



Network Node Proposal

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City of Richmond

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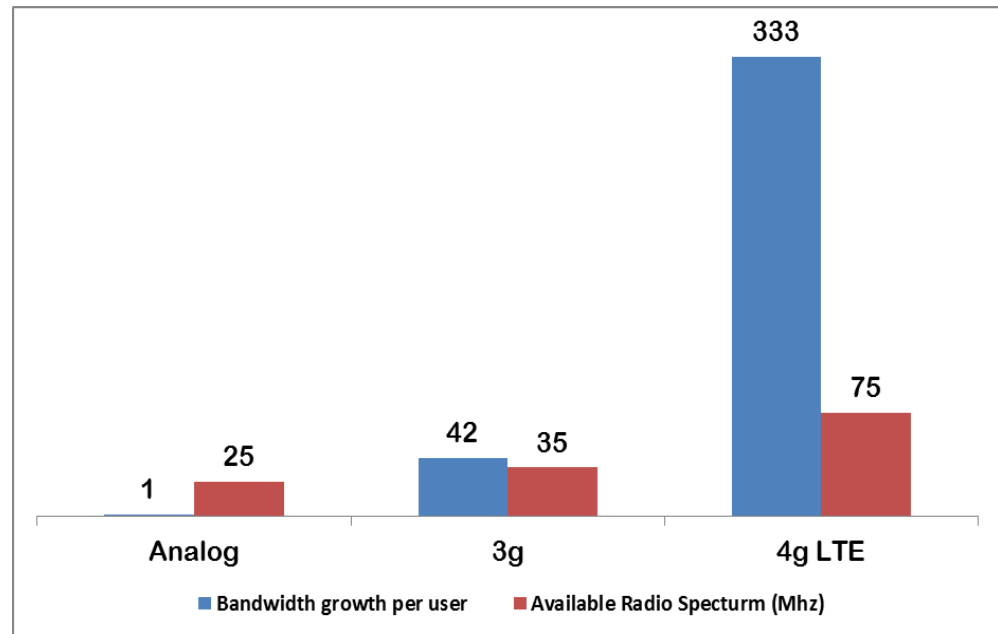


Introduction

- **Why Coverage alone is no longer the driver for Network growth?**

In 2012, wireless broadband usage produced steady growth in consumption rates. 4G LTE made way for the advancement on how consumers and businesses use wireless data.

Industry trends estimate that consumer and corporate data usage is growing at a rate of 333 times more than growth periods for previous technologies*.



