



# Corporate Overview

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*Q2, 2012*



**RUCKUS**

Simply Better Connections

# Fast and Fierce

Founded 2004, Sunnyvale, CA

Innovation Carrier class Smart Wi-Fi

Customers 12,000+

Employees 500+ in 20 countries

R&D Centers Sunnyvale, China,  
Taiwan, India, Israel

Capitalization \$76 million

Investors Sequoia, Sutter Hill, Motorola,  
T-Ventures, Focus Ventures,  
Telus

Patents 55 granted (80 pending)

Units shipped 3 million and counting

Markets Carrier/enterprise infrastructure

## EMPLOYEE BREAKDOWN

- R&D
- Support
- Sales and Marketing
- Administration

# Critically Acclaimed Everywhere

**Gartner**

2011 fastest growing of top 5 WLAN vendors

**DO** DELL'ORO  
GROUP

2010 carrier Wi-Fi market share (41%)

2011 best performing wireless system

**tom's**  
hardware

2011 top Wi-Fi channel company

**CRN** **ARC**  
ANNUAL REPORT CARD

2011 best mobile broadband technology

**MOBILE.**  
WORLD CONGRESS

# Strong Enterprise/Carrier Growth

ENTERPRISE

**3Q11 to 4Q11**

CARRIER

**2011**

**290%**

TOP 5  
SUPPLIERS  
Wireless LAN  
coordinated  
access points,  
unit shipments  
worldwide

Gartner

RUCKUS  
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Other

**23%**

**33%**

**5%**

**12%**

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**44%**

MOTO

**2.1%**

**17%**

HP

Cisco

Aruba

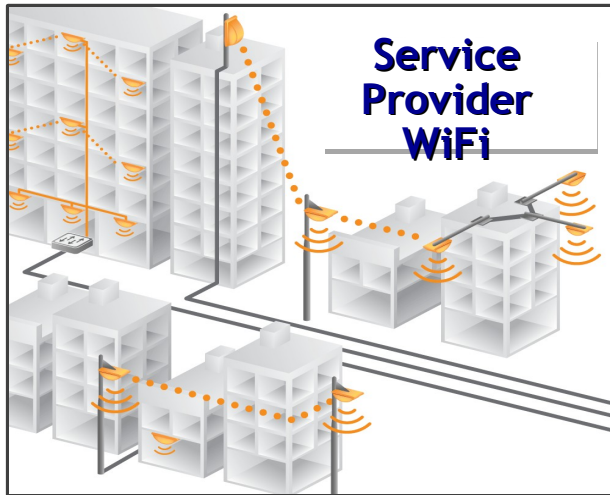
**-25%**

DELL'ORO  
GROUP

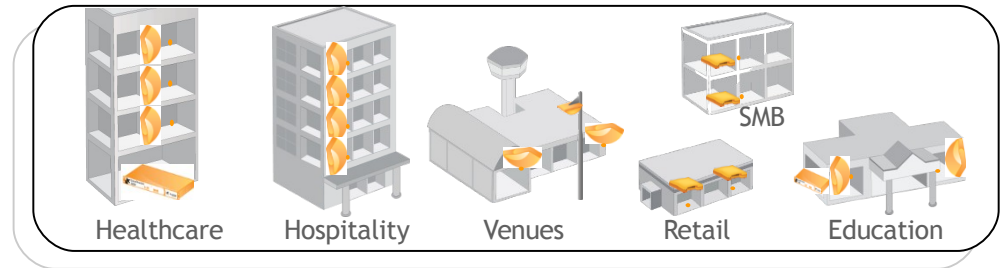
**27%**

of worldwide  
market for  
shipments of  
Wi-Fi nodes  
to carriers

# Customers and Markets Served



## Enterprise WLANs



# What's the Problem(s)?



**CONSISTENT PERFORMANCE  
AT ANY RANGE**



1. Wi-Fi is undependable, signal strength erratic
2. Performance is inconsistent
3. Signals don't reach, coverage is spotty
4. WLAN systems are costly, cumbersome, and complex

# Interference is a Wi-Fi Killer!

- 802.11 is a shared medium operating in the unlicensed bands
- Many interfering sources don't respect 802.11 protocols
- Interference effects both TX and RX
  - If a Wi-Fi device hears interfering signal, it will defer and not transmit
  - Interference also impacts your ability to receive error-free packets
- Mitigating Wi-Fi interference is about managing the spectrum

**Dropped connections have significant impact on productivity**



# The Enterprise Opportunity



## FORTUNE 500

- Costly
- Cumbersome
- Complex
- Designed for 10,000+ users



## Enterprise Market

- Feature-rich
- Simple to install
- Affordable
- Reliable
- Multiple APs
- 100s-1000s users
- Little IT staff

