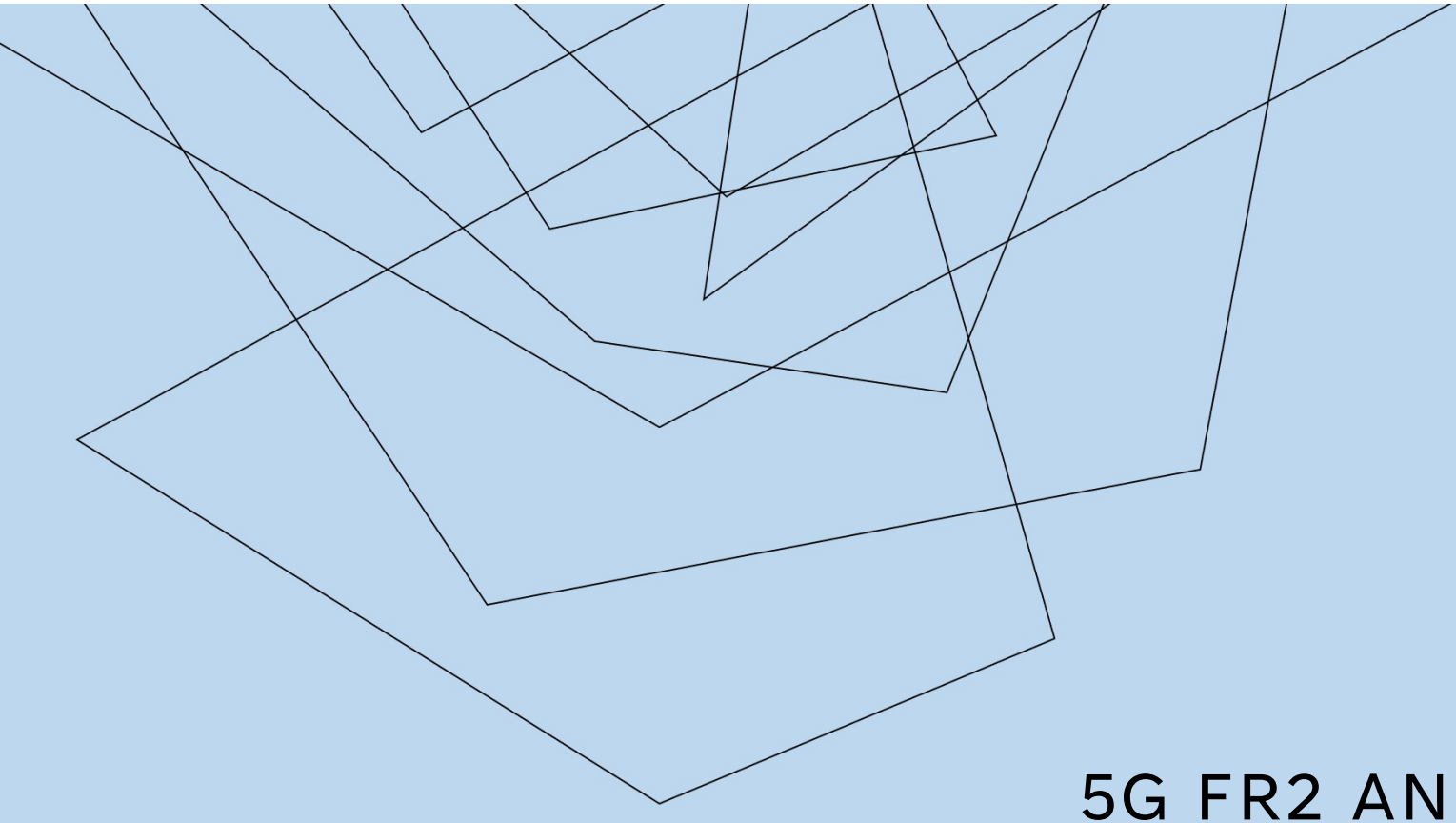


5G FR2 AND IAB – A MATCH MADE IN HEAVEN!

AGENDA

Wedding Cake Strategy for 5G Deployment

FWA as the key driver for FR2 Deployments

Hurdles for FR2 Deployment

IAB for Cost Effective Deployment of FR2

IAB Internals

Complexities in IAB Networks

IAB Use Cases

WEDDING CAKE STRATEGY FOR 5G DEPLOYMENT

THE 5G WEDDING CAKE

FWA AS A KEY DRIVER FOR FR2 DEPLOYMENTS

FWA ADVANTAGES OVER FTTH

- **Easy and Quick way to offer high speed internet to homes and small businesses**
  - No hassles of civil construction permits
  - No hassles of digging to lay fiber to the home
  - Can be self installed by users, no need to send out technicians
  - Much better time to market compared to FTTH
- **More cost effective than FTTH**
  - Operators can leverage their existing 5G network to serve FWA users
  - Lower maintenance cost as there as no issues such as fiber cuts
- **Reach places where Fiber is not economically viable with FWA**
  - Rural and other low density housing areas do not offer an ROI for expensive FTTH deployments, FWA is a good solution at those places as well
- **Operators have started offering FWA over FR1, but will need to tap into FR2 spectrum as they scale out their FWA deployments**

