Wireless Global Congress

Wireless Broadband Alliance

Wireless Global Congress Americas

Tiago Rodrigues

President & CEO, Wireless Broadband Alliance

Moderator and CEO Welcome

Wireless Global Congress Americas

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Session Speakers

Cameron Dunn
AT&T

Dr. Sarper Gokturk
Airties

Dr. Derek Peterson
Boingo Wireless

Matt MacPherson
Cisco

Eric McLaughlin
Intel Corporation

Wireless Global Congress Americas

Time	Presentation
11:10 AM (CDT)	**Moderator and CEO Welcome** Tiago Rodrigues, President & CEO, Wireless Broadband Alliance
11:15 AM (CDT)	**In-Building & Wi-Fi Convergence** Cameron Dunn, Assistant Vice President, AT&T
11:25 AM (CDT	**Fireside Chat - Impact of Convergence in the Home and Enterprise - Near and Mid Term** Dr. Sarper Gokturk, VP of Innovations, Airties; Dr. Derek Peterson, CTO, Boingo Wireless.
11:55 AM (CDT)	**Fireside chat: How do Current Wireless Trends Transition in Real Terms for End Users and Customers** Matt MacPherson, Wireless CTO, Cisco; Eric McLaughlin, VP & GM Wireless Solutions, Intel Corporation.
12:35 AM (CDT)	COFFEE & NETWORKING

Wireless Broadband Alliance Services

WBA Services Automated Frequency Coordination (AFC)

21st May 2025

WBA LAUNCH AS AFC OPERATOR

Wireless Broadband Alliance Services

FCC US Telecoms Regulator certified AFC operators to control Wi-Fi devices in the 6 GHz bands using Automated Frequency Coordination (AFC) for standard power to protect incumbent operations

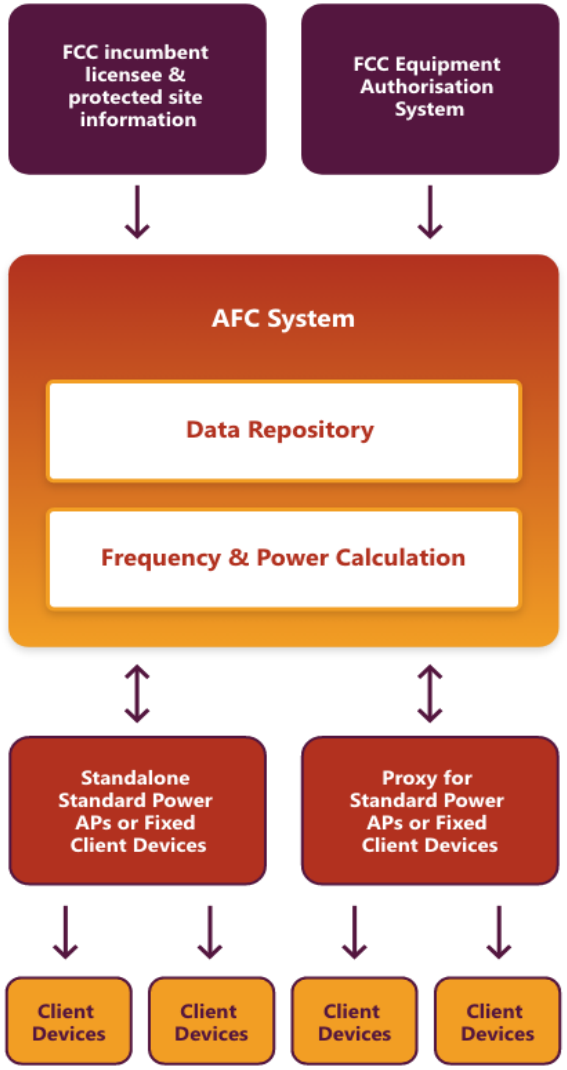
Apr 2020	Nov 2022	Dec 2023	Feb 2024	May 2025
FCC announces creation of AFC operators	FCC grants WBA conditional approval	WBA completes certification	FCC certifies WBA as an AFC operator	WBA Services created and launch AFC service

AFC Operators in the U.S. must be approved by the FCC.

WBA SERVICES AFC – How It Works

Wireless Broadband Alliance Services

- To operate at standard power devices must send daily request messages to its designated AFC
- AFC performs interference analyses in the geolocation of the device.
- AFC sends a response message back to the device specifying the channels/frequencies it can operate at and the maximum allowable power over each channel/frequency.



AFC device register/request for spectrum

Data Registration requires: Geographic coordinates (latitude and longitude referenced to North American Datum 1983 (NAD 83)); antenna height above ground level, FCC identification number, and unique manufacturer's serial.

AFC - Validates device FCC ID

AFC - registers, authenticates, and authorizes devices

AFC - determines the available frequencies in steps of no greater than 3 dB below the maximum permissible e.i.r.p of 36 dBm, and down to at least a minimum level of 21 dBm

AFC - applies propagation models and protection criteria provided in Section 15.407(l) and (m)

AFC - implements international agreements

Daily re-check by devices/proxies

Upon request, registered devices/proxies must receive from the AFC a list of available frequencies and the maximum permissible power in each frequency range at the standard power access point and fixed client device's location

SERVICES FOR WBA MEMBERS & CUSTOMERS

Wireless Broadband Alliance Services

- **WBA Services AFC - a cloud service that all your Access Points communicate with**
  - Complies with FCC regulations
  - Based on Open AFC Specification
  - Returns usable channels/frequencies and allowable power levels
- **AFC Support Options**
  - Interference Incident Response: Engineering and analysis to respond to interference incidents and mitigate impacts.
  - Access Point Deployment Planning & Analysis: Survey analysis, implementation assessment, risk assessment, interference mitigation.
- **Enhancement Options**
  - Developing custom software, simulation, or analysis capability to support unique needs (e.g., increase accuracy, reduce interference risk)

WHY WBA SERVICES AFC

- The Wireless Broadband Alliance (WBA) has over 20 years of experience advancing Wi-Fi globally.
    - WBA Inc. Non-profit industry body founded in 2003
    - WBA Services Commercial unit delivering AFC services to the market
- While operated separately, both divisions share a deep commitment to advance Wi-Fi.
- Whilst WBA Services AFC is a commercial service, embedded in our DNA is delivering quality services that support industry standards to our customers at affordable prices
- WBA Services, is a wholly owned subsidiary of WBA Inc. (Non-profit industry body) - we are committed to continue to work to ensure your success.

Wireless
Broadband Alliance
Services

wballianceservices.com

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Wi-Fi Innovation: Connecting Our Digital World

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Cameron Dunn

Assistant Vice President, AT&T

In-Building & Wi-Fi Convergence

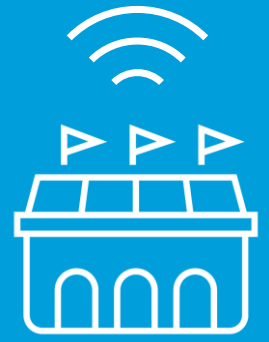
In-Building & Wi-Fi Convergence

Cameron Dunn, AVP In-Building Solutions
AT&T Network Planning & Engineering

May 2025

Provide AT&T subscribers with ***In-Building access*** through creation and support of best cost structures via:

1. In-Building Investment Strategies
2. Negotiation & Vendor Management
3. Alternative Technologies



AT&T

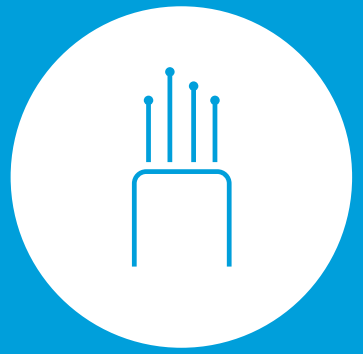
In-Building Solutions

Distributed Antenna Systems (DAS)

Tier 1-2-3 venues (leased & owned)

Very expensive and long technology roadmap

Need for alternative, cost-effective technologies



Alternative Technologies

Wi-Fi & Neutral Host

Grow Passpoint footprint (roaming, owned, DePIN)

Cost-effective supplement or alternative to DAS

Convergence Challenges

Seamless switching between Wi-Fi networks remains difficult

Customers must be on the best available network

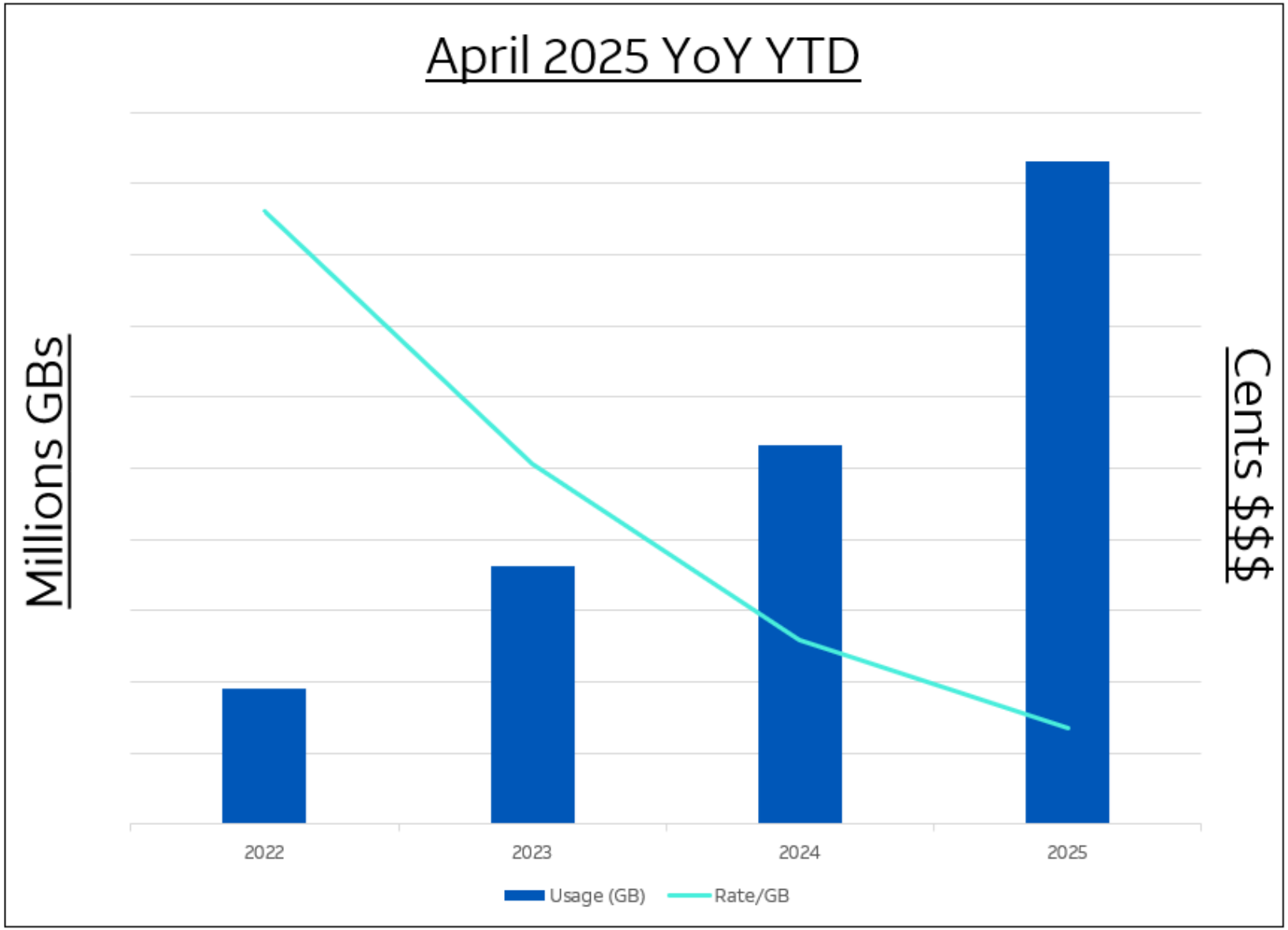
Investments in QOS needed

AT&T

Wi-Fi: A Key Pillar of In-Building Strategy

AT&T

Wi-Fi Roaming – Growth and Cost



Venue Type	Count
Retail Store	5,788
Restaurant	2,896
Office Building	1,512
Grocery Market	1,194
College	643
Recreational Centre	221
Medical Building	153
City Park	117
Hotel	117
Apartment Building	94
Military	69
Stadium	52
Airport	36
Campground	9
Casino	8
Marina	5
Bus or Boat Terminal	1
Subway	1
Grand Total	**12,916**

AT&T

Thank you!

AT&T

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Fireside Chat - Impact of Convergence in the Home and Enterprise - Near and Mid-term

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Fireside Chat: How do Current Wireless Trends Transition in Real Terms for End Users and Customers

Matt MacPherson

Wireless CTO, Cisco

Eric McLaughlin

VP & GM Wireless Solutions,
Intel Corporation

cisco | intel®

Fireside Chat:

How Do Current Wireless Trends Transition in Real Terms for End Users and Customers

Eric McLaughlin
VP, Connectivity Solutions, Intel Corp.

Matt MacPherson
Wireless CTO
Cisco

Decades of Collaboration

Across Many Vectors

1. Standards and Regulatory

2. Product Leadership

3. Innovation

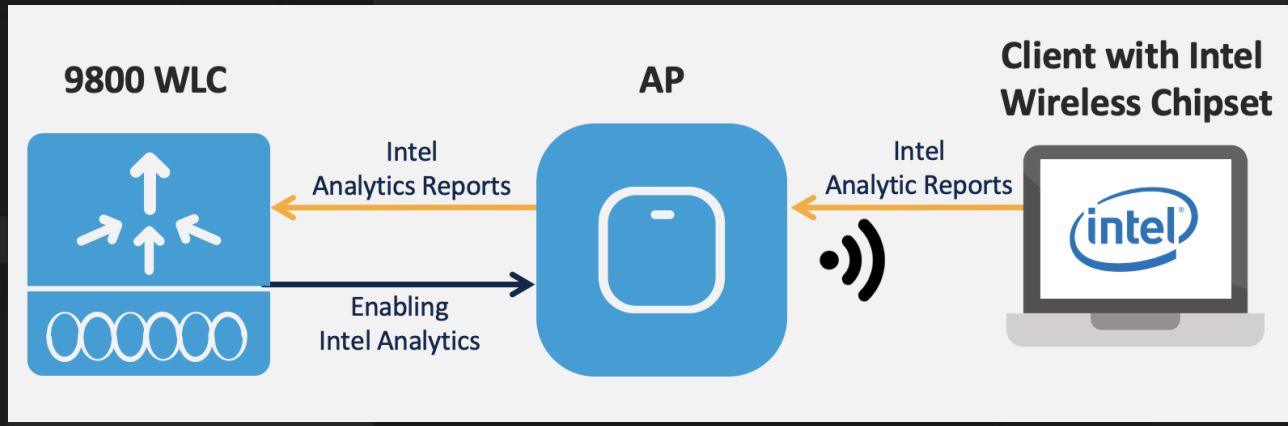
4. Industry Influence

CISCO CCX

SU Throughput
DL OFDMA
UL OFDMA
DL MUMIMO
11mc FTM Ranging
Location Based Services
Concurrent Dual Band
Dynamic B/W
SMPS
Tx burst operation
Multi-AP coordinated spatial reuse
.11az, Wi-Fi Sensing, UWB
QoS
....
....
....

Wireless TSN

Telemetry Analytics

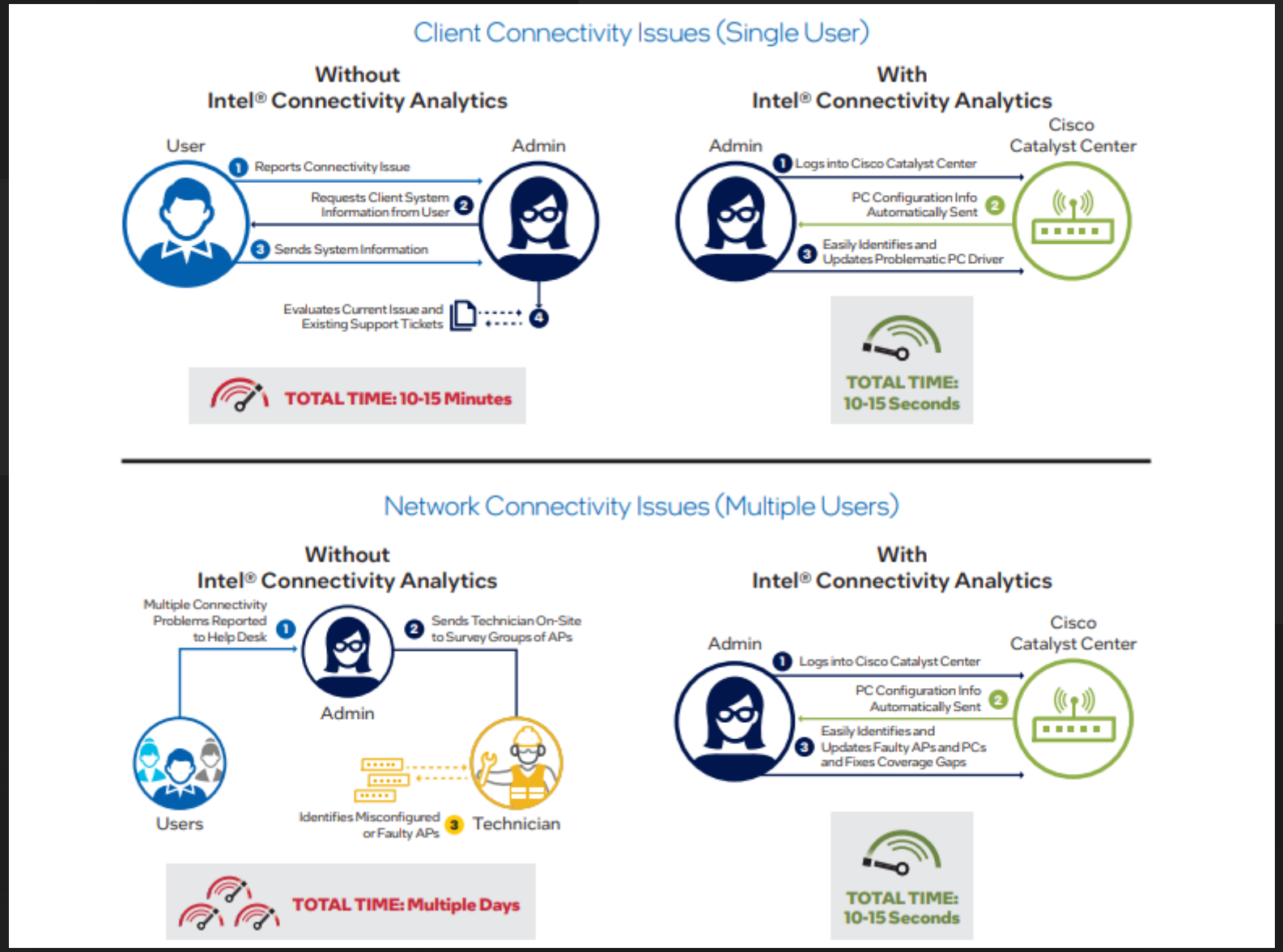


OpenRoaming

Recent Example

Collaborating for real end-user benefit

Conclusion Intel IT played a pivotal role in the collaboration between Intel's Connectivity Solution Group and Cisco. We use Intel Connectivity Analytics to improve the Wi-Fi network UX and network management efficiency. The solution's insights enhance network manageability, expedite troubleshooting, reduce MTTR, and deliver better overall network management total cost of ownership. The broader set of real-time data supports more sophisticated AIOps models that predict and self-heal client issues, ultimately resulting in a better UX.




cisco
intel

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NETWORKING LUNCH
BE BACK IN 55 MINUTES AT 1:30 PM CDT

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Steve Andrews

TMT Chairman/NED, Board Advisor & Investor,
WBA Board Advisor

Moderator Welcome

Wireless Global Congress Americas

Session Speakers

G S Sickand
COX Communications

Mittal Parekh
RUCKUS Networks

Eric McLaughlin
Intel Corporation

Vijay Venkateswaran
C3Spectra

Dr. Sarper Gokturk
Airties

Huw Rees
NetExperience

Joey Padden
Helium

Stewart Goumans
Ekahau

Robert Lamb
Aprecomm

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Time	Presentation
1:30 PM (CDT)	**Moderator Welcome** Steve Andrews,TMT Chairman/NED, Board Advisor & Investor
1:35 PM (CDT)	**Transforming the In-home Connectivity Landscape** GS Sickand, Vice President Engineering, Cox Communications
1:50 PM (CDT	**Evolving Role of AI in Converged Network Management - From Planning to Support and From Cloud to the Edge** Mittal Parekh, Senior Director, Product Marketing, Ruckus Networks
2:10 PM (CDT)	**Connectivity Convergence: Uniting Technologies for a Flawless Consumer Experience** Eric McLaughlin, VP & GM Wireless Solutions, Intel Corporation
2:30 PM (CDT)	**Geo-Spatial AI-Driven Wi-Fi 7: Unlocking the Full Potential of 6 GHz for Next-Gen Connectivity** Vijay Venkateswaran, Head of Strategy and Business Development, C3Spectra
2:45 PM (CDT)	**PANEL: Unlocking Reliable Wi-Fi Connectivity For the Modern Consumer** Dr. Sarper Gokturk, VP Innovation, Airties; Huw Rees, Vice President Of Business Development, NetExperience; Joey Padden, VP of Network Architecture, Helium; Robert Lamb, Global VP Sales, SVP Strategy & Partnerships, Aprecomm; Stewart Goumans, Community & Customer Engagement Director, Ekahau.
3:30 PM (CDT)	**COFFEE & NETWORKING**

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GS Sickand

Vice President Engineering, Cox Communications

Transforming the In-home Connectivity Landscape

Operator Perspective: Transforming the in-home connectivity landscape

May 21, 2025

Presented by:

GS Sickand

Wireless Engineering

Cox Communications, Inc.