UNFORTUNATE 50,000

## CONSUMER/SOHO

- Cheap
- No features
- Hard to manage
- Single AP
- <10 users







# Where's the Monster Market?

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*Q2, 2012*



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RUCKUS WIRELESS PROPRIETARY AND CONFIDENTIAL

# Mobile Internet Changing Everything

*Driving Wireless Technology Convergence*



**Devices,  
Apps, Reach**

*Anywhere  
Anytime  
Access*



**Ubiquitous  
Connectivity**

*Blurring  
Network  
Boundaries*



**Technology  
Confluence**

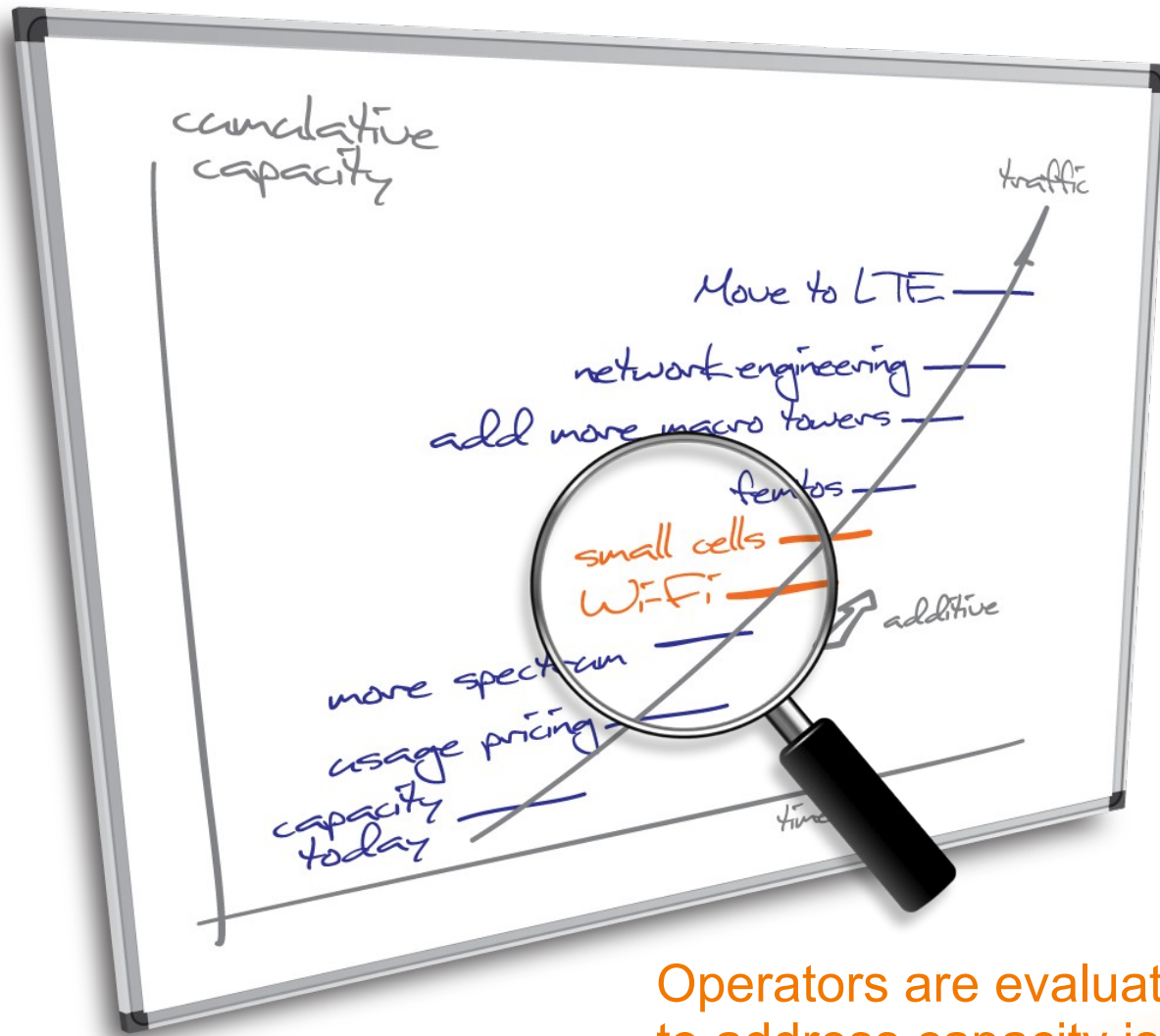
*HetNets:  
Macro + Wi-Fi  
+ Pico/Femto*



**Traffic  
Explosion**

*Capacity  
at Lower  
Cost per Bit*

# Carriers Will Do Everything



➤ SMALL CELL SHIPMENTS

**\$14 billion**  
BY 2015

➤ OUTDOOR METRO

PICOCELL SHIPMENTS

**248% CAGR** In-Stat

OVER NEXT 5 YEARS

Operators are evaluating all options to address capacity issues



## The Old Problem

# COVERAGE



# The New Problem

# CAPACITY



# Service Provider Wi-Fi

*Why? And What's Changed?*

- **OLD MODEL:** No sustainable business model
  - Hotspot islands
  - Low speed metro Wi-Fi
  - Outdoor focused
- **NEW MODEL:** Wi-Fi to support overall mobile service strategy
  - Prevent subscriber churn while increasing loyalty
  - Cost optimization (3G/4G offload)
  - Focus shifting from throughput to density
  - Increased capacity to support data tsunami
  - Better subscriber visibility and control
  - Extending branded services, service area
  - Managed WLAN services for additional revenue
  - Indoor, outdoor, everywhere

