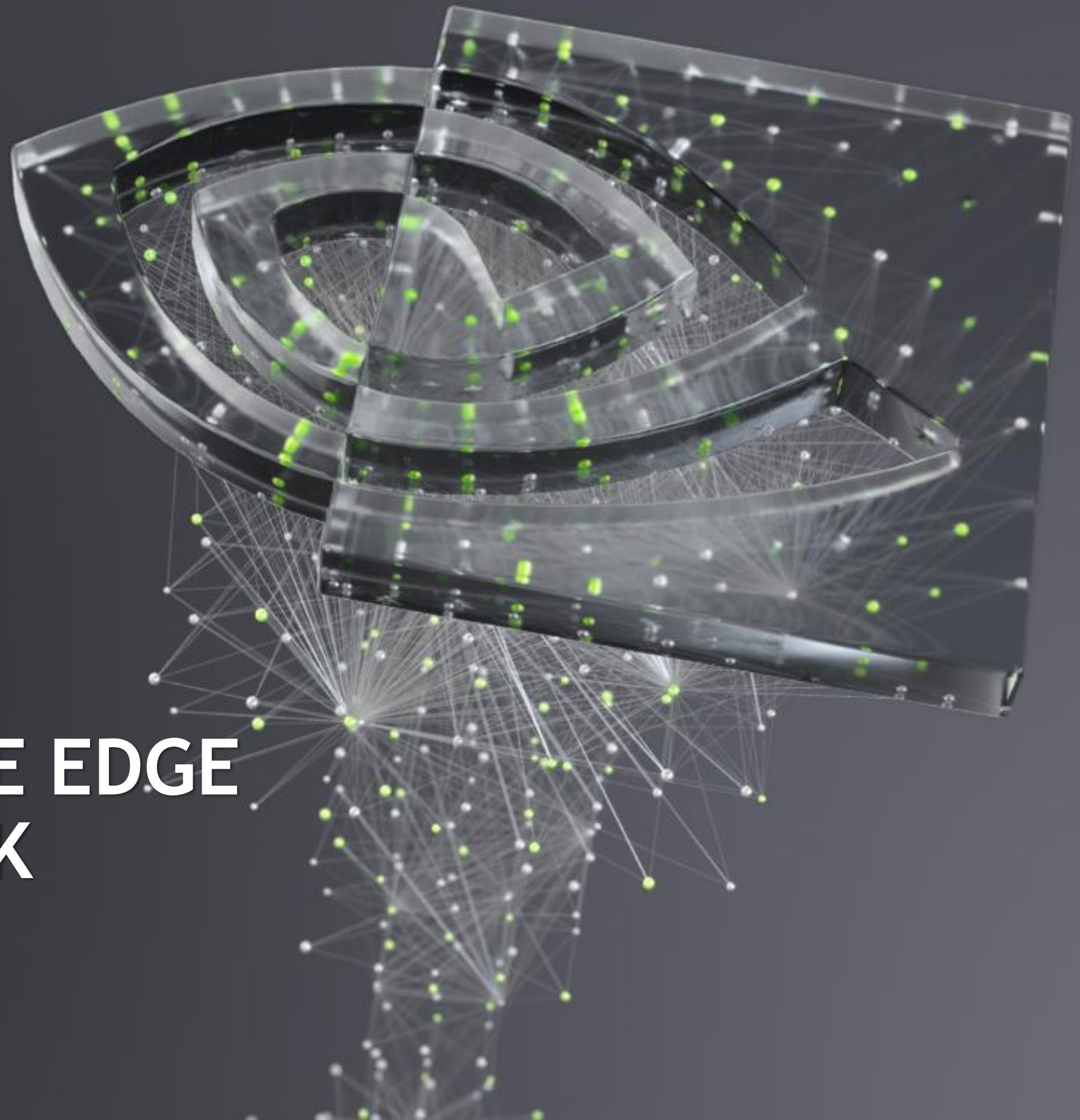




MONETIZING AI AT THE EDGE OF YOUR 5G NETWORK

July 2020



TODAY'S SPEAKERS



Chetan Sharma
CEO
Chetan Sharma Consulting



Joao Gomes
Edge AI Global Leader, Telecom
NVIDIA

AI at the Edge of your 5G Network

New Revenue Generating Services

Chetan Sharma
CEO, Chetan Sharma Consulting

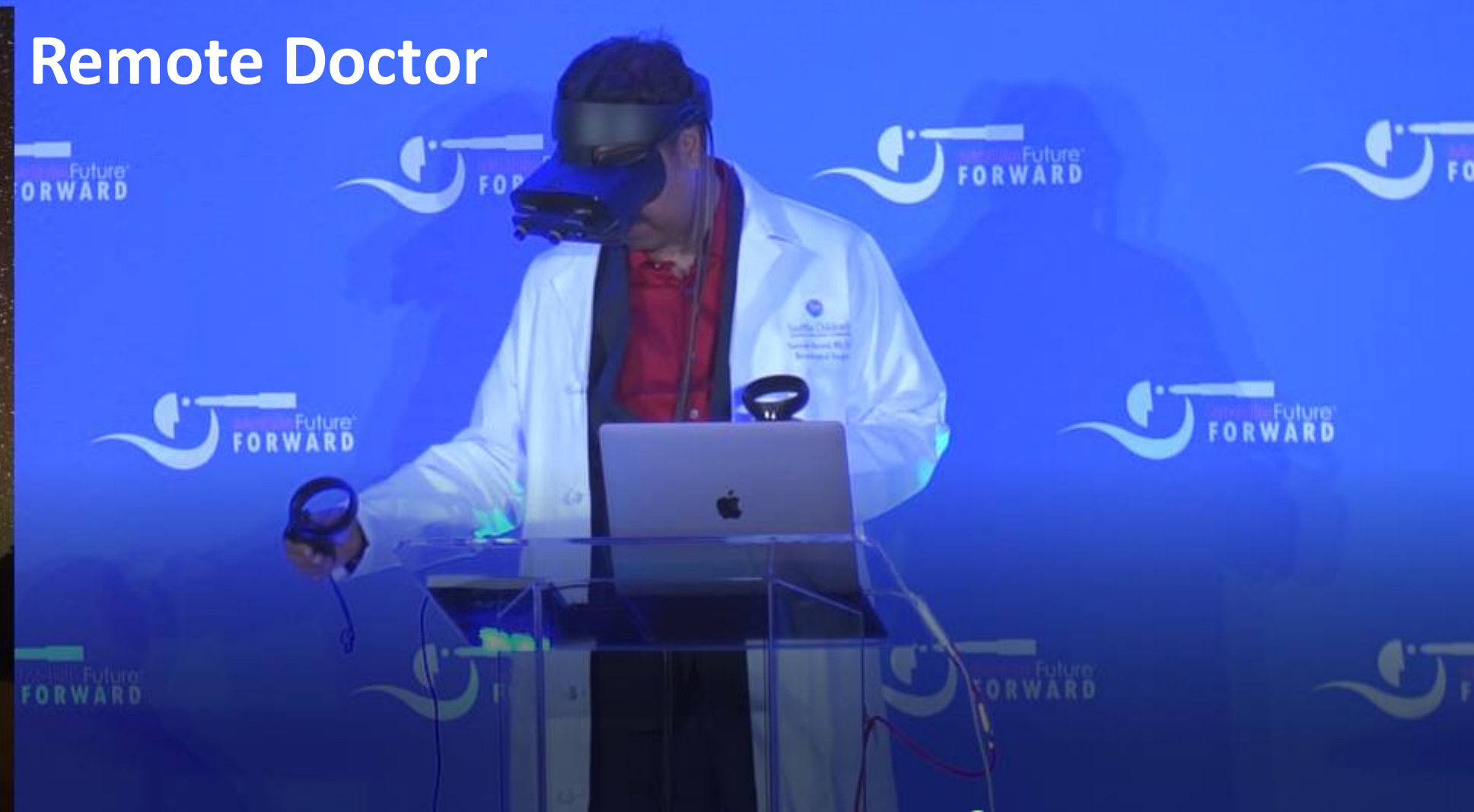
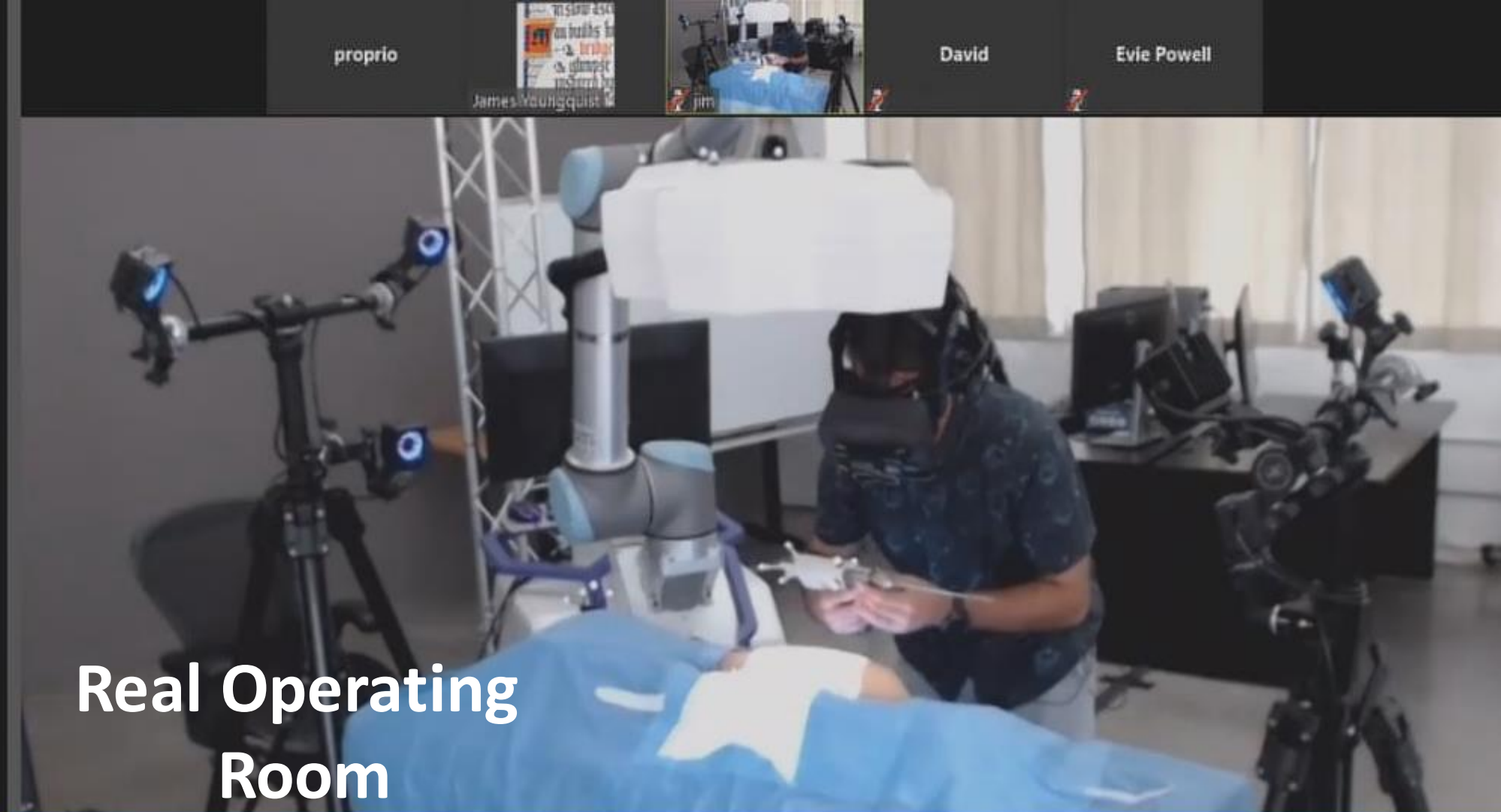


chetan sharma
CONSULTING

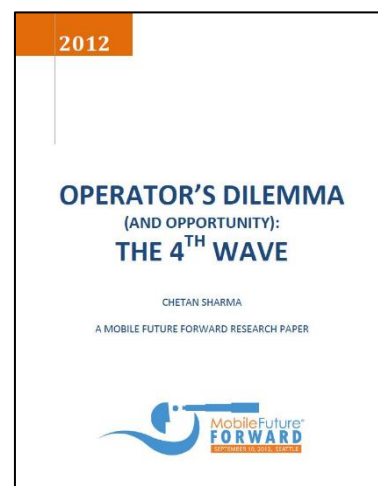
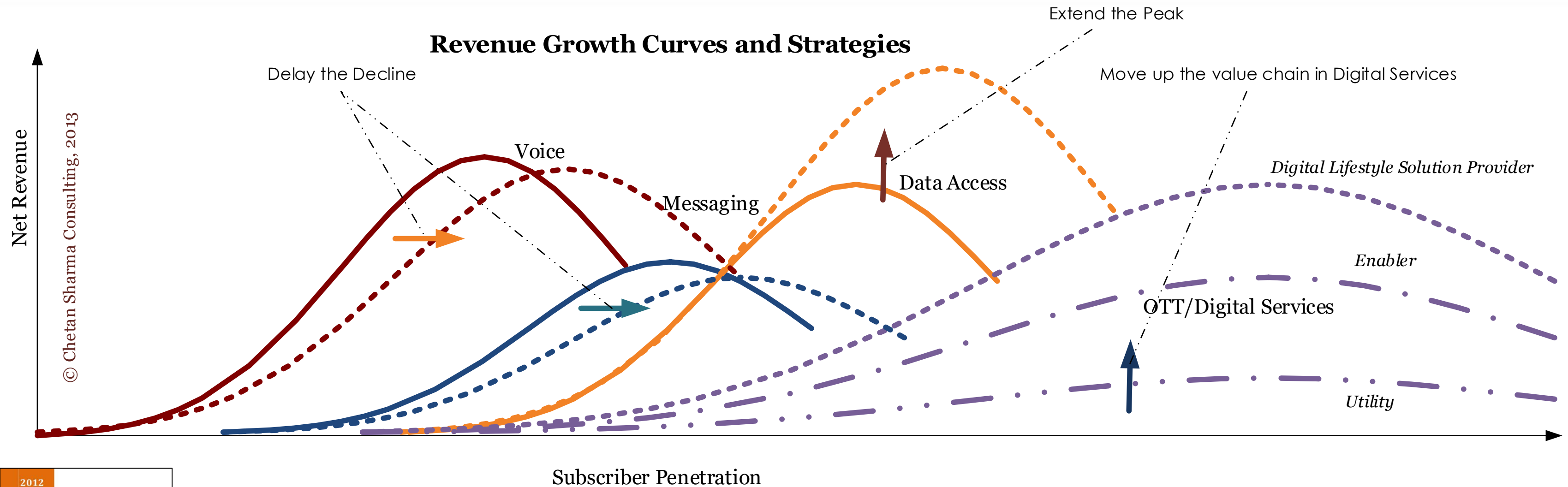
Chetan Sharma Consulting: A Global Mobile Strategy Firm