COX ENTERPRISES

Privately Held & Family-Owned

Founded in 1898 by Ohio Governor James M Cox
120+ Years of Innovation & Technology Leadership

COX

Largest privately held telecom company in the U.S.

COX BUSINESS

COX MEDIA

COX AUTOMOTIVE™

World leader in vehicle remarketing services and software for automotive dealers and global consumers

KELLEY BLUE BOOK OFFICIAL GUIDE

Autotrader

Dealertrack

Manheim

COX ENTERPRISES | NEW VENTURES

Cleantech | Healthcare | Esports

BRIGHT FARMS

iorahealth

SIERRA ENERGY

CARBON LIGHTHOUSE

ATLANTA REIGN

Cox Prosight℠

Cox Edge

ATLANTA FAZE

Cox Private Networks

COX HOTSPOTS

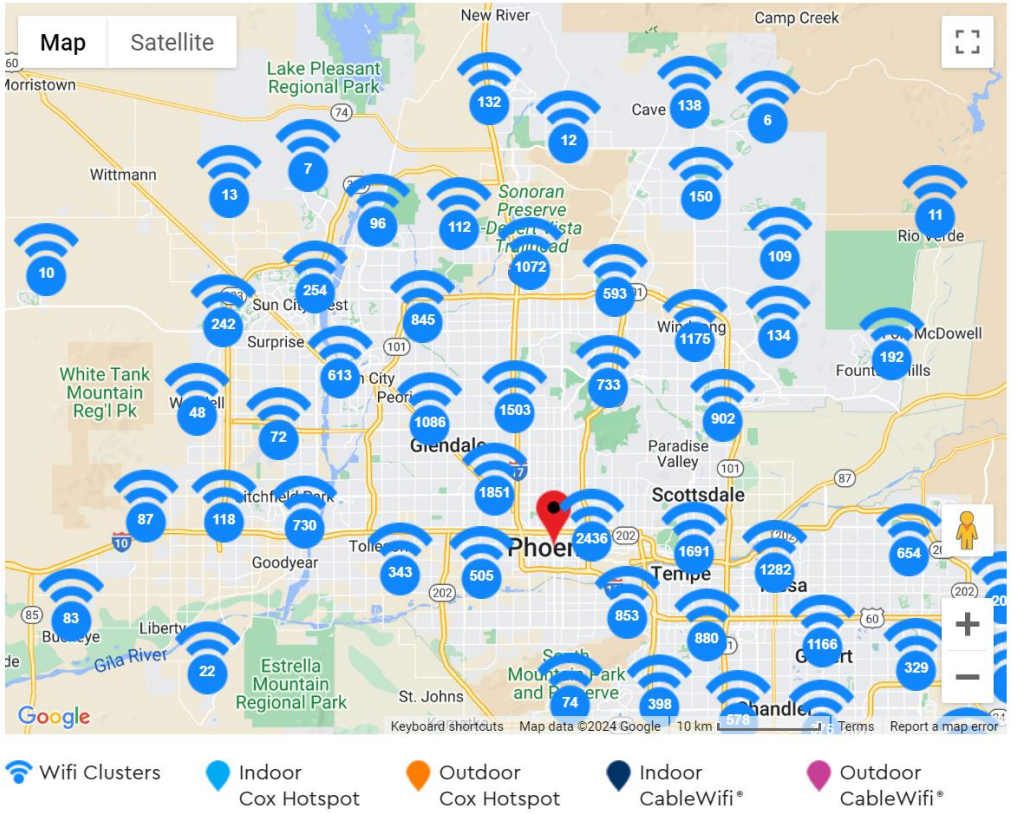
Wi-Fi where you need it

Cox Hotspots provides access to four million Wi-Fi hotspots nationwide for all Cox Internet customers at no additional charge.

- You can take Cox Internet with you when you leave home.
- Cox Hotspots provide fast, wireless, on-the-go internet connectivity for your tablet, smartphone, or other Wi-Fi enabled devices.
- Access more than four million hotspots to help you save on your wireless data plan
- Cox Hotspots are available in all Cox markets at the following outdoor and indoor venues. Find locations near you at our Cox Hotspots page.

Cox Hotspots are available in all Cox markets at the following outdoor and indoor venues.

- Central business districts where people often eat, shop, and socialize
- Waiting areas in professional small and medium size businesses
- Residential multi-dwelling unit (MDU) common areas, including the pool area, lobby, and recreational playground and parks
- Cox Retail Stores



RESIDENTIAL: WHAT'S WORKING?

Improvements

- 802.11 evolution, speed continues to improve
- More spectrum, more capacity - release of 6GHz is huge!
- Wi-Fi7 (be) adoption will continue to enhance customer experience – speed, latency, capacity, security
- Solutions are more easily integrated into operator dashboards/systems
- BYOD devices are more intelligent handling roaming, stickiness, near-far situations, etc. better than in the past

SPEED AND SPECTRUM ON THE HORIZON

Increasing User Speeds and Experience

- Wi-Fi is still typically the bottleneck – the last bridge to the **INTERNET!**
- User demands continue to grow
- More customer devices(UEs) are connecting to the network
- More APs being deployed
- More bandwidth @ wider channels == more contention across even the new spectrum…

Help on the Horizon

- 6GHz adoption, Wi-Fi 7 –wider channels, Higher QAM, MLO, MRU & Puncturing
- Wi-Fi 8 future to better use of spectrum, UHR, Deterministic latency, cellular integration etc.
- QoS, guaranteed throughput and security to effectively communicate with 3GPP technologies
- **MORE, MORE, MORE…** continue to advocate for more spectrum and better performance to stay in front of user demands

UE OPPORTUNITIES

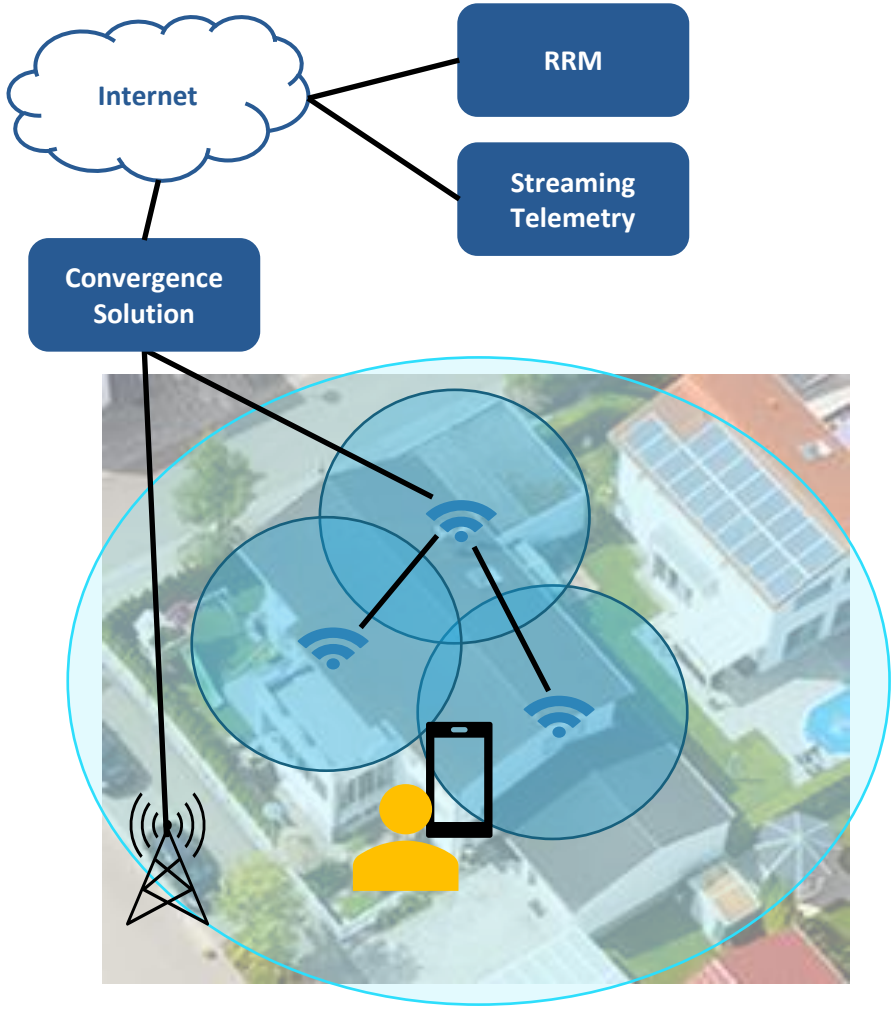
Device Intelligence and Influence

- Wi-Fi and Cellular convergence
- Algorithm should aim to enhance the user experience and reliability
- Provider influence of connection choices
- Network influence based on congestion

Experience Visibility

- Operator visibility to UE experience
- Should apply to Mobile, Hotspot and Guest users
- Should be standards-based
- Should be device agnostic

OPERATOR OPPORTUNITIES



Raise the Residential Bar

- RRM (intra and inter-home)
- More APs less extenders
- Enhanced roaming/transition decisions
- Cellular/Wi-Fi Convergence/transitions
- Improved solution alignment across products (Res and SMB share APs, stepping up to Medium/Enterprise, etc.)
- Improved provisioning/automation alignment

Streaming Telemetry Driven Reliability Analytics

- Know the customer experience as well as the customer (Wi-Fi performances defines Cx)
- Help and enable the customer self-solve
- Identify pain-points and trend to **Proactively** isolate Network Issues – bugs/defects, outages or performance
- Partner with device manufacturers

RELIABILITY IS THE FOUNDATION OF OUR SERVICES – NOT OPTIONAL


COX
Bringing us closer

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Mittal Parekh

Senior Director, Product Marketing, Ruckus Networks

Evolving Role of AI in Converged Network Management

- From Planning to Support and From Cloud to the Edge

RUCKUS®
COMMSCOPE

Evolving role of AI in converged network management - from planning to support and from cloud to the edge

21 May 2025

Mittal Parekh

Senior Director, Product Marketing and Technical Marketing

A New Era of Networking is Upon Us!

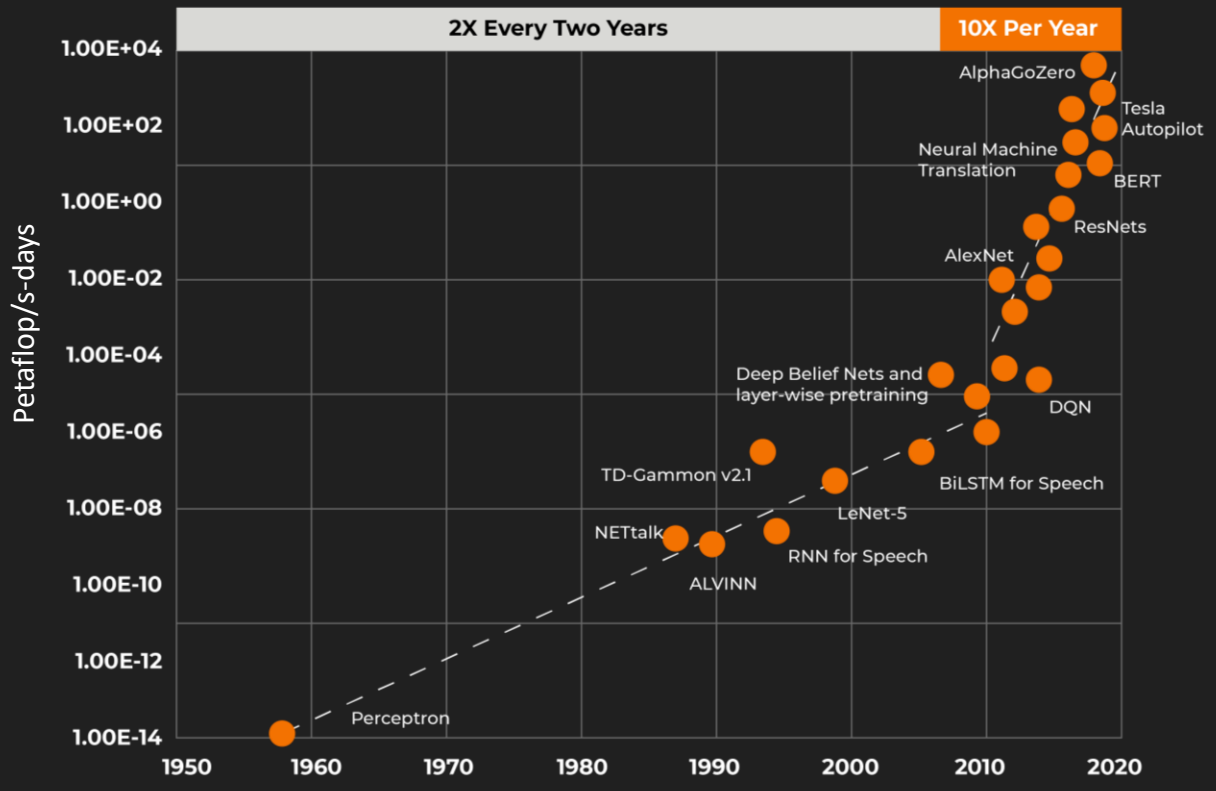
- Modern Networks are getting ***more diverse and complex***
- IT is getting ***leaner***
- It's all about ***SLAs*** and ***accountability***
- Service Disruptions are getting ***costlier***
- Helpdesk is getting ***costlier to manage***
- Subject Matter Expertise (SME) is getting ***expensive***

YOU have a choice

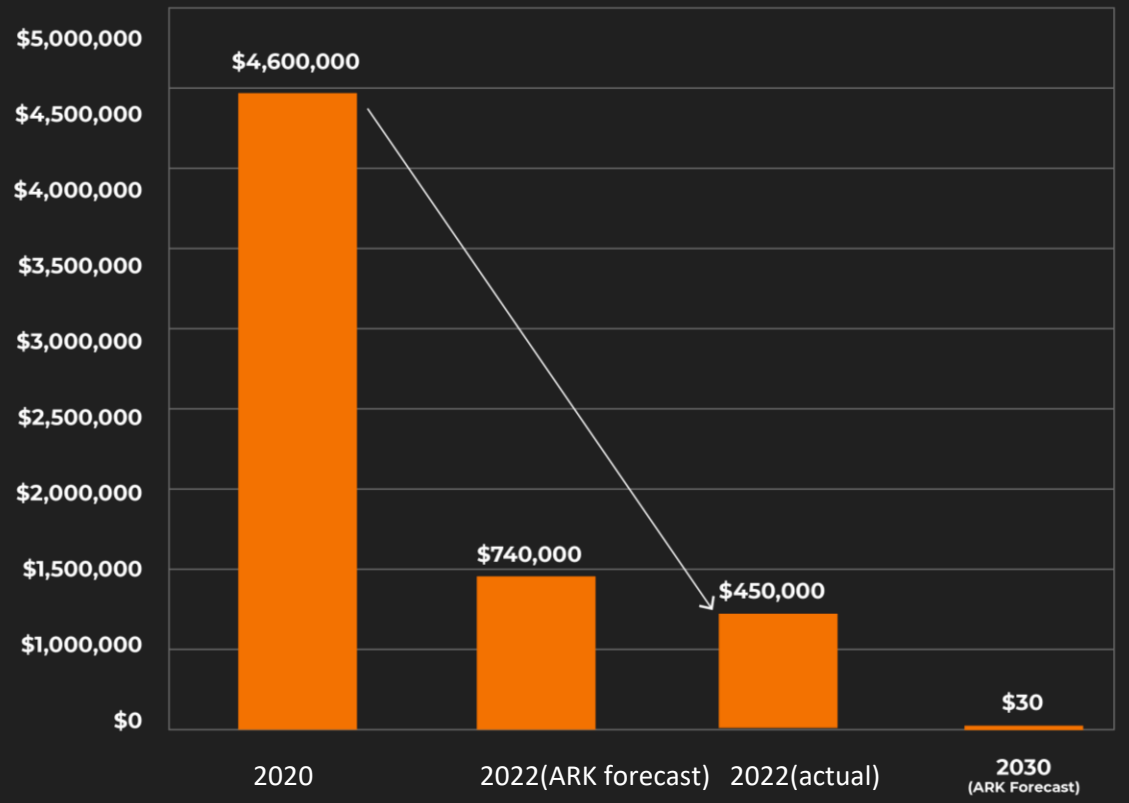
Flourish or Perish

AI: The Time is NOW

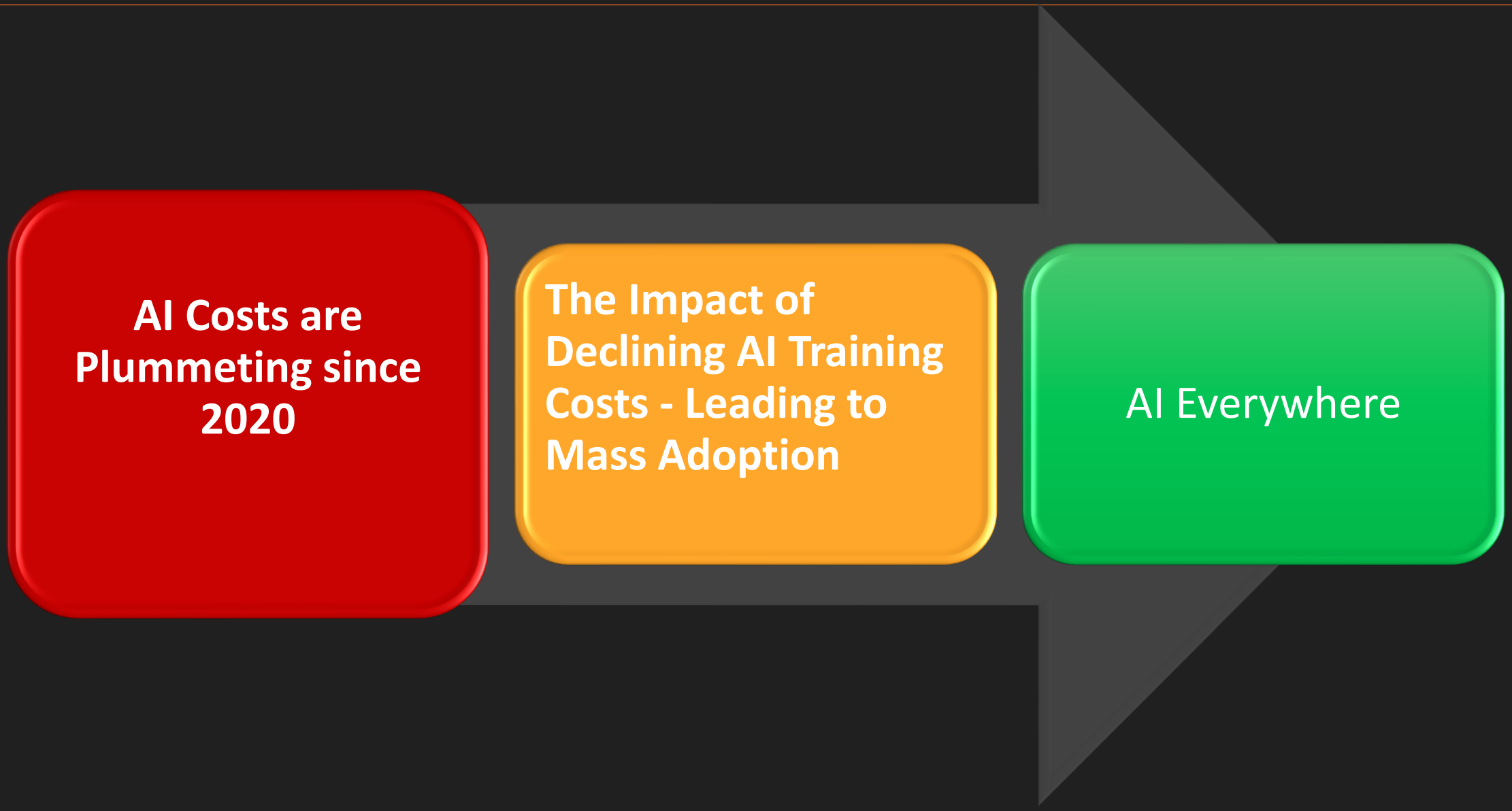
Two Eras of Compute Usage in Training AI Systems



Cost to train GPT-3 level Performance [ARK Invest Big Ideas 2023]



AI is leading the charge in this **NEW** ERA OF NETWORKING



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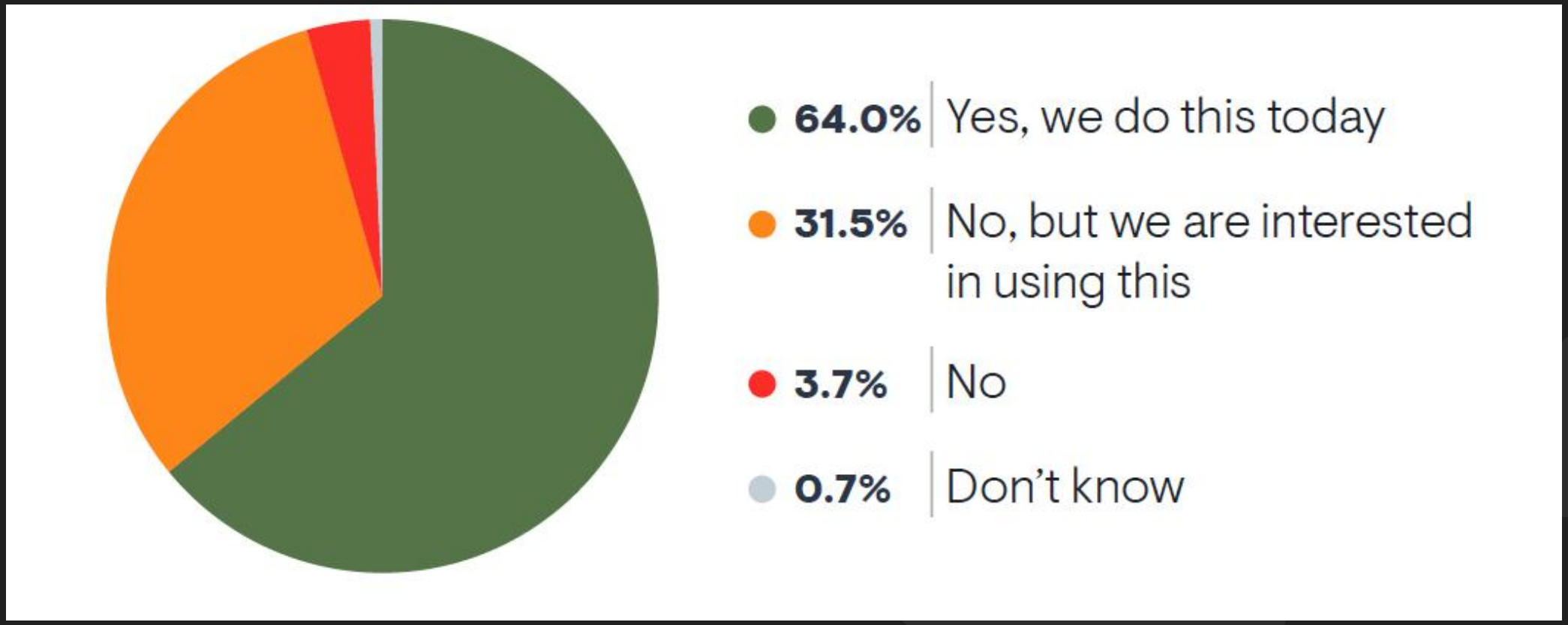


DOES YOUR ORGANIZATION USE ANY AI/ML-BASED FEATURES DELIVERED BY YOUR NETWORK MANAGEMENT AND NETWORK INFRASTRUCTURE VENDORS?

