THE STATE OF THE UNION OF WIRELESS

APPROACHES FOR IMPROVING THE WIRELESS EXPERIENCE IN MDUS

THE STATE OF THE UNION OF WIRELESS

- **Moderator/Speaker:**
  Dave Russell – Sr. Marketing Director, Calix
- **Speakers:**
  Richard Sherwin - CEO, Spot On Networks
  Dan Leaf – Founder & CEO, Leaf Communications
  Nate Fuentes – Wireless Product Manager, CommScope
  Izik Kirshenbaum – Co-Founder, President & Chairman of the Board, Siklu Communications

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INTRODUCTION

Problem Statement

- How to bring better wireless connectivity-Wi-Fi, cellular and public safety-to MDUs

Solutions

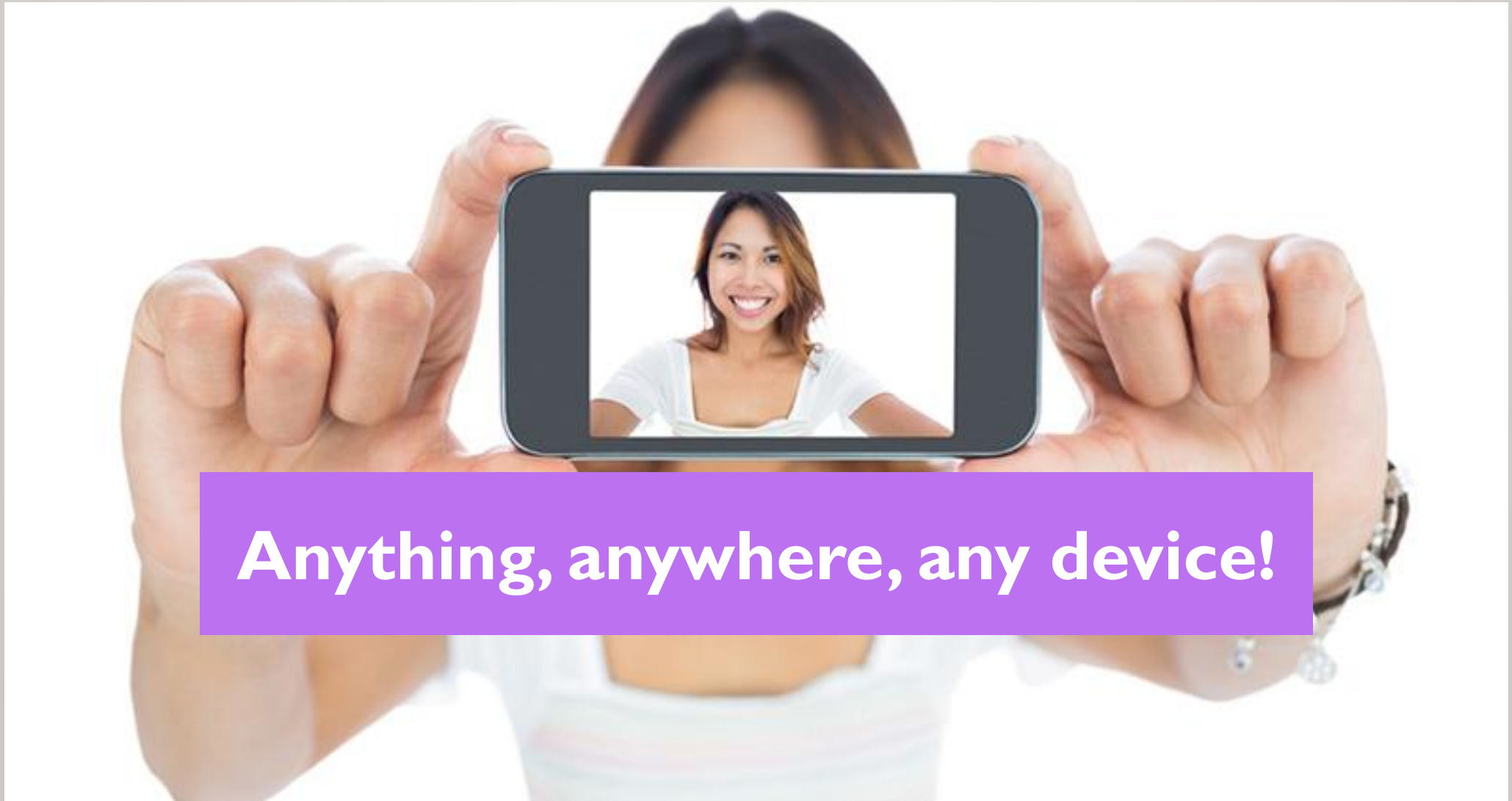
- Bringing connectivity to the building
- Distributing connectivity within the building

