Warehouse Solutions
Challenges & Needs
Industry Challenges!

1. Interference
   - Dropped packets, low data rates
   - Dealing with mobile device capacity and management
   - Product and management solutions for any network

2. Capacity Constraints
   - Dealing with mobile device capacity and management

3. Flexibility and Scale
   - Product and management solutions for any network

MORE USERS
MORE TRAFFIC
MORE HOTSPOTS
MORE APPLICATIONS
MORE VIDEO
MORE NOISE
Increasing cost and performance pressures

More online shopping, just-in-time inventory and reverse logistics
  -> leading to higher volumes of smaller orders.

Warehouses (and distribution centers, ports, etc...) are harsh RF environments

There is very limited or no on-site IT expertise

Critical needs are consistent coverage, good roaming, indoor/outdoor, mesh
Warehouse/Logistics Wi-Fi Needs

**TOP 10**

- Full coverage
- Smooth roaming
- Consistent performance everywhere
- Adaptable to changing RF environment
- Indoor / Outdoor
- Voice and Video support
- Meshing to extend coverage area
- Mobile coverage for VMUs
- Secure access for employees, contractors and suppliers
- Rugged enclosures for harsh environments
Diverse Application Requirements

- Traditional AIDC terminals and mobile computers.
- Voice prompted data collection.
- VoWLAN / PTT
- Constant data stream devices on the RF network. i.e. bar code label printers – operating in either “on-demand” or “batch” modes.
- Indoor and outdoor coverage
What’s the Problem?

1. Wi-Fi is undependable, signal strength erratic
2. Performance is inconsistent
3. Signals don’t reach, coverage is spotty
4. Warehouse and DC environment is RF dynamic
5. WLAN systems are costly, cumbersome and complex
Solutions
The Right AP For Every Warehouse Need

**INDOOR**

- **3X3, 3-stream dual-band 802.11n**
- **Mid-range dual band**
- **Entry level 802.11n**

**OUTDOOR**

- **3x3:3, 3-stream dual-band**
- **Mid-range Dual band**
- **Point to point and multipoint bridges**

**MANAGEMENT**

- **6 to 50 Aps SME**
- **50 to 500 Aps Mid-range**
- **50 to 1000 Aps High end**

--- Omni or 120° sectorized ---

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IP 67 Rated------------------------
Flexible Deployment Options

- Standalone or centrally-managed APs
- Mesh or hardwire mesh APs
- Option for centralized or remote controllers
- Remote Wi-Fi management over WAN
- Seamless integration with security services
- Distributed controller-less data flow for APs
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
Transmit Beamforming

Adaptive Antennas and Transmit Beamforming Working Together

Problem

Client Direction

AP

Best-of-Both-Worlds Solution

Conventional TxBF pattern

3dB

Asymmetric BeamFlex AA pattern

6dB

Composite BeamFlex 2.0 AA + TxBF pattern

9dB

Net Result:

Better client connection

Less self-interference than symmetric TxBF pattern

SIGNAL TO INTERFERENCE PLUS NOISE (SINR) IMPROVEMENT

> 9dB

> 15dB

OF

INTERFERENCE MITIGATION

OF

> 15dB

OF

INTERFERENCE MITIGATION

> 9dB

OF

SIGNAL TO INTERFERENCE PLUS NOISE (SINR) IMPROVEMENT
Automatic Interference Mitigation

- Interference mitigated by positioning antenna nulls in specific directions
- Avoiding interference delivers more benefits than a stronger signal
- Better throughput
- More predictable connectivity
• Better reception (PD-MRC) for weak and hard to "hear" devices
• Better transmission to devices constantly changing their orientation
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
Results
Independent Test Results

AVG. TCP THROUGHPUT

Highest, most reliable performance

Lowest, least reliable performance

VIDEO ERRORS

Ruckus 7982
Cisco 2602i
HP 430
Xirrus 4820
Aruba 135
Meraki MR24
Meraki MR16
Ubiquiti UniFi Pro

Juniper 532
Cisco 3602i
Aerohive AP330
Aerohive AP121
HP 460
Aruba 105
Meraki MR24
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Independent Test Results

Industry’s First 3x3:3 802.11n Competitive Testing

Percentage of Vendor Test Wins
(87 tests)
Live Warehouse Results

Leading Vendor

Ruckus delivered:

• Much larger coverage area
• Approximately 6dB more signal strength

Ø Easier to install and manage
Ø Fewer APs for larger areas
Ø Better Application Performance
Best Warehouse Wi-Fi Solution

Better coverage = fewer APs and more deployment flexibility

Optimal AP portfolio for warehouse needs

Easier to manage

Better application performance
Smarter Wi-Fi in Warehouses and DCs

- **Smart Meshing**: Extends Wi-Fi services to parking areas and remote building without Ethernet.
- **SmartCast QoS**: Automatically prioritize VoIP or video traffic – no configuration needed.
- **5GHz Wi-Fi Backhaul**: Eliminates recurring fixed-line, fiber to extend broadband connectivity.
- **Centralized Remote Management**: Eliminates controllers at every site and the need for all traffic to flow through a single point.
- **Flexible Deployment Options**: Provide the right tool for the job.
- **Zero IT**: Automatic end user device security configuration for owned and BYOD.
- **Open/DPSK**: Simplifies security with unique encryption keys for each user.
- **Adaptive antennas and band steering**: Ideal for challenging RF environments.
- **Outdoor Wi-Fi**: Can easily deploy indoors or out, even in hazardous areas.
Why RUCKUS!

- Proven best Wi-Fi performance in warehouse environments
- Full range of access points - indoor, outdoor, mesh, PtP, DAS
- Lowest total cost of ownership
- Award winning partner programs and high reseller margins