# The Carrier Wi-Fi Opportunity

*Real World Examples Indicates Massive Untapped Opportunity*



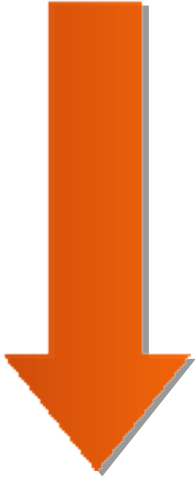
	TODAY	LIFETIME (3-5 years)
Subscribers	32M	6B
Projected network size	350K APs	60M APs
Infrastructure spend(APs,	\$500-\$1,000	\$500-\$1,000
TAM	\$24 million	\$30-60 billion

# The Players

*Few Viable Competitors Creates Ideal Opportunity to Dominate*

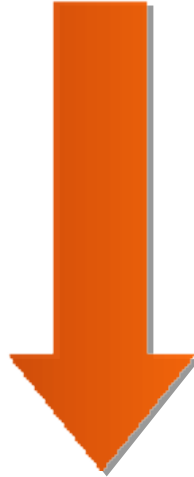
ERICSSON 

BelAir  
NETWORKS



Metro play,  
no technology  
advantage

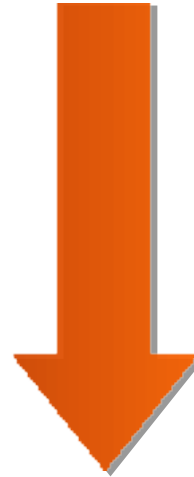
ARUBA<sup>®</sup>  
networks



Enterprise play,  
no purpose-built  
carrier products

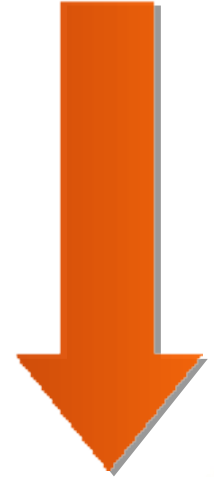
Nokia Siemens  
Networks

Alcatel-Lucent 



No real  
Wi-Fi  
expertise

  
CISCO



Big,  
end-to-end