EMA™

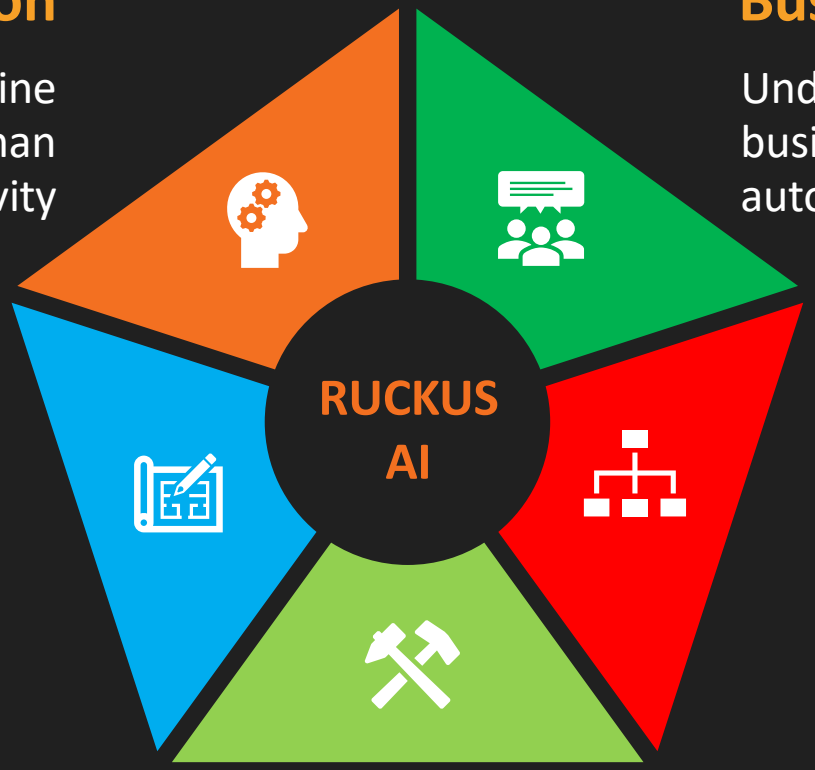
Role of AI within enterprise networks

Intelligent Orchestration

Orchestration and automation of routine and repetitive tasks to minimize human errors and improve productivity

Business Intent Cognition

Understands the business intent and translate business requirements and policies into automated network configurations



Design and Optimization

With the increasing complexity in wireless technologies, AI-Driven network optimization is essential to network performance

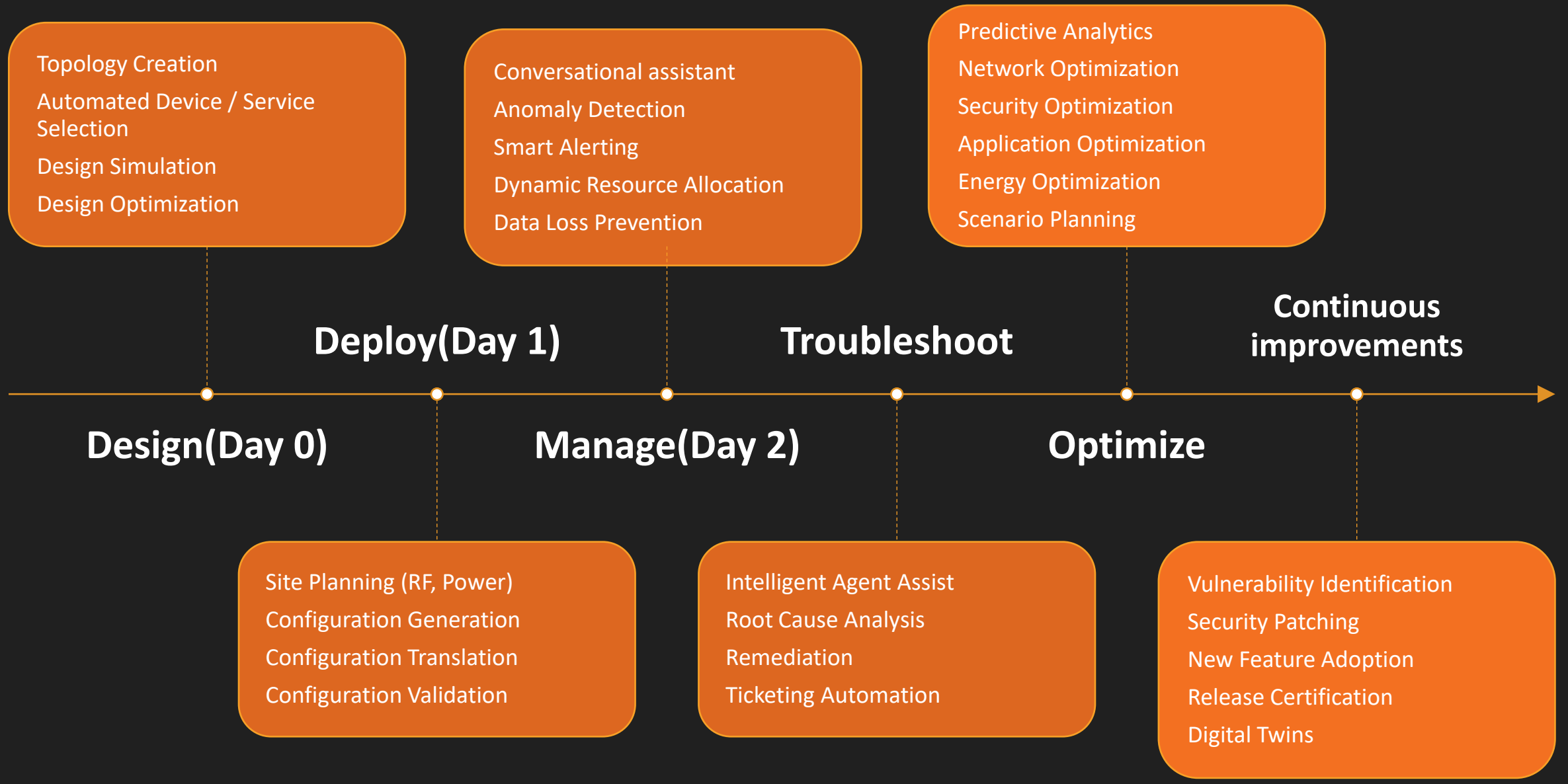
Network Management

Dynamic network configurations to tune networks based on network usage, traffic patterns and RF environment

Network Troubleshooting

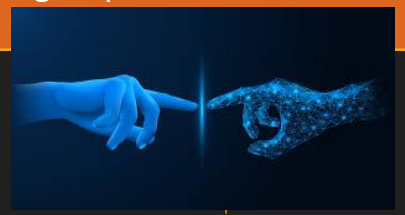
Auto identification, root cause analysis and recommended remediation actions

AI Across the Network Management



AI Impact Across the Network Lifecycle

- Topology Creation
- Automated Device / Service Selection
- Design Simulation
- Design Optimization



Design(Day 0)

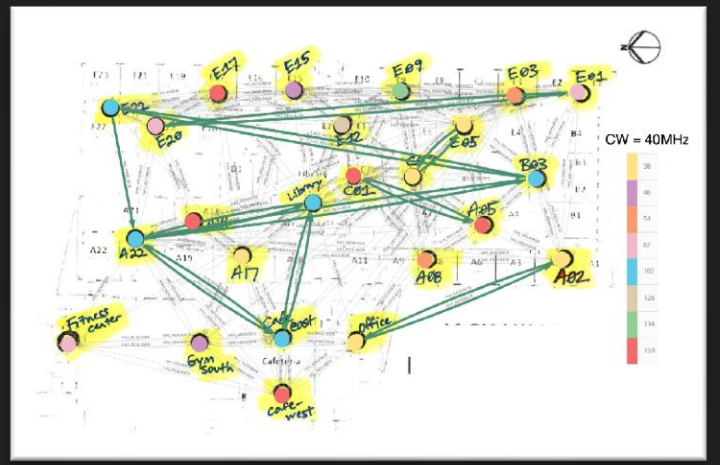
AI-Driven RRM
AIOps

Step 01 — **Create a Digital Twin**

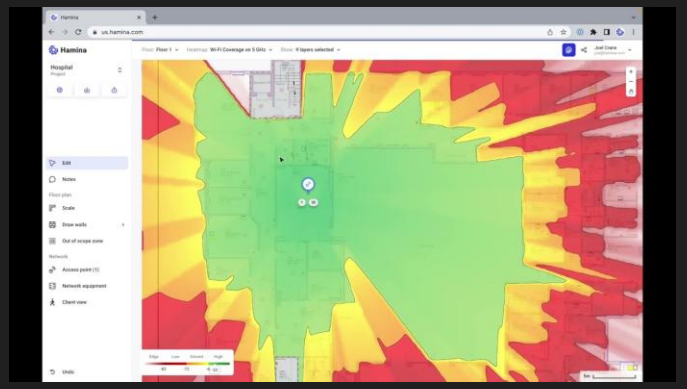
Generate a RF Graph for every Zone and fuse it with the network configurations

Step 02 — **AI-Driven Simulations**

AL algorithms run simulations in the digital twin and select configuration permutations with the optimal outcome.



AI Impact Across the Network Lifecycle



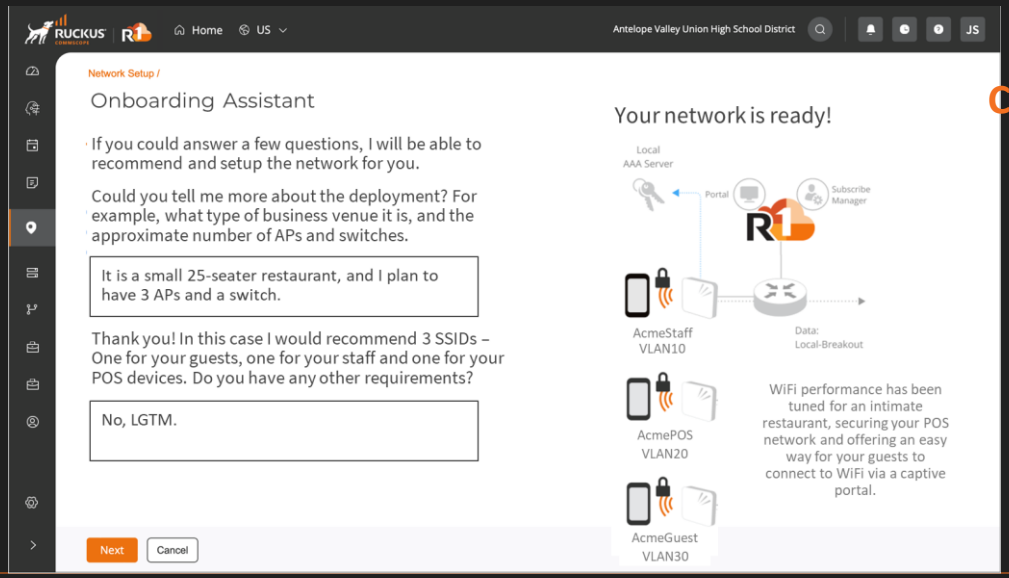
Site Planning tools

e.g. Hamina, Ekahau

Service Catalog

Deploy(Day 1)

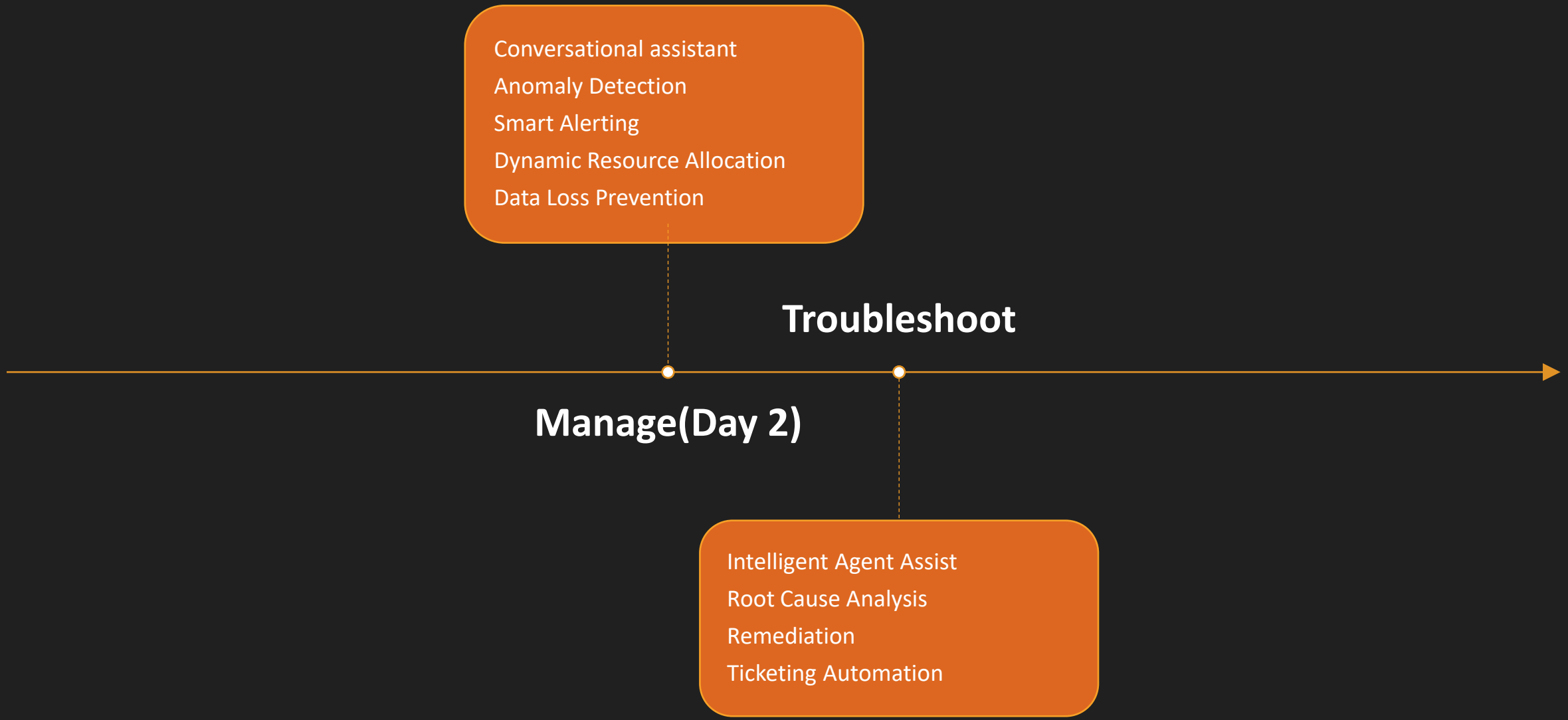
Site Planning (RF, Power)
Configuration Generation
Configuration Translation
Configuration Validation



Conversational Configuration With GenAI

 |

AI Impact Across the Network Lifecycle



AI in Network Efficiency

Surface issues before they blow up

ML-driven incident and anomaly detection

Address the most urgent issues first

AI-driven prioritization

Fix them fast

ML-driven root cause and recommendations

Compare network KPIs before and after a change to analyze the impact

Config change analysis

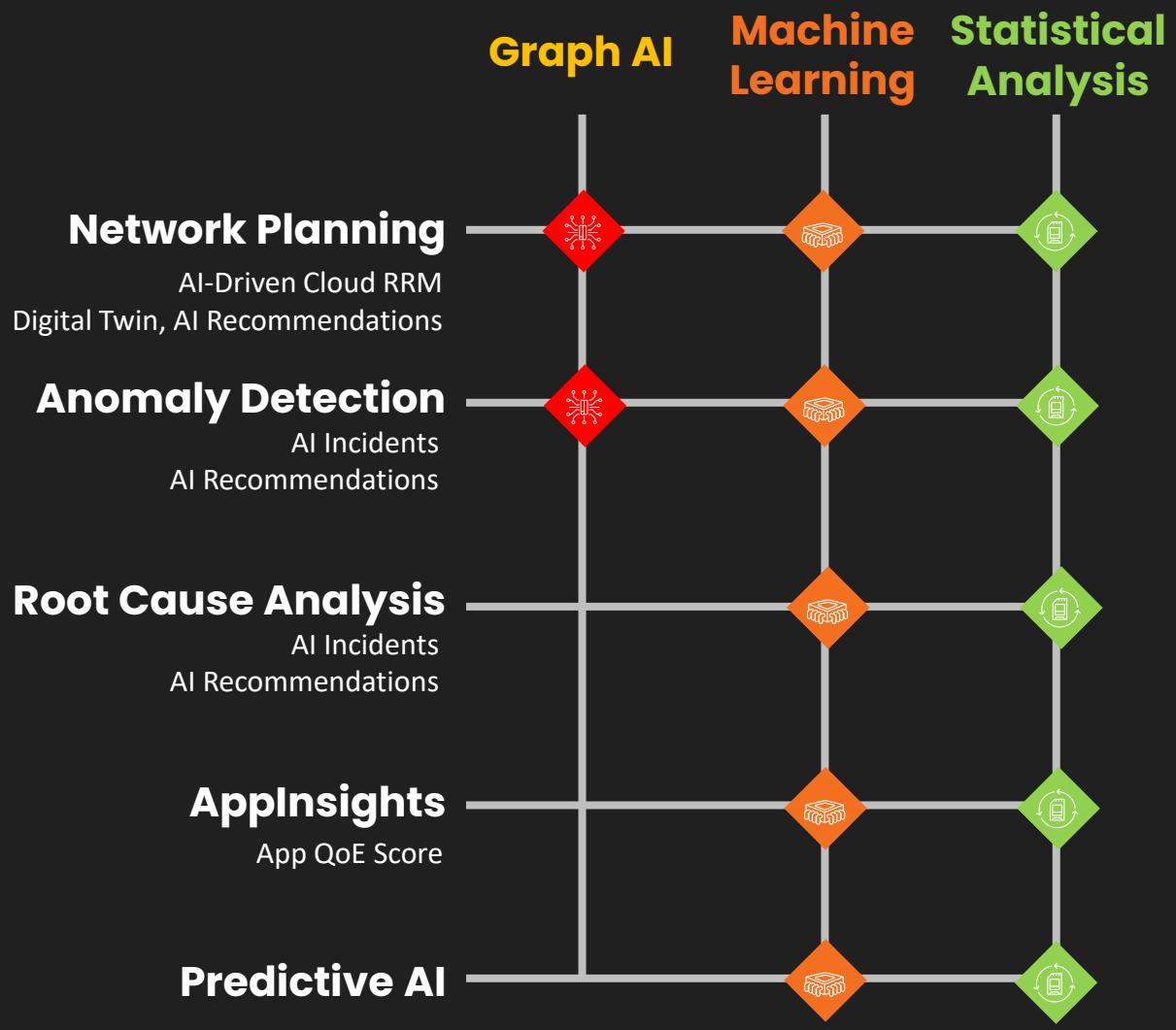
Let the system make recommendations on changes to improve network performance

AI-recommendations

Let Cloud RRM drive down interference and maximize capacity every day.

