KEY TAKEAWAYS FROM THE BIG 5G EVENT

If you couldn't attend the Big 5G Event in Austin, TX from May 16-18, you missed out on an interesting and educational three days. There were speakers, panels, presentations, and vendor booths to quench the greatest thirst for all things 5G. PrivateLTEand5G.com attended many sessions. Here are a few of our takeaways from the show.

There is a consensus – 5G is an Enterprise-first network

- 5G is the first generation of wireless that was not designed for retail customers– it's designed for the enterprise. The main reason enterprises want 5G is to get real-time data to make better decisions.
- Every operator and vendor boasted about their 5G success and enterprise verticals they are enabling. Industry 4.0 is an obvious common denominator.
- Rakuten went an extra mile by highlighting their 4-year journey to create a fully autonomous cloud-native 5G network. It's always refreshing to hear an operator talk about the disruption. Some interesting statements and stats shared:
    - "Rakuten is the only operator that launches products faster than PowerPoint"
    - 4 Years achievements: 96% coverage in 4 years, 94% of data traffic on-network (no roaming) - helps us move faster, 50K microcells, 250K small cells
    - The entire network is operated by just 250 people (the power of automation). On top of that we are putting a hiring freeze
    - Open RAN is just a means to an end. It's about open ecosystem. Created a customer loyalty program–- changes the buying behavior–- redefining the industry to participate in the digital ecosystem and add value
    - We are not happy where we are today with the time it takes to introduce the software component to the network. In our industry it still takes 9-12 months. We are working to change that through the concept of marketplace and AppStore.
    - There is no right answer for public or private cloud. They are both justified for different use cases
- Edge, O-RAN compliant vRAN, cloud-native virtualization, and AI/ML-based automation are the key technology ingredients to make 5G experience real. "The industry is not there yet but getting there." But what tops all technology drivers is the cultural mind shift required in network operations team to adopt automation.
- Operators learning so far in deploying 5G and vRAN/O-RAN?
    - vRAN is real and we are running on it, but it wasn't an easy ride
    - Cloud-native virtualization is not the same as cloud-native virtualization of RAN. RAN is 1000 times more complex due its distributed nature

  - We can no longer build networks for throughout and coverage. We are building 5G networks to handle different use cases and requirements. MEC is a key element for it.
  - We are not yet running telecom workloads in hyperscaler's cloud. It will take some cultural and skills alignment to make that happen
  - Edge infrastructure is important for both residential and enterprise offerings
  - Synergies between edge and RAN are still early days
  - 3 Ps of 5G are Performance, Price, and Power. vRAN is making a dent in all 3.
- What do operators need from the vendors and ecosystem?
  - There is an opportunity for the industry to put the solutions together in a better way. We want to see some more SIs who can solve this problem for operators.
  - Make technology more resilient. The new disaggregated and distributed network needs to be equal and more resilient than our current network
  - Build a healthy ecosystem
  - Better training and education to equip our team, better integration, and diagnostic tools

Open RAN – mixed emotions and readiness concerns persist

- While Rakuten was the strongest proponent of Open RAN and its commercial deployment, the assertion was that it is foundational and a means to an end. Most other operators focused on their journey to vRAN with a roadmap to Open RAN. Dish was the most aggressive in following the Rakuten path to adopt Open RAN.
- In the big telco's opinion, Open RAN operationalized must have:
  - Better analytics
  - Demonstration that it works
  - We have to get over our fears
  - It needs to be simple for the guys running the network
- Dish made an interesting comment that the industry did a disservice to Open RAN by not giving enough importance to RIC (RAN Intelligence Controller), which is critical to realize the true benefits of programmable network
- Ericsson had a less enthusiastic (or a practical) view on Open RAN and ecosystem, stating its full maturity will be closer with the 6G timing. Their vision continues to provide purpose built as well as cloud RAN solution, which needs to be resilient, sustainable, open, and intelligent. Their foundation work focusses on:
  - Cloud RAN
  - Intelligence and Automation portfolio
  - Open internal RAN interfaces
  - Contribute to O-RAN
  - Overall network cloudification

We witnessed live that Edge has started to eat the Cloud

The edge was a major topic of discussion, with multiple sessions devoted to different aspects.