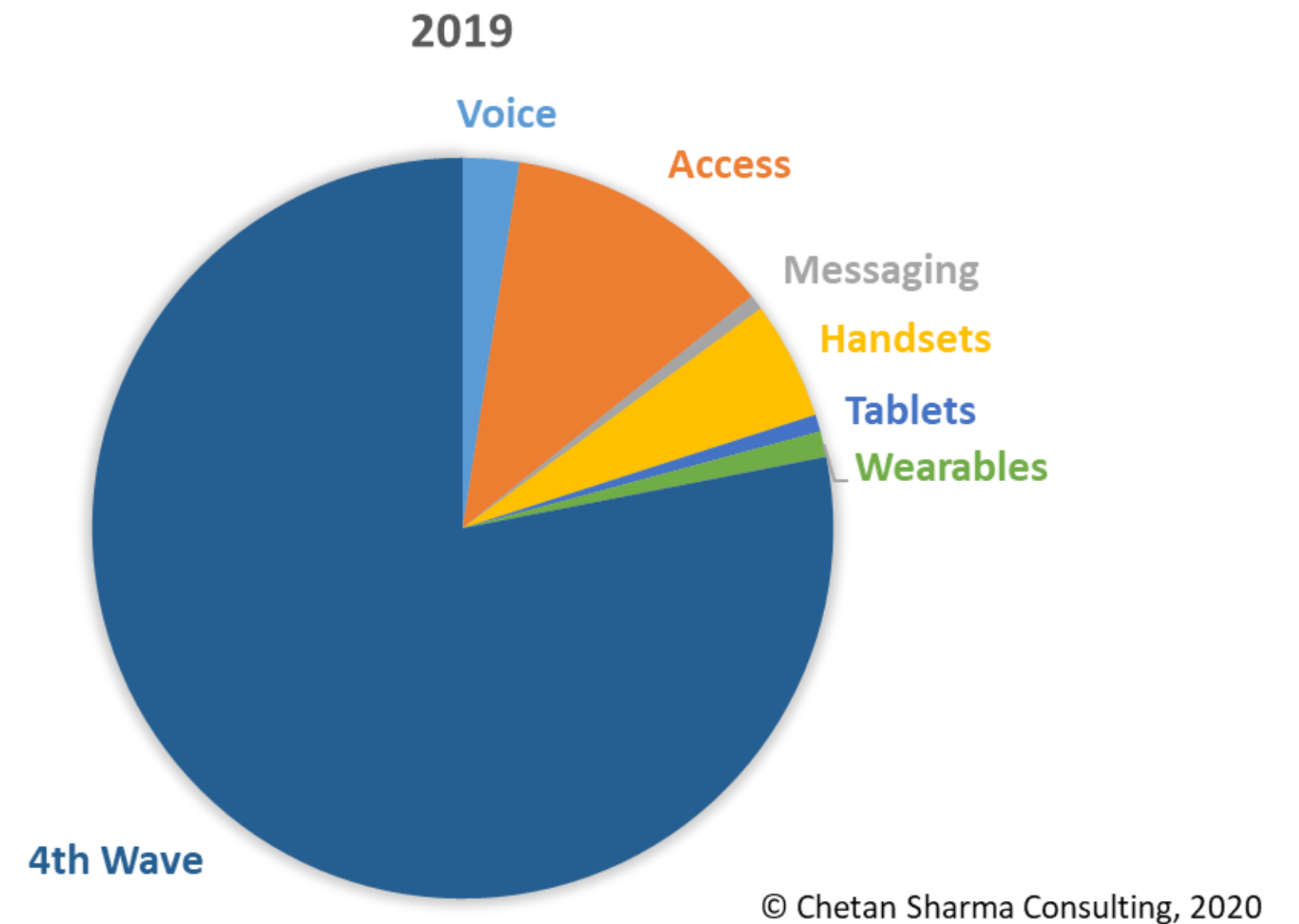
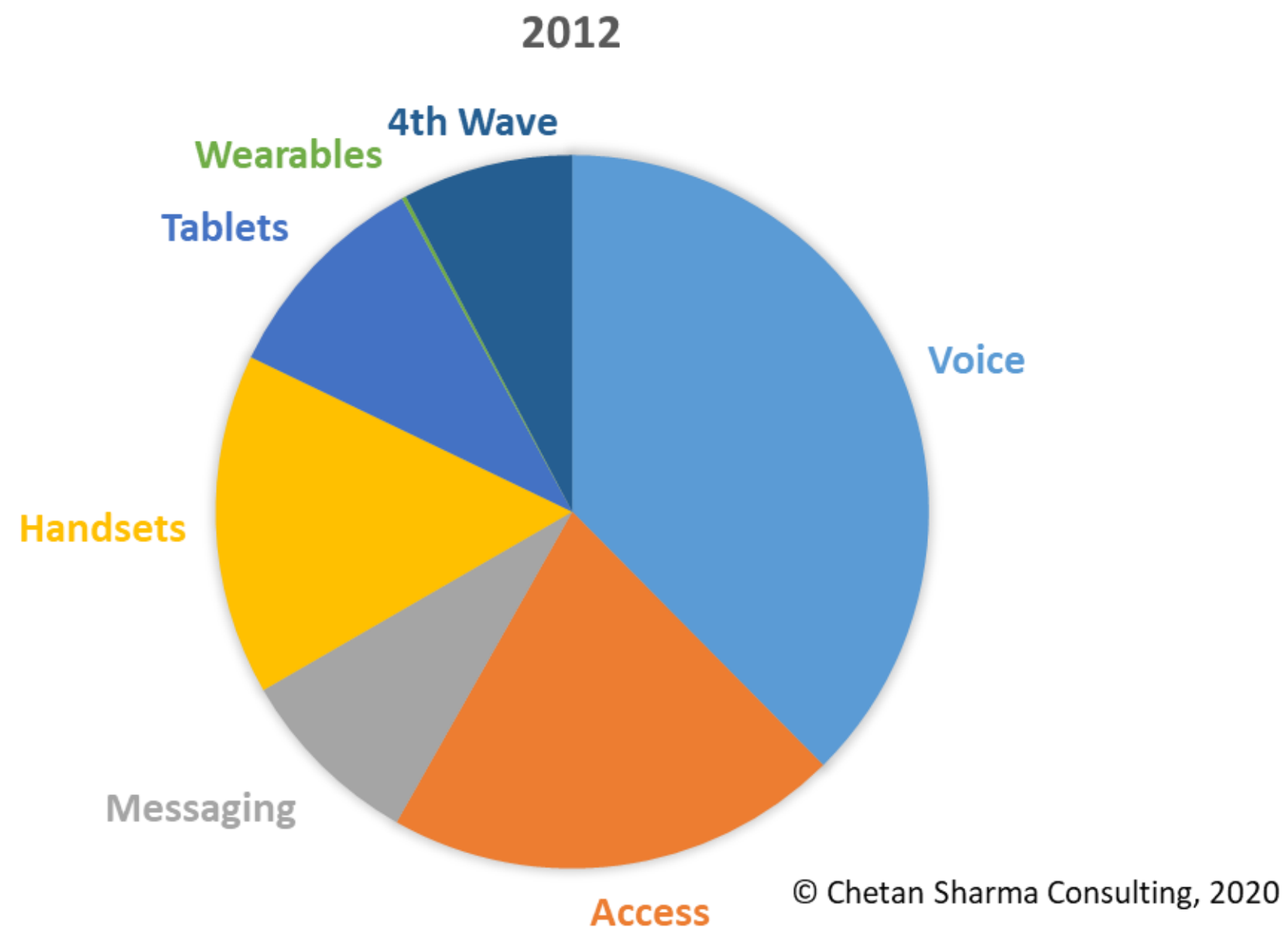
- 20 yr young Seattle based Mobile Strategy firm, 25 years in mobile
- Advisor to major operators, brands, startups, VCs, and Fortune 500 firms around the world.
- Worked with boards of mobile operators on all 5 continents
- Strategy for each of the **top 9 global** mobile data operators
- Have a unique 360° view of the ecosystem
- **Advisory Boards:** Telefonica, Kymeta Corporation, Globalpay, Opanga Networks, Lotusflare, Ericsson, NextNav, Other Startups
 - Market Research
 - Product and Business Strategy
 - Intellectual Property
 - Mobile Thought-leadership Summits



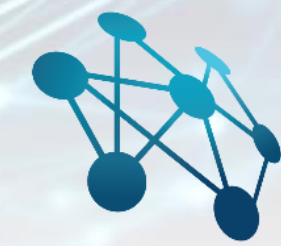
Predicting Growth & Disruption



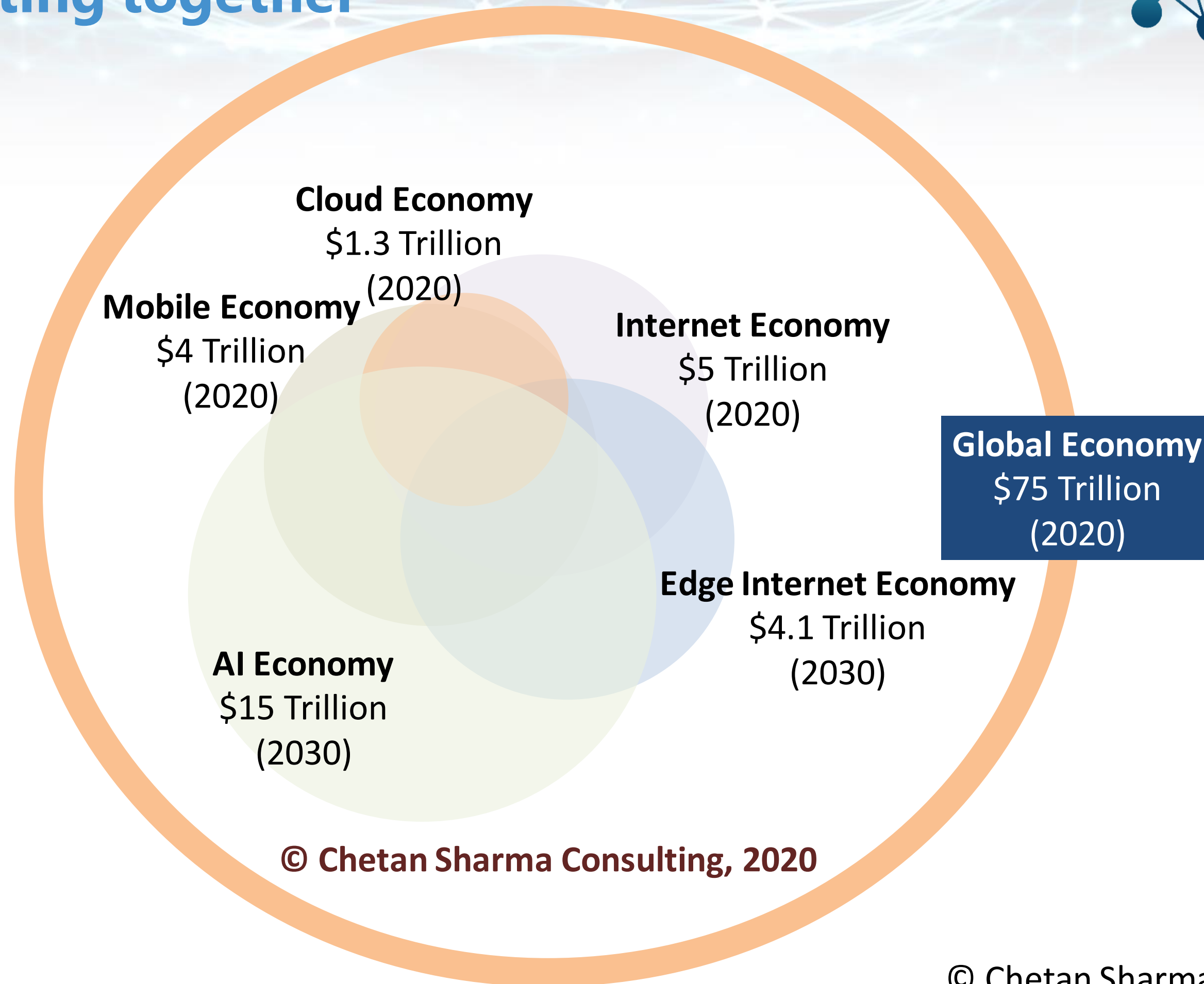
Mobile Industry shifted to 4th Wave in LTE Era



Edge, AI, 5G – Fitting together



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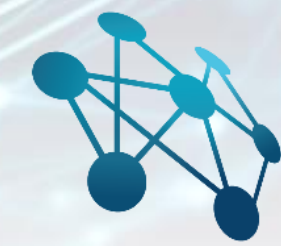