AI-Driven Cloud RRM

AI For Network Efficiency



Graph AI
(Social networks recommendations)

Personalized PageRank, Label Propagation, Louvain Clustering, Betweenness Centrality, Graph Embedding, Weakly Connected Components

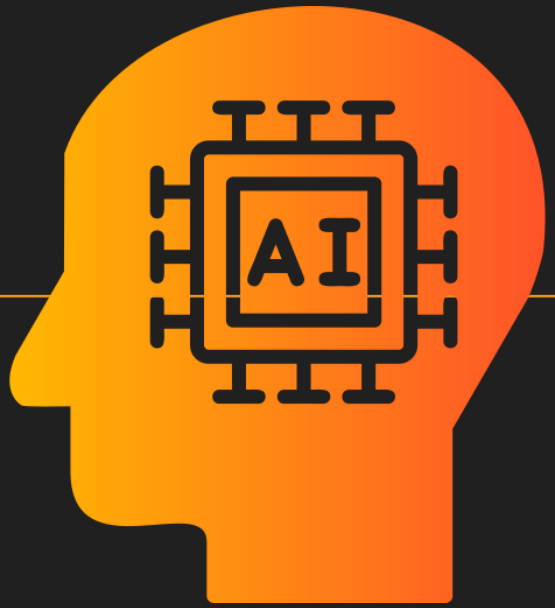
Machine Learning
(Prioritization)

Decision Tree, Reinforcement Learning, Hybrid Federated Learning, Jenks Optimization, Logistic Regression, Local & Isotonic Regression, Dimension Reduction, Mean Shift Clustering

Statistical Analysis
(Historical data analysis)

Maximum Likelihood Estimation, Seasonality decomposition, Bayesian Inference, Event Density Analysis, Complex Event Processing

AI Impact Across the Network Lifecycle



AI agents interact with the network to collect information or effect changes.

Optimize

- Predictive Analytics
- Network Optimization
- Security Optimization
- Application Optimization
- Energy Optimization
- Scenario Planning

Continuous improvements

- Vulnerability Identification
- Security Patching
- New Feature Adoption
- Release Certification
- Digital Twins

The View Gets Only Better!

The Future Is Here

Self-Healing Networks

Networks will automatically detect and repair problems. This autonomy dramatically reduces downtime and minimizes IT intervention.

Intent-Based Networking

Simply describe what you want accomplished. The AI translates business intent into technical implementations automatically.

Digital Experience Assurance

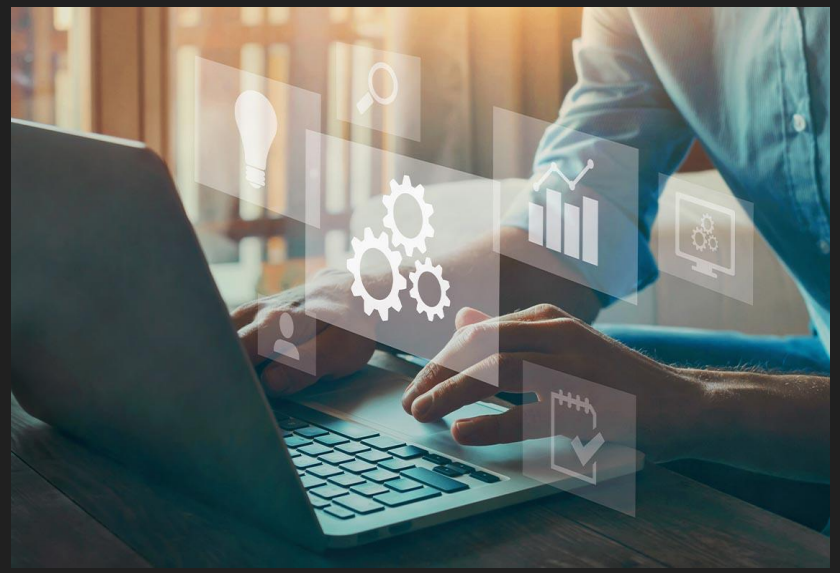
AI will guarantee optimal user experiences. Networks adapt in real-time to changing conditions and priorities.

AI at the Edge

Cloud processing combines with edge intelligence to create powerful, privacy-preserving machine learning systems.

Intent-based Networking

Business outcome-first approach to AI-powered Network Management



Business-Focused Approach

Define what you need. The network handles the how. Business outcomes drive network configuration.

Software-Driven Automation

Complex configurations happen automatically. Manual CLI commands become obsolete. Network intelligence handles implementation.

Continuous Validation

Networks verify they're meeting your intent. Systems adjust when conditions change. Problems get solved proactively.

Intent-based Networking

Business outcome-first approach to AI-powered Network Management

Business Intents

Client Density OR Client Throughput

Time to Connect OR Client Density

Energy savings OR Performance

Compatibility OR Performance

AI Agents

AI agents are autonomous software systems that perform tasks, make decisions, and pursue goals on behalf of users or other systems, often without human intervention

- Focuses on specific, well-defined tasks within a limited domain
- Operates within predefined rules or learned patterns, with limited autonomy and adaptability
- Often requires reprogramming for new tasks; adaptation is limited
- Typically reactive, responding to user inputs or triggers as they occur
- Operates as an individual entity

Agentic AI

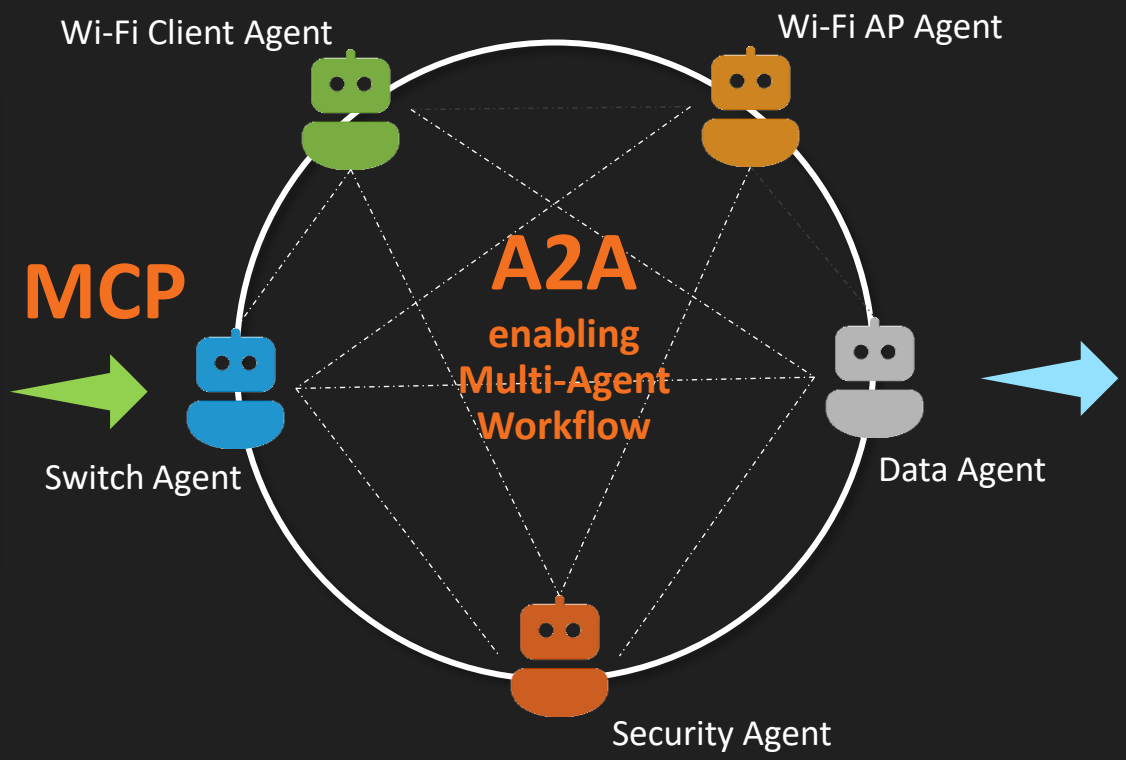
Represents a higher-order, orchestrating intelligence that leverages multiple AI agents to autonomously solve complex, adaptive problems

- Orchestrates multiple agents to solve complex, multi-step, and adaptive problems
- Higher autonomy, making independent, goal-driven decisions and adapting strategies in real time
- Continuously learns from feedback, adapts to new situations, and refines its approach dynamically
- Proactively identifies goals, anticipates needs, and orchestrates actions without explicit prompts
- Functions as a framework or conductor, integrating and coordinating multiple AI agents and tools for holistic outcomes

Digital Experience Assurance with **Agentic AI**

Vendor Proprietary Domain Knowledge

- Vertical-specific best practices
- Purpose-driven configurations
- Enterprise networking domain knowledge
- Product knowledge & expertise
- Customer Support tickets



Each LLM agent is “trained” with specific expertise and collaborate with other agents to solve complex networking issues

Purpose-Driven Outcomes

- Bespoke config recommendations for every deployment
- Application and traffic-aware optimizations
- Automated troubleshooting for specific client types
- Correlate network behaviors with security policies and highlight anomalies
- Run Digital Twin simulations to enhance security and performance

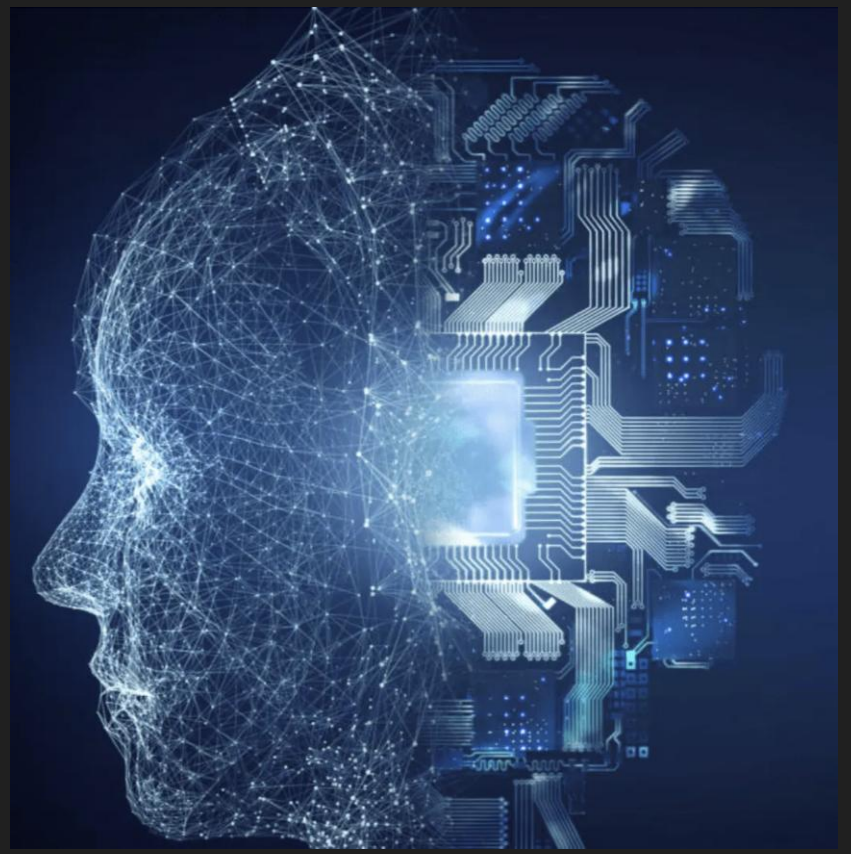
Edge AI

Distributed Intelligence

Machine learning happens across local nodes without centralizing data.

Parameter Exchange

Only model weights travel between devices, not raw data.



Data Privacy, Security, and Latency

Sensitive information stays local, leverages collective insights while reducing latency.

Benefits of Edge AI

Performance Boost

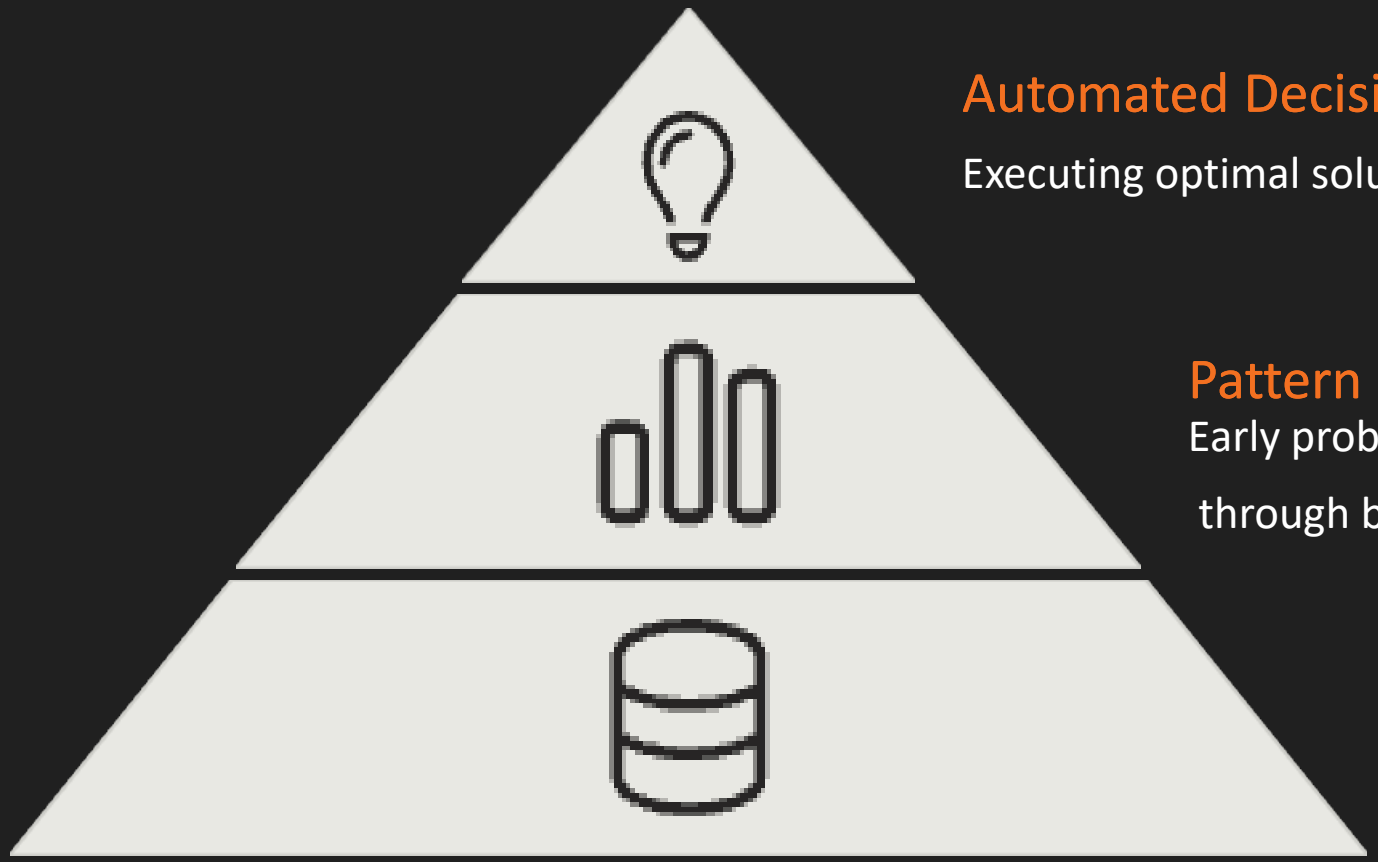
Reliability

Cost Efficiency

Enhanced Privacy and Data Security

Resource Efficiency

Self-Healing Networks



Automated Decision-Making

Executing optimal solutions based on data.

Pattern Recognition

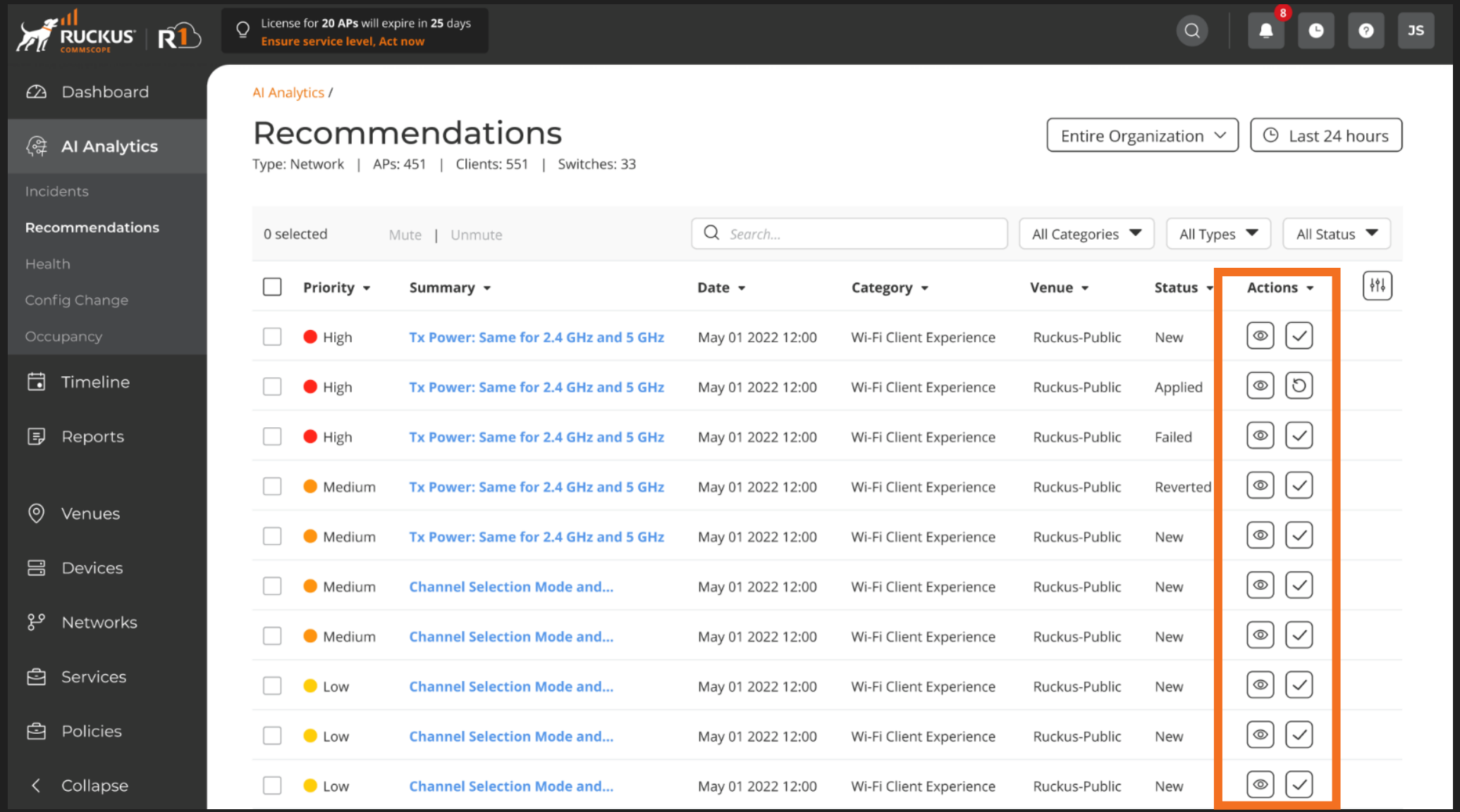
Early problem detection and opportunities to optimize through behavioral analysis.

Baseline Establishment

Learning normal network behavior through data analysis.

Machine learning algorithms analyze data to predict failures and opportunities to optimize.
Self-learning capabilities improve over time through experience.

Self-Healing Networks: Are We There YET?



How Far We Truly Are?

