



# HotView Pro™ Mesh Management Software



HotView Pro provides centralized management and control of single or multiple FireTide mesh networks with an intuitive web based user interface.

It is a sophisticated, yet simple-to-use platform for configuring, monitoring, and managing HotPort™ mesh nodes and HotPoint™ access points.

## HotPort Multi-Service Mesh Network

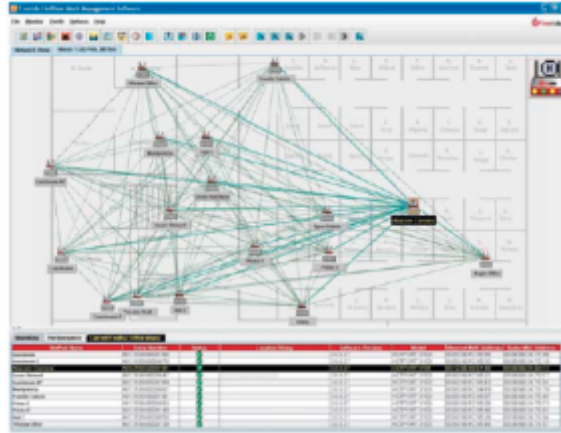
The HotPort mesh system provides a high capacity, self-healing wireless mesh network that operates seamlessly indoors and outdoors. Designed for maximum performance, scalability, mobility and security, the mesh delivers throughput of up to 32 Mbps and can operate at 2.4 GHz for maximum range and penetration, or at 5 GHz to minimize interference with wireless LANs. A special Public Safety version of the HotPort mesh network is also available for use in the USA-licensed 4.9 GHz spectrum.

FireTide's patented AutoMesh™ routing protocol makes the mesh fully self-forming and self-healing, to afford rapid deployment and dependable operation for both static and mobile mesh infrastructures. Mesh-wide performance is constantly optimized with unique AutoMesh features such as flow based routing, congestion control, cost-based bandwidth metrics and industry-leading low latency. Multiple auto-sensing 10/100 Mbps Ethernet ports on each HotPort node create a virtual Ethernet switch, providing direct connectivity to devices such as video surveillance cameras and Wi-Fi access points, forming a high-performance multi-service infrastructure.

## Optimal Mesh Performance

The HotView software incorporates a number of unique flow control, traffic prioritization and management capabilities to deliver high throughput and low latency needed to support concurrent voice, video and data communications.

- Bandwidth metrics improve overall throughput by selecting best transmission paths based on link capacity, link type, hop count, and link retransmission count.
- During high network utilization, HotView manages and mitigates traffic congestion on a per flow basis. Three levels of congestion control are triggered by traffic in transmit queues and overall link capacity.



- Mesh traffic can be prioritized by Ethernet port or by 802.1p QoS based high, medium, or low field values in order to optimize video or voice applications.
- With flow-based routing traffic is balanced across the mesh to best optimize aggregate throughput and increase network performance. Flows are established between source and destination nodes and are balanced based on link-specific traffic loads and class-of-service priorities.
- Network performance can be optimized in crowded environments by manually removing redundant links from the mesh.
- To reduce network traffic and improve overall performance, broadcasts can be contained to a single mesh or multiple contiguous meshes.
- Static Route Assignments can be implemented to ensure the highest possible performance between any two source and destination nodes.
- In poor RF environments transmit data rates can be locked-in at a lower rate to reduce re-transmissions and ensure constant throughput.
- Multi-Hop optimization reduces contention in mesh topologies with numerous redundant paths.
- Received Signal Strength (RSSI) Threshold settings prioritize paths by link quality.
- For improved performance over longer distance routes, the Extended Range feature enables timing parameters to be optimized for longer propagation times.

- Adjustable transmit power levels minimize interference within the mesh, while Dynamic Frequency Selection (DFS) minimizes radio/radar interference.
- Virtual LANs segment and direct traffic along specific VLAN routes.