HURDLES FOR FR2 DEPLOYMENT

OPERATORS WANT TO USE FR2 FOR FWA. BUT…

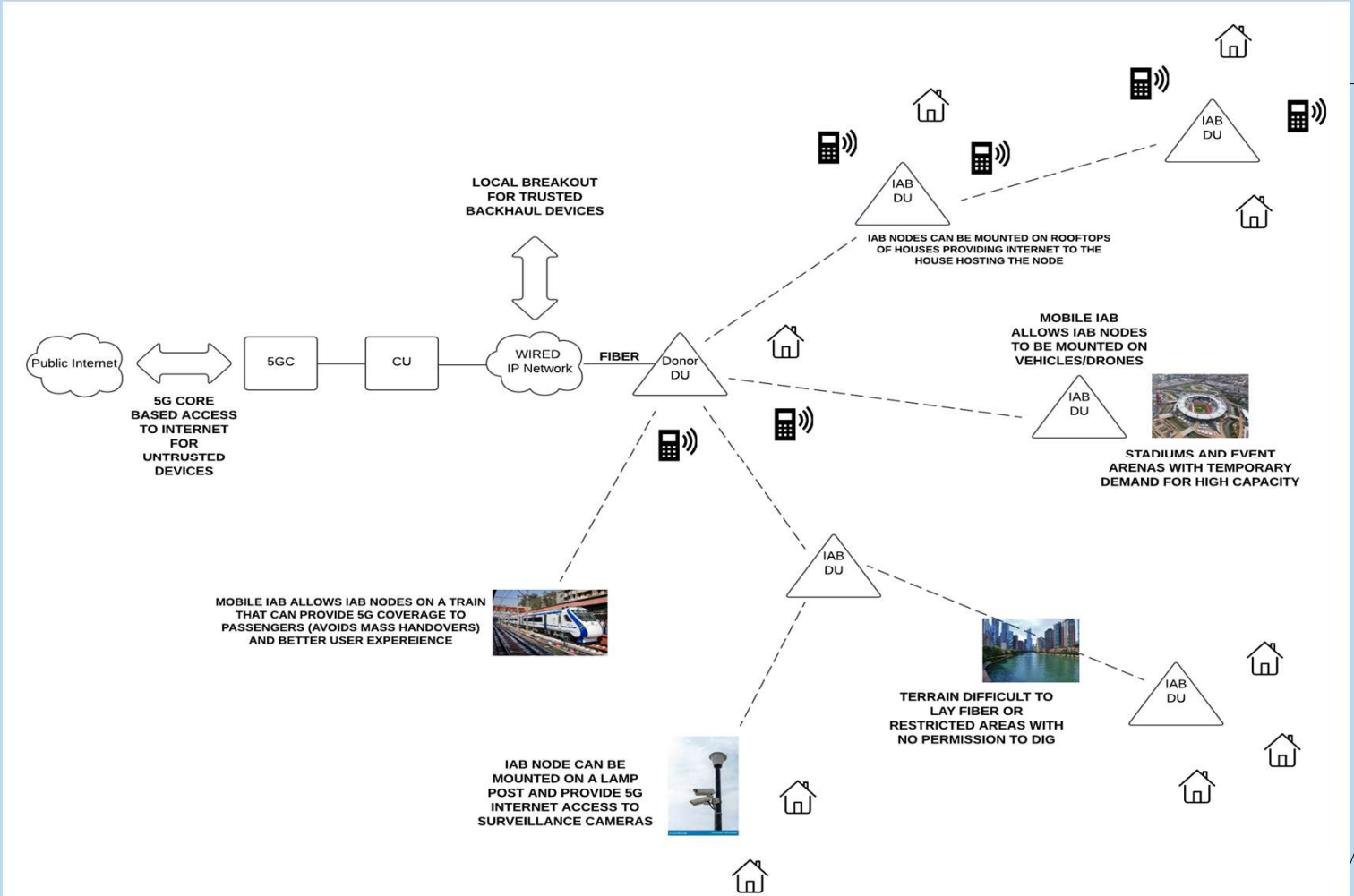
- **FR2 deployment has many challenges that need to be addressed**
  - FR2 frequencies have very high propagation loss which leads to much smaller cell radius when compared to FR1
  - FR2 frequencies degrade significantly when passing through obstructions
  - The above points lead to the need for a very dense network of small cells to deploy 5G FR2 which is very costly to build
  - The cost is mainly due to the need for fiber to be drawn to all these small cell sites for backhaul
- **FR2 products in the market are still early in the maturity cycle when compared to the FR1 products**
  - Extension of cell range with beamforming results in a complex system with wide and narrow beams and fast switching of users across beams