	Manual	Assisted	Partial	Conditional	High	Full
	L0	**L1**	**L2**	**L3**	**L4**	**L5**
Execution	P	P/S	S	S	S	S
Awareness	P	P/S	P/S	S	S	S
Analysis	P	P	P/S	P/S	S	S
Decision	P	P	P	P/S	S	S
Intent/Experience	P	P	P	P	P/S	S

P = People (Manual) | S = System (Autonomous)

PURPOSE-DRIVEN
ENTERPRISE NETWORKS

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Eric McLaughlin

VP & GM, Connectivity Solutions Group, Intel Corporation

Connectivity Convergence:

Uniting Technologies for a Flawless Consumer Experience

WBA - WGC AMERICAS 2025

Connectivity Convergence:
Uniting technologies for flawless user experiences

Eric A. McLaughlin

VP & GM, Connectivity Solutions Group
Intel Corporation

May 21, 2025

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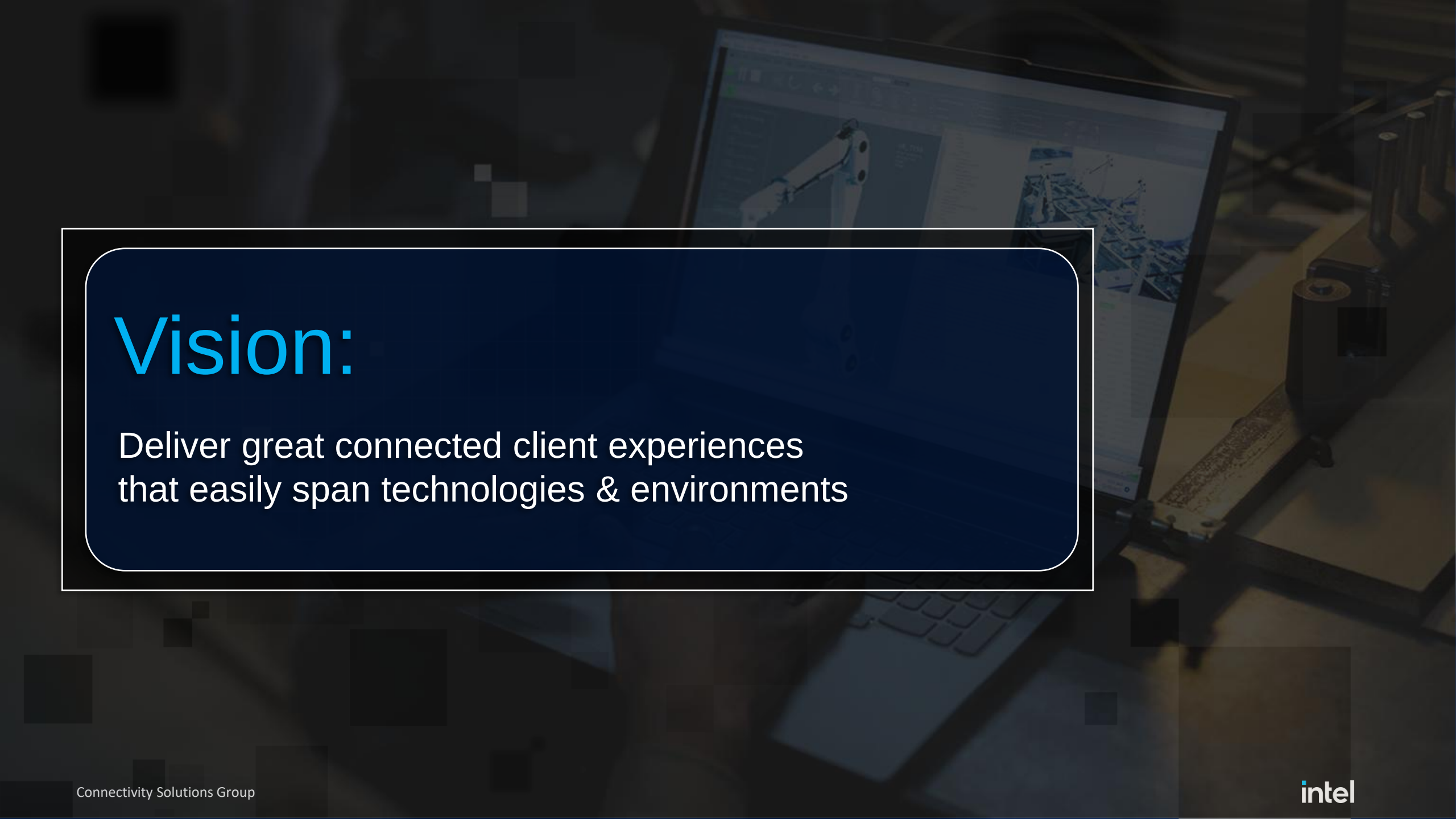

Vision:

Deliver great connected client experiences
that easily span technologies & environments

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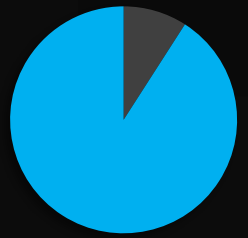
Industry Data Points

~10x

Total Wi-Fi data vs. all cellular networks combined (including 5G)

- Comcast 2024



~90%

of smartphone data is over Wi-Fi

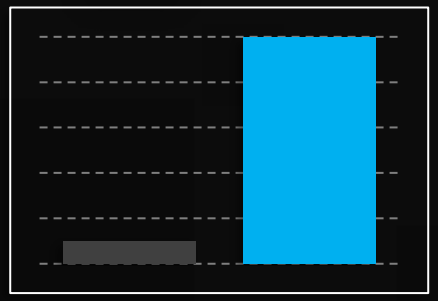
- Comcast 2024

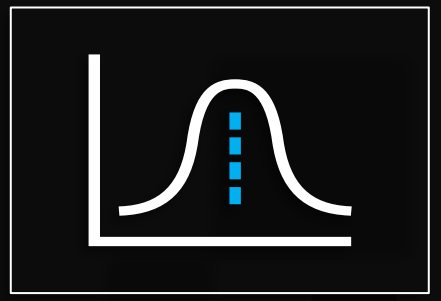
~20

Average number of connected devices per home / per day

(Top 1% ~150)

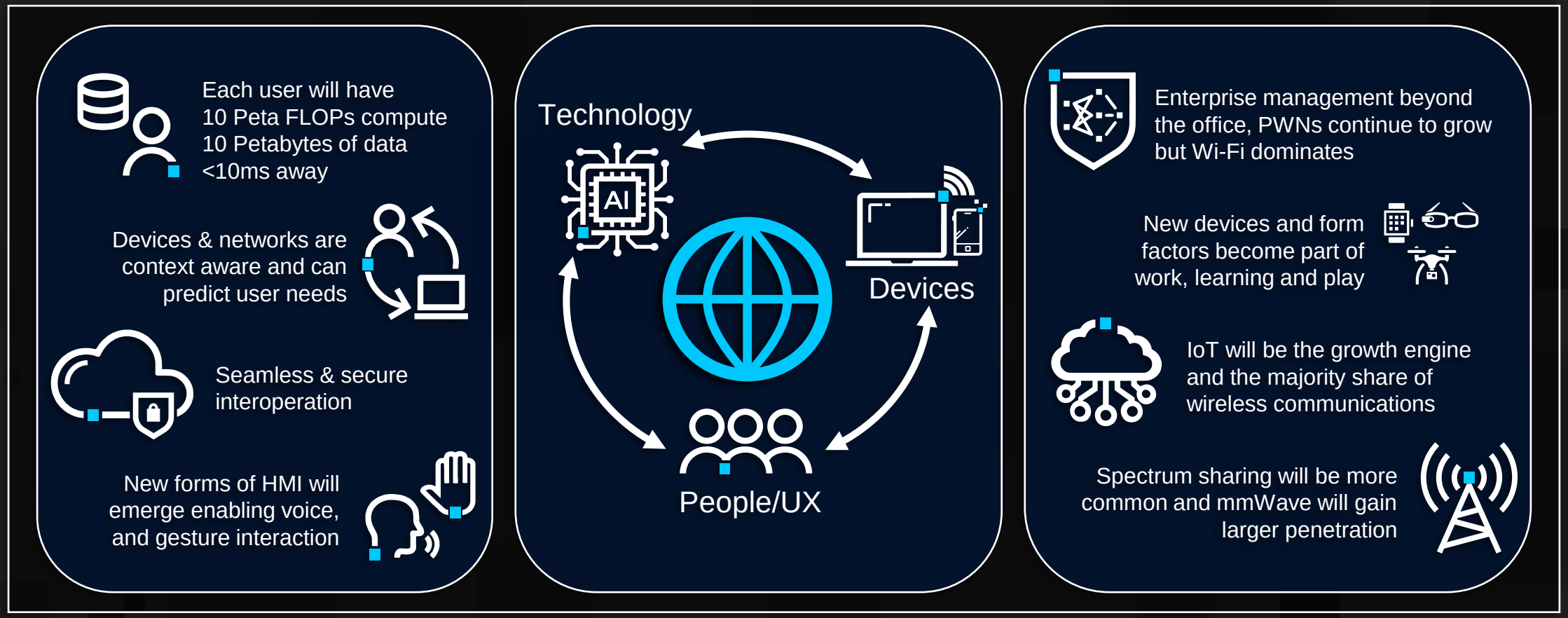
- Comcast 2024





Wi-Fi technology has evolved to address continuously increasing challenges…
(More networks, devices, applications, data, and AI)

Megatrends: Impacting Wireless in 2030



Use cases, technologies, and markets will emerge based on the intersection of technology, human experience, devices, and the world around them

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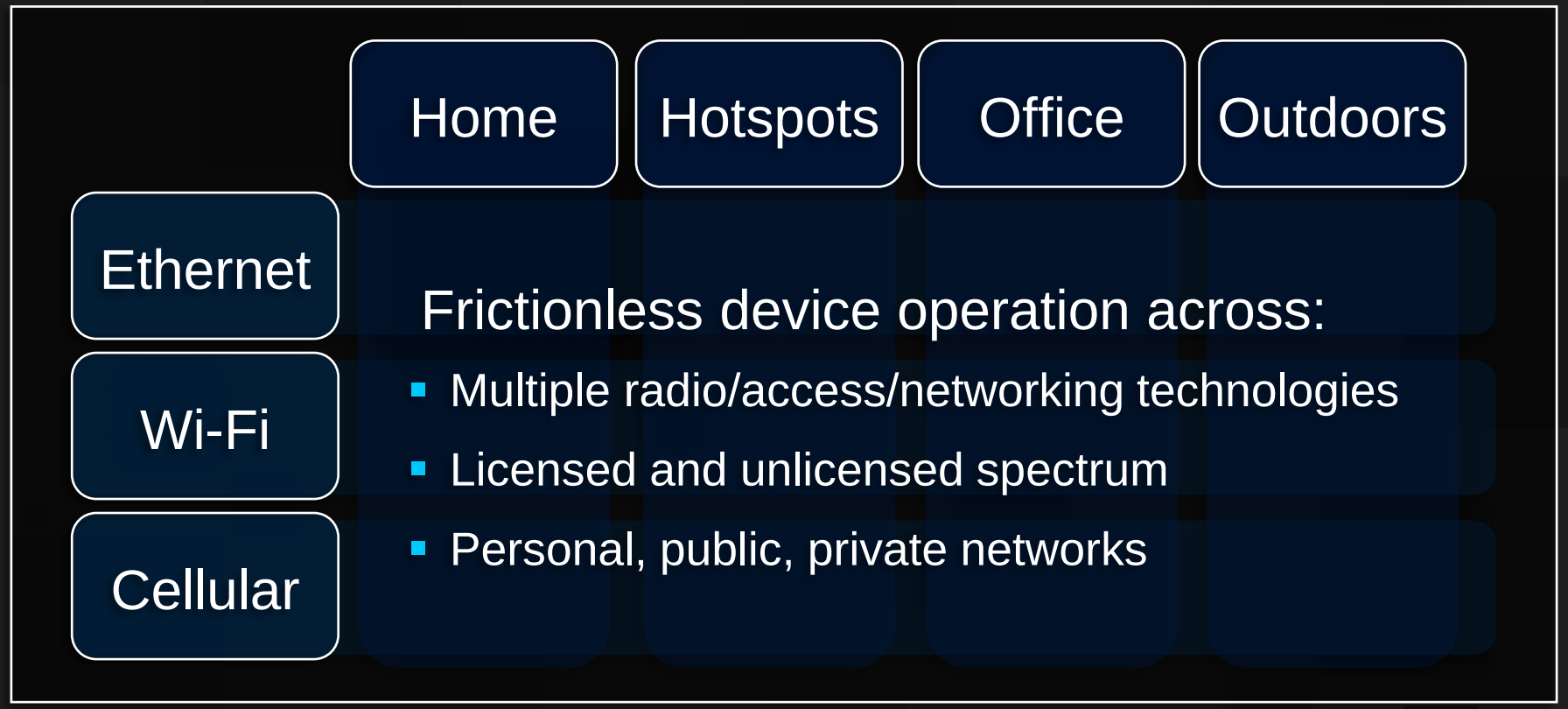
Convergence is Key for Future Device Experiences



More intelligent devices, applications, and harmonized policies
for simple location & technology-agnostic experiences

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Intel-Enabled PC Device Networking Convergence

intel KiLLER

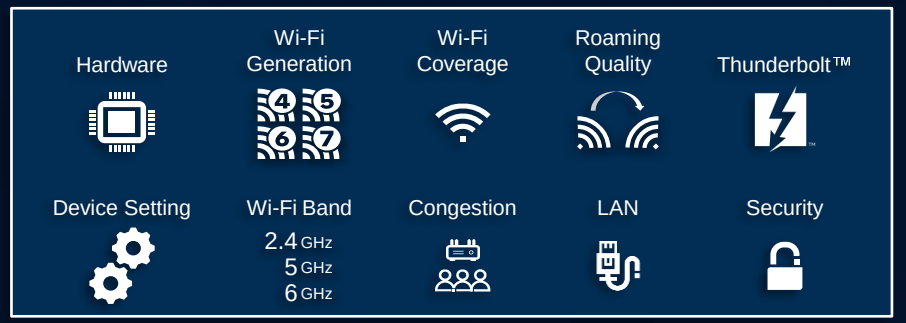
intel® Connectivity Performance Suite

- Advanced Connection Manager
- Smart AP Selection & Fast Switching
- Traffic Prioritization

Intel® Connectivity Analytics

Unique/Real-time Data - from Intel's large PC footprint

Actionable Insights and/or SDK - Faster Resolution Time



Device intelligence: Cellular, Wi-Fi, Ethernet
AI monitoring, smart decisions, device/network insights

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Example: Network-Device Convergence Challenge

Enterprise Roaming: Private 5G Networks and Wi-Fi-only PCs

Private 5G networks

- 5G and Wi-Fi credentials are different
- Significant complexity required to enable
- Costly CAPEX & OPEX

OpenRoaming Mitigation

- Federated roaming to help 5G roaming limitations
- Help with network discovery and selection
- Need to leverage/scale OR vs. Wi-Fi device exclusion

Industry harmonization is needed to meet market expectations:
Seamless device authentication & access to core network services

Closing Thoughts

- Wi-Fi devices & data demands will continue to grow exponentially
- Optimized client experiences will rely on the convergence of multiple radio/access technologies
- Simplified network/device solutions are needed for easy enabling, deployment, & management

Let's continue our industry collaboration and deliver access network-agnostic experiences

- Scale OpenRoaming for today's Wi-Fi-only devices and Private 5G Networks
- Enable simple 6G and Wi-Fi solutions that can be deployed and leveraged easily

THANK YOU!

For more information, please visit: www.intel.com/wireless

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Vijay Venkateswaran

Head of Strategy and Business Development, C3Spectra

Geo-Spatial AI-Driven Wi-Fi 7:

Unlocking the Full Potential of 6 GHz for Next-Gen Connectivity

SPECTRA

Geo-Spatial AI-Driven Wi-Fi 7

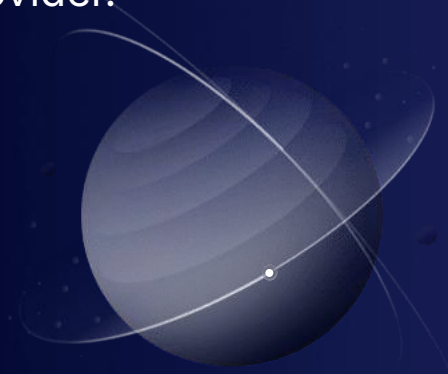
Unlocking the Full Potential of 6 GHz for Next-Gen Connectivity

SPECTRA

C3Spectra Introduction

Who We Are

AI-driven wireless network automation and spectrum management solutions provider.

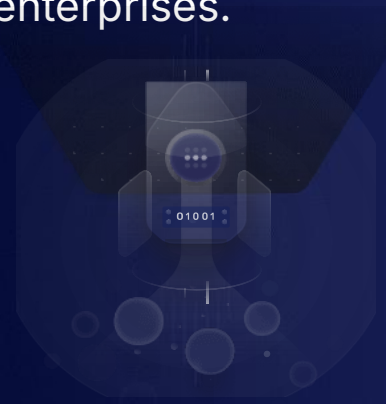


Our Expertise

Wi-Fi 6 GHz, CBRS, private networks, AFC solutions, and geospatial and deep learning AI for wireless planning and optimization.

Why We’re Here

Driving innovation in Wi-Fi 7 and 6 GHz to accelerate deployments, improve performance, and drive growth for service providers and enterprises.



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Wi-Fi 7 + 6 GHz: A Strategic Leap for Next-Gen Connectivity

Unleashing Wi-Fi 7 Performance through 6 GHz Spectrum

6 GHz is foundational to Wi-Fi 7's transformative capabilities

— Ultra-fast, low-latency, and high-capacity wireless experiences.

— Seamless, high-performance connectivity across residential, enterprise, and dense urban

Wider Channels = Faster Speeds

320 MHz-wide channels unlock multi-gigabit performance for XR video, gaming, and deterministic enterprise networking.

Lower Interference, Better Reliability

Cleaner spectrum reduces congestion in MDUs and dense indoor deployments. AFC coordinated Standard Power drives greater reliability.

Multi-Link Operation (ML) Enables Dynamic Load Balancing

MLO intelligently shifts traffic between 5 GHz and 6 GHz bands, reducing interference and congestion while maintaining consistent service quality.

5G Offload & Network Convergence

Supports seamless traffic handoff from 5G to Wi-Fi for ISPs, MSOs, and MNOs seeking unified service delivery.

Wi-Fi 7's full potential hinges on intelligent use of 6 GHz.

Enabling value-driven standard power operations requires more than just spectrum access — it demands spatial intelligence, automated compliance, and adaptive network coordination powered by AI and AFC integration.

This is where the next wave of innovation begins.

SPECTRA

How Machine Learning and GeoSpatial AI Create Opportunities for Enhancing 6 GHz Wi-Fi 7 Deployments

End-to-End Wi-Fi 6 GHz Planning & Deployment

- AI-assisted site selection, RF design integration, and field validation in a unified workflow.
- Automated AP registration, AFC-compliant geo-verification, and deployment lifecycle management.
- Smart self-configuration of standard power and low power APs for indoor, outdoor, and mixed environments.

Seamless Network Automation

- Real-time spectrum intelligence to dynamically assign optimal channels for performance and compliance.
- Multi-vendor orchestration for streamlined provisioning and AFC integration without manual intervention.

Interference Mitigation & Coexistence

- Continuous monitoring of channel conditions and adjacent AP behavior (Low/Standard Power).
- AI-powered policy adjustments for interference avoidance and efficient MLO-based load distribution.

Geo-Spatial AI

- High-precision geo-location inference using digital twins and spatial data fusion, even in non-GPS environments (e.g., indoor facilities, venues, MDUs).
- Dynamic asset mapping and signal path estimation to accelerate AFC coordination and RF optimization.
- Real-time correlation of location, RF, and spectrum use data to guide placement and power decisions at scale.

> Geo-Spatial AI and ML aren't just enablers — they're catalysts. They turn Wi-Fi 7 + 6 GHz into a platform for precise, adaptive, and intelligent connectivity across real-world indoor and urban environments.

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GenAI detection and GIS integration provides critical geo-location data in GPS denied environments

GeoSpatial AI fused with interference avoidance information offers reliability for deploying Standard Power indoors for Wi-Fi 7 deployments

ML-based workflow automation brings together the power GeoSpatial AI with interference free operation of the network

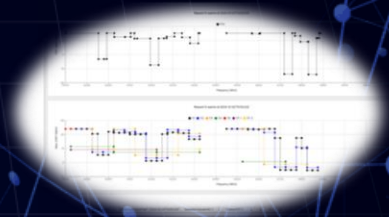
GenAI Detection

GeoSpatial AI fusion

Interference Detection

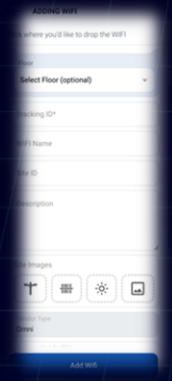
Interference Avoidance

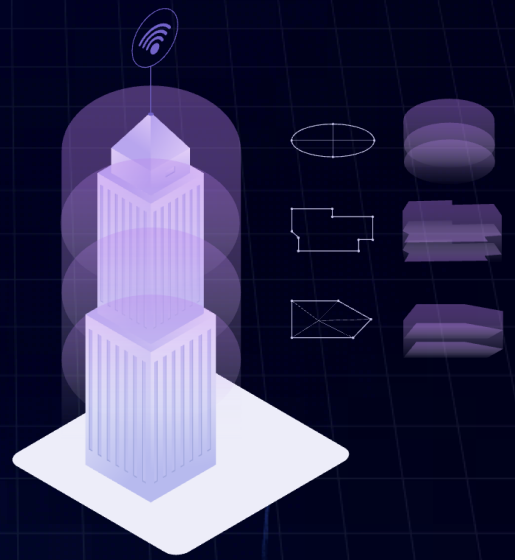
ISP Channel / Policy Automation



RF Design ML Workflows

Network Automation





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Emerging Opportunities in 6 GHz with Wi-Fi 7 + Intelligent Spectrum Automation

1 Residential & Small Business

- Multi-gigabit connectivity, low-latency gaming, and smart home reliability.
- Dynamic indoor/outdoor standard-power coordination ensures broader coverage and fewer support calls.
- Enhanced subscriber sales targeting of high-value speed tiers with greater confidence.

2 Enterprise & Public

- Airports, arenas, and universities require cost-effective, resilient, interference-aware wireless.
- Automated planning, RF validation, and location-based frequency control enable deterministic performance in high-density areas.

3 Network Operators

- 6 GHz and Wi-Fi 7 unlock high-capacity indoor offload and convergence across fiber and 5G for MNOs and MSOs.
- Cloud-based AFC integration and API-enabled deployment workflow automations accelerate time to coverage and compliance.