## Highly Scalable Networks

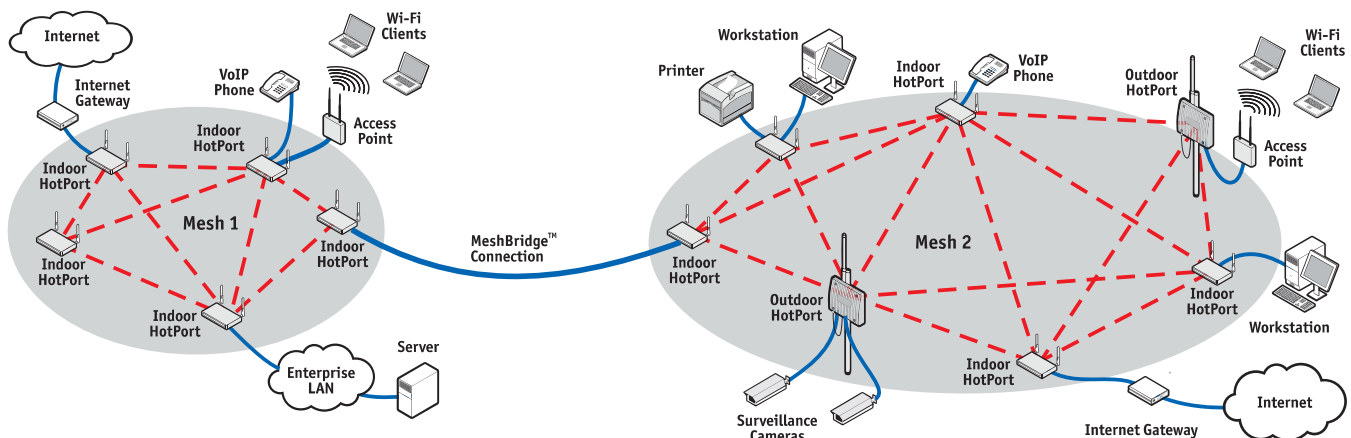
The virtual-Ethernet architecture of HotPort systems combined with the

AutoMesh routing protocol provide superior scalability with the following features:

**EthernetDirect™** — With EthernetDirect a HotPort mesh can be seamlessly extended to a wired backbone or any two mesh nodes can be interconnected with a high speed full-duplex 100 Mbps wired link, reducing overall hop counts. This feature also allows two portions of a single mesh network to be linked across a routed IP network.

**MeshBridge™ Integration** — The MeshBridge feature is used to connect multiple mesh networks into a single, integrated mesh environment with up to 1000 nodes. A MeshBridge link can be established using a direct wired connection, or made via any separate switched or routed LAN or WAN infrastructure. MeshBridge helps extend reach and enhance performance, and enables the use of multiple RF spectrums and channels in campus or metropolitan applications.

**Internetworking with Other Domains** — Any HotPort mesh can internetwork with any other LAN/WAN domain, including the Internet or an enterprise network. A node designated as a Network Gateway Interconnect (NGI) provides the basic connection; multiple NGI nodes add multi-path performance and redundancy. A standby Gateway Server can be optionally configured to ensure seamless failover from standby to active. A separate node can be designated as a gateway server to consolidate multiple NGIs into a single, high-bandwidth link. HotView also supports IEEE 802.1q VLAN tagging of packets traversing the mesh to and from other network domains.



Firetide HotPort™ Wireless Mesh Network

## Maximum End-to-End Security

The HotPort system provides a set of layered security options in order to ensure multi-level data integrity, access control, and intrusion protection both across the mesh and to the client.

- For end-to-end traffic encryption, administrators can enable Advanced Encryption Standard (AES) at 128 or 256 bits, WPA2 (256-bit key) and/or WEP at 104/128 or 40/64 bits.
- Traffic can be filtered by MAC address. This form of access control can be configured on either an explicit Allow or Deny basis.
- VLANs, which segment traffic within the mesh, add yet another layer of security.

- Mesh node ESSID encryption and suppression prevents unauthorized viewing of HotPort mesh nodes, even with sophisticated wireless monitoring tools.
- Mesh nodes are digitally signed, requiring certificate based acceptance before any HotPort node can join the mesh.
- Firmware upgrades are also certificate-based, requiring nodes to accept upgrades only from trusted and digitally signed sources.
- In addition to security across the mesh backbone, the HotPort AP is 802.11i compliant and supports 802.1x RADIUS authentication, VPN tunneling and filtering, and SSID suppression.

