimized RAN (Outputs)
Spectral Efficiency (High Capacity)
Low Power
Sleep Mode Active
Energy Saving (Reduced OpEx)
Massive MIMO Beamforming (Enhanced Coverage)
Result: Maximum Network Performance & Sustainability

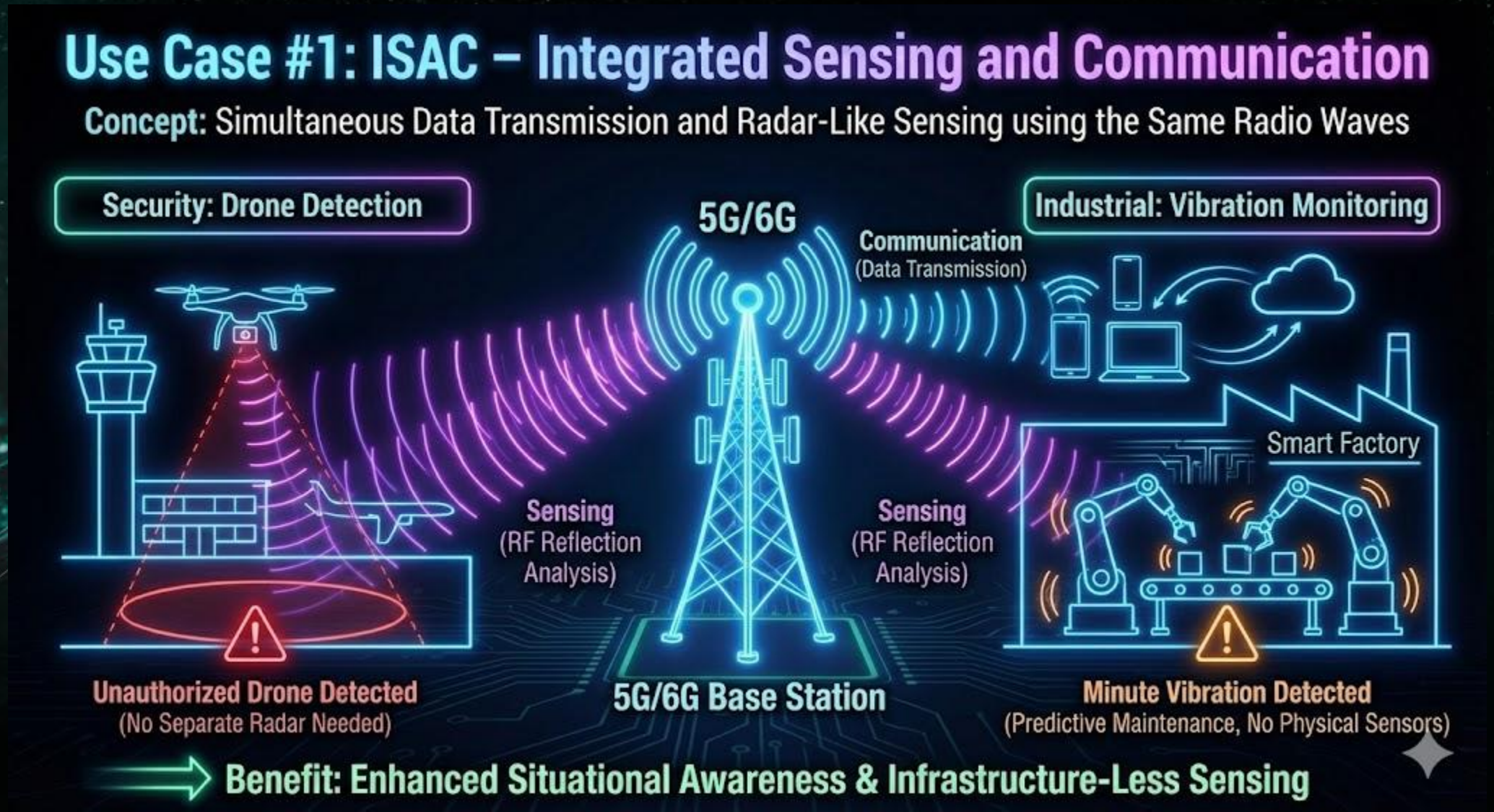
AI-on-RAN


AI-on-RAN (Revenue): Monetizing the Edge Compute
Hosting user-centric AI applications directly on RAN infrastructure for ultra-low latency
RAN Edge Infrastructure
(DU Server)
Distributed Unit (DU)
Edge Compute Capacity
Edge Compute Capacity
RAN Workload (Low Priority)
Edge AI Platform
(Multi-Tenancy & Orchestration)
LLM Inference Service
Computer Vision App
Smart Factory
Computer Vision
(Quality Control, Automation)
User Devices
GenAI Service