The EdgeAI Internet Economy builds on and extends the existing tech ecosystems

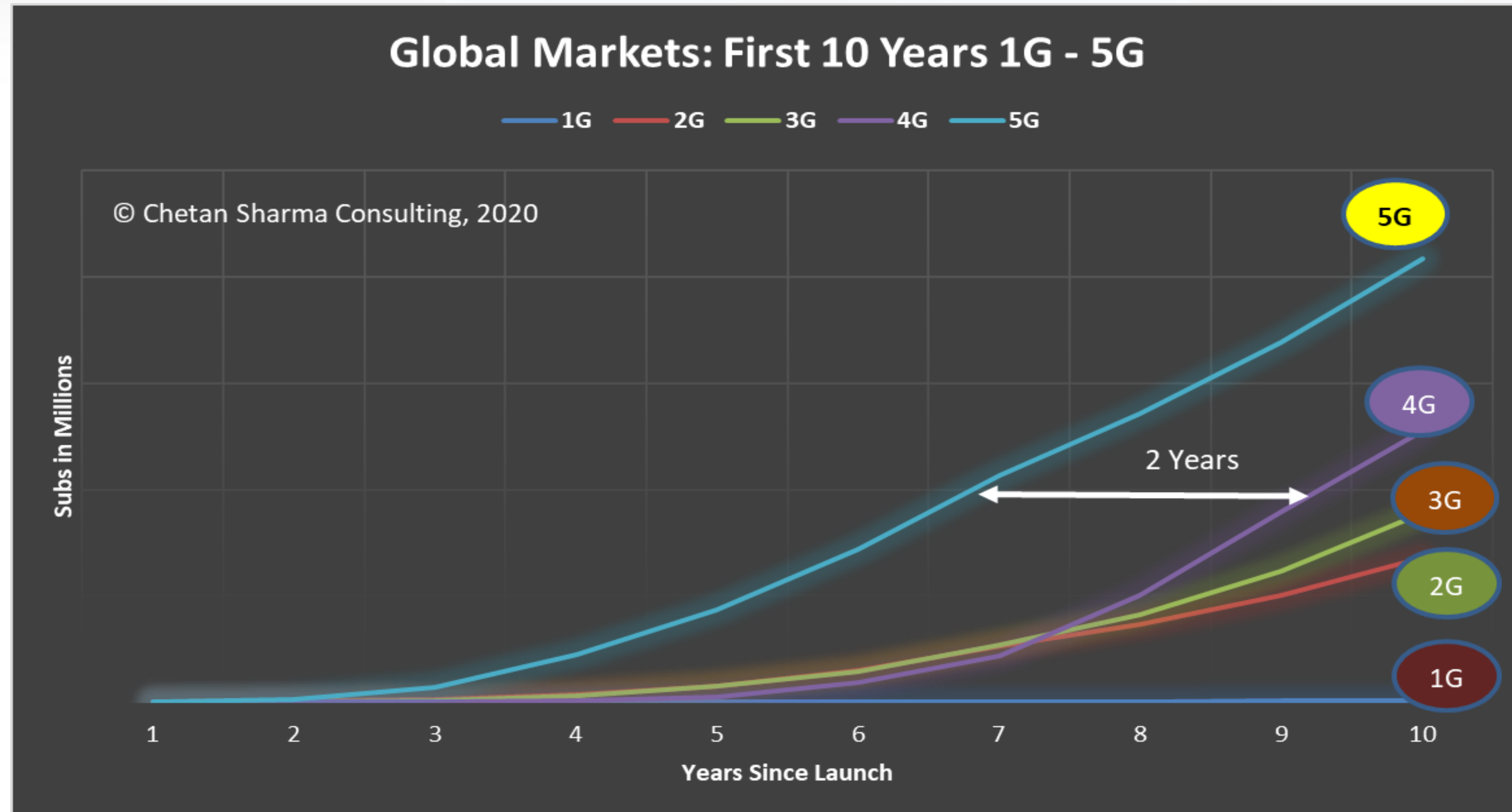
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5G: Accelerated Deployment



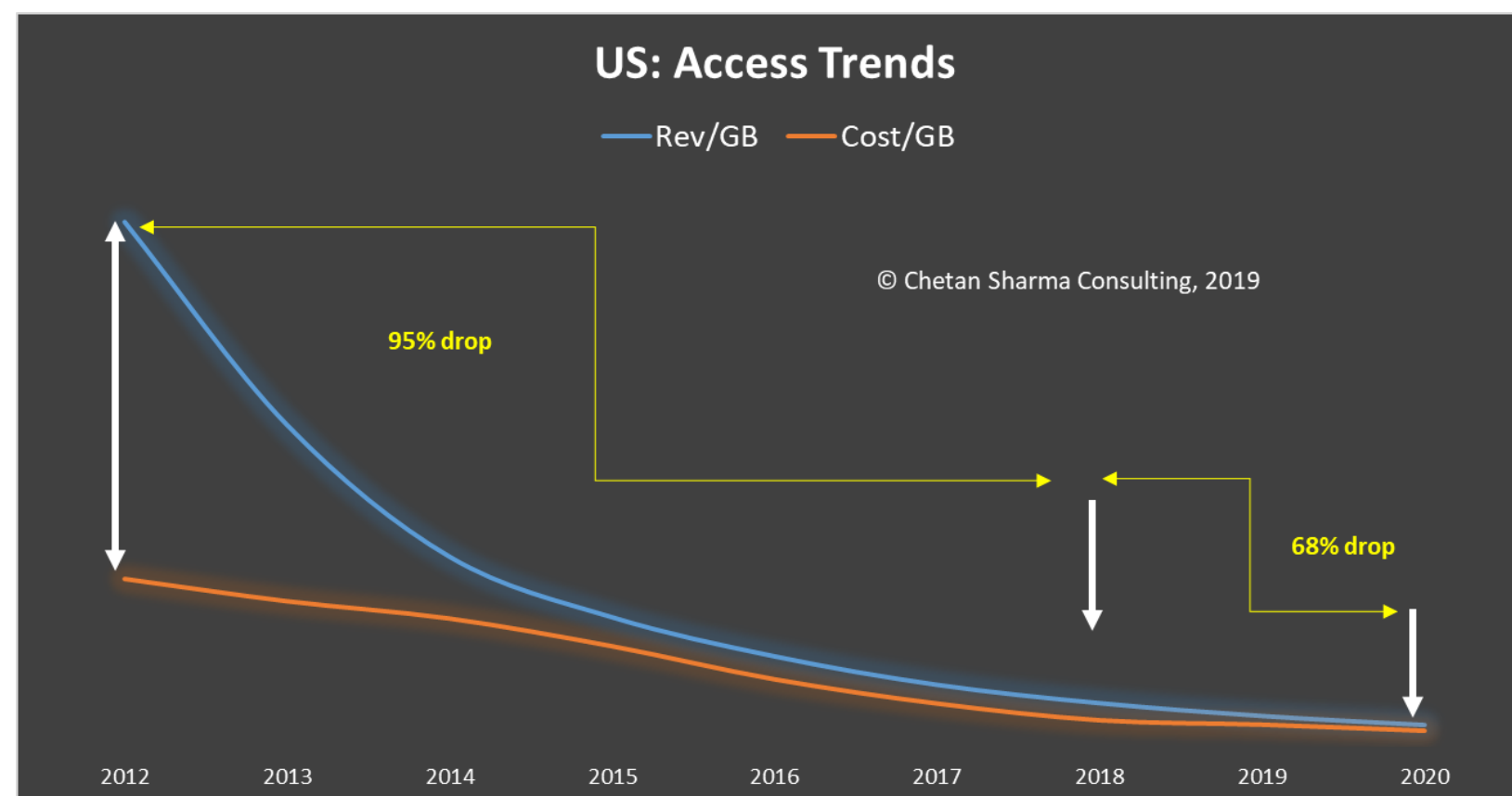
chetan sharma
CONSULTING



Cost is one of the most critical KPIs for 5G

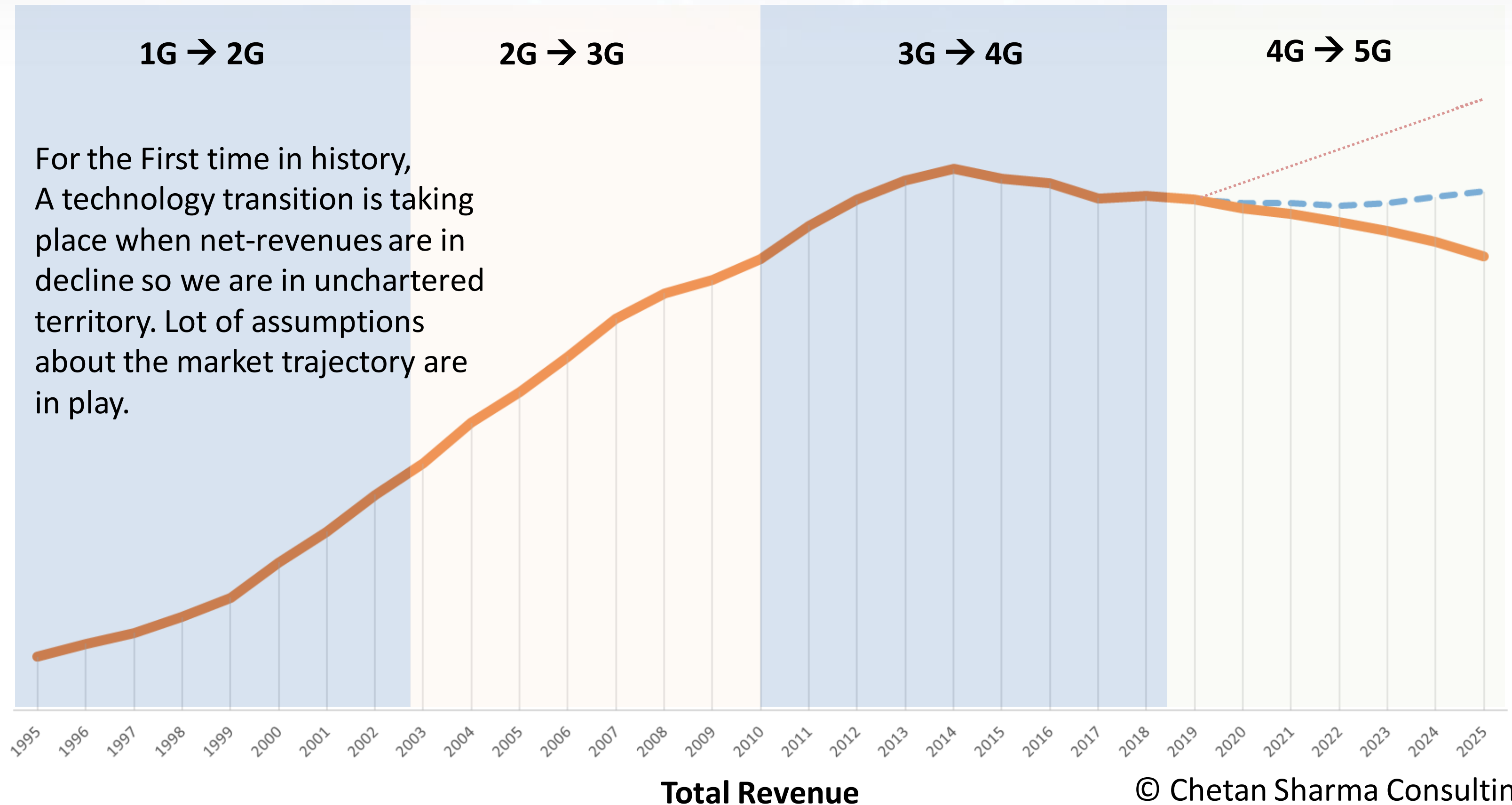
Generation	Engineering Focus
1G	Bit/s/Hz
2G	Bit/s/Hz
3G	Bit/s/Hz/m ²
4G	Bit/s/Hz/m ² /joule
5G	Bit/s/Hz/m²/joule/\$

- The single-most important KPI for an operator will be how cost-effectively they can transmit data packets.
- Edge will also lead to new business models of deploying networks and service bundling involving more and newer players.