6 GHz and Wi-Fi 7 when paired with intelligent geo-location, coordination and automation, deliver synergies that unlock innovation and measurable business impact.

SPECTRA

The Path Forward – Why Now?

- Wi-Fi 7 is arriving faster than expected — now is the time for providers and enterprises to plan their 6 GHz strategy.
- Geo-spatial AI is transforming deployment readiness — enabling precise site planning, AFC compliance, and dynamic RF optimization in complex indoor and outdoor environments.
- C3Spectra is actively working with partners to drive real-world deployments of AFC-enabled Wi-Fi 6 GHz networks.
- Ecosystem innovation will shape the future of Wi-Fi 7 and 6 GHz — faster, smarter, and more efficient.

6 GHz is a catalyst, not just a capacity upgrade — it's opening the door to smarter Wi-Fi 7 deployments, new service models, and a more intelligent wireless ecosystem.

SPECTRA

Interested in trials, AFC integration or learning more?

Let’s connect!

C3Spectra’s Spectra-XPro is ready to integrate Machine Learning with Geo-Spatial AI to enhance Wi-Fi 7 in 6 GHz today

Reach out!

sales@c3spectra.com
www.c3spectra.com

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Unlocking Reliable Wi-Fi Connectivity For the Modern Consumer

Steve Andrews (Moderator)

Board Advisor, Wireless Broadband Alliance

Sarper Gokturk

VP Innovation, Airties

Huw Rees

Vice President Of Business Development, Net Experience

Joey Padden

VP of Network Architecture, Helium

Robert Lamb

Global VP Sales, SVP Strategy & Partnerships, Aprecomm

Stewart Goumans

Community & Customer Engagement Director, Ekahau

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COFFEE & NETWORKING
BE BACK IN 20 MINUTES AT
3:50 PM CDT

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Steve Namaseevayum

VP Industry Engagement, Wireless Broadband Alliance

Moderator Welcome

Wireless Global Congress
Wireless Broadband Alliance

Session Speakers

Mario Di Dio
Helium

T.J. Forner
CommScope-RUCKUS

Giovanni Guerri
Guglielmo

Drew Lentz
Senior Solutions Architect

Alphonso Jenkins
Wireless Broadband Alliance

Irvind Ghai
Silicon Labs

Bruno Tomas
Wireless Broadband Alliance

Malcolm Smith
Cisco

Paul Lai
AsiaRF

Venkat Rayudu
Silicon Labs

Tiago Rodrigues
Wireless Broadband Alliance

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Time	Presentation
3:50 PM (CDT)	**Moderator Welcome** Steve Namaseevayum, VP Membership & Industry Engagement, Wireless Broadband Alliance.
3:55 PM (CDT)	**Delivering Wi-Fi QoS in Decentralized Networks** Mario Di Dio, General Manager, Network, Helium.
4:15 PM (CDT)	**Connected Communities Forum - Addressing the Drivers for Digital Poverty, Innovation and Connected Cities** Steve Namaseevayum (Moderator), VP Membership & Industry Engagement, Wireless Broadband Alliance.TJ Forner, Sr. SP Account Manager, RUCKUS Wireless; Giovanni Guerri, CEO, Guglielmo; Drew Lentz, Senior Solutions Architect, Eero Al Jenkins, Connected Communities Advisor, Wireless Broadband Alliance.
4:45 PM (CDT)	**Fireside Chat - Edge AI for Wi-Fi IoT** Irving Ghai, VP, Silicon Labs; Tiago Rodrigues (Moderator), President & CEO, Wireless Broadband Alliance
5:05 PM (CDT)	**IoT in the Enterprise** Malcolm Smith, CTO Advisor – Wireless, Cisco.
5:25 PM (CDT)	**Enabling IoT connectivity in the rural, urban and enterprise environment** Bruno Tomas (Moderator), CTO, Wireless Broadband Alliance, Paul Lai, CEO, Asia RF, Venkat Rayudu, Senior Product Manager, Silicon Labs; Malcolm Smith, CTO Advisor, Cisco.
5:55 PM (CDT)	**End of Day 1 -Wrap Up** Tiago Rodrigues, President & CEO, Wireless Broadband Alliance
7:00 PM (CDT)	**NETWORKING PARTY – BAR LOUIE**

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Mario Di Dio

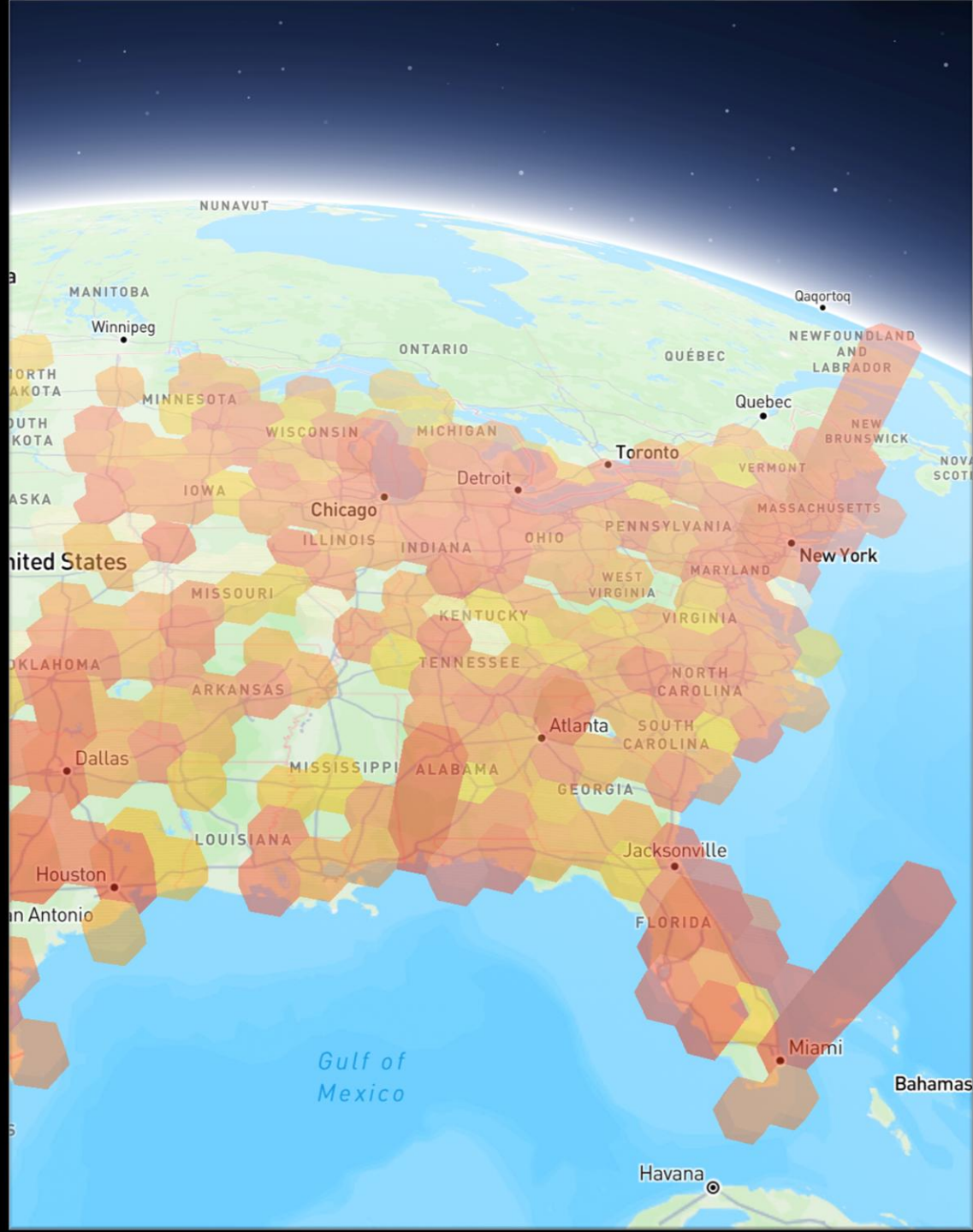
General Manager, Network, Helium

Delivering Wi-Fi QoS in Decentralized Networks

helium

Delivering Wi-Fi QoS in Decentralized Networks

Mario Di Dio, GM, Network
mario@helium.com



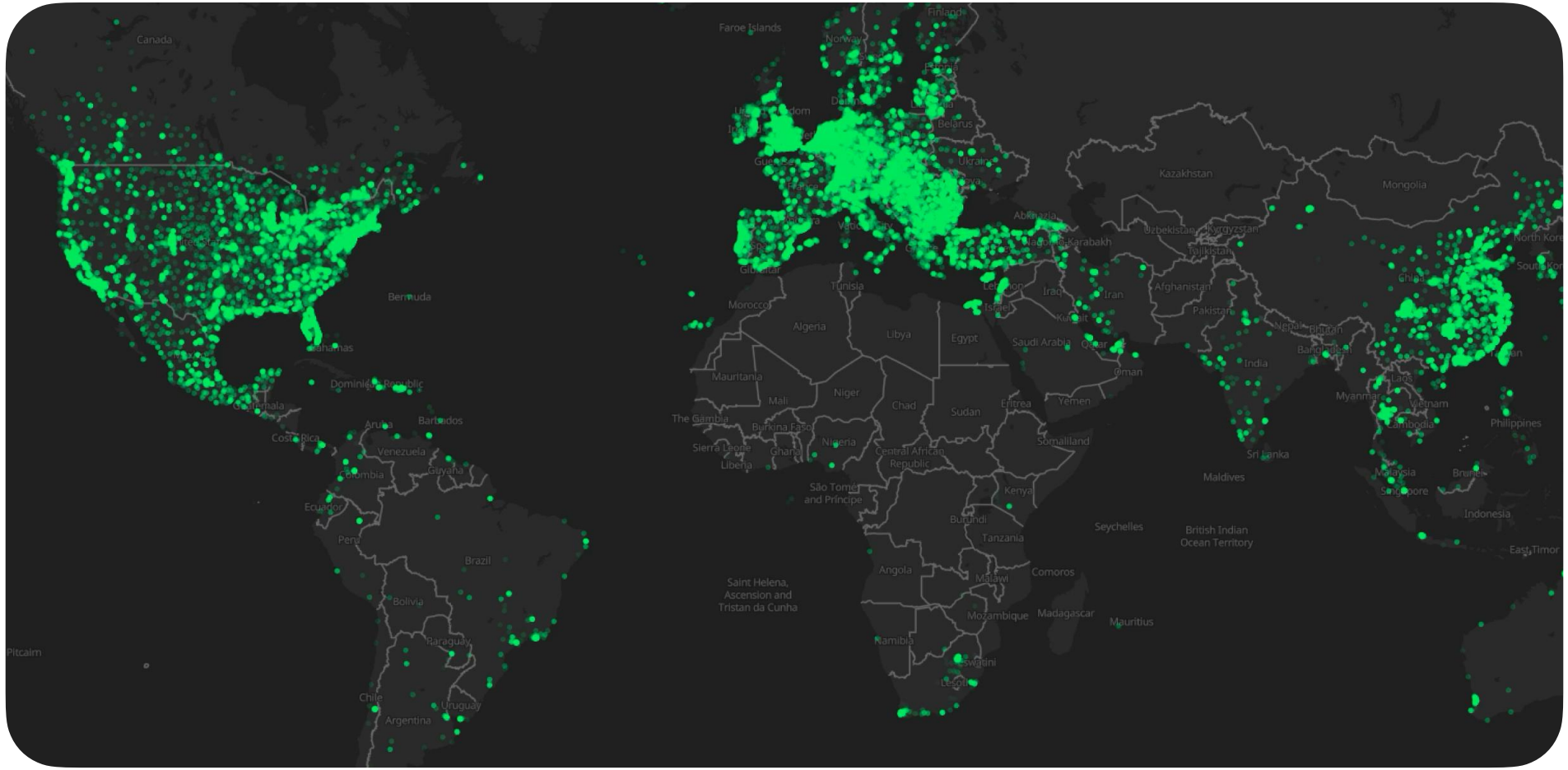


Image Source: https://explorer.helium.com/

Helium Network

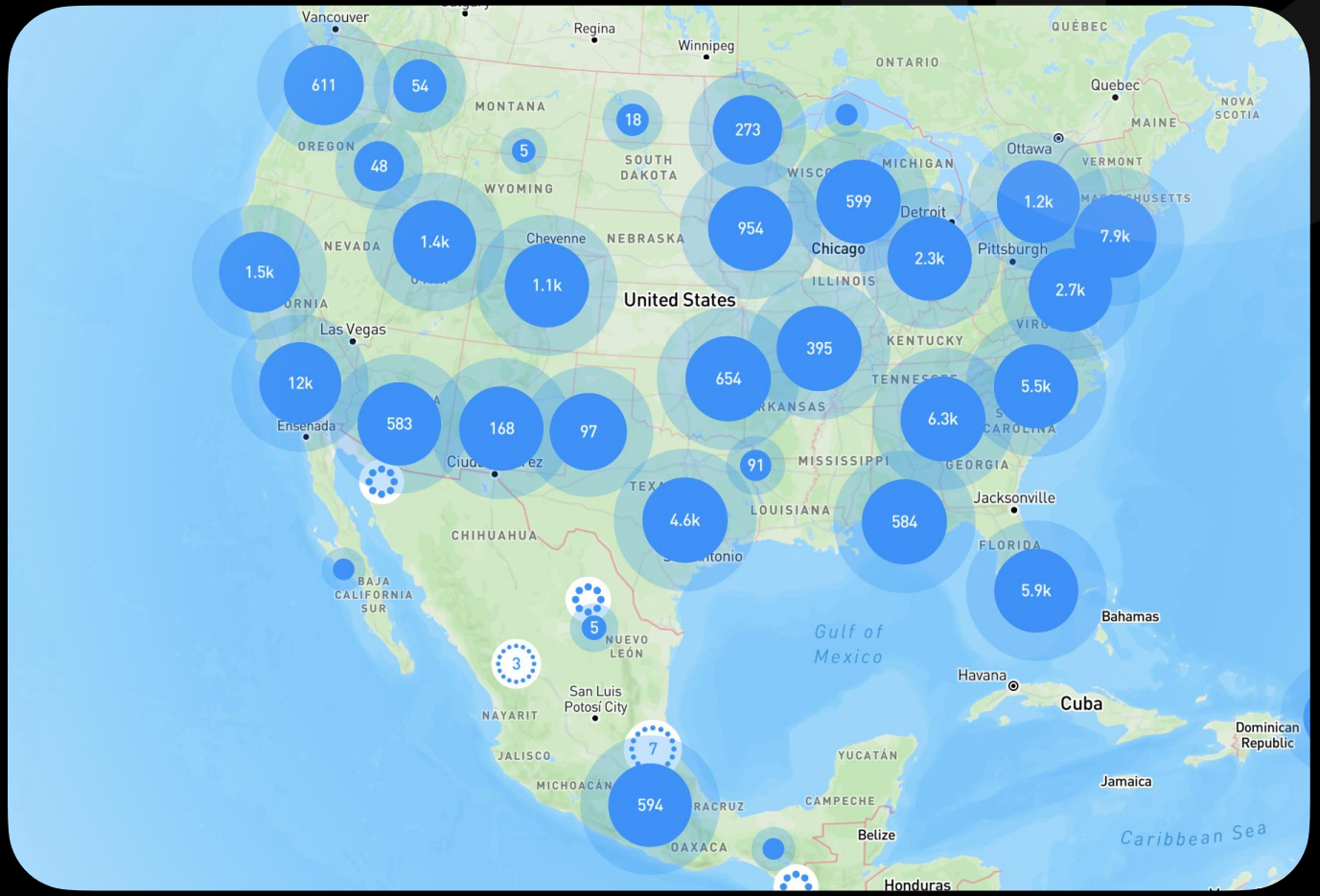
HELIUM MOBILE HOTSPOTS & CONVERTED WI-FI

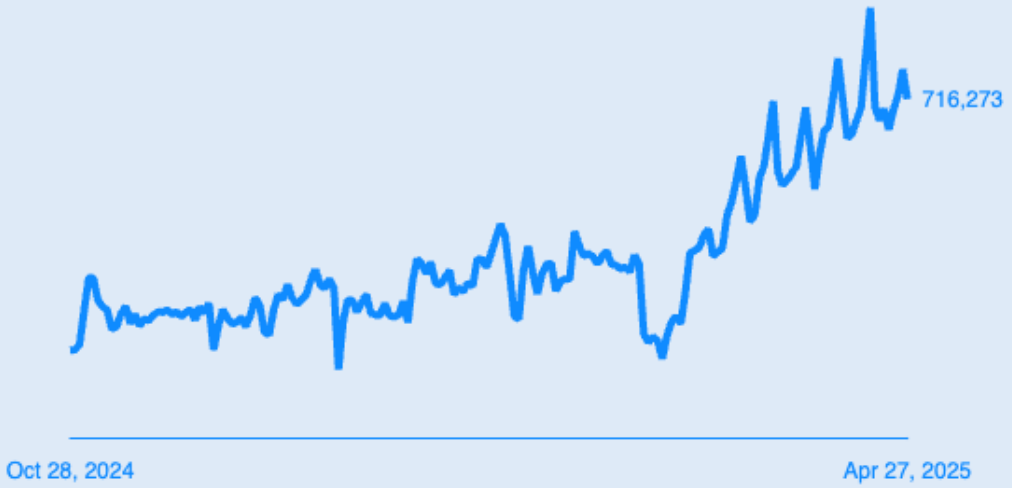
- The Helium Network is the world's largest, decentralized Wi-Fi Offload infrastructure
- Helium Community deploys carrier-grade coverage by purchasing and installing new hardware or by converting existing Wi-Fi networks
- Helium Community can also build targeted coverage where the carriers need
- In the US, the network serves 2 MNOs, and several MVNOs.
- Outside of the US, Telefonica Movistar in Mexico is using the Helium Mobile Network.

Helium Network

HELIUM MOBILE HOTSPOTS & CONVERTED WI-FI

- Helium Mobile Hotspots are easy-to-deploy, enterprise-grade Wi-Fi devices that can be installed wherever there is an internet connection.
- Existing Wi-Fi deployments can also be converted into Helium Hotspots via Passpoint/RADIUS configuration
- Over 90k Helium Mobile Hotspots are offloading over 25TB of mobile traffic daily.
- Hotspots Deployers are part of the Helium Network. Deployers earn $HNT for deploying coverage and routing mobile data.
- To learn more: world.helium.com



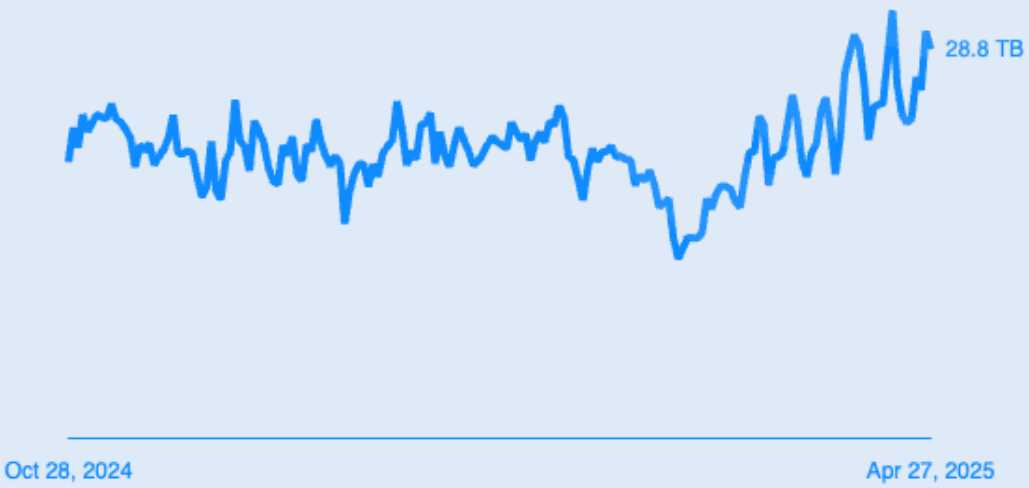


+15,773 7D

Daily Users

716,273 /day

Cell phones from multiple carriers can connect to the Helium Network. This graph shows the number of unqiue cell phones that connect through Hotspots each day.