Technologies

- Gigabit to the building over fiber and wireless
- Distributed antenna (DAS) architectures and design
- Living unit and common area Wi-Fi solutions

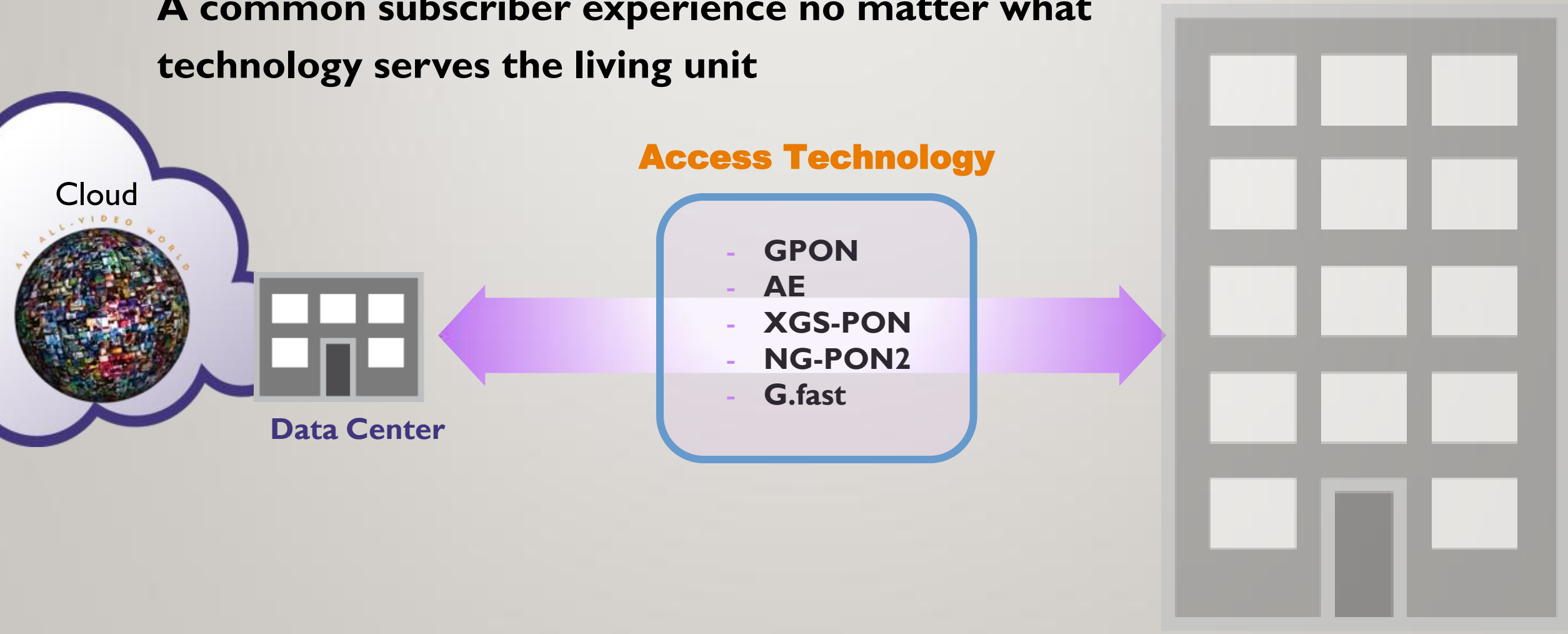
GIGABIT TO THE LIVING UNIT ANTENNA

DEMANDING THE GIGABIT EXPERIENCE



A PREDICTABLE USER EXPERIENCE