# Product Portfolio & Technology Innovations

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*Q2, 2012*



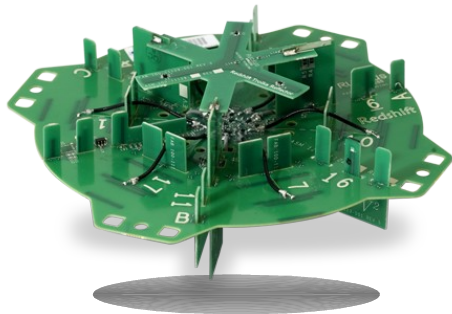
**RUCKUS**

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RUCKUS WIRELESS PROPRIETARY AND CONFIDENTIAL

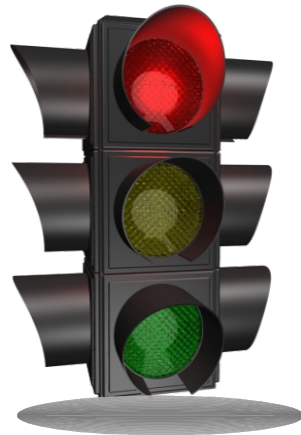
# Technology Breakthroughs

## ADAPTIVE ANTENNAS



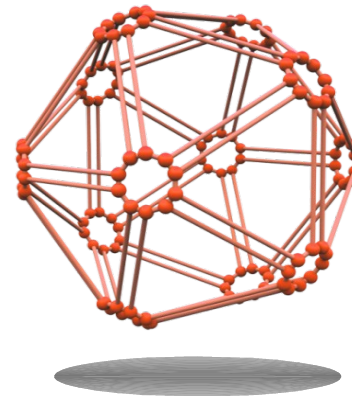
Adaptive antenna technology

## QOS



Precision per-user per-traffic class QoS

## MESHING



Self-provisioning self-optimizing high speed wireless backbone

## SECURITY



Advanced per-user security

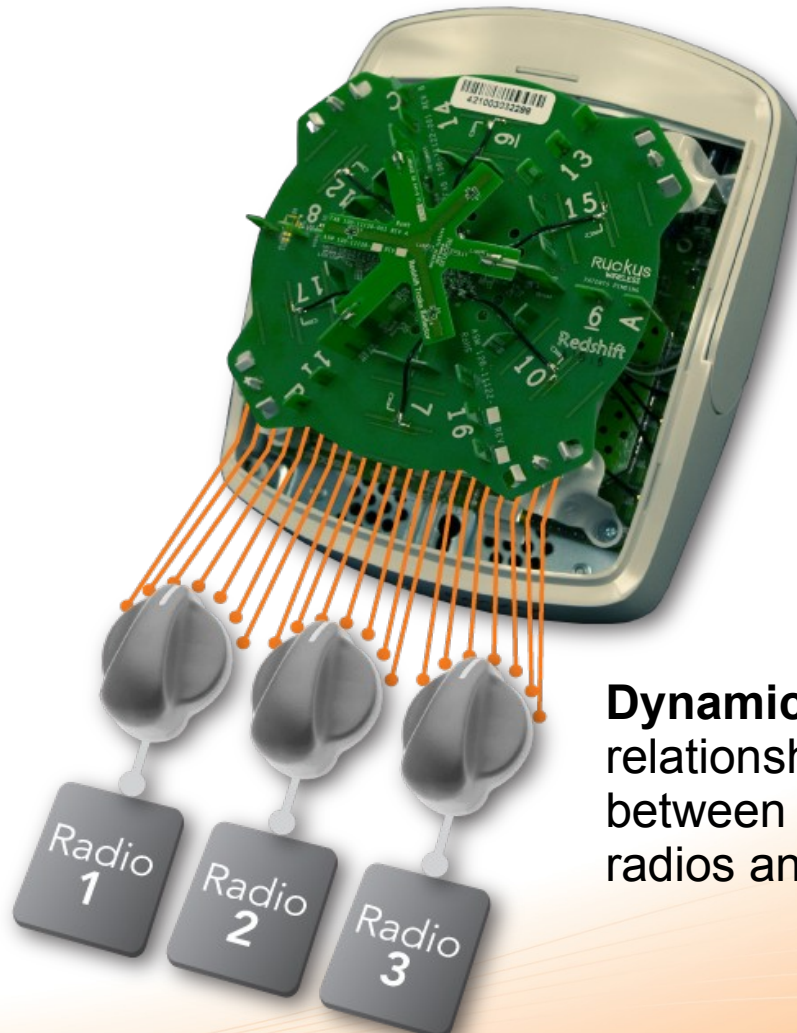
# What Makes Ruckus Different?

THEM



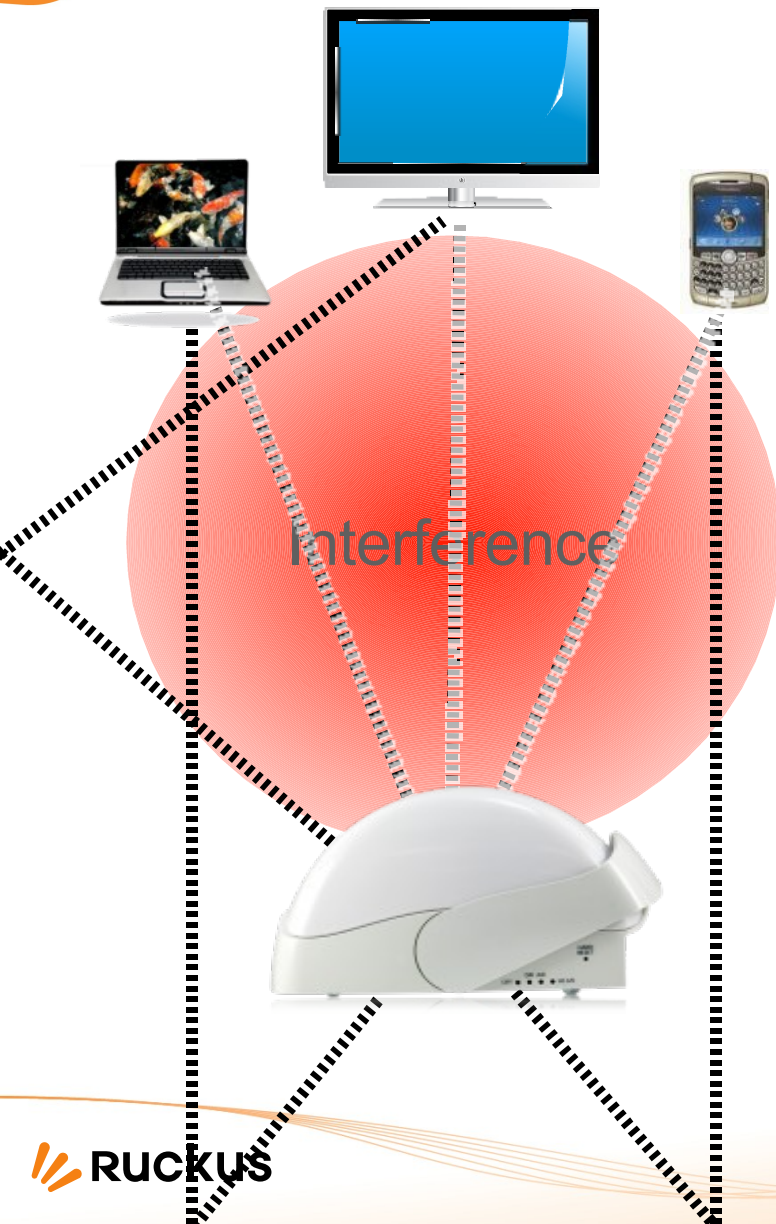
**Fixed** 1:1 relationship between Wi-Fi radios and antennas