+2.66 TB 7D

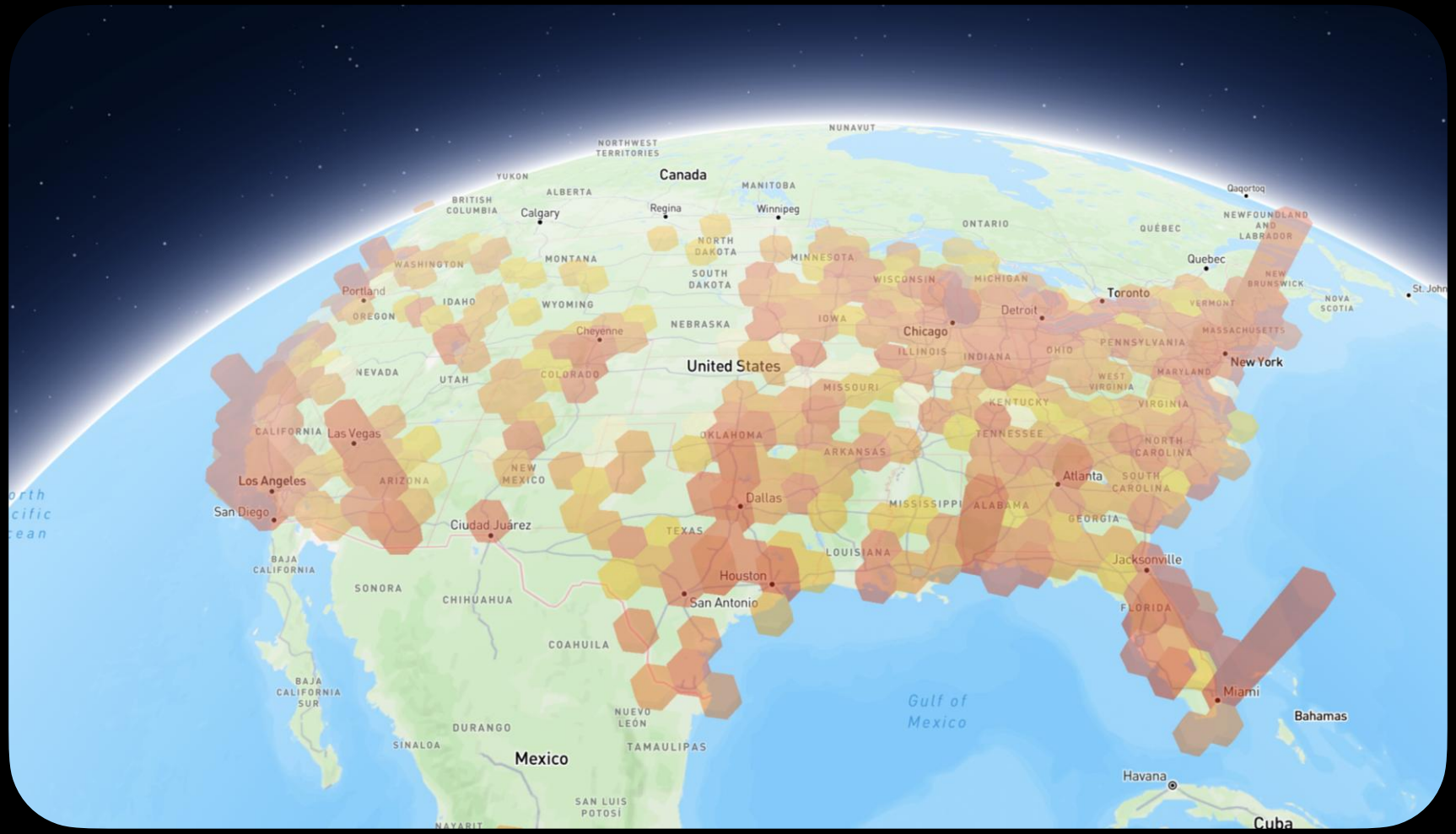
Daily Data Transfer

28.76 TB /day

Cell phones can transfer data through the Helium Network. This graph shows the amount of production data (for example: sending messages, consuming YouTube, etc.) that users have transferred through Hotspots.

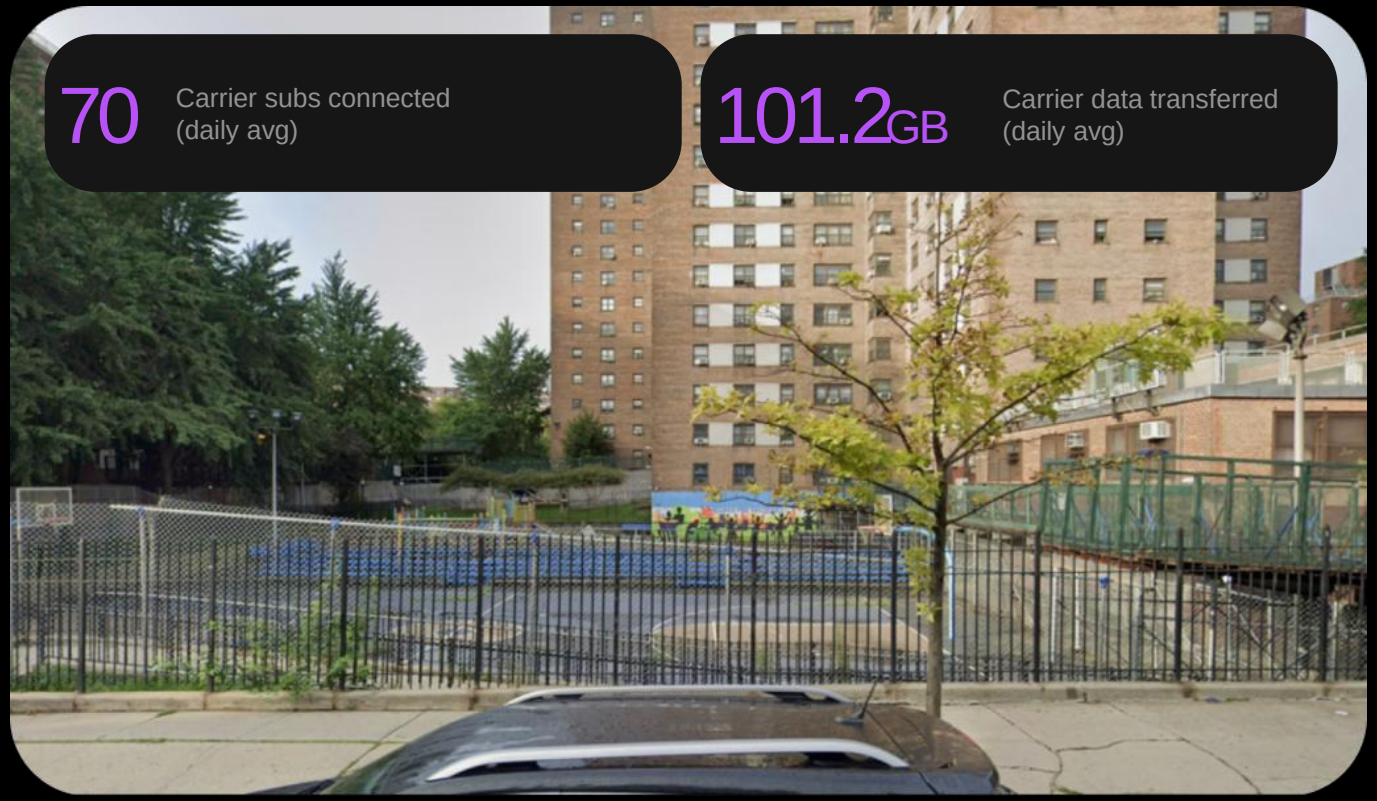
Image Source: world.helium.com/en/mobile/stats

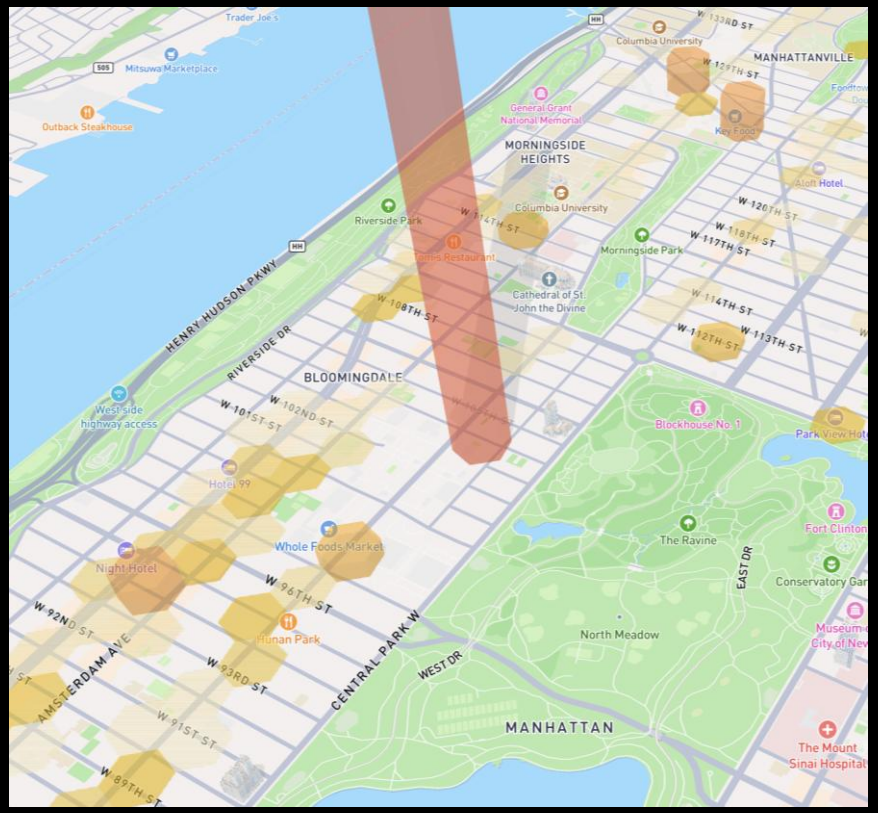
Real-World Deployment Case Studies



REC CENTER

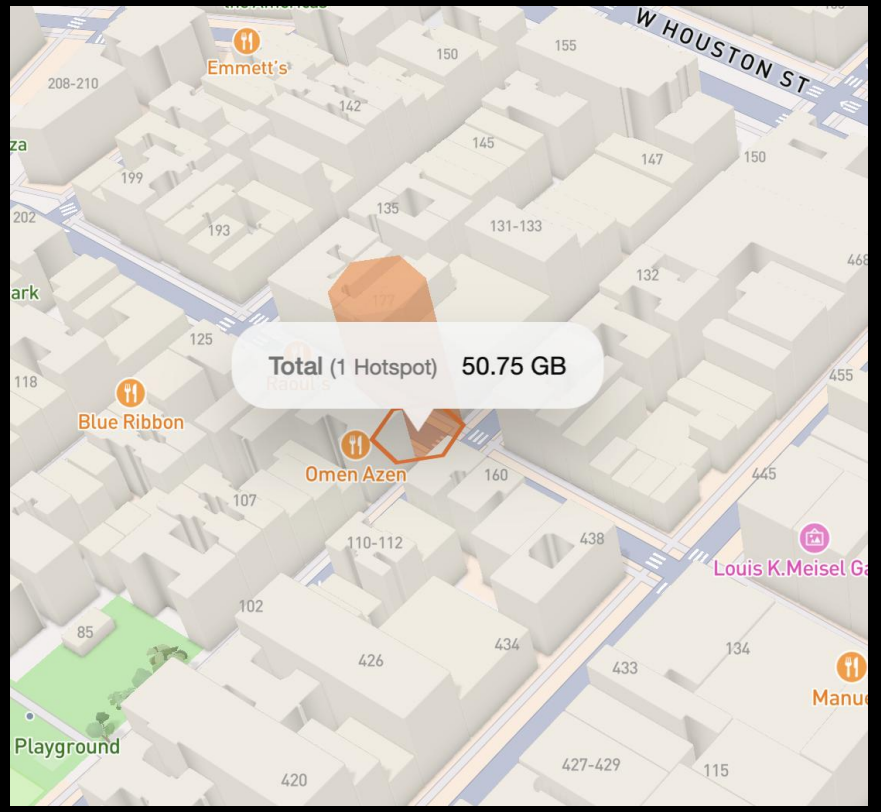
Children’s Aid Frederick Douglass Community Center





RESTAURANT

Heavenly Market and Deli



RAPID, RELIABLE OFFLOAD COVERAGE BUILT VIA

Crypto Incentives

- The Helium Network is deployed by community.
- They are skilled radio deployers who optimize for capturing $HNT, the utility token for the Helium Mobile Network.
- Radio owners are rewarded in two buckets:
  - Proof of Coverage
  - Data Transfer
- Proof of coverage earns variable amounts of $HNT depending on location, quality of the backhaul, (soon) quality of the Wi-Fi metrics.
- Data transfer is a fixed rate per GB depending on region, carrier selection, users caps.
- These incentives result in highly-reliable, carrier-grade Wi-Fi offload infrastructure.

Helium Carrier Offload Program

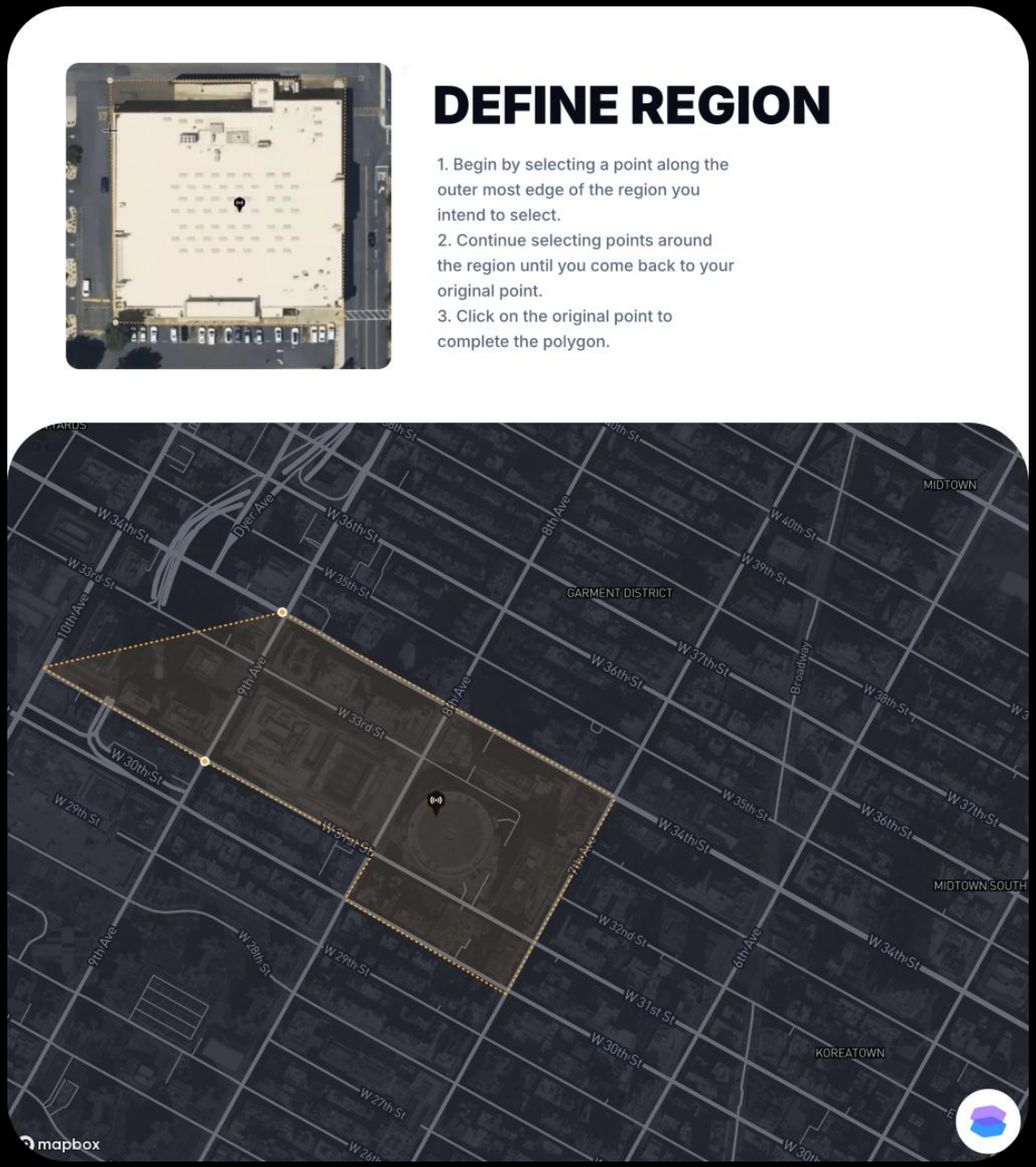
In the US, two MNOs and several MVNOs use the Helium Network to offload data for subscribers.

In Mexico, Teléfonica Movistar is bringing Helium to over 2 million subscribers.

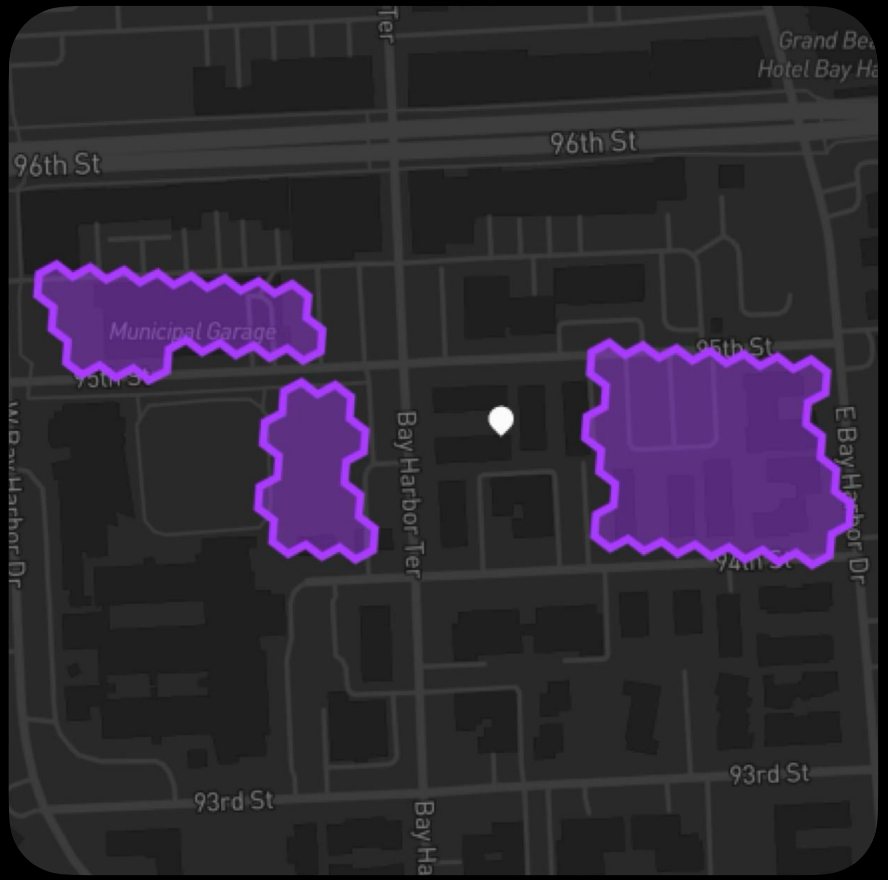
- Added coverage in high usage areas, or areas with coverage challenges (indoor venues, shopping malls, restaurants, etc.)
- Zero Capex requirements to expand coverage
- Reduced cost per GB versus their existing roaming options (MVNOs)
- Quality-driven Wi-Fi offload strategy

Carrier
Offload Manager UI

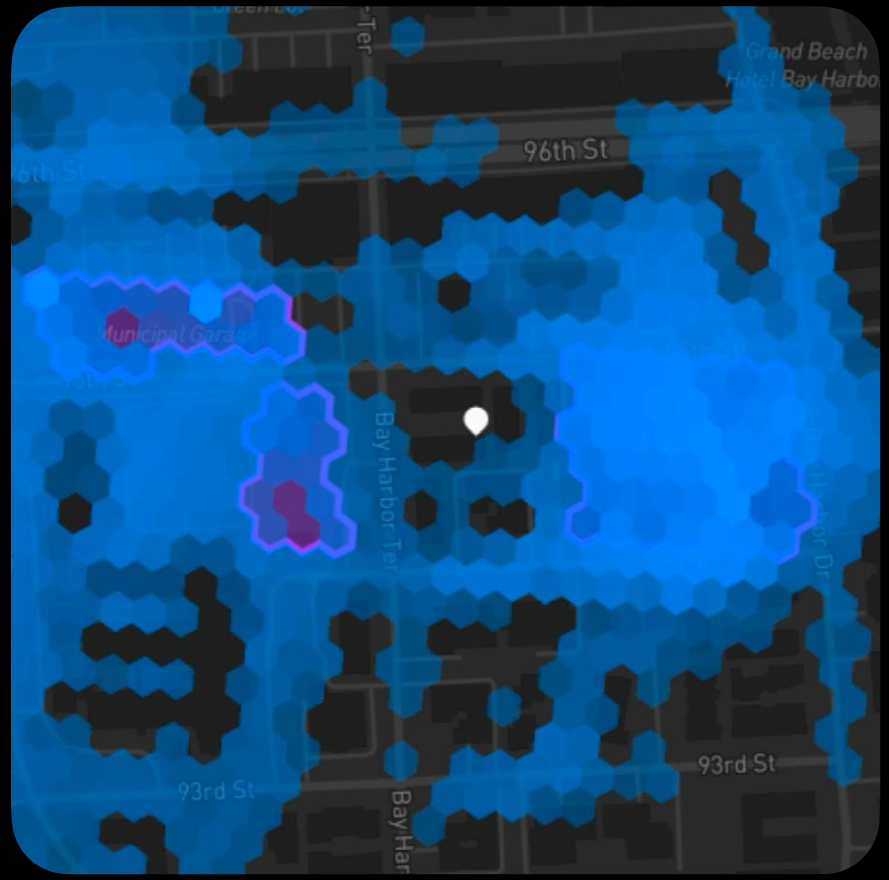
- Carrier Offload Manager is a UI for carriers to draw maps of where they need coverage.
- Helium deployers see these coverage requests and respond by creating coverage to capture the data traffic.