5G: This time it is different

US: Service Revenue Trends



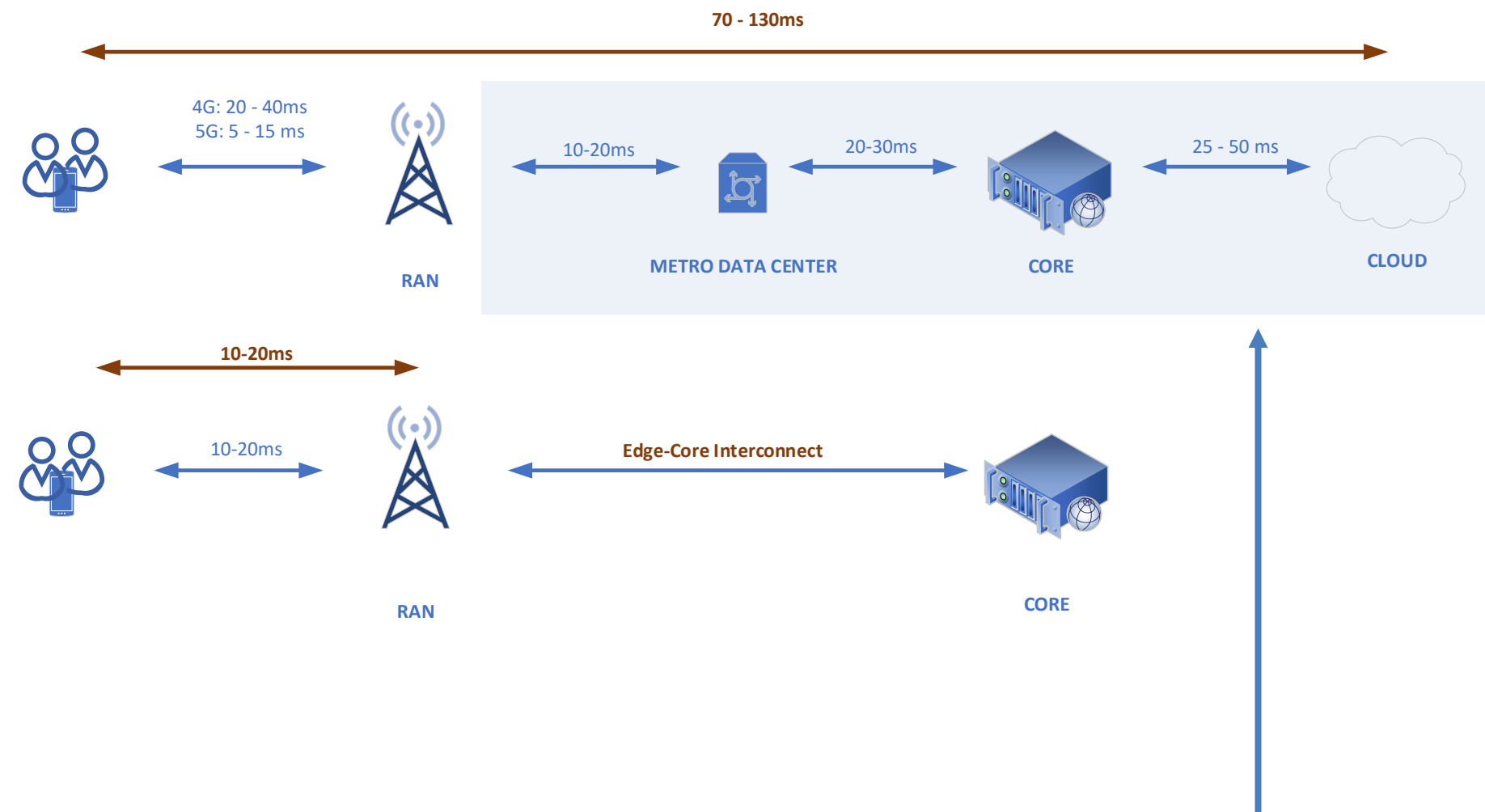
EdgeAI: A Paradigm Shift



- We are on the cusp of a seismic paradigm shift wherein computing and communications will move from the core network and a centralized cloud architecture to the Edge
- EdgeAI Internet is a network upgrade to current fixed and mobile network architecture such that compute and data resources are always available at the nearest node possible and optimized for performance and cost
- EdgeAI not only enables new applications and services but also makes the existing apps run better and more cost effectively

Why EdgeAI?

- The current Internet architecture is running into the limits of balancing performance and costs
- The current mobile network architecture is running into the limits of how congestion is managed cost effectively especially in light of a 3x surge expected with 5G
 - While 5G reduces the Device-to-RAN latency, the overall E2E latency doesn't get reduced dramatically
- The new set of applications and services are not possible without an upgrade of the network architecture e.g. VR, Cloud Streaming, Cloud Robotics, Sports Betting, Advanced Manufacturing, Holographic Entertainment, Autonomous Fleet



© Chetan Sharma Consulting, 2019

EdgeAI helps in eliminating the delays associated with the rest of the network

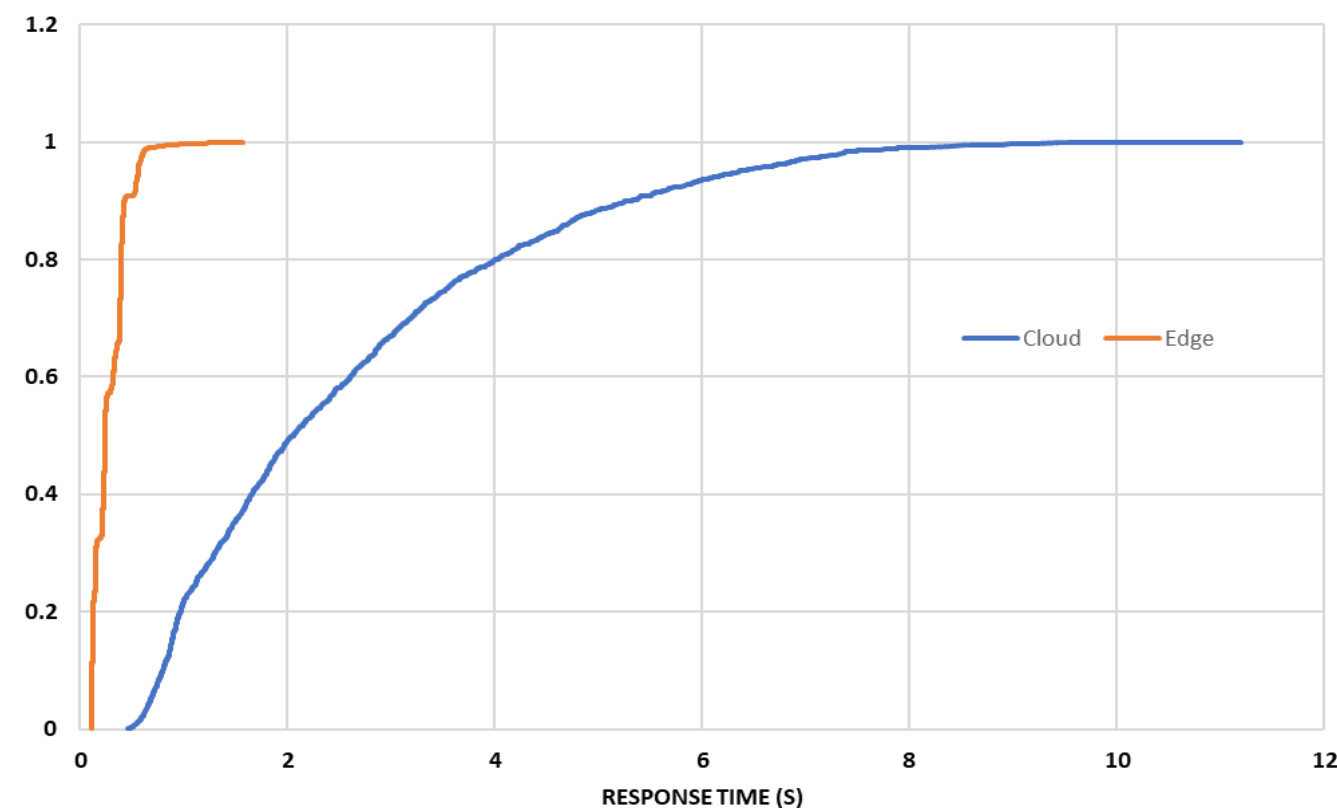
Won't 5G solve the problem?

- The densification nature of the 5G network is a natural fit for Edge Computing but Edge doesn't rely on a specific access technology. It is more of an architectural upgrade wherein you move the resources (content, compute, analytics, AI training and inference, data residency, etc.) closer to the Edge on-demand and anticipatorily.
- Thus Edge is as much applicable to 3G or 4G as it is to 5G, to WiFi as it is to Fixed. Edge does shine in use cases where low latency is not achievable through access means.
- 5G doesn't eliminate the RAN-Core-Cloud latencies.

Why Edge is Important?

Case Study: Tier-1 Operator was having problem network congestion and video advertising will suffer from network congestion and buffering issues. Edge helped to relieve congestion and improve all cost and performance KPIs.

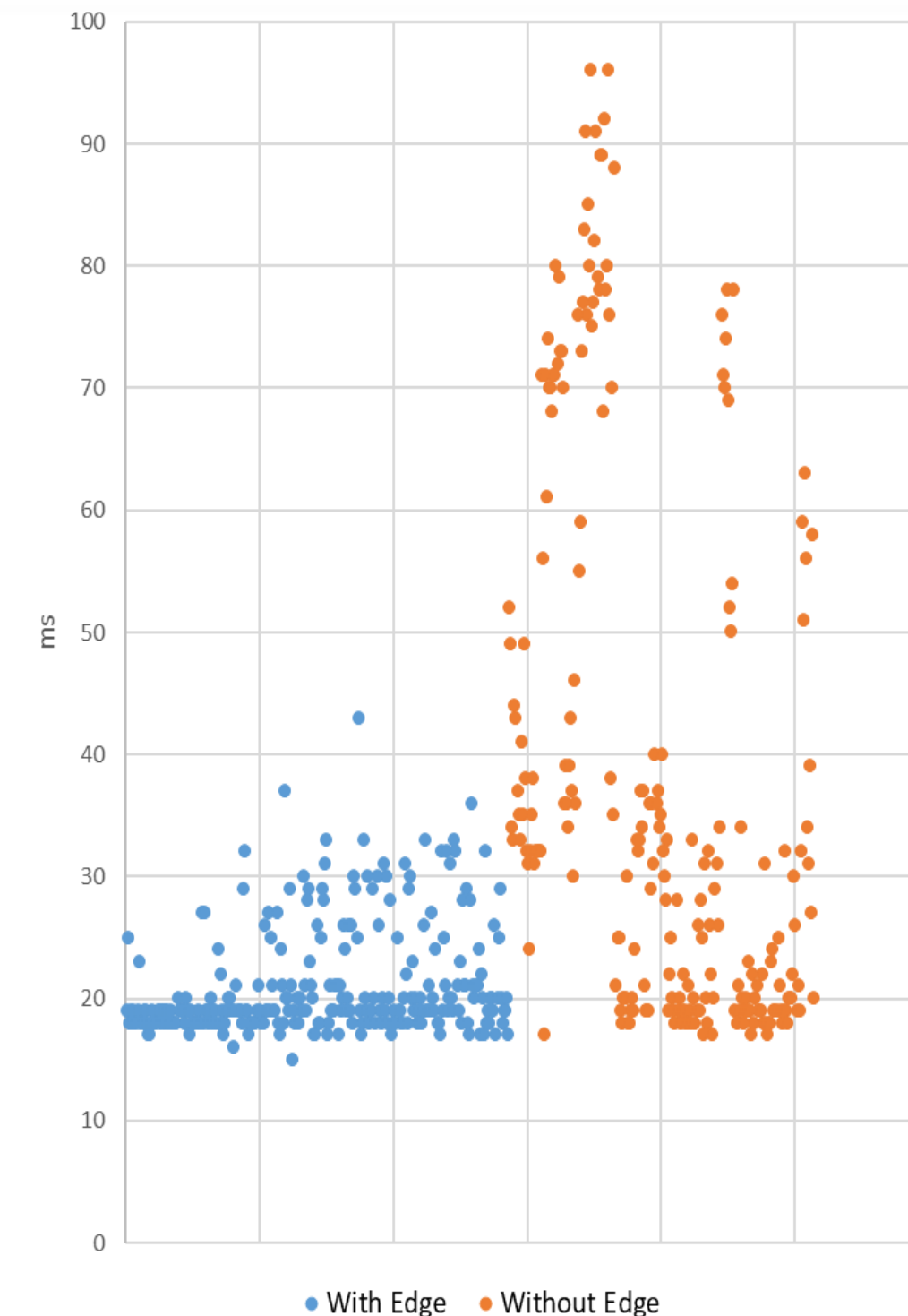
ADVERTISING: CLOUD VS. EDGE



Reduction in Latency leads to lower cost, new business models, and higher revenue streams