US



**Dynamic** 1:many relationship between Wi-Fi radios and antennas

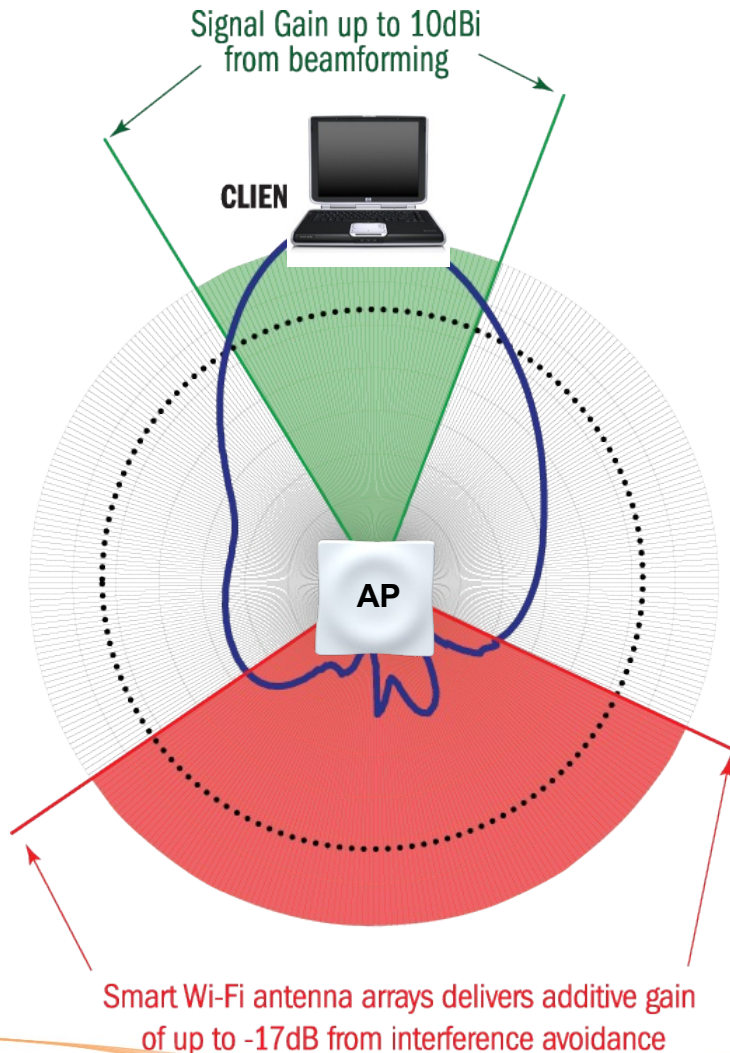
# Real-Time Adaptation



- Patented technology that combines:
  - Smart antenna arrays
  - Best path selection algorithms
  - Advanced quality of service engine
  - Smart mesh RF routing
  - Centralized Wi-Fi management
- Adapts to real-time changes in environmental conditions
- Extends signal range (Wi-Fi coverage) 2 to 4 times with fewer APs
- Radically simplifies deployment and administration

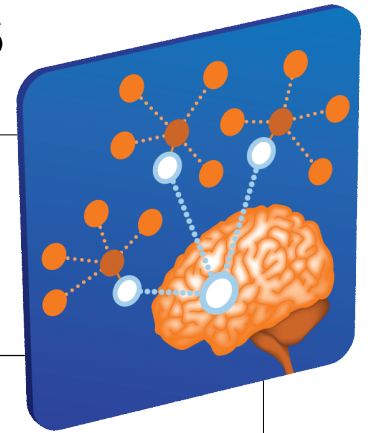
# Automatic Interference Mitigation

*Minimizes Packet Loss and Re-Transmissions, Increases Reliability*



- Interference mitigated by positioning antenna nulls in specific directions
- Avoiding interference delivers more benefits than a stronger signal
  - Better throughput
  - More predictable connectivity