Miami



EXPANSION AREA



RESULTING COVERAGE

Mexico City

EXPANSION AREA

RESULTING COVERAGE

Helium QoS

The Helium Mobile Network ensures reliability by requiring hotspots to meet and maintain numerous QoS metrics.

QoS measurements are used to:

- align the incentives with quality
- select eligible hotspots
- automatically remove hotspots

HEART BEATS
(EVALUATES STABILITY OF THE BACKHAUL)

4 heartbeats/hour => 96 heartbeats/day

Req: 1 heartbeat/hour in 12 hours of the last 24 hours

LOCATION AWARENESS
(VALIDATES LOCATION ASSERTED BY DEPLOYER)

Indoor: Skyhook location service (randomly every 12 hrs)

Outdoor: GPS (randomly every 12 hrs)

Req: < 30 meters from asserted location (for boosted locations)

BACKHAUL TESTING
(EVALUATES QUALITY OF THE BACKHAUL CONNECTION)

Downstream/Upstream/Latency test (randomly every 12 hrs)

Req: 100 Mbps Down/10 Mbps Up/50 ms

WI-FI ACCESS TESTING
(EVALUATES QUALITY OF THE WI-FI CONNECTION)

Wi-Fi Access Metrics AVP-77 (Connect-Info) collected via RADIUS

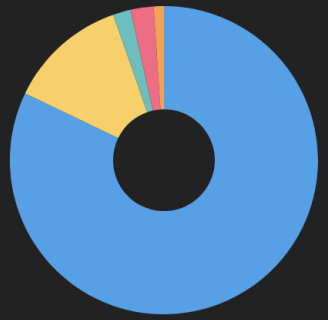
Req: grading algorithm (work in progress)

PRODUCTION DATA FROM HELIUM FLEET

Backhaul QOS

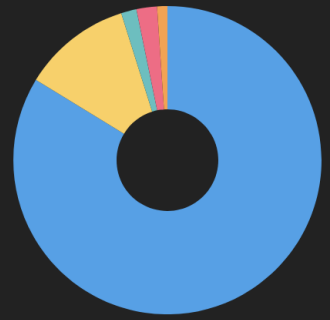
Tiers

Acceptable	16269
Degraded	2478
Poor	368
Failed	477
N/A	213



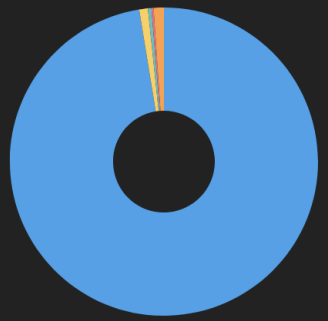
Download Speed Tiers

Acceptable	16580
Degraded	2265
Poor	320
Failed	427
N/A	213



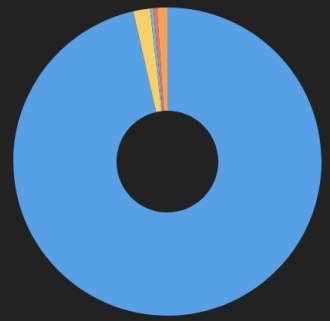
Upload Speed Tiers

Acceptable	19295
Degraded	180
Poor	74
Failed	43
N/A	213



Latency Tiers

Acceptable	19099
Degraded	347
Poor	72
Failed	74
N/A	213



AVP-77 CONNECT INFO (JOINT EFFORT HELIUM & SINGLE DIGITS IN WBA ACCESS METRICS WG)

Wi-Fi Metrics QoS

- Format to be sent in Access-Request:

```
Connect-Info = "CONNECT 400.00 Mbps 802.11ac Channel: 36”
```

- Format to be sent in Accounting-Start:

```
Connect-Info = "CONNECT 400.00 Mbps 802.11ac Channel:36
               RSSI:48 RSSI-min:80 Noise:94 ChanUtil:25"
```

- Format to be sent in Accounting-Interim/Stop:

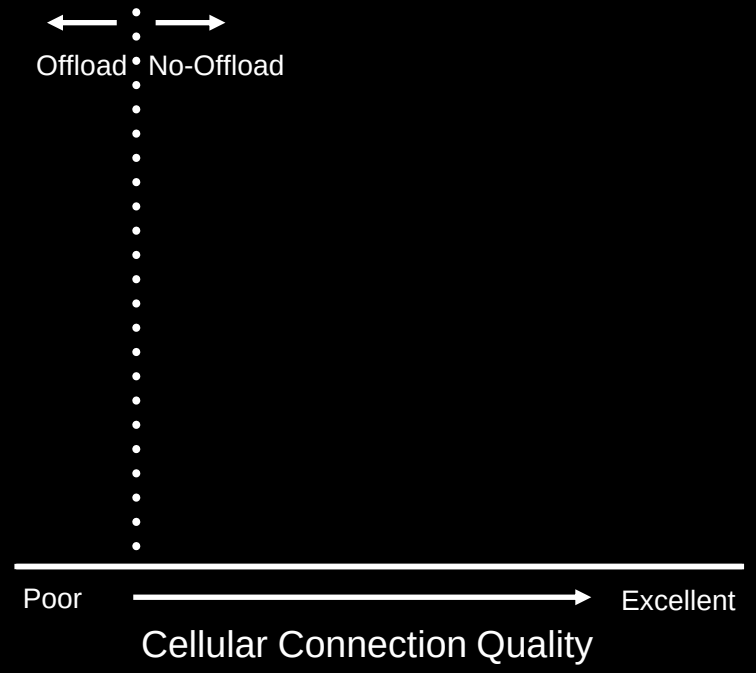
```
Connect-Info = "CONNECT 400.00 Mbps 802.11ac Channel:36 Band:5
                RSSI:56 RSSI-min:80 Noise:90
                ChanUtil:35 TxBitRate:150.0
                RxBitRate:150.0 FrameLoss:3 FrameRetry:6"
```

- Metrics collected:
  - Connect Speed
  - Wi-Fi Standard
  - Channel
  - Band
  - RSSI
  - RSSI Minimum
  - Noise Level
  - Channel Utilization
  - TxBitRate
  - RxBitRate
  - Frame Loss
  - Frame Retry

AVP-77 CONNECT INFO (JOINT EFFORT HELIUM & SINGLE DIGITS IN WBA ACCESS METRICS WG)

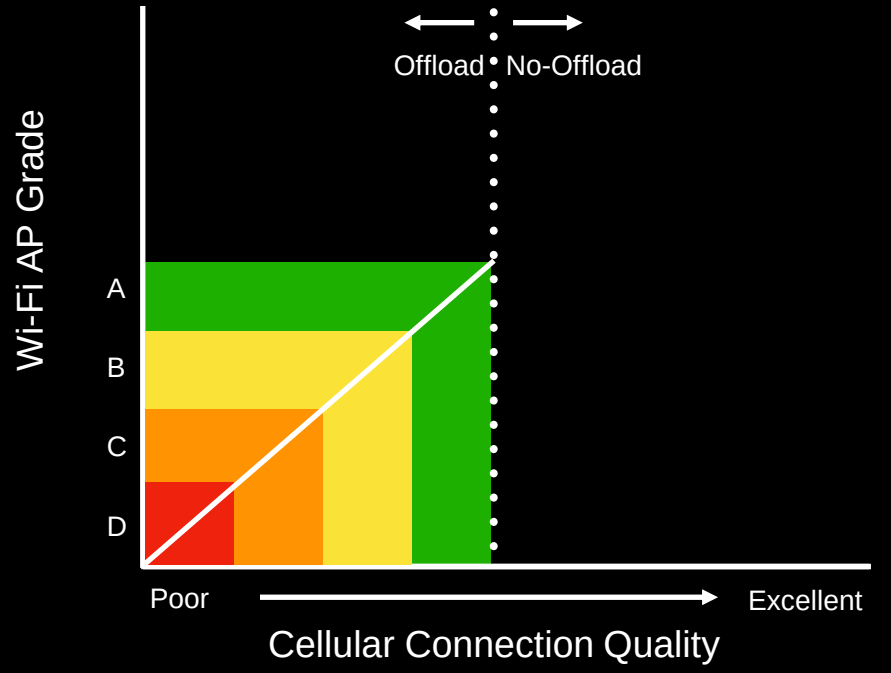
Wi-Fi Metrics QoS

No Wi-Fi Metric Offload Logic



- Black box “offload and hope” subscriber UX
- Conservative offload threshold
- Cellular capacity burdened unnecessarily

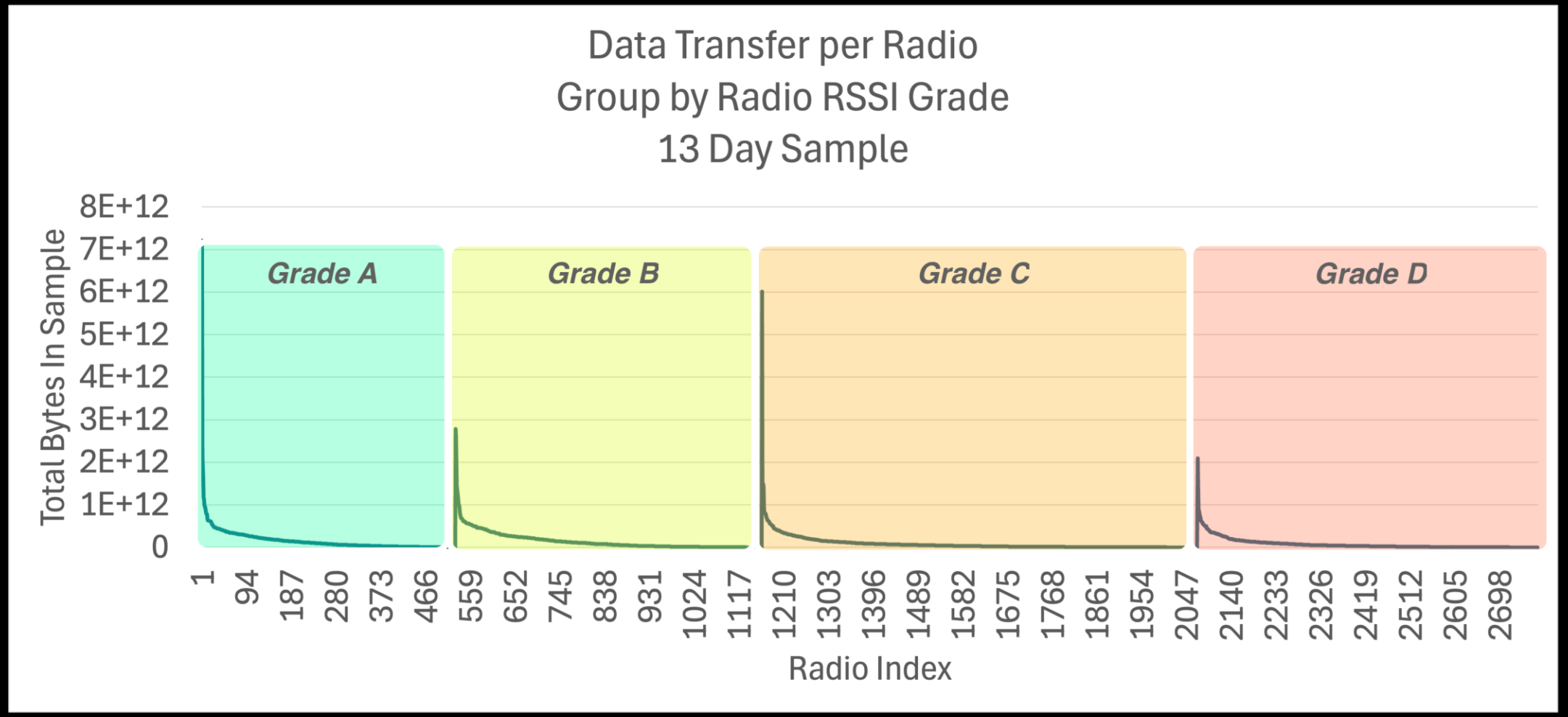
Wi-Fi Metric Informed Offload Logic



- Control of session UX when offloading
- Ability to use more aggressive offload threshold
- Ability to free cellular capacity proactively

AVP-77 CONNECT INFO (JOINT EFFORT HELIUM & SINGLE DIGITS IN WBA ACCESS METRICS WG)

Wi-Fi Metrics QoS




helium
QUESTIONS?

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Addressing the Drivers for Digital Poverty, Innovation and Connected Cities

CONNECTED COMMUNITIES FORUM
WIRELESS BROADBAND ALLIANCE

Steve Namaseevayum (Moderator)

VP Industry Engagement, Wireless Broadband Alliance

TJ Forner

Sr. SP Account Manager, CommScope/RUCKUS

Giovanni Guerri

CEO, Guglielmo

Drew Lentz

Senior Solutions Architect

Al Jenkins

Board Advisor, WBA Connected Cities

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Fireside Chat - Edge AI for Wi-Fi IoT

Irvind Ghai

Vice President Marketing,
Silicon Labs

Tiago Rodrigues (Moderator)

President & CEO,
Wireless Broadband Alliance

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Malcolm Smith

CTO Advisor – Wireless, Cisco

IoT in the Enterprise

Innovations in Smart Enterprise Environments

Cisco's Wi-Fi7 AP: A platform for Smart Spaces

BLE 6.0 Radios
to connect and manage
high density sensors

GPS
auto-location capabilities

UWB
next-level location accuracy

Wi-Fi7
High density Wi-Fi for
private and public use cases

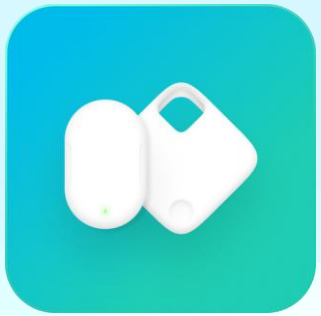
Cisco Spaces foundational technologies

AI-Maps

AI 3D maps

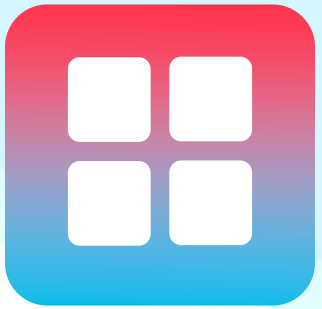
Auto Onboarding
Auto Location

Auto-onboard and Auto-locate Access points, Collaboration endpoints, sensors and People (OpenRoaming)



Multi-sensor Connect

Onboard, manage, map & get telemetry from 3rd party sensors.
Open Device & Partner ecosystem



Apps, AI & API's

Cloud dashboard with Outcomes, AI Assistant and Open APIs

Digital twin

The foundation: 3D Maps

Facilities CAD Maps

3D map

Automatically digitize floor-plans and transform them into dynamic, digital maps - no physical site visits needed

AI engine enhances accuracy and metadata extraction by automatically identifying rooms, furniture, and building outlines from CAD files

Add overlay data to the model from different sources: Occupancy, Room availability, Collaboration endpoint and sensors, sensor data, ...

Leverage across other platforms, share with partners

Auto-onboard & Auto-locate Devices

1 Auto-onboard APs

Authenticate and Auto-onboard APs

2 AP Auto-placement – location anchors

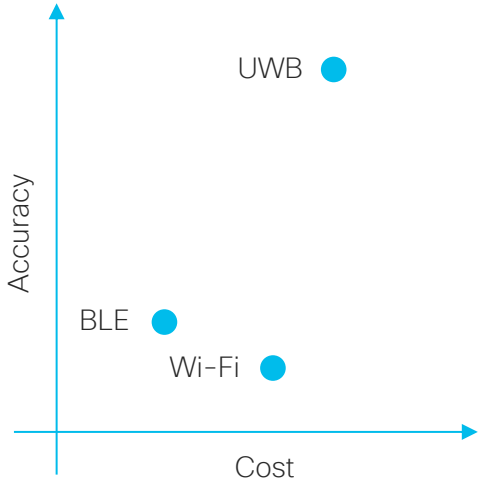
Automatically determine the location of Access Points in your buildings and place them on a digital floor map using GPS, Wi-Fi FTM and UWB ranging data

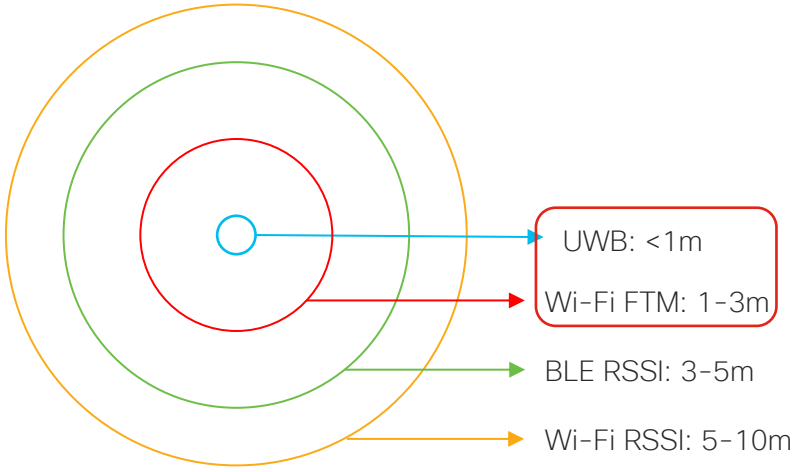
3 Auto-onboard & Auto-place Webex devices & Sensors

Auto-Locate Webex endpoints and sensors Leveraging BLE and UWB

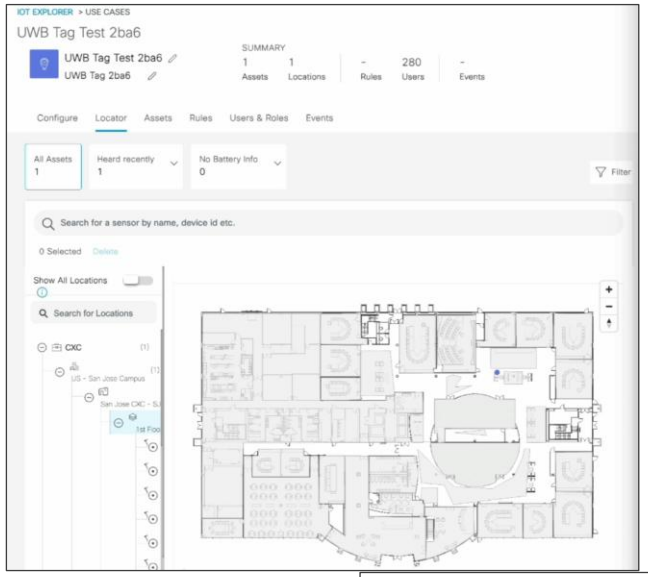
Onboard Webex devices and sensors based on location

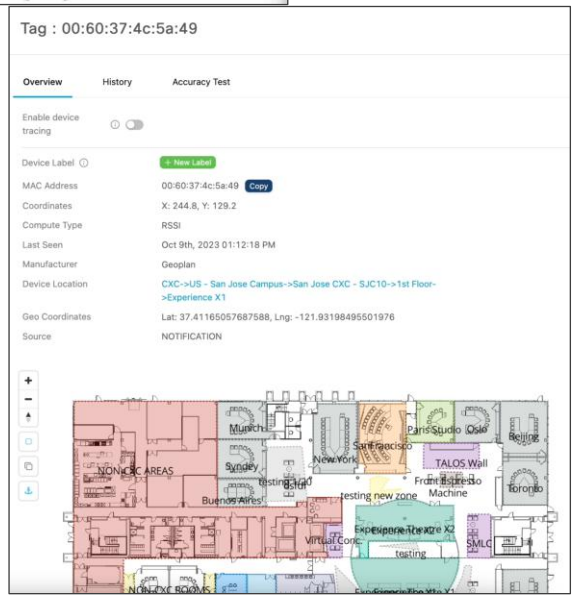
Location technologies





Accuracy Comparison





Occupancy

Leverage Cisco hardware as a sensor to anonymously track and analyze occupancy of buildings, floors, rooms

Wi-Fi Device data (RSSI)

Cameras (head count)

3rd party data

API

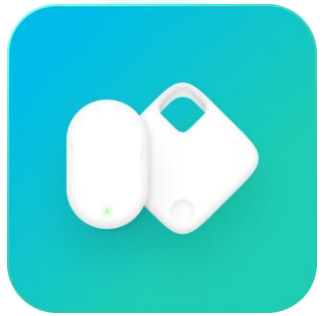
Digitization Re-cap

- Deploy Wi-F7 APs as a **sensor** platform
- Create a digital **twin** of the physical Space
- Gain **Insights** (occupancy, space and infrastructure usage, footfall, environment)
- **Optimize** Workspace and Retail experience

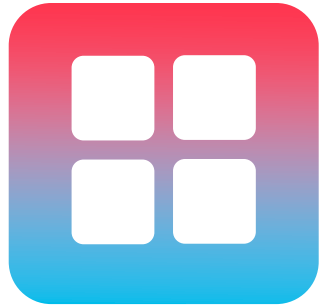
AI-3D Maps

Auto Onboarding
Auto Location

Multi-sensor
Connect



Apps,
AI &
API's



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Enabling IoT Connectivity in the Rural, Urban and Enterprise Environment

Bruno Tomas (Moderator)

CTO, Wireless Broadband Alliance

Paul Lai

General Manager, AsiaRF

Venkat Rayudu

Senior Product Manager, Silicon Labs

Malcolm Smith

CTO Advisor – Wireless, Cisco

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Tiago Rodrigues

CEO, Wireless Broadband Alliance

End of Day 1 – Wrap Up

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