Analysis based on data from Tier-1 Mobile Operator

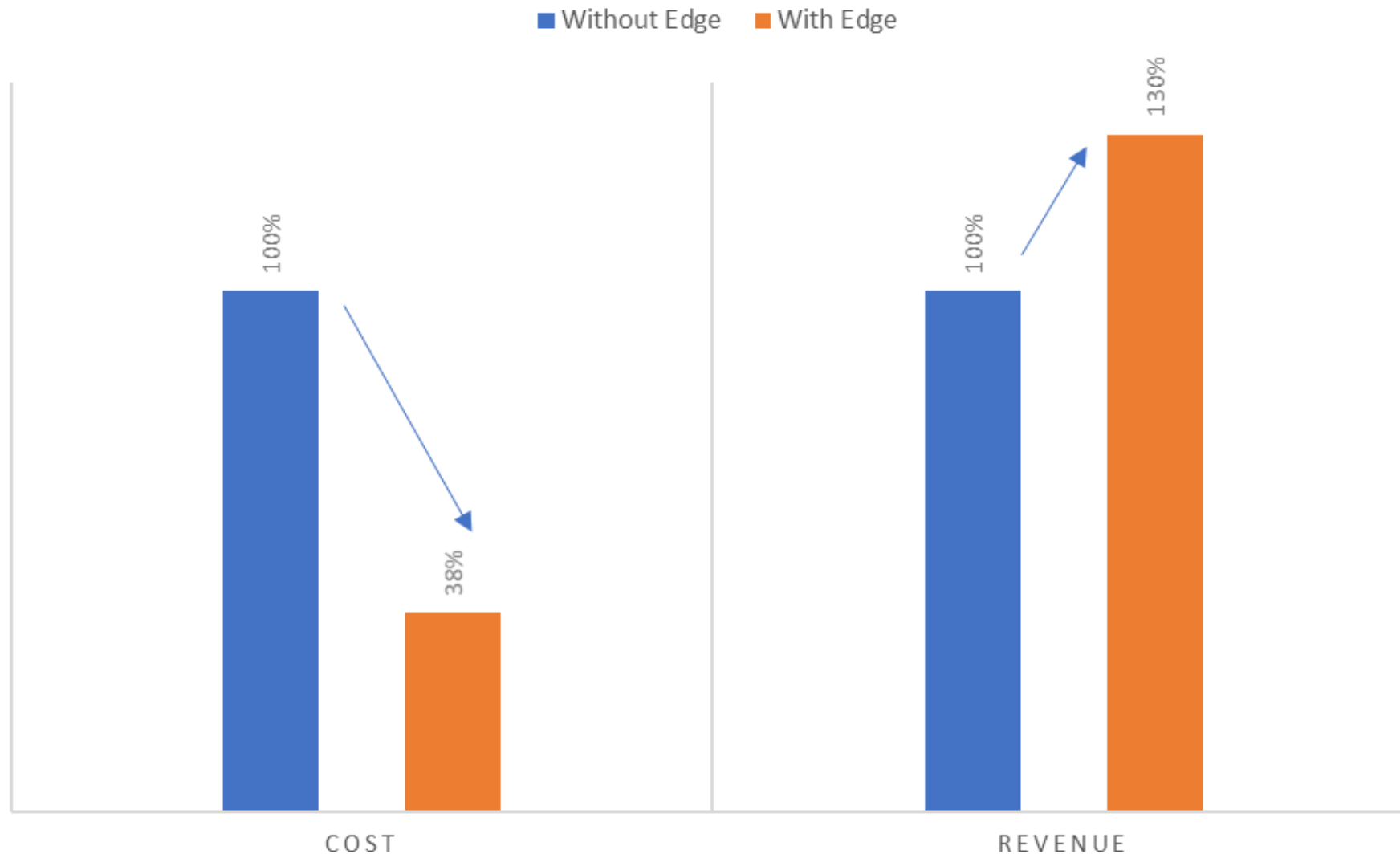
Network Latencies



Data from the field

Edge: Show me the money

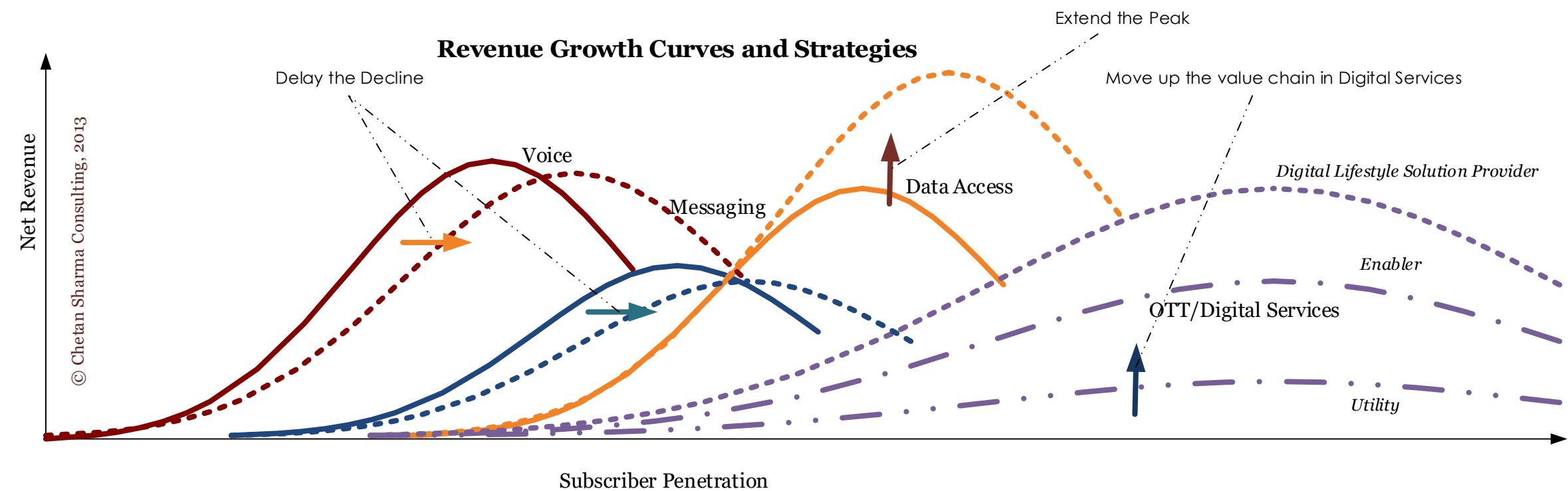
IMPACT OF EDGE ON OPERATOR ECONOMICS



- We looked deeply into an Edge implementation at a tier-1 global operator who was looking to solve some specific video streaming issues. There was a dramatic decrease in cost structure and significant improvement in revenue enabled by new business models and service packaging
- This model is quite replicable across different use cases, domains, and industries

Operator's Role in EdgeAI

- Enabler
- Platform Provider
- Service Provider

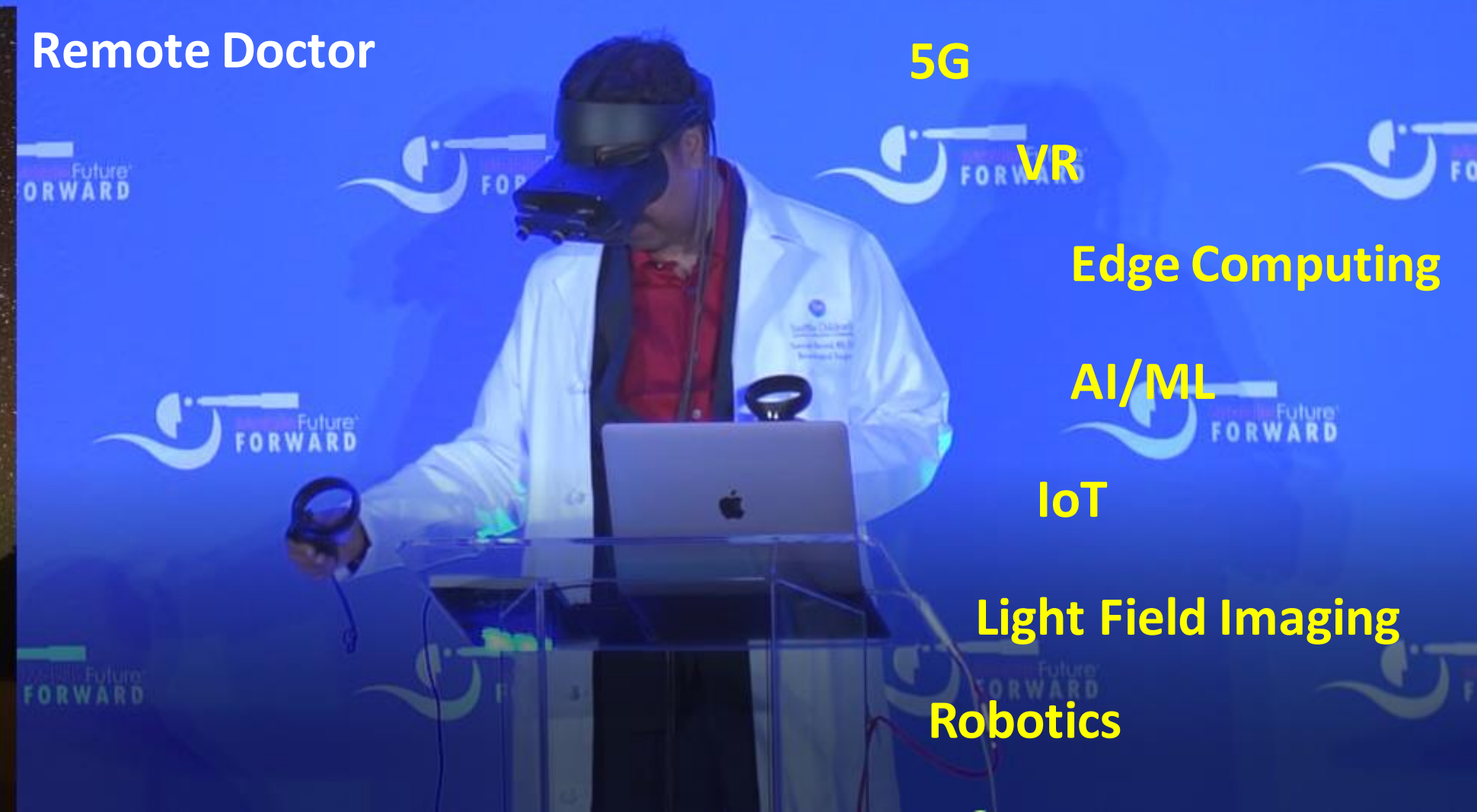
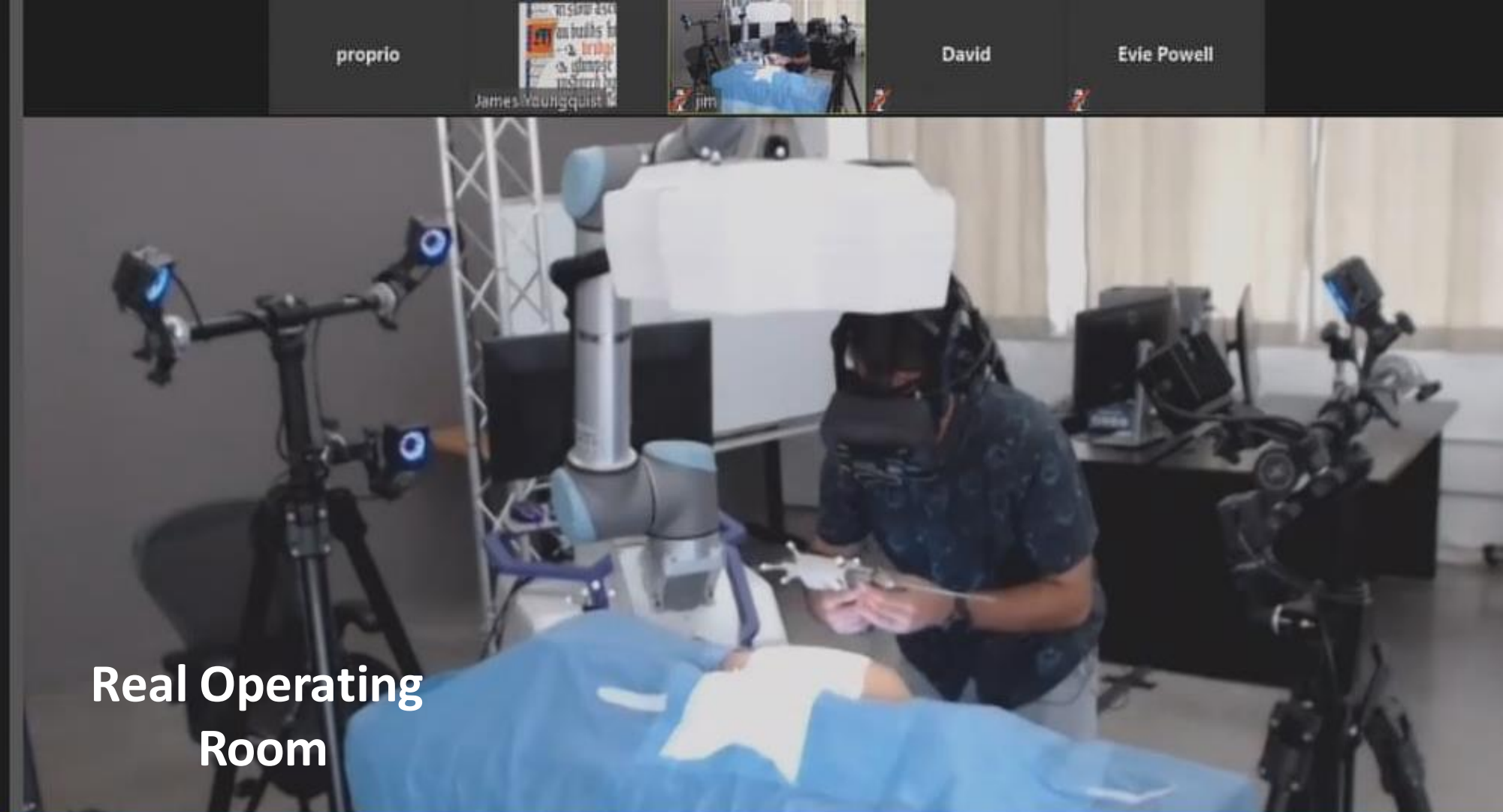
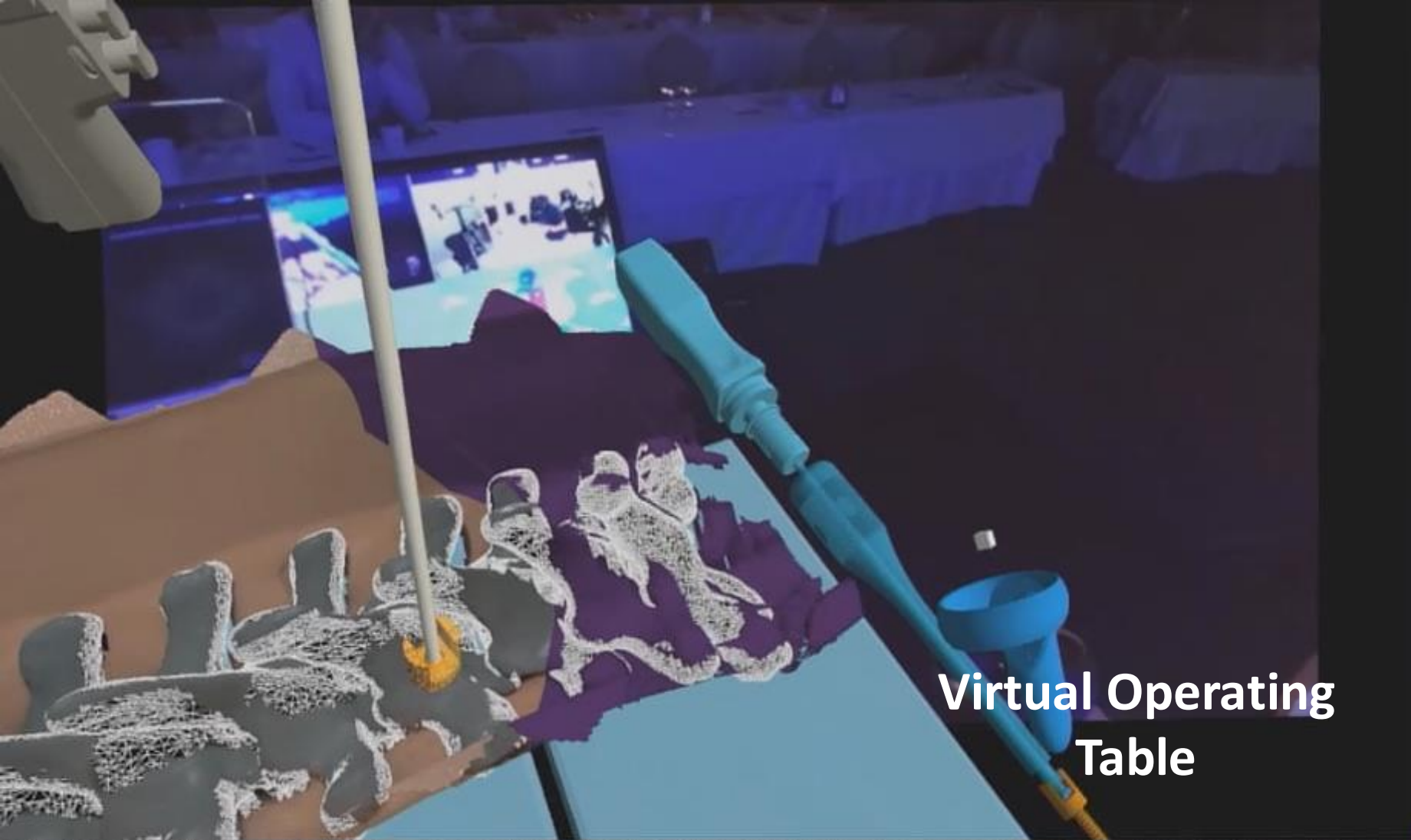


