Private Wireless Broadband Networks: 
*The Automesh™ Advantage*

Pramod Akkarachittor
Vice President, Product Management
Goal for Today

Learn how Firetide’s patented AutoMesh™ technology

• Delivers benefits that no other wireless platform can deliver
• Offers a compelling advantage in real world applications
• Competes with conventional topologies – with advantages vs. competition

Feel confident in why Firetide AutoMesh technology provides real solution advantages to you and your customers
Webinar Agenda

- Wireless broadband challenges
- What is Firetide’s AutoMesh technology?
- How is AutoMesh unique – top 5 capabilities
- Benefits of AutoMesh
- AutoMesh advantages at work in the real world
- AutoMesh vs. conventional technologies
Wireless Broadband Challenges

- Readiness for new real-time applications
- Network availability and resiliency
- Mobility
- Time and cost to deploy
- Security and data integrity
Firetide Uniquely Addresses Challenges

- AutoMesh™ technology - secret ingredient inside every Firetide wireless solution
- Considerable investment in intellectual property to develop unique technology underlying our differentiated products
- 19 patents that allow advanced wireless infrastructure capabilities (look for the Firetide logo 🕗 = patent!)
AutoMesh Differentiates Firetide Portfolio

AutoMesh™

HotView™ Pro

HotPort®
Wireless Infrastructure 7000 Series & 5020 Edge

FMC 2000 Mobility Controller

HotPoint®
Wireless Access Points 5100/5200 & 4000

Network Management

Software Platform

Hardware
What is AutoMesh?

Patented mesh software protocols and services that form the foundation for Firetide wireless infrastructure solutions
What Makes AutoMesh Unique?

PRIME
What Makes AutoMesh Unique?

- End-to-End Security
- Performance & Scalability
- Resilience
- Integration Simplicity
- Mobility

AutoMesh™
What Makes AutoMesh Unique?

- Performance & Scalability
- End-to-End Security
- Resilience
- Mobility
- Integration Simplicity
- AutoMesh®
## Performance and Scalability

<table>
<thead>
<tr>
<th>Technology</th>
<th>Capability</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firetide Mesh Routing Protocol</strong>: highly efficient, flow-based routing</td>
<td>• 15 linear wireless hops without fiber, no performance degradation (up to 390 mi/628km)</td>
<td>✓ Very large scope of coverage with optimal performance</td>
</tr>
<tr>
<td>Enable high performance (throughput) by bonding two radios</td>
<td>• Emulation of full duplex over a single communication link</td>
<td>✓ Rapid infrastructure deployment</td>
</tr>
<tr>
<td>• Multi-hop optimization</td>
<td>• Real-time video control PTZ, very smooth</td>
<td>✓ Low total cost-of-ownership</td>
</tr>
<tr>
<td>• Designed for stringent requirements of video</td>
<td></td>
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</tbody>
</table>

### Benefit

- **Very large scope of coverage with optimal performance**
- **Rapid infrastructure deployment**
- **Low total cost-of-ownership**
Scaling Your Network With 5x Less Fiber

Throughput vs. Hops

Latency vs. Hops
Advantage AutoMesh! Performance & Scalability

Thailand Royal Irrigation World’s longest wireless infrastructure network

Application
• Smooth, real-time data and video delivery for flood monitoring along the entire length of the river network

Why Firetide
• Only system to deliver up to 240 Mbps bandwidth over 372 km with <1ms delay per hop (with link distances of 20-45 km between nodes)
• Speed of deployment of wireless infrastructure consisting of over 25 wireless links (hops)

Customer Value
• Real-time flood forecasting and historical data collection
• Live video feeds via internet of the Chao Phraya River
Advantage AutoMesh! Performance & Scalability

Scottsdale Intelligent Traffic Management System

Application
• Continuous traffic monitoring of live video feeds over large city area from a central command center

Why Firetide
• Only solution that could deliver 100Mbps of very low latency throughput while maintaining 'low-sight' wireless connectivity over long distances

Customer Value
• Reduced traffic congestion
• Active management of traffic affected by special events, weather, and emergencies
What Makes AutoMesh Unique?