(Low-Latency LLM Chatbot)
New Revenue Streams & Service Innovation

AI-and-RAN


AI-and-RAN (Resource Sharing): Dynamic Compute Orchestration
Maximizing GPU utilization by dynamically shifting between RAN L1 processing and AI workloads
Dynamic Resource Orchestrator
Day
(High RAN Traffic)
AI Workload
(Training/Inference)
RAN Workload
(L1 Processing)
Night
(Low RAN Traffic)
Core
Core
GPU
Core
Core
RAN Workload
(L1 Processing)
AI Workload
(Training/Inference)
Shared GPU Resource
Maximized Asset Utilization & ROI

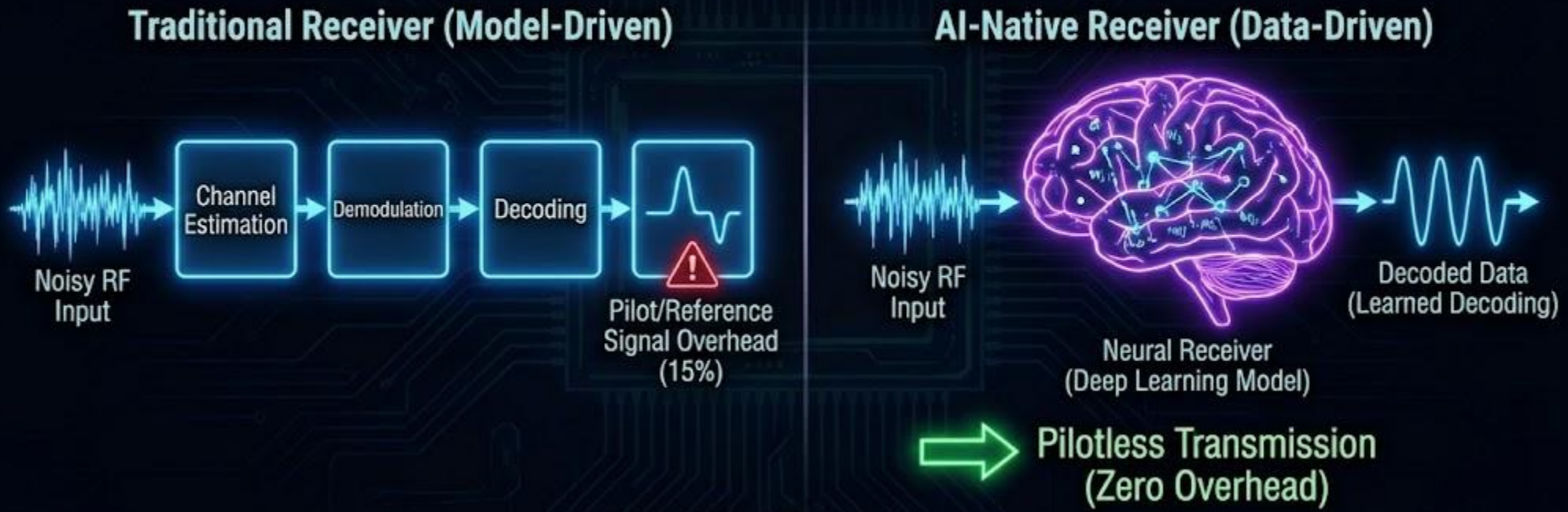
AI-RAN Use Cases



AI-RAN Use Cases

Use Case #2: The AI-Native Air Interface

Concept: Replacing rigid processing blocks with a single Deep Neural Network (DNN)



