Mesh Networks for Port Terminal Operations

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What is a Mesh?
Mesh Rate and Capacity

High site based network architectures trade “Range for Rate”
Most devices at non-Peak data rates - Lost Efficiency & Capacity!

All channels and devices operate at Peak data rates - Maximum Efficiency & Capacity!
Benefits of a Wireless Mesh

- Better Data Speeds
  Since clients are closer to access points, they can use higher data rates

- Lower Power Consumption
  Wireless devices use batteries. By using nearby, low power access points less transmit power is used

- Better Coverage
  Low site design allows for dense coverage without shadows
  Multi-hopping gets around obstacles

- Lower Backhaul or Deployment Costs
  Since fewer sites need physical connections, less fiber is run. Put sites where you need them, not where you have connections
Motorola’s Two Mesh Technologies

**MEA**
(Mobility Enabled Access)

- Proprietary protocol optimized for mobility and high RF interference mitigation.
- Designed for critical communications.

*Products: 2.4GHz MEA MotoMesh*

**Wi-Fi**
(802.11 a/b/g)

- Industry standard wireless data communication protocol.
- Works with off-the-shelf computers and other Wi-Fi devices.

*Products: HotZone Duo*

All Motorola products use MeshConnex routing protocol to efficiently route traffic.
Unique MEA Capabilities

- **RF Resiliency**
  - Multiple channels and multi-hopping provide connectivity in extremely harsh radio environments
    - *Glasgow, Scotland* – City traffic lights controlled through MEA after WiFi proved unreliable.

- **Client Meshing**
  - Subscribers hop through each other to extend network where there is no coverage
    - *Rotterdam, Neth. Ports* – Used for communication in dock area – constantly changing environment with 50’ walls of containers.

- **Ad Hoc Client Communication**
  - Subscribers are capable of creating a network anywhere
    - *Ripon, CA* – Rapid deployment of network in areas outside of city.

- **Mobility**
  - Seamless Handoffs allow uninterrupted data at speeds up to 250 mph
    - *Medford, Oregon* - Video to and from Police helicopters

- **Non-GPS Positioning**
  - Time of Flight measurements provide accurate location data
    - *Buffalo, MN* – Police vehicle position feeds CAD system to ensure fast response.
Case Study: ECT Hanno Terminal – Rotterdam, Neth.

Problem:
- Had 19.2Kbps frequency hopping solution
- Coverage problems, low bandwidth and low mobility through small site
- Needed solution for EuroMax port

Proposal:
- MEA 2.4 network 5 AP, 22 VMMs
- IAP’s on 45m light posts

Result:
- Solid operation for three years
- 300 Kbps throughout site

MEA technology chosen for EuroMax
Case Study: Nanjing River Port – Nanjing, China

Problem:
- Wanted broadband system to support dispatch to transfer vehicle communications over 1 km²
- Trial system for SCT & SPCC

Proposal:
- MEA 2.4 network 12 AP, 40 subscriber units.

Result:
- In operation since June 2006
- Excellent coverage and performance
- 100 Kbps throughout site

MEA chosen as preferred technology by Shanghai Port Association
Case Study: Georgia Ports Authority

Problem:
- Need broadband network to backhaul RFID and Satellite Positioning Detection System (PDS)
- Knew 2.4 WiFi was difficult in high RF noise, multi-path environment
- Competitive solutions called for as many as 50 APs over 2 mi²

Proposal:
- MotoMesh 2.4/4.9 Infrastructure
  - 15 AP’s and 120 VMM’s
  - 2.4 WiFi system supports legacy devices

Current Status:
- Going live October 2007