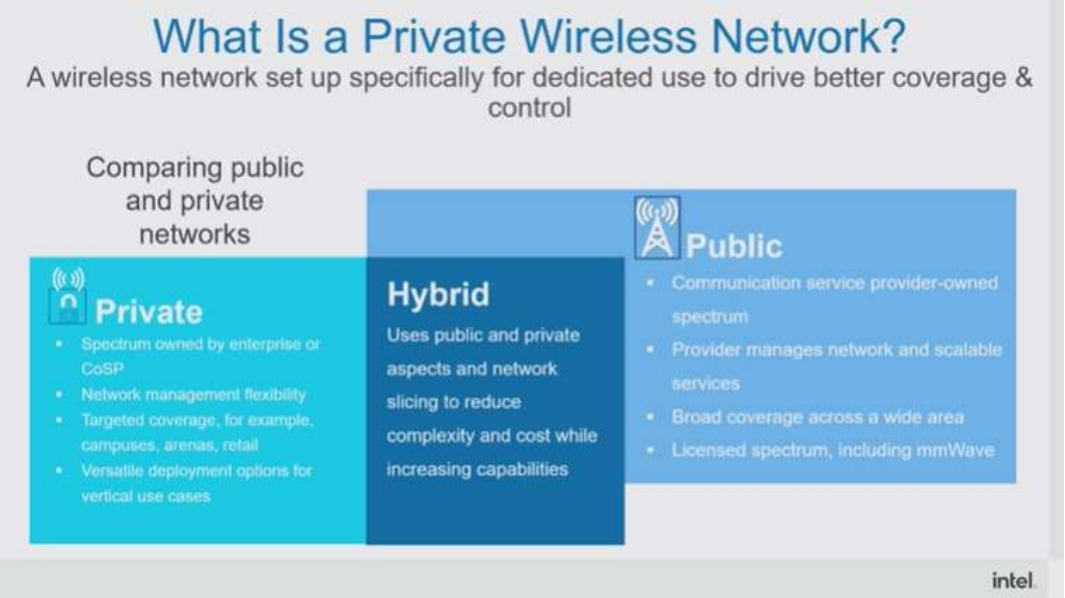
- The TAM for edge processing will be >$500B by 2030.
- From the discussion KAIROS Pulse had while moderating a round table “the role of Edge in delivering the promise of 5G” to the number of presentations and panels at the show, it was clear that Video analytics (intelligent video) is and will be a huge part of the edge.
    - Most will be processed locally, perhaps just metadata sent to core
    - One speaker said the network edge will become the video edge.
- While the industry is still grappling with the idea of cloud-native, the industry is already talking about edge-native applications.
- You can't take cloud native software and deploy at the edge. However, not all edges are same. On premises edge solutions need to work under extreme conditions. It's a connected edge that is sometimes not connected. Network edge more or less operates like cloud.
- Going edge native requires 3 things:
    - **Hyperconvergence:**
        - Edge density
        - Edge native containerization - optimized for the latency expectations
        - Supports multiple types of workloads - 5G RAN, UPF, etc... you will run out of compute very quickly...that's why we are building very thin containerization platform.
        - The edge must be deterministic - forward error correction, etc.
        - If you don't have the platform optimized for the edge, your RAN will suck up all your resources.
    - **Secure**
        - Data must be stored in secure locations.
        - Applications and network nodes must pass the trust services (to avoid getting any tampered apps or nodes in the system.)
    - **Sustainability**
        - Cloud computing is a voracious consumer of energy.
        - Edge needs green computing.
        - You need to track power telemetry to reduce power utilization (put an entire core to sleep state, turbo boot, etc.)
        - AI based real time scheduling decisions
        - Capabilities exposed through APIs
- Key differences between cloud and edge
    - Data centers were compute-driven
    - Cloud was compute-driven
    - Edge is data driven, not much done until a trigger occurs
- What are the challenges for the edge?
    - Business – making a strong ROI
    - Technical – there are a lot of choices – public or private edge

    - Operations – have to be automated
    - Security – edge is more open to cybersecurity attacks; needs to be designed in from the start
- Things that happen at the edge:
    - Media processing
    - Transcoding
    - AI
    - Security attack vector to handle
    - Work autonomously
    - You don't have command and control concept at the edge
- Verizon Business said they're no longer building their network for throughout and coverage - they are building to handle different use cases and requirements, and MEC is a key element of it.
- Intel reports that the priorities for video services at the edge are:
    - Viability
    - Scalability
    - Utility