Edge AI Use Cases

We should think of Edge Internet Economy in two overlapping phases:

- Existing Use Cases
- New Use Cases

Existing Use Cases	New Use Cases
Advertising Network Operations Commerce Transportation Healthcare Smart Cities Agriculture Airlines/Airports Media and Entertainment Finance and Insurance	AR Games Cloud Gaming VR Entertainment Stadiums Sports Betting Enterprise – Drones Enterprise – Manufacturing Autonomous Cars Fleet Management Holographic Entertainment



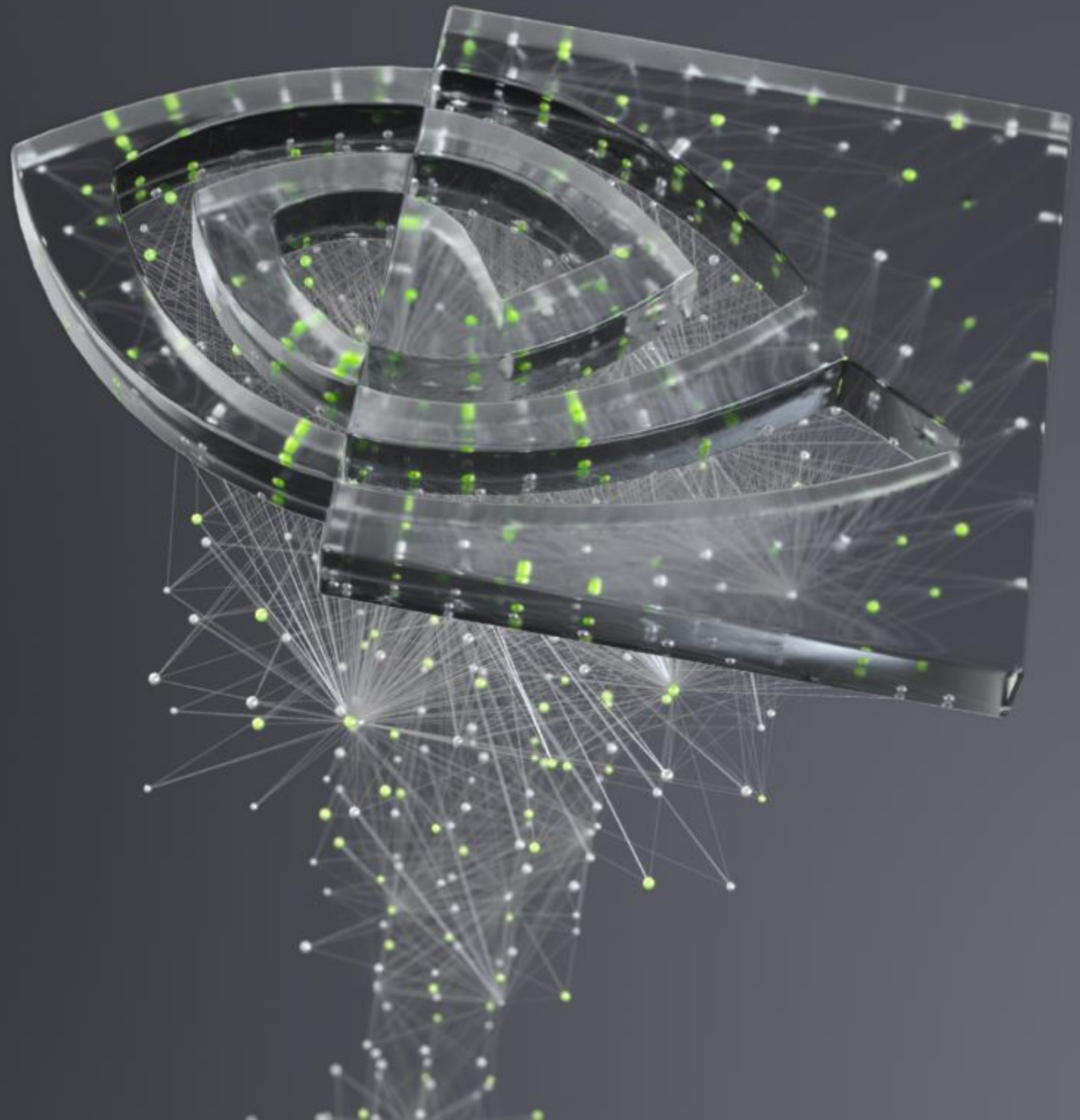
Mobile Operators: Way Forward

- There is no 5G Nirvana w/o the 4th Wave and Services revenue stream.
- Start building ecosystems and partnerships to understand and be part of the EdgeAI value chain beyond “access.”
- EdgeAI presents a remarkable opportunity to value-add to the 5G network.
- Market is likely to create hundreds of new revenue streams starting 2022-23. Get ahead of the curve.
- Put a plan in place and start experimenting.



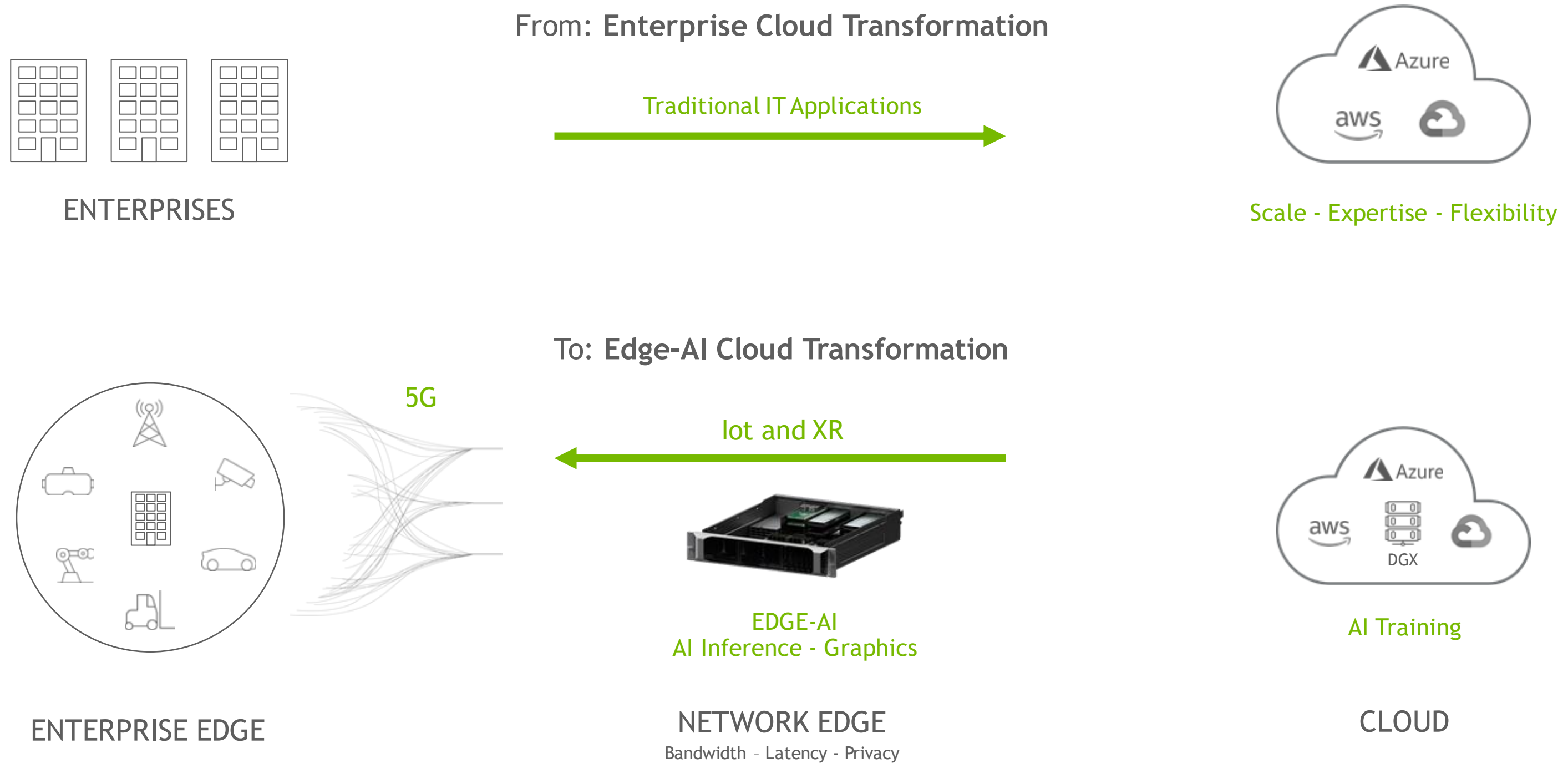
EDGE AI: NEW OPPORTUNITIES FOR TELCOS

Joao Gomes, Edge AI Global Leader, Telecom



EDGE AI

The Next Phase of Cloud Transformation



NVIDIA EDGE PLATFORM

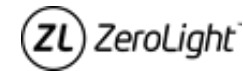
Creating a Large Application Ecosystem



ECOSYSTEM ADOPTION

Revenue Generation
with large Partner
Ecosystem

CLOUD XR / AR & VR

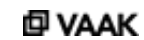


...

METROPOLIS / IVA



...



AERIAL / VNFs



...

STACK



...