# More Than Just Great Radios

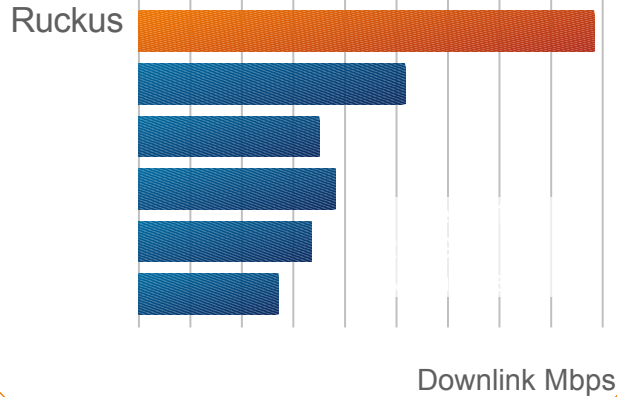


Smart meshing	Autonomously optimized, self-organizing networks, including hybrid meshing Adapt automatically (and carefully) to changes in environment and interference
Dynamic channel management	Predictive capacity modeling Automatic channel selection based on actual capacity
Band steering	Balances client load across bands by redirecting clients based on capabilities Maximizes overall throughput
QoS at AP level	Application queues per client Prioritization of voice, video, and data
Airtime fairness	Round-robin time allocation based on client capabilities Prevents slower clients from throttling faster ones

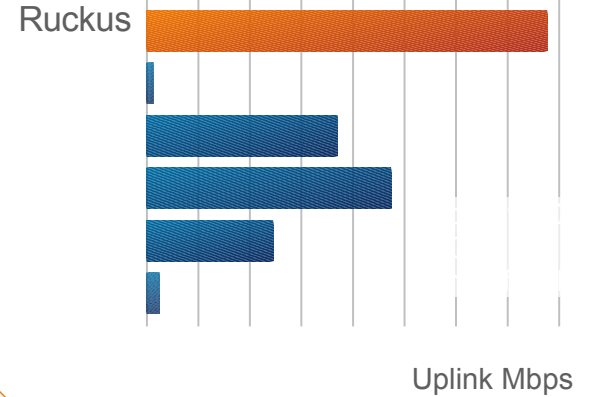
# Pervasive Performance Proven



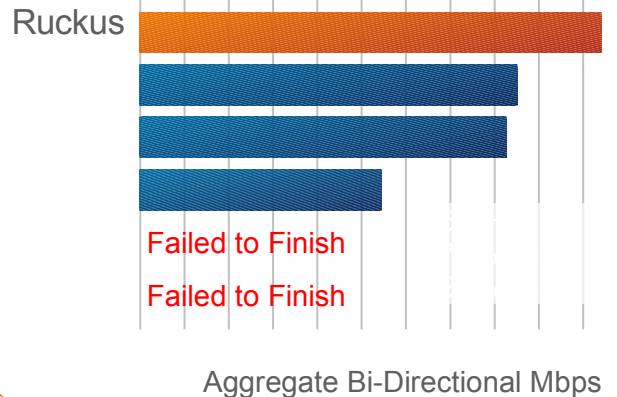
## Non Line of Sight



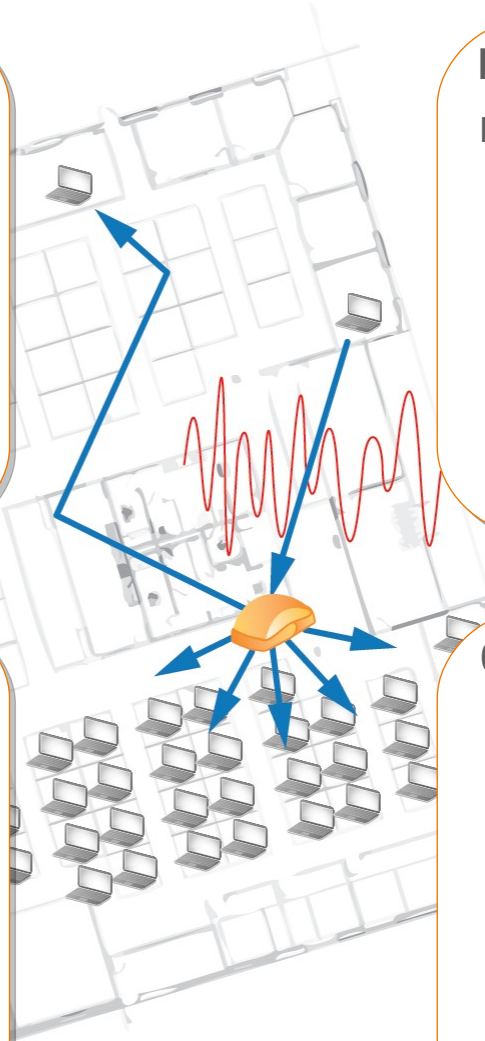
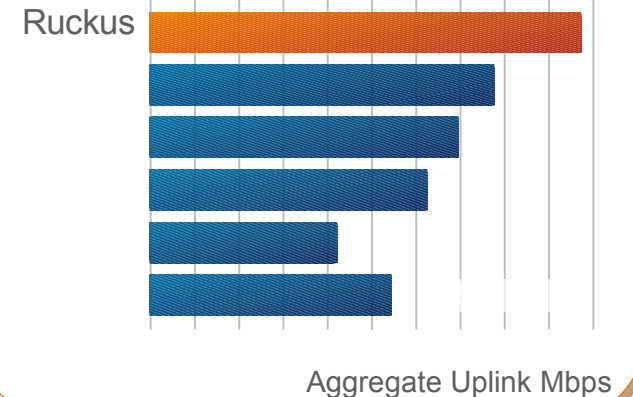
## Beating Interference