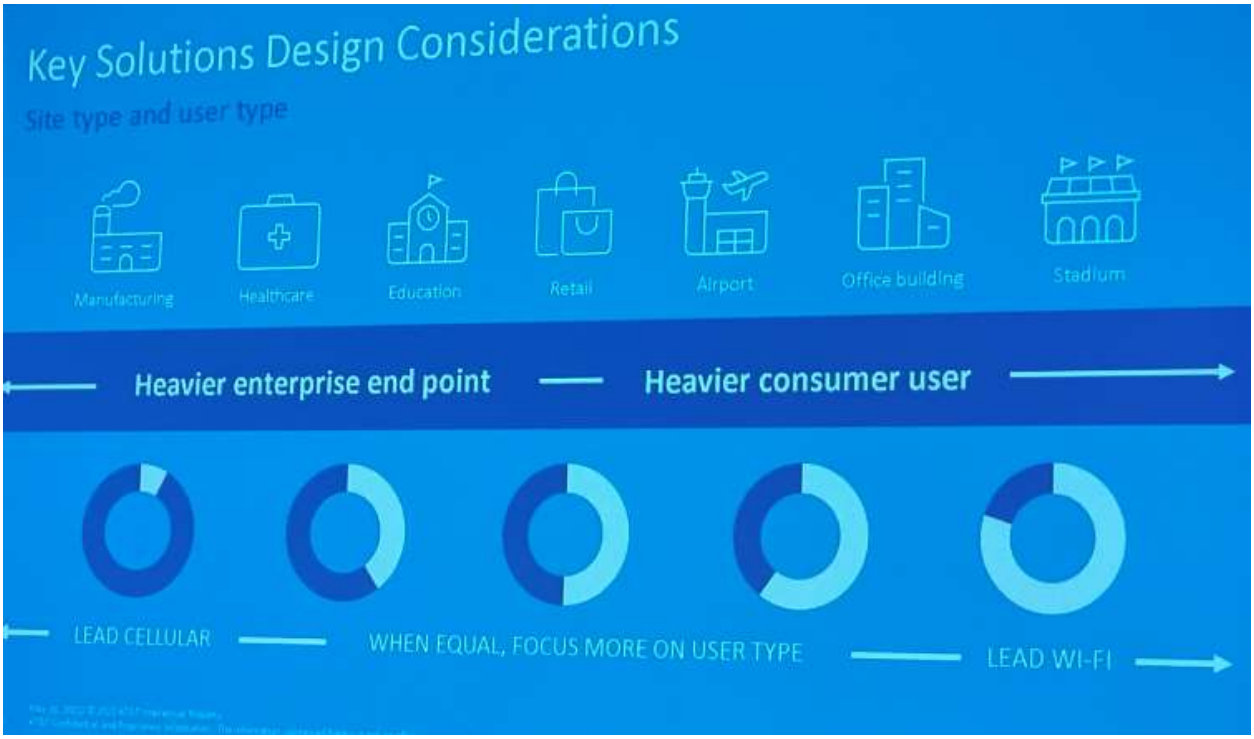
Private 5G (LTE in most cases) networks are gaining commercial success

- Private LTE/5G network was a dominant topic in the event's overall agenda, with a dedicated track covering all things Private networks.
- While its early days for private 5G networks, the momentum is picking up. Many deployments were discussed across a variety of industry sectors:
    - Smart agriculture
    - Manufacturing (Ex: robotic assembly lines, AGVs)
    - Schools
    - Smart Cities (parking meters, collaboration with the school districts, Indian reservations)
    - Ports (Cranes break the Fiber…Wireless is critical)
    - Warehouses
    - Refineries
- There were bold claims of live deployments by Intel, Cradlepoint, and AT&T
- How is Private 5G Network GTM and sales different from 5G networks?
    - Caroline Chan of Intel noted that the biggest challenge in different Go to Market motions is setting the right expectations. When you are selling to enterprises you are selling the outcome, but when you are selling to telcos you are selling the technology.
    - It's all about the business KPIs
    - It's about giving customers 'optionality'
- What do enterprise customers want the most?
    - Deterministic connectivity – all the time connection

    - Low latency
    - Security – which is built into 5G
    - Consistency of experience
    - To know how 5G and private networks can change their business model
- Concerns of Enterprises (Example: Department of Transportation)
    - Biggest challenge we have is - is it truly a mature technology, does it have reliable connectivity everywhere
    - We need cellular everywhere – what different cellular solutions we need to make sure autonomous vehicles work every time
- There is a consensus that it's not about Wi-Fi or Cellular, enterprises need both depending on the use case. However, when it comes to RoI everyone claims to bash Wi-Fi by highlighting the Opex savings gained by replacing 10s or 100s of Wi-Fi access points with a few CBRS small cells. One site changed from 127 Wi-Fi access points to 3 cellular access points
- What's critical to drive Private Network adoption?
    - Long term partnerships are important
    - Edge and Private Networks are complimentary
    - CBRS spectrum is the centerpiece of many deployments; however, AT&T had a different view (explained below)
    - Most use cases require collecting data locally
    - We need 5G SA support to support industrial use cases, which we don't have in public network yet, but we can have that in private network
    - 90% of enterprises are SMB – companies must learn to sell to small businesses.
    - Part of the connectivity solution is just putting coverage where there is none now.
- Challenges to be solved for Private Networks
    - System integration
    - TCO justification
    - Application innovation
- Intel showed a nice slide detailing public, private, and hybrid private networks.



- AT&T made some very interesting comments:
  - Everything that is in the macro network applies equally in micro private network
  - CBRS is not the only thing. mmWave is good if we know where to use it
  - It's about the convergence of tech, people, and things: network and applications working together
  - Why companies are talking about private cellular:
    - They want to control access to data
    - Cost per square foot becomes attractive when outdoor comes into play
    - Security is critical
  - We are targeting to solve the day-0 wireless connectivity challenge for the enterprise. The cost benefit even for the basic capability is 12:1 vs. Wi-Fi
  - There are some common patterns across enterprise use case. The grounding philosophy, listen below, defines the type of wireless connectivity needed
    - Site type and user type
    - Who owns the data?
  - To support the above point, Jason Inskeep of AT&T showed an illuminating slide, showing verticals and which needed cellular vs. Wi-Fi coverage.



Our thanks to Informa, The Network community, and all the sponsors and speakers of the Big 5G Event for putting on a fantastic show. We're already looking forward to next year!