SYSTEMS

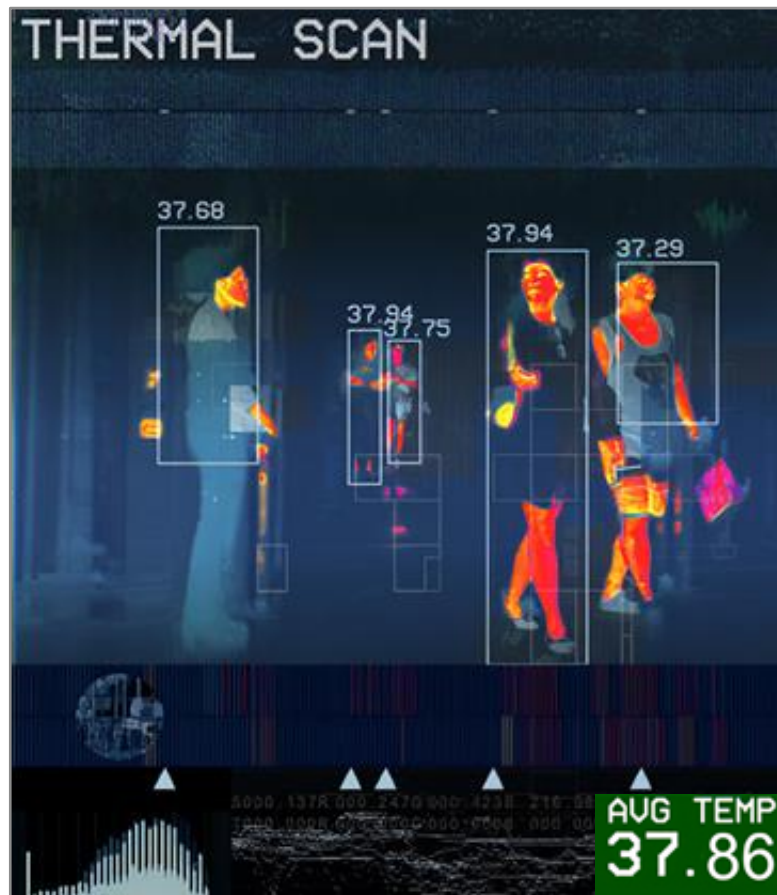


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Infrastructure

INTELLIGENT VIDEO ANALYTICS (IVA) APPLICATIONS

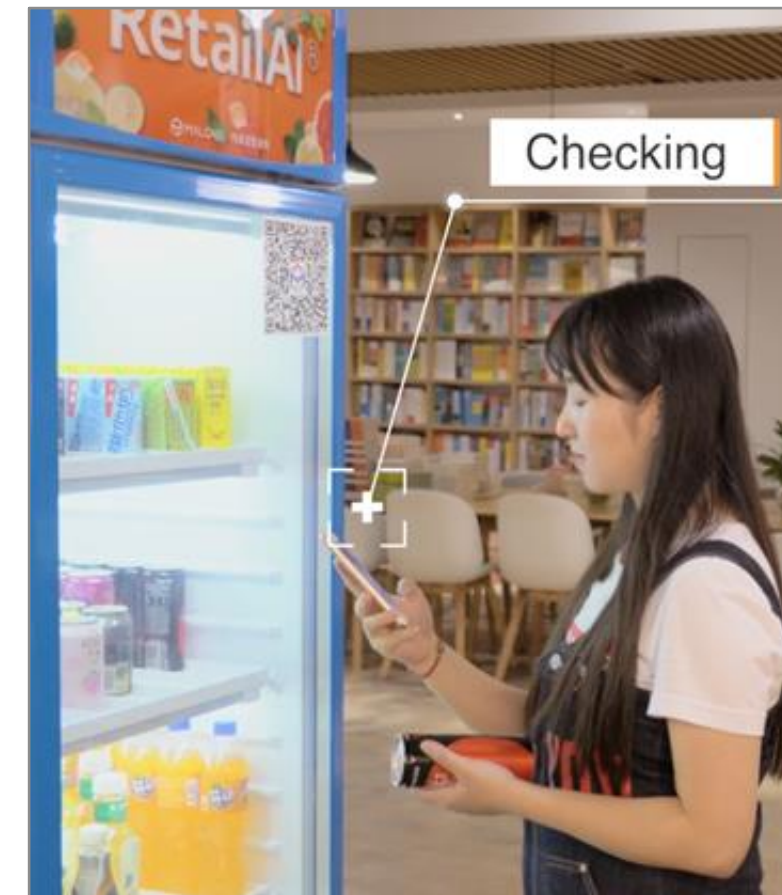
Edge-AI Use Cases



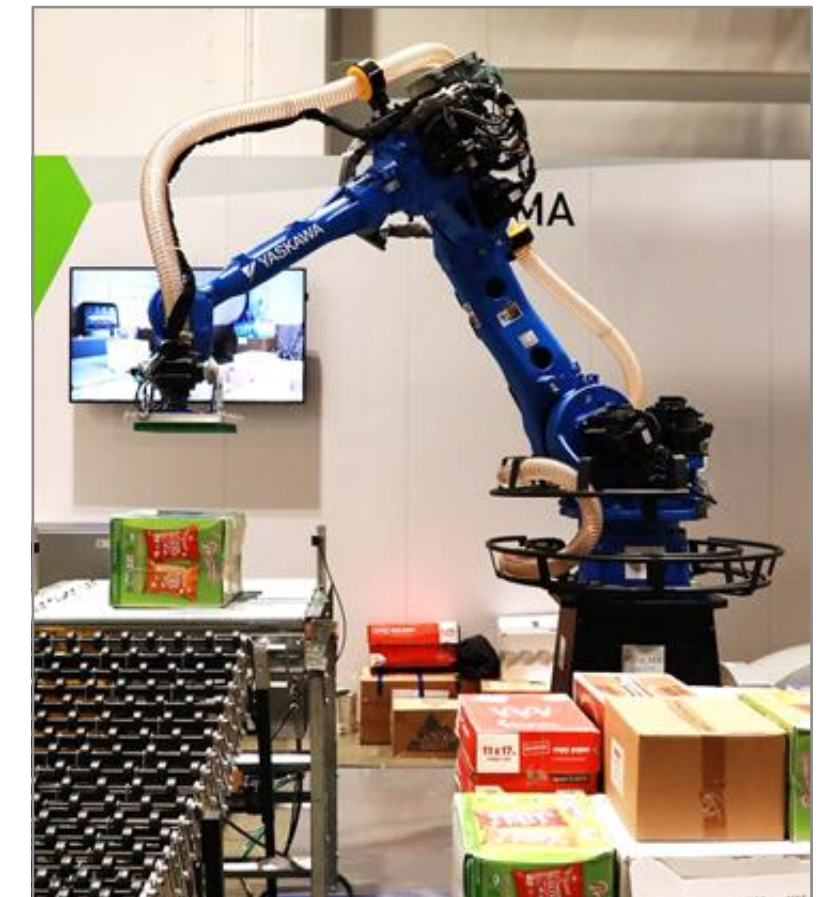
Safety for Business and Public Spaces
Touchless access control, social distancing enforcement, fever detection, occupancy density, etc



Smart Cities
Traffic Management, Convenience and Safety



Retail Intelligence
Self Checkout, Loss Prevention, Autonomous Shopping



Industrial Efficiency
Inspection, Robotics, Automation

INCREASING CONSUMER SAFETY IN RETAIL

Across the Customer Journey

ASSET
PROTECTION

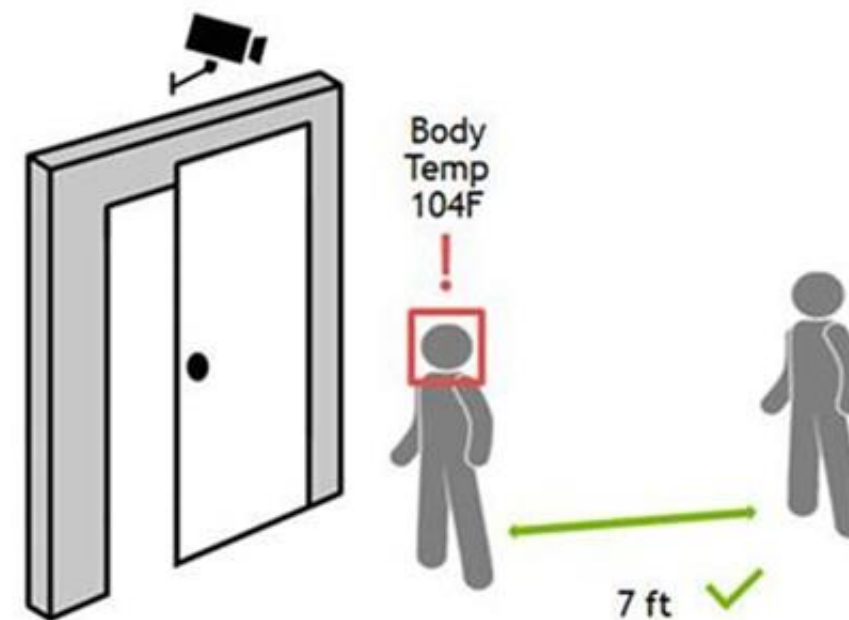
STORE
ANALYTICS

AUTONOMOUS
SHOPPING



Ticket Switching, Mis-Scanning and Theft Prevention
Self and Autonomous Checkout
Heat Mapping, Demographics and Stockout

SAFETY



Face Mask and Elevated Body Temperature Detection
Social Distancing, Crowding Detection

CURB PICK UP

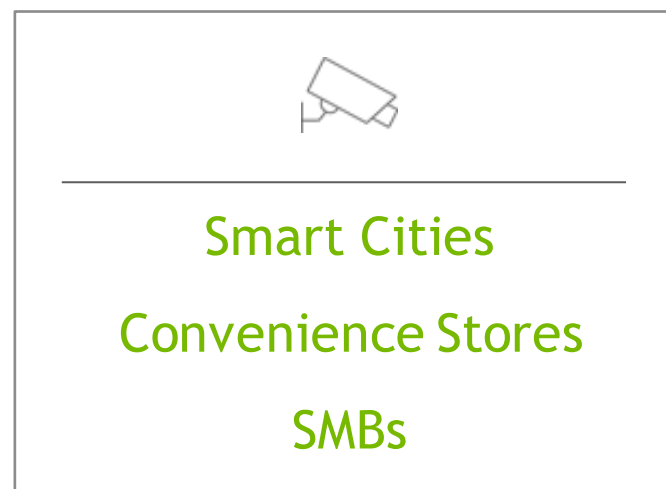


Car Plate Detection
Automated Delivery
Alert Store Associates to Fulfil Orders

EDGE-AI TELCO USE CASES

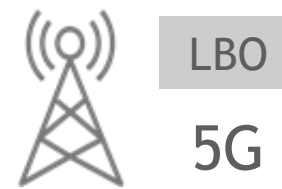
Intelligent Video Analytics (IVA) Applications

VERTICALS



Wireless

5G Connected Cameras

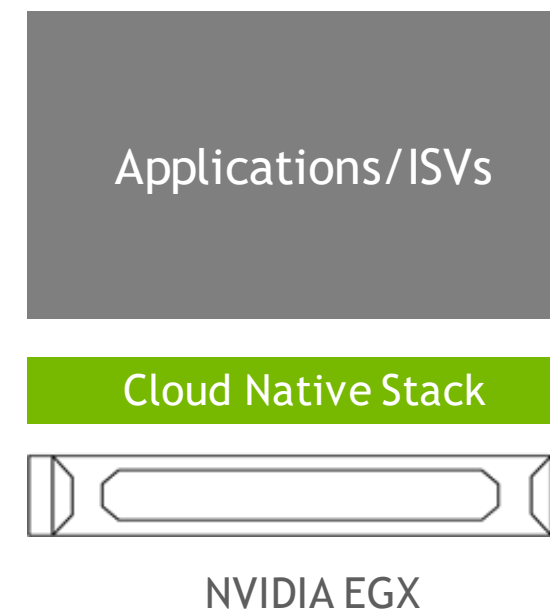


Wireline

Traffic Aggregation from 100's
of Thousands of Cameras

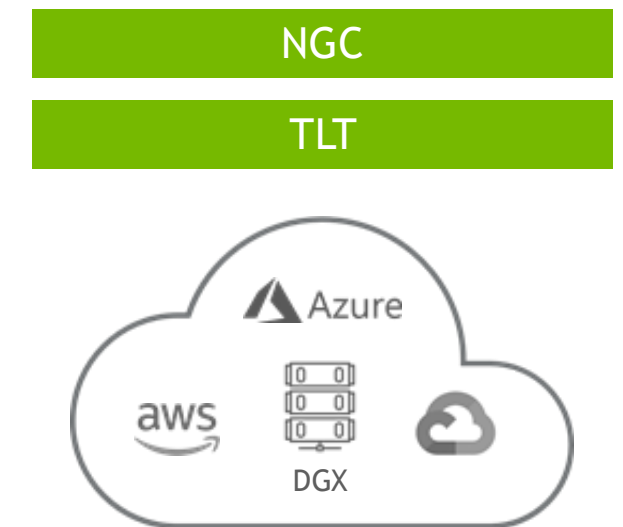
NETWORK EDGE

Video Inferencing



CLOUD/SERVICES

AI Training



PHOTOREALISTIC EXTENDED REALITY

Enterprise Use Cases — From Gaming to Professional Business Applications



Architecture



Engineering



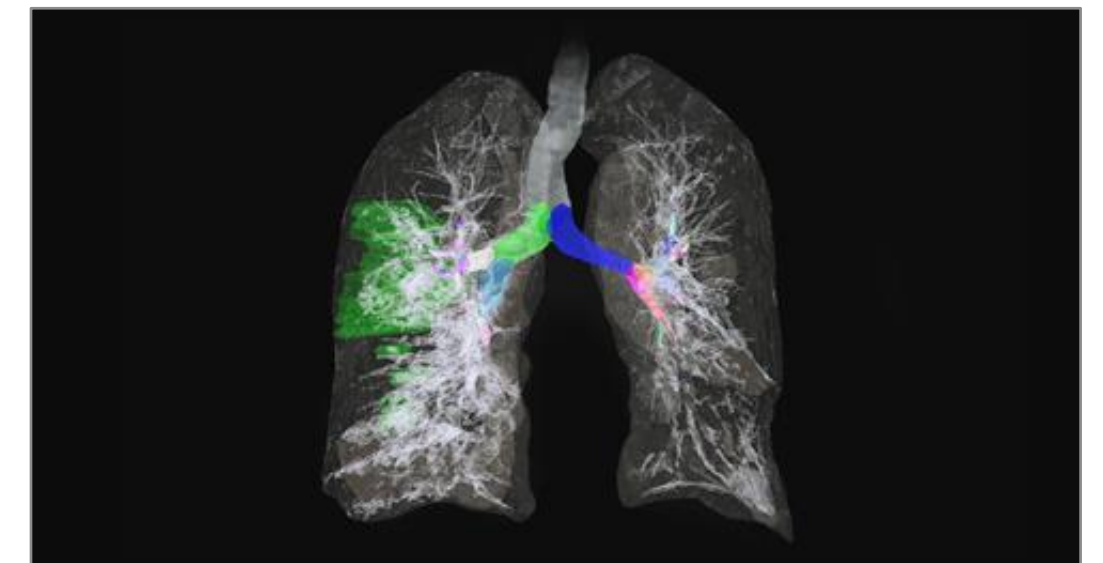
Design



Manufacturing



Immersive Virtual Meetings



Healthcare

FUNDAMENTAL XR CHALLENGES

VERY HIGH PIXEL RENDERING

+

MAINTAINING VERY LOW LATENCY

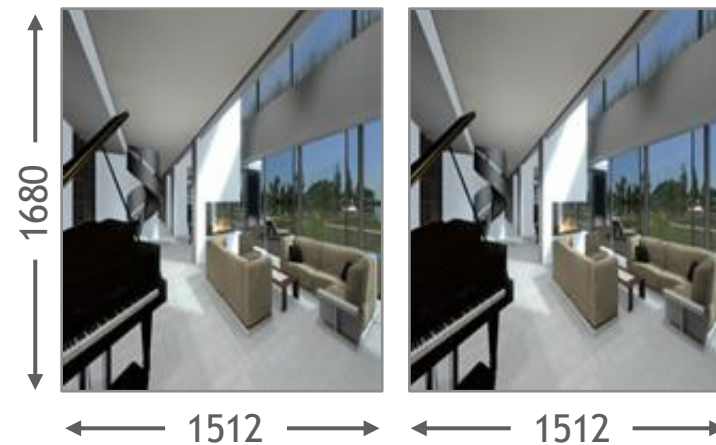
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TETHERED EXPERIENCE