- Performance & Scalability
- Resilience
- Integration Simplicity
- Mobility
- End-to-End Security

AutoMesh™
## Resilience

<table>
<thead>
<tr>
<th>Technology</th>
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<th>Benefit</th>
</tr>
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<tbody>
<tr>
<td>Self-healing environment-aware network, rerouting in case of failure</td>
<td>• Seamless failover</td>
<td>✓ Network always up – 99.9% availability</td>
</tr>
<tr>
<td>Multiple fiber drops in network</td>
<td>• Deployment in challenging terrain</td>
<td>✓ Critical applications run over the network</td>
</tr>
<tr>
<td>• Flexibility of architecture to do mesh, PTP, PTMP or Ring Mesh</td>
<td>• Back-up for fiber</td>
<td>✓ Add fiber as you go without network interruption</td>
</tr>
<tr>
<td></td>
<td>• Minimized interference</td>
<td>✓ Improved performance</td>
</tr>
</tbody>
</table>
= Zero Downtime Carrier Grade Reliability

Self-healing via redundant links for critical apps
Advantage AutoMesh! Resilience

South Asia Gateway Terminal, Sri Lanka

Application
• Mission-critical data and voice applications in challenging environment
• Integrate land mobile radio and VoIP over WiFi
• Enable 802.11A/B/G WiFi coverage of all principal terminal areas

Why Firetide
• Only system with redundant infrastructure to ensure 100% reliability and availability
• Superior cost-effectiveness and performance

Customer Value
• Increased port productivity and operational flexibility
What Makes AutoMesh Unique?

End-to-End Security

Performance & Scalability

Resilience

Integration Simplicity

Mobility
## Integration Simplicity

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<tr>
<th>Technology</th>
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</thead>
</table>
| L2 Distributed Ethernet connectivity | • Easy integration into existing network  
• End-to-end policy management/QoS  
• One IP vs. multiple IP’s to manage each mesh network | ✓ Streamlines network deployment  
✓ Central management for entire network  
✓ Lower network maintenance cost  
✓ Consistent user experience across indoor wired/outdoor wireless |
| FMRP encapsulation | • Standards-based 802.1 VLAN/802.1P QoS compliant | |
= No-Hassle IT Management

Simplicity of wired Ethernet carried over to wireless mesh
What Makes AutoMesh Unique?

- End-to-End Security
- Performance & Scalability
- Resilience
- Intuitive Operations
- Mobility
## Mobility

### 3rd Gen patented Mobility solution

<table>
<thead>
<tr>
<th>Technology</th>
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<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero packet loss at high speeds and seamless hand-off of voice and video</td>
<td>• Live HD video surveillance at up to 100mph</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fleet offload: in-depot offload Gigabits of data in &lt; 1 minute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Remote monitoring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Digital signage on mobile fleets</td>
<td></td>
</tr>
<tr>
<td>• Bi-directional high-speed connectivity across multiple mesh networks</td>
<td></td>
<td>✓ Improved real-time crime prevention</td>
</tr>
<tr>
<td>• Mobile load balancing</td>
<td></td>
<td>✓ Increased efficiency, workforce productivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Reduced operating costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ Potential new sources of revenue</td>
</tr>
</tbody>
</table>
100 Mbps Network Connectivity @100 mph

UDP Throughput (Mbps)
Packet Loss

Station 1  Pole 1  Pole 2  Pole 3  Pole 4  Station 2  Pole 5
Advantage AutoMesh! Mobility

Seoul Metro Rapid Transit – World’s Longest Subway

Application
• Real-time video surveillance, broadcast information on moving subway trains and in stations

Why Firetide
• Only system to successfully deliver high-speed seamless hand-off along fixed wireless infrastructure
• Real-time video streaming from station’s cameras to monitor on a train moving @50mph, with zero packet loss

Customer Value
• Increased passenger safety
• Enables train operator to view situation at station before arrival
• More accurate, real-time information available to passengers
Advantage AutoMesh! Mobility

Mumbai Metro Real-Time, Mobile Wireless Video Surveillance

Application
• On-board real-time video surveillance and broadcast messages to onboard display

Why Firetide
• Only system capable of providing high-speed bandwidth and meeting stringent performance standards necessary for real-time, video streaming in harsh environment
• Link redundancy in various scenarios of metro operation

Customer Value
• Increased passenger safety
• More accurate, real-time information available to passengers
AMTRAK Wireless Mesh Infrastructure

Application
- On-board Wi-Fi service to meet increasing bandwidth demands of passengers traveling from Penn Station to and from NYC through many tunnels

Why Firetide
- Only system capable of high-speed hand-offs between nodes in a wireless mesh network
- Speed of deployment, 2-3 months vs. 2-3 years with fiber

Customer Value
- Improved business passenger service on one of its most critical lines
What Makes AutoMesh Unique?