## 60 Clients, Bi-Directional



## 60 Clients, Uplink



# Broadest Wi-Fi AP Portfolio

## INDOOR

HIGH END

MIDRANGE

LOW END



**ZoneFlex 7982**  
Dual-band 802.11n  
3x3:3



**ZoneFlex 7962**  
Dual-band 802.11n  
3x3:2



**ZoneFlex 7363**  
Dual-band 802.11n  
2x2:2



**ZoneFlex 7321**  
2.4 or 5GHz 802.11n  
2x2:2



**ZoneFlex 2942**  
802.11g



**ZoneFlex 7025**  
2.4GHz 802.11n  
1x1:1

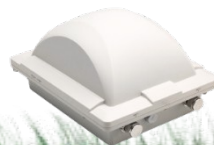
**SmartCell 8800**  
Dual-band 802.11n  
3x3:3



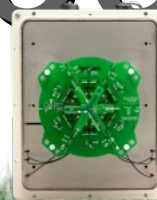
**ZoneFlex 7761-CM**  
Dual-band 802.11n  
3:3:2



**ZoneFlex 7762-AC**  
Dual-band 802.11n  
3x3:2



**ZoneFlex 7762**  
Dual-band 802.11n  
3x3:2



**ZoneFlex 7762-S**  
Dual-band 802.11n  
3x3:2



**ZoneFlex 7731**  
P-T-M-P 5GHz  
802.11n



## OUTDOOR



# Ruckus ZoneFlex Indoor APs



<b>Maximum PHY rate</b>	54 Mbps	300 Mbps	54 Mbps	300 Mbps	600 Mbps	600 Mbps	900 Mbps
<b>Wi-Fi technology</b>	802.11n (2.4 GHz)	802.11n (2.4 or 5GHz)	802.11g	802.11n (2.4 GHz)	802.11n (2.4/5GHz)	802.11n (2.4/5GHz)	802.11n (2.4/5GHz)
<b>Concurrent users</b>	100	250	100	250	250	250	500*
<b>Radio chains:streams</b>	1x1:1	2x2:2	1x1:1	2x2:2	2x2:2	3x3:2	3x3:3
<b>Antenna elements</b>	1	4	12	8	14	19	21
<b>Antenna patterns</b>	-	-	4000+	256	300+	4000+	3000+
<b>EIRP (2.4/5GHz)</b>	26 dBm	31/29 dBm	29 dBm	29 dBm	29/27 dBm	31/29 dBm	34/32 dBm
<b>BeamFlex gains</b>	-	3 dB Tx	4 dB Tx	4 dB Tx	4 dB Tx	6 dB Tx 4 dB Rx	9 dB Tx 4 dB Rx
<b>Interference mitigation</b>	-	-	Up to 10 dB	Up to 10 dB	Up to 10 dB	Up to 15 dB	Up to 15 dB
<b>Polarization</b>	Vertical	Vertical	Dual	Vertical	Vertical	Dual	Dual
<b>Rx sensitivity (2.4/5GHz)</b>	-72 dBm	TBD	-99 dBm	-98 dBm	-96/-97 dBm	-95/-98 dBm	-101/-101 dBm
<b>ChannelFly</b>	✓	✓	✓	✓	✓	✓	✓
<b>Smart meshing</b>	-	✓	✓	✓	✓	✓	✓
<b>Ethernet ports</b>	5	1	2	1	3	2	2
						\$999	\$1099

\*future

# Ruckus ZoneFlex Outdoor APs



<b>Maximum PHY rate</b>	54Mbps	600Mbps	600Mbps	600Mbps	600Mbps	300Mbps
<b>Wi-Fi technology</b>	802.11g	802.11n	802.11n	802.11n	802.11n	802.11n
<b>Concurrent users</b>	100	250	250	250	500*	-
<b>Radio chains:streams</b>	1x1	3x3:2	3x3:2	3x3:2	3x3:2	2x2:2
<b>Antenna elements</b>	12	12	Sectorized	12	12	PTP, PTMP
<b>Antenna patterns</b>	4000+	4000+	24	4000+	4000+	-
<b>EIRP (2.4 GHz / 5GHz)</b>	29 dBm	26 dBm	35/31 dBm	33/31 dBm	31/31 dBm	37 dBm
<b>Interference mitigation</b>	Up to 15 dB	Up to 15 dB	Up to 15 dB	Up to 15 dB	Up to 15 dB	Up to 15 dB
<b>Polarization (vert/horz)</b>	Dual	Dual	Vertical	Dual	Dual	-
<b>Rx sensitivity (2.4/5GHz)</b>	TBD	-95/-94 dBm	-95/-94 dBm	-95/-94 dBm	-95/-94 dBm	-98 dBm
<b>ChannelFly</b>	✓	✓	✓	✓	✓	✓
<b>Smart meshing</b>	✓	✓	✓	✓	✓	-
<b>Ethernet ports</b>	2	2	2	1	2	1