*CTIA



4g LTE Phones and features

Presence Powered Communications



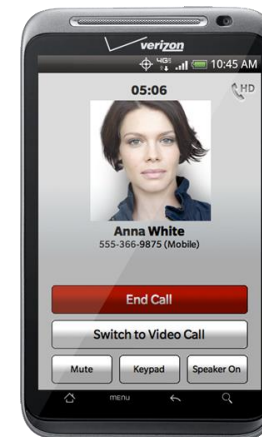
Always On, Instant Video Communications



Feature-Packed Messaging Experience



HD Voice / VoLTE





Network Node Deployment Strategy

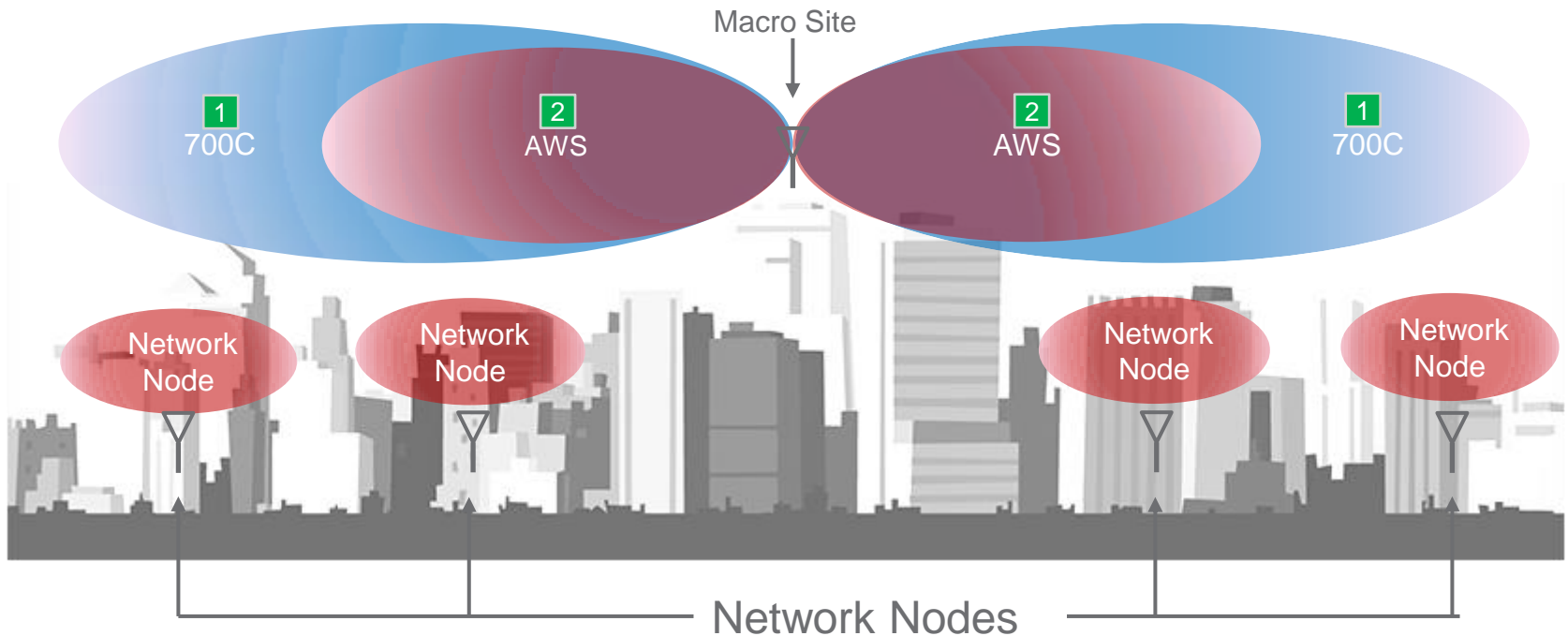
Cell-edge

Mid-cell

Near Cell

Mid-cell

Cell-edge



Network Node Deployment Strategy

- **Capacity demands generate the need for Network Nodes**
- **Network Nodes provide**
 - Small coverage (100's of feet)
 - Low power (2x5W)
 - Low antenna height (<35')
 - Smaller space requirement
- **Identify Location of Usage**
Local Jurisdictions



What is a Network Node?

Network Nodes:

- Covers less than 1000 foot radius (more typically 500 feet)
- Two categories: Coverage and Capacity

Notes:

- Unique antenna locations
- Low profile design- Aesthetics of area kept in mind with design
- Average 18 – 35 foot antenna centerlines (height above ground)



- Low profile antenna structure
- Low power
- High density pedestrian or slow moving traffic areas
- Provide increased capacity within small areas



Typical antenna equipment used in Network Node Deployment

MICROCELL



Average size per antenna: 17"H x 10"W x 7"D,
weight 25lbs.

D-RAN



Antenna/equipment cabinet micro design



Average size equipment: 13"H x16" W
x11"D weight: ~ 40 lbs.



Microcell – Equipment Cabinet #1 vs. Cabinet #2

DC cabinet
Battery backup
Dual-band (dual-MCO)
support



Size: ~55" H x 21.25" W x 20" D
Weight: 400lbs (fully equipped)

AC cabinet
Dual-band (dual-MCO)
support



Size: 30"H x 21.25" W x 20" D
Weight: ~200lbs (fully equipped)



Antenna Example

- **Less than 24" tall**
- **Typically mounted 18'-35'**
- **Very low profile**
- **Very low power output (5 watts)**
- **Outdoor or Indoor**
- **GPS**





Transport Requirements for Network Nodes

- **Transport Options**

- Dark Fiber Solutions- VZW preferred option
- Lit Fiber Solutions – VZW 2nd option
- Microwave – VZW 3rd option





Installation





Installation

- Resort





Mall Installation

Mall Parking Garage

