

Santa Rosa & Verizon Wireless Small Cell Program



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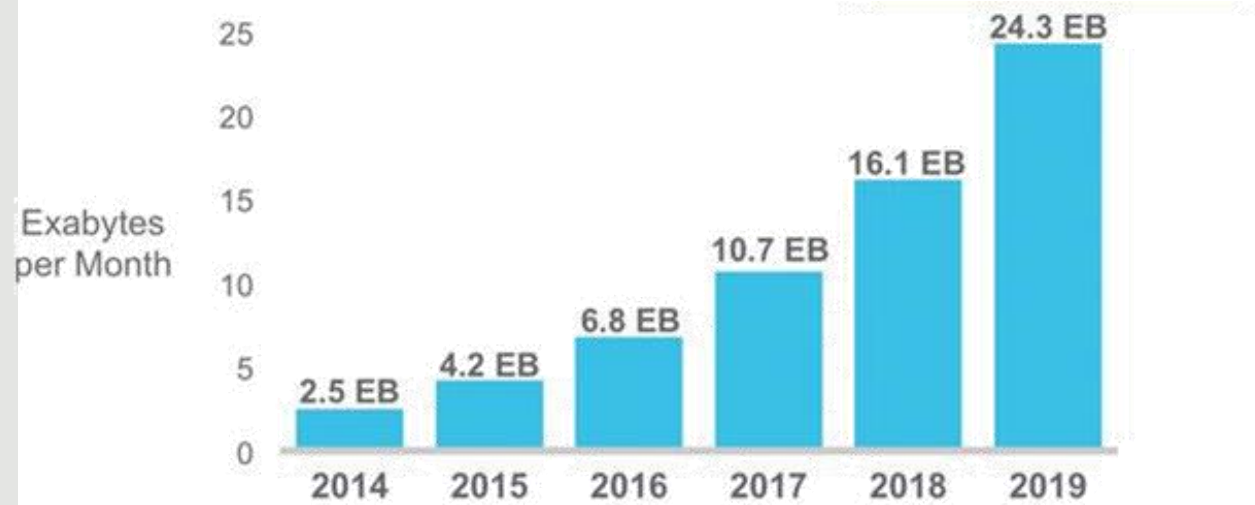
Agenda

- 1. Why Are Small Cells Needed?**
- 2. Small Cell Design & Components**
- 3. Deployment Examples**
- 4. Benefits**

Why are Small Cells Needed? Growth in Data

- Deploy Macro Cells
- Add Capacity to Existing Sites
- Deploy Small Cells

57% Annual Growth



Global Mobile Data Traffic Projected Growth

Source: Cisco VNI Mobile, 2015

Key Demand Drivers and Impact

YouTube hulu NETFLIX

Video Streaming
Incremental



Multiple Devices
Incremental

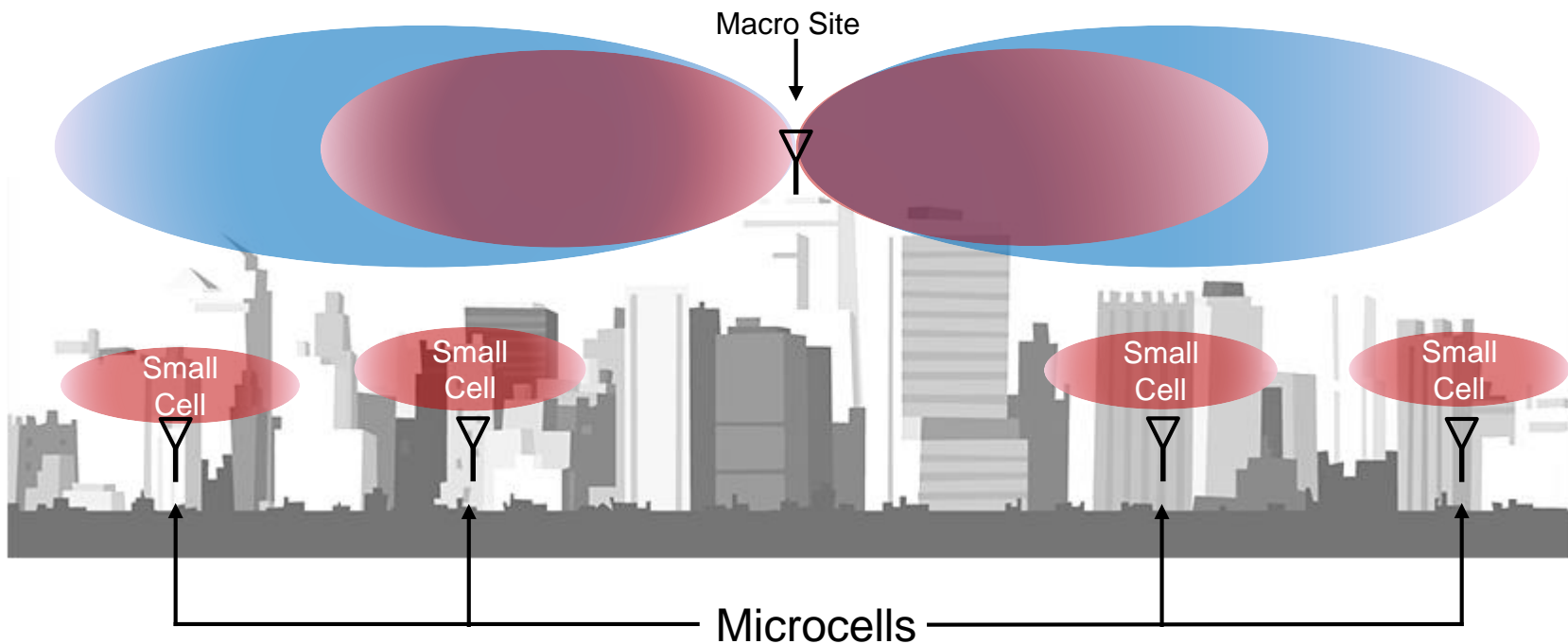


4K TV (UHD)
Exponential



Augmented Intelligence
Exponential

Macro vs Small Cell



Components

- Antenna
- Radios
- Power
- Backhaul
- Battery Backup
 - 4 hours preferred



Design Options



Street Light



Utility Pole



Traffic Control Pole with Cabinet

San Francisco



Kansas City, MO



Benefits of the Small Cell Program

Emergency Services:

- Continued support of Fire and Police Departments
- EMS 1st responders direction routing from a 911 call
- Medical records and patient conditions from Ambulance to expecting hospitals happen over LTE data subscriptions

Public Safety

- Citizens rely on their phones to receive/transmit voice calls and data messages that could be a matter of life or death
- Roughly 50% of citizens are doing away with home phones and relying solely on their wireless phone for calls and internet

Public Benefit

- VZW to provide state-of-the-art 4G technology to our customers in Santa Rosa at no cost to the city
- Support future technology growth

Smart Communities

- Support technology initiatives
- Internet of things

Revenue stream for the City

- The City will be paid \$350 annually for each small cell VZW installs in the ROW
- Due to the small concentrated footprint, multiple locations are needed.