A common subscriber experience no matter what technology serves the living unit



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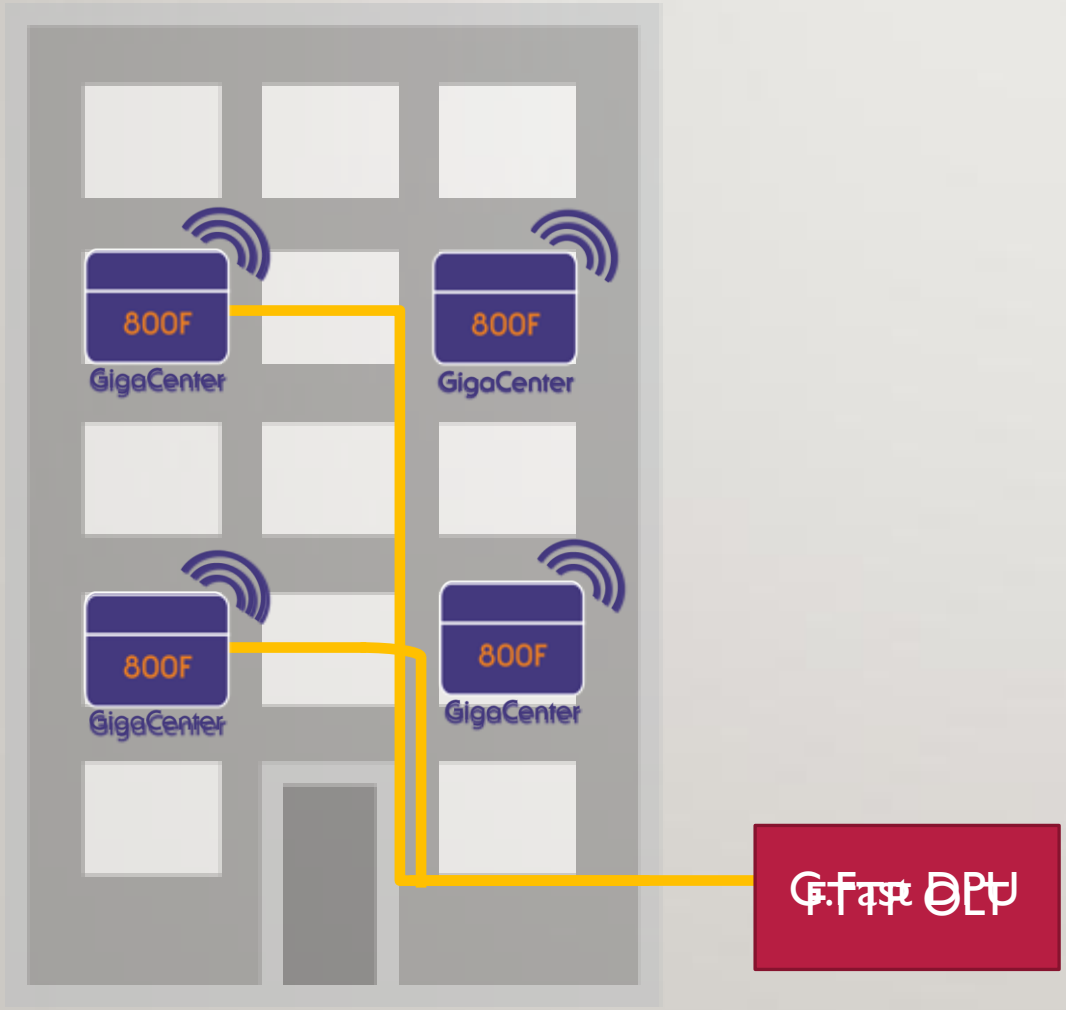


Carrier class W-Fi

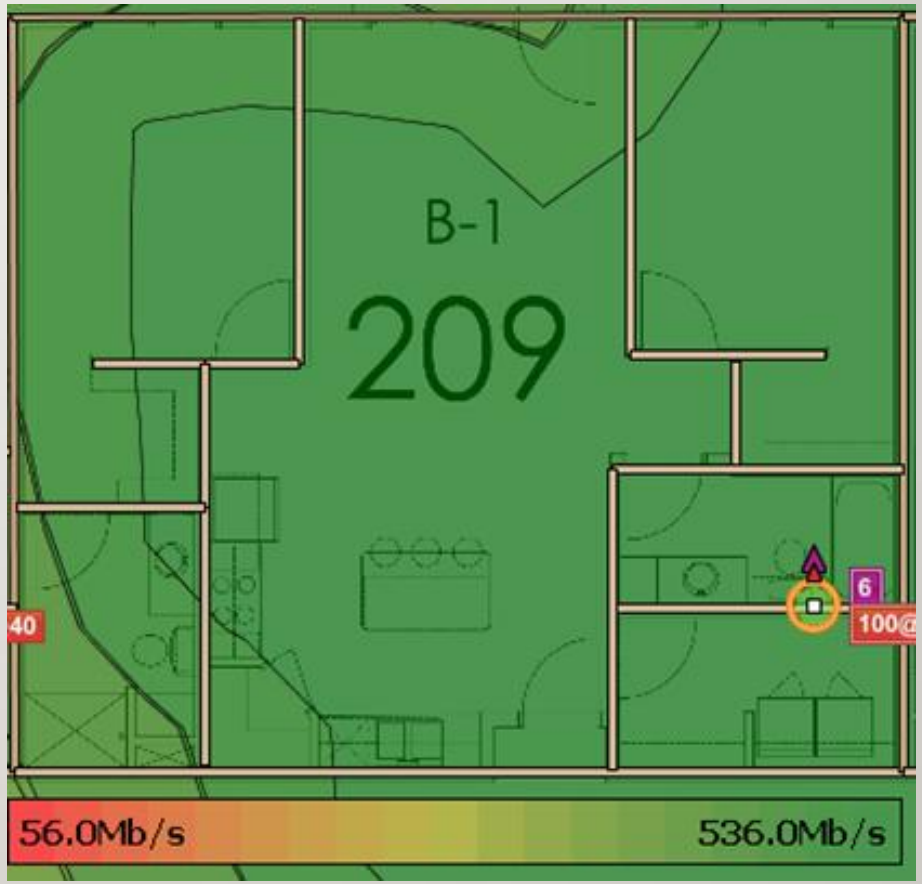
- Ubiquitous coverage
- DFS frequencies
- 4X4 MU-MIMO
- Near Gig OOKLA speeds
- IPTV over Wi-Fi
- Voice over Wi-Fi