# Why Do People Choose Ruckus?

## Technical Leadership

- Patented adaptive antennas
- Proven industrial strength meshing
- Unrivaled scale

## Price / Performance

- Half the CAPX
- 3X performance
- Lower TCO

## Complete System

- CPE
- Access
- Mesh APs
- Indoor and outdoor
- Backhaul
- 3GPP/WiFi Integration
- Management

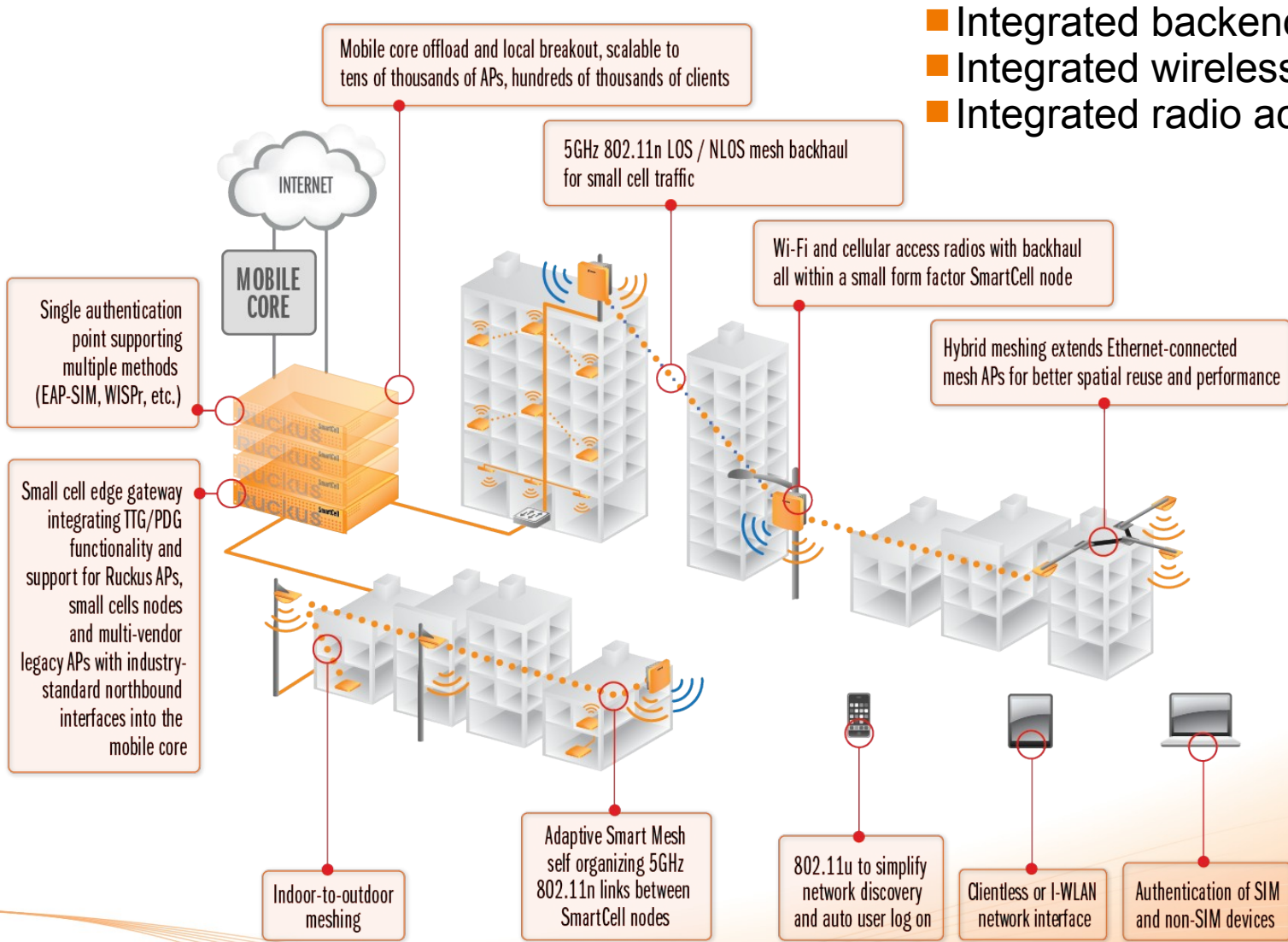
## Ease of Everything

- Configuration
- Deployment
- Use
- Management
- Form factor

## Strategic Focus

- KDDI
- PCCW
- BSKyB
- Towerstream
- Bright House
- ARRIS (MSOs)
- UTStarcom (China Carriers)
- Bharti Airtel
- TWC

# The Final Destination *(Wi-Fi + Small Cells + Core Integration)*



- Integrated backend services
- Integrated wireless backhaul
- Integrated radio access



**Thanks.**

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*More questions?*



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