- End-to-End Security
- Performance & Scalability
- Resilience
- Integration Simplicity
- Mobility

AutoMesh™
# End-to-End Security

<table>
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<tr>
<th>Technology</th>
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<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>End-to-end 256 AES encryption</td>
<td>• End-to-end security</td>
<td>✓ Security and integrity of data</td>
</tr>
<tr>
<td>- no per hop decryption and</td>
<td>• Prevents wireless snooping of packets</td>
<td>✓ Military grade secure applications</td>
</tr>
<tr>
<td>encryption</td>
<td>• No degradation in latency</td>
<td>✓ Improved video performance</td>
</tr>
<tr>
<td>Proprietary security</td>
<td></td>
<td></td>
</tr>
<tr>
<td>extensions to 802.11 protocol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• FIPS 140-2 compliant</td>
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</tr>
</tbody>
</table>
= End-to-End Secure Transmission
# Why We Win: AutoMesh Advantage!

<table>
<thead>
<tr>
<th>PRIME Benefits</th>
<th>AutoMesh</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Performance &amp; Scalability</strong></td>
<td>Firetide</td>
<td>PTP Ubiquiti</td>
</tr>
<tr>
<td>400 cameras - all-wireless backhaul in 2 sq. km</td>
<td>Multi-link limitations</td>
<td>Shared capacity limitations (base-subscriber)</td>
</tr>
<tr>
<td>700 km - linear wireless mesh</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Resilience</strong></td>
<td>99.9% availability</td>
<td>Single link of failure</td>
</tr>
<tr>
<td><strong>Integration Simplicity</strong></td>
<td>Single IP to manage each mesh network</td>
<td>Multiple IP to manage as network scales</td>
</tr>
<tr>
<td><strong>Mobility</strong></td>
<td>0 packet drop at 100 Mbps @100mph</td>
<td>Not available</td>
</tr>
<tr>
<td>E-to-E Security</td>
<td>Military-grade 256-bit AES End-to-End encryption</td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Topology Deployment Fit</strong></td>
<td>Flexible Technology! All network topologies supported – PTP/PTMP/Mesh</td>
<td>PTP topology</td>
</tr>
</tbody>
</table>
Firetide AutoMesh Advantage

- Most cities covered
- World’s longest mesh

- World’s longest subway
- Surveillance at high speeds

- Critical operations enhanced
AutoMesh Advantage Gets Stronger

AutoMesh 7.15 new features

- **Simplified network administration** with scheduled upgrades, notifications & more
- **Online license activation**
- **Packet route**
- **Visualization**
- **CLI access** (Telnet, SSH)
- **Quality-of-Service**
- **Enhanced mobility** of rail-metro and bus fleet deployments
- **User-configurable channel scan list**
- **Deployments**
  - Linear mobility for metro
  - Radio Silence for Municipal
- **Clock**
  - **Synchronization** between network systems
- **Firmware** upgrade scheduler
- **V R R P** packet control
- **Automated DFS blacklist**
- Pre-programmed **MESH NETWORK** triggers and alarms
- **Network efficient**
- **Multicast**
- **One-click node settings**
- **User-controlled Gateway**
- **Groups**
- **User-configurable channel scan list**
- **Managing licensed nodes with un-licensed HotView Pro**
Upgrade to AutoMesh™ 7.15

- Login to the Firetide Partner Portal at partners.firetide.com
  - If you do not have a Partner login, please sign-up by sending an email to partners@firetide.com
- Select Support -> Click on ‘Software and Firmware’
- Download “NEW AutoMesh™ 7.15.0.0 Release”
- Click on ‘Manual and Quick-start guides’
- Download “HotView Pro Version 10.15.0.0 Reference Manual” for installation instructions
It’s Prime Time for Good Selling!

Performance & Resilience
Integration Simplicity
End-to-End Security
Scalability
Mobility