IAB FOR COST EFFECTIVE FR2 DEPLOYMENT

IAB OFFERS A COST-EFFECTIVE WAY TO DEPLOY FR2

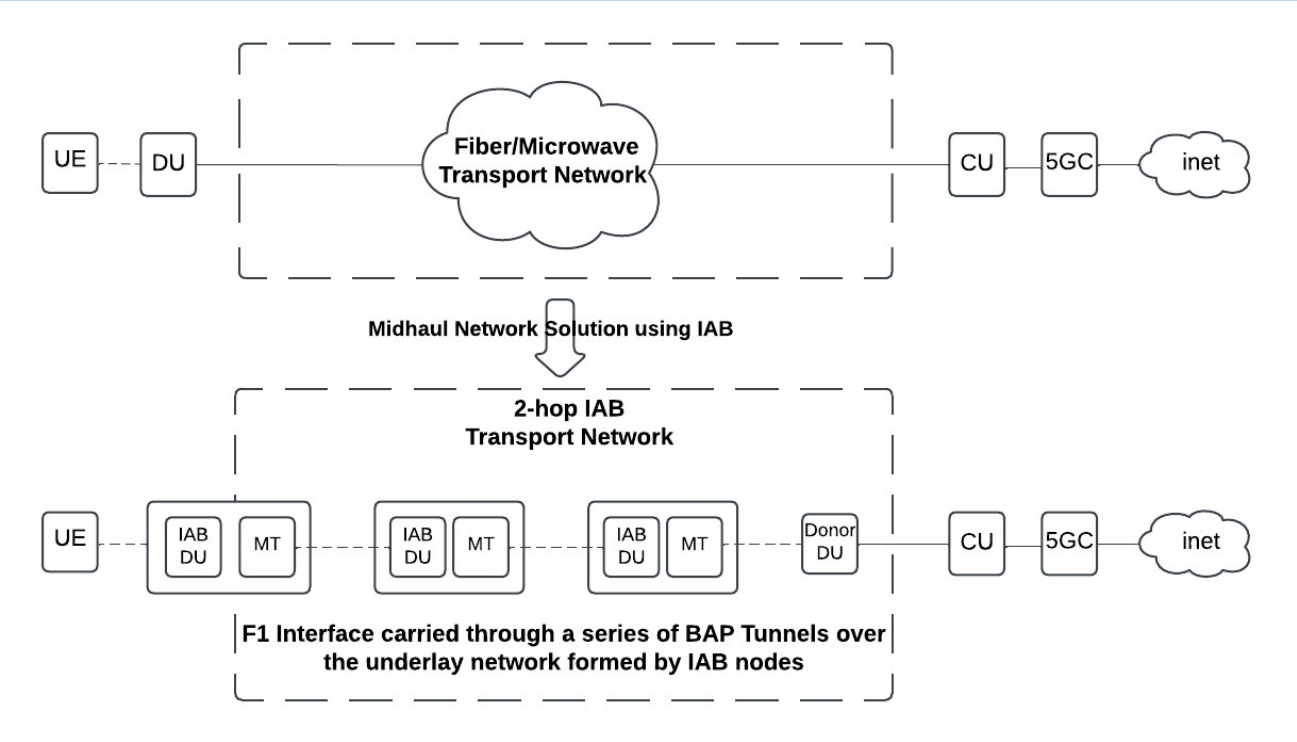
- **IAB makes FR2 deployments commercially viable to the operator**
  - Reduces the need for fiber for FR2 deployments thus reducing the cost and time to market significantly
  - Allows operators to distribute the capacity of a single fiber backhaul across a much wider area than what is supported by FR2
  - Allows operators to create FR2 links around obstacles
  - Allows operators to expand their FR2 coverage to regions where fiber cannot reach
- **IAB is fully 3GPP and O-RAN compliant**
  - Being completely standards compliant IAB has the advantage that over time there will be a strong ecosystem to support the technology

IAB NETWORK TYPICAL DEPLOYMENT



IAB – THE INTERNALS

IAB TUNNELS THE F1 INTERFACE ACROSS MULTIPLE RLC HOPS



COMPLEXITIES IN IAB NETWORKS

INTERESTING PROBLEMS TO SOLVE IN IAB

- **Achieving Full Duplex**
  - Self interference cancellation
  - Smart scheduling of beams to avoid high self interference
  - Dynamic TDM
- **Backhaul Link Reliability**
  - Robust P2/P3 procedures and BFR handling
  - RLF Handling
  - IP Address Preservation
- **End to end QoS, Flow Control, Solving Spatial Bias etc.**
- **Optimizing end to end Latency**
  - Preemptive BSR
  - Prioritizing Backhaul Traffic over Access

IAB USE CASES

IAB USE CASES

- **Fixed IAB Use Cases**
  - In general cost effective FR2 deployment
  - Cell Site Backhaul
- **Mobile IAB Use Cases**
  - 5G access within trains and busses
  - IAB nodes on drones deployed to serve temporary capacity demands from stadiums and event venues
  - Maritime mesh networks for ports and oil rigs
  - IAB nodes deployed on drones and military vehicles that form a tactical bubble

THANK YOU

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