APARTMENT COMPLEX CASE STUDY

- 163 Living units – 3 buildings – 3 floors
- Fiber connected WAP in each unit for voice and broadband services
- Concerns about interference

WI-FI NETWORK BUILDING DESIGN

- Predictive design
  - Software tools to model structure, WAPs, and attenuation
  - Produce maps of predicted RSSI, SNR, PHY rates
  - Generate optimized channel plans (channel and power) in 3D



DESIGN VALIDATION

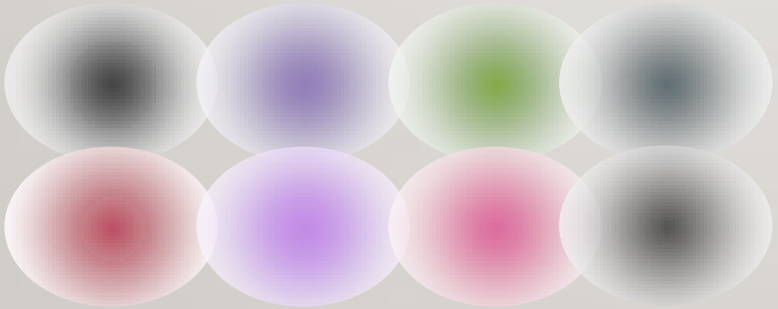
- Deploy WAPs as specified in predictive design
- Walk site with data capture tools to validate prediction
- Iterate design if necessary (adjust power, channels, etc.)

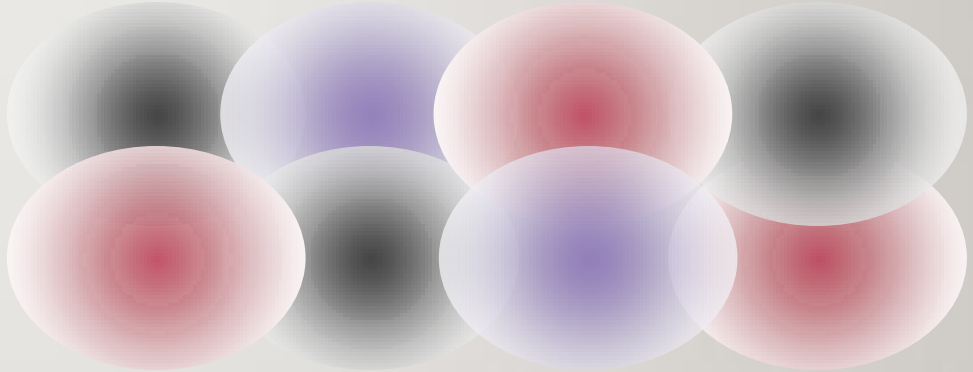
2.4 GHz Coverage (RSSI) of Unit 204

5.0 GHz Coverage (RSSI) of Unit 204

MDU DEPLOYMENT LESSONS LEARNED

- Design goals
  - One WAP per living unit
  - Approach building as a "system" to optimize
  - Minimize interference
    - Even WAPs you cannot control





- Implementation
  - Minimize power levels
  - Use more channels
  - Use 5GHz aggressively
  - Use DFS frequencies when possible
  - Reduce channel widths
  - Leverage technology in new standards
    - Beamforming, MU-MIMO