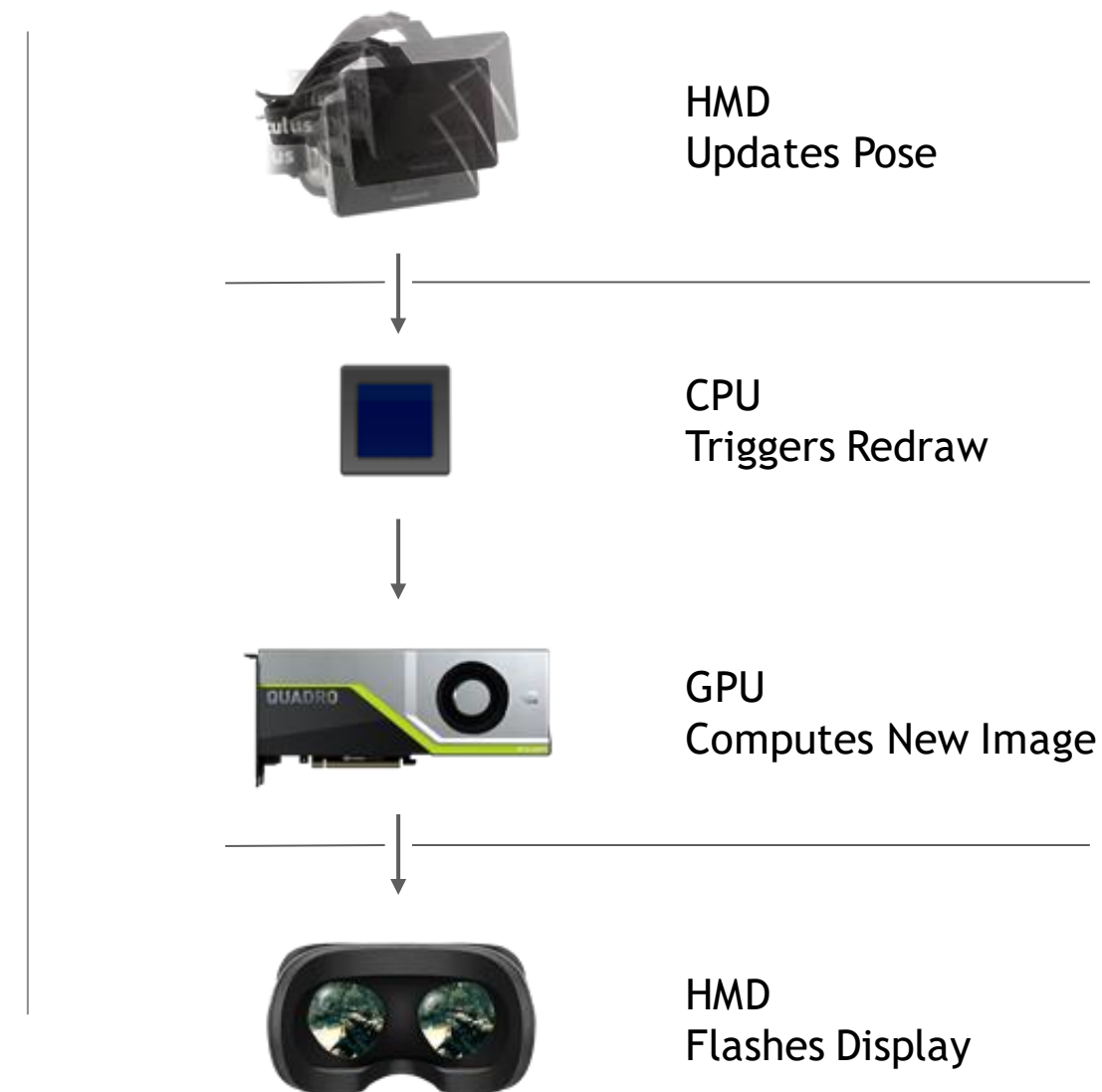
TRADITIONAL = 60 MP/S
(1920 X 1080 @ 30 FPS)



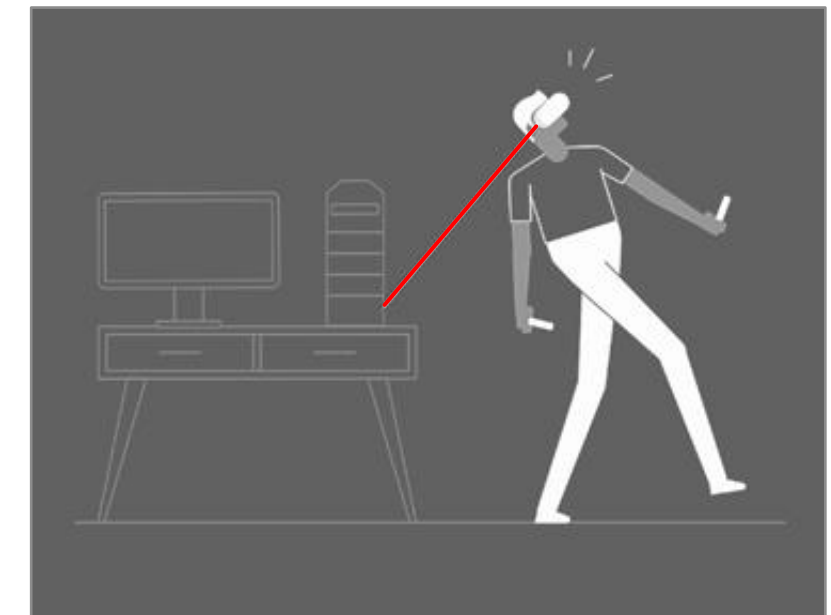
VIRTUAL REALITY = 450 MP/S
(3024 X 1680* @ 90 FPS)



Motion to Photon: ≤ 20 ms

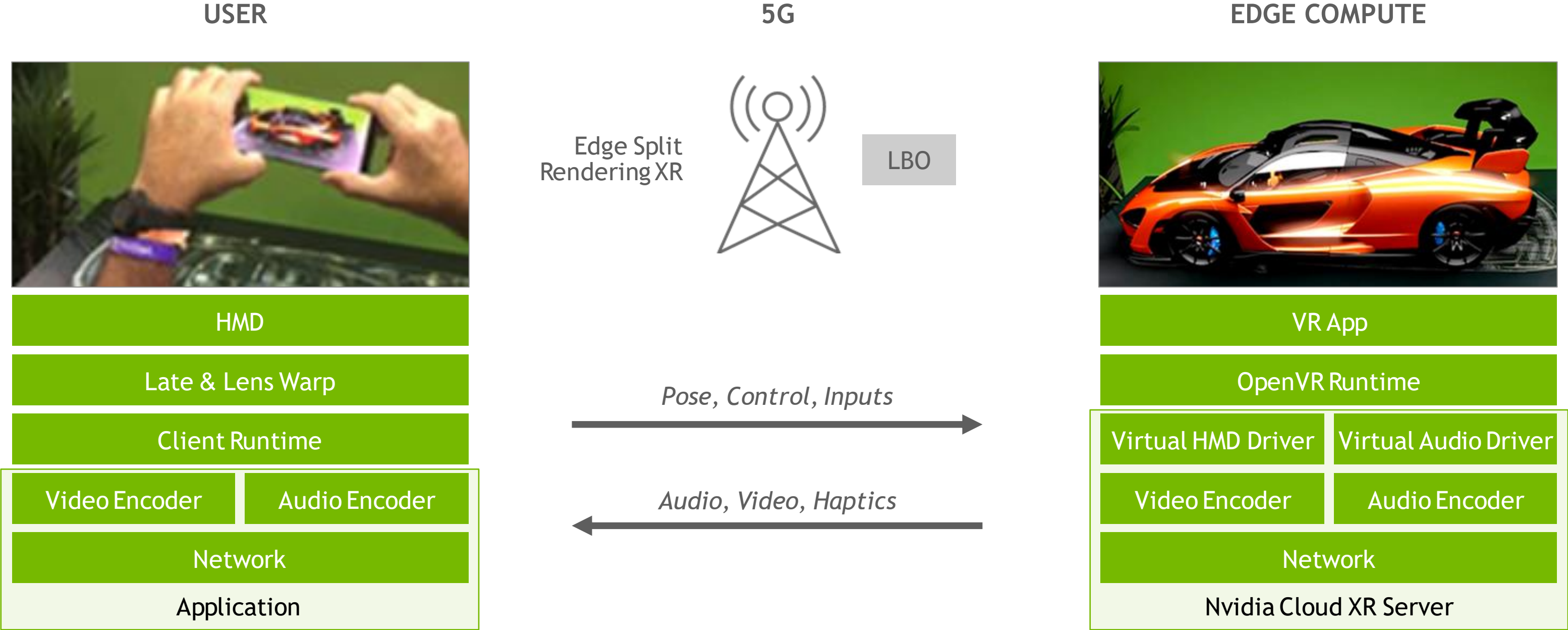


Constraining the Magic Spell Of XR



NVIDIA CLOUD XR™

5G “Killer Application”



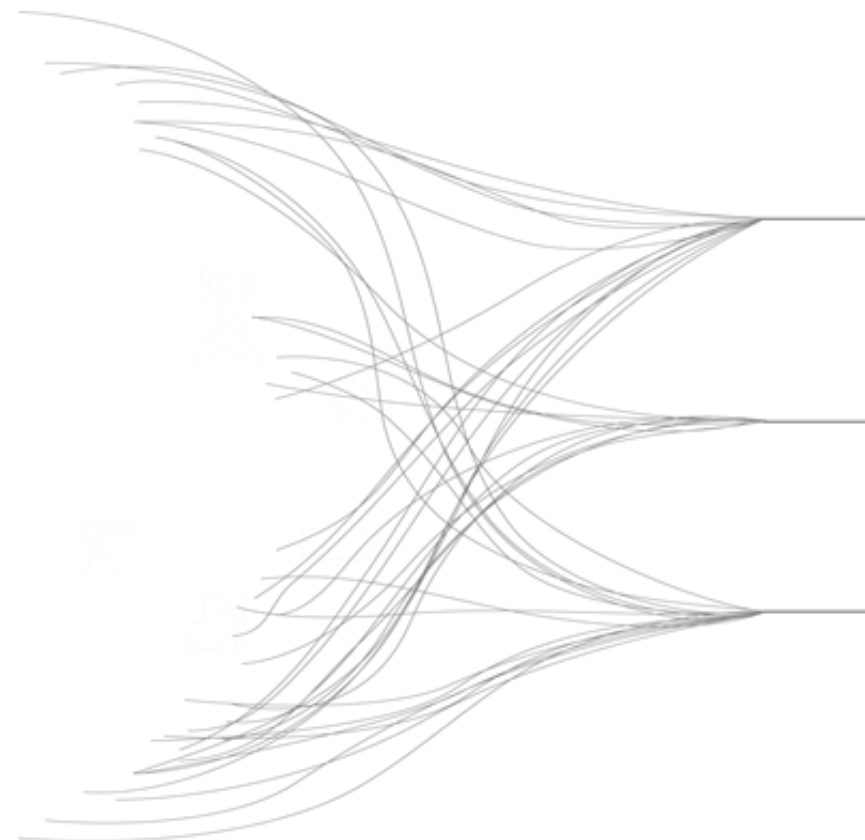
BRINGING PHOTOREALISTIC VR TO CAR DEALERSHIP

Boundless XR Over 5G Retail Experience

CAR DEALERSHIP



5G



TELCO EDGE COMPUTE



LBO

Qualcomm

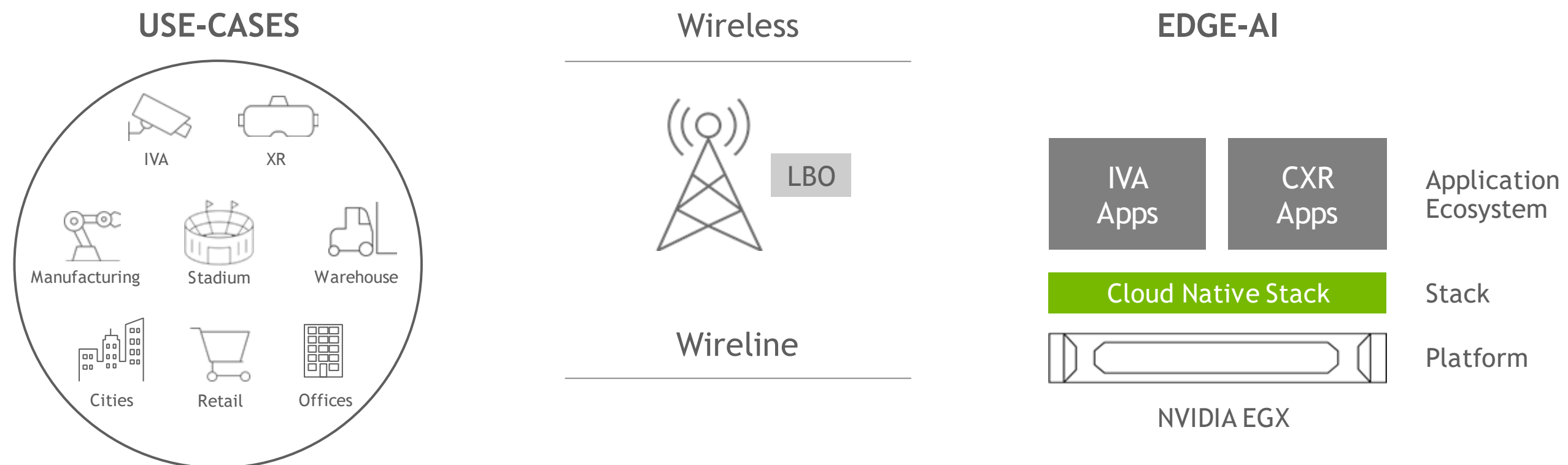
ZL ZeroLight™



NEW REVENUE OPPORTUNITIES

Telco EDGE-AI

- Edge is a new market opportunity driven by 5G, IoT and AI
- Edge-AI enables new customer experiences, improved safety and efficiency to all enterprise verticals
- Telcos are well-positioned to play a critical role





Q&A