Benefit: Significant Spectral Efficiency & Capacity Gain (Pilotless)

AI-RAN Use Cases

Future Directions for the AI-RAN

AI-RAN @ EXCCON

Automation & Orchestration

AUTORAN & MultiCloudRAN

Enabling multi-cloud, multi-tenant deployment on mixed regional/edge infrastructure.

Intelligence & Security

AITORAN, SmartRAN & ReactRAN

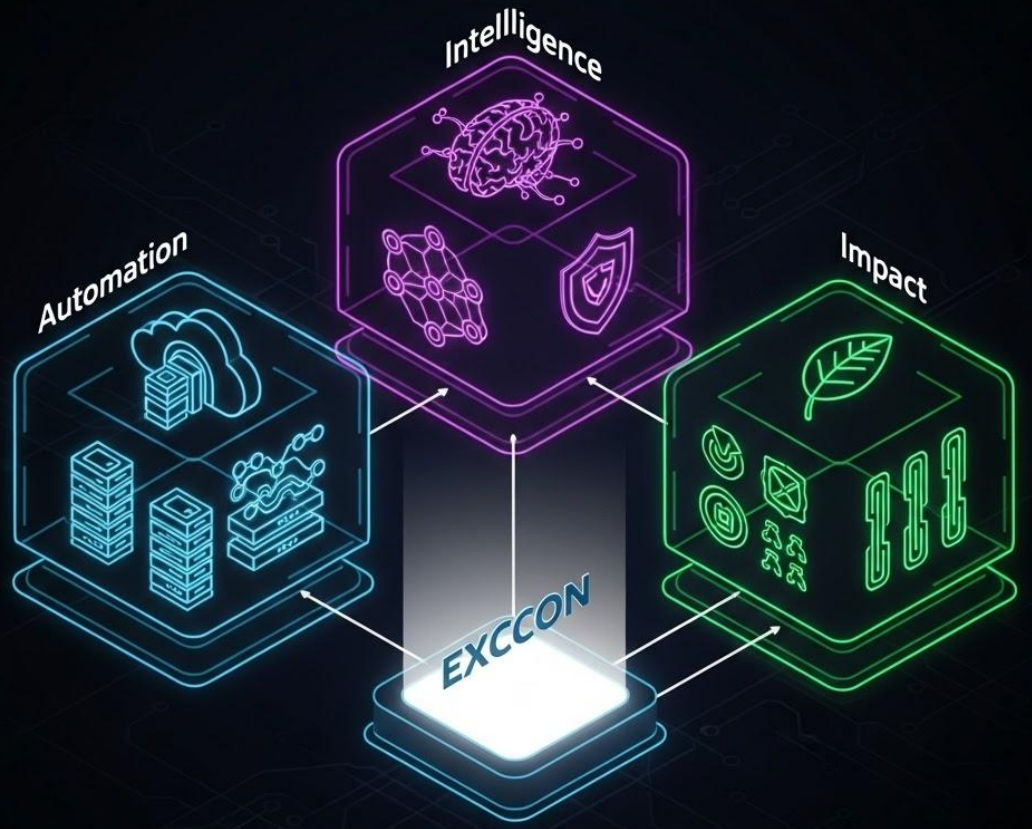
Enhancing security (DDoS defense), energy efficiency, and dynamic sharing logic.

Verticals & Sustainability

EffStratRAN & DOTERAN

Smart Open RAN for Telemedicine and Connected Ag via low-latency computer vision.

Join the Deep Dive: Thursday, 10:30 AM
"Open RAN at the Intersection of Telecom, Cloud, and AI: Enabling Next-Gen Connectivity in Brazil"



RetroWave for the works!

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Obrigado!

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