## Unmatched Mobility

In addition to supporting mobile Wi-Fi clients as they roam from cell-to-cell, HotPort mesh nodes provide an entirely mobile infrastructure. This enables unique applications such as real time video and high-quality voice calls as well as uninterrupted Wi-Fi access on moving vehicles such as police cars, fire trucks, buses and trains. The HotPort AutoMesh protocol delivers seamless roaming with zero-packet loss and zero-handoff delay.

## Advanced Management Architecture

### Client/Server Architecture —

HotView Pro is implemented in a traditional client/server design. The server utilizes a database to store and export mesh and node configurations, operating statistics, fault log records, administrator access privileges, and user preferences. One or more clients provide the intuitive GUI for the many management tools. The client and server functions operate across a LAN or WAN, or can be collocated on a single platform.

### Managing Multiple Mesh Networks —

Each local or remote HotView Pro client is capable of managing one or more HotPort mesh networks from a single screen. Multiple networks can be independent, or integrated with MeshBridge™ to form a single mesh environment with up to 1000 nodes. Real-

time monitoring depicts a graphical view of active connections in the mesh topology, along with a display of mesh/node statistics and event/fault logs. The display can be customized by importing a floor plan, map or drawing to show the physical location of all nodes in the mesh. The MultiMesh feature displays all mesh networks in a single comprehensive view, and also allows each mesh to be displayed separately.

### Multi-user Management —

HotView Pro allows multiple administrators to be assigned different management capabilities. Each administrator is granted a set of password-protected access privileges, including the ability to change (Read/Write) or simply monitor (Read Only) either a single mesh or multiple mesh networks. To support good change management practices, only

one user at a time is granted full Read/Write capability for any mesh. HotView Pro also includes a default ID lockout feature that enables redefinition of default user IDs to thwart possible brute-force attacks.

### SNMP Management —

SNMP management allows network administrators to customize and integrate management of individual or multiple HotPort mesh networks into a network management system such as HP OpenView or IBM NetView. SNMP enables large enterprises and system integrators to customize mesh management for their users.

### Web-based Client —

The HotView web server feature enables network managers to use a web browser to connect to the HotView Pro Server. This eliminates the need to run a separate mesh management client application.

## Highly Flexible Deployment

HotPort mesh networks offer extraordinary flexibility for deploying, changing, expanding, and upgrading a multi-service mesh. With a modular design, broadest range of radio band support, and seamless indoor and outdoor operations, the HotPort system readily integrates with existing wired and wireless network infrastructure and devices. This enables customers to optimize their network investment, lowering total cost of ownership and improving overall ROI.

## Real-Time Management

**Real-Time Monitoring and Statistics** — HotView Pro affords at-a-glance monitoring of one or more mesh networks. The information includes network status, performance statistics, and current/logged faults. Statistics and log files can be exported for offline analysis. The fault log displays the severity, date and time, node location, fault type, and description of every fault or error encountered on the mesh.

**Managing Inventory** — The information captured and maintained by HotView Pro provides an automatic, up-to-date inventory of all HotPort nodes. Details about each node include its model number, serial number, radio MAC address and software version. This application also allows administrators to assign a unique node name and a description of each node's physical location.

**Easy and Secure Mesh Updates** — HotView allows all or selected nodes in any mesh network to receive software updates concurrently in one easy operation. This simplifies the task and ensures that all nodes share the most current software, while preserving existing mesh/node configurations and unique identifying information. Individual node security is enhanced with certificate-based firmware upgrades which require nodes to accept upgrades only from digitally signed sources.

Statistics Last Refreshed at : Fri May 20 10:20:59 PDT 2005

**Neighbor Statistics**

Neighbor Node	RSSI (dBm)	Input Packets	Output Packets	Input Bytes	Output Bytes	Data Rate (kbps)	Packets Dropped	Total Retries
0.7	-77	188088	184325	9114831	15595886	54000	874	223
0.7	-77	188097	7512	9114595	1505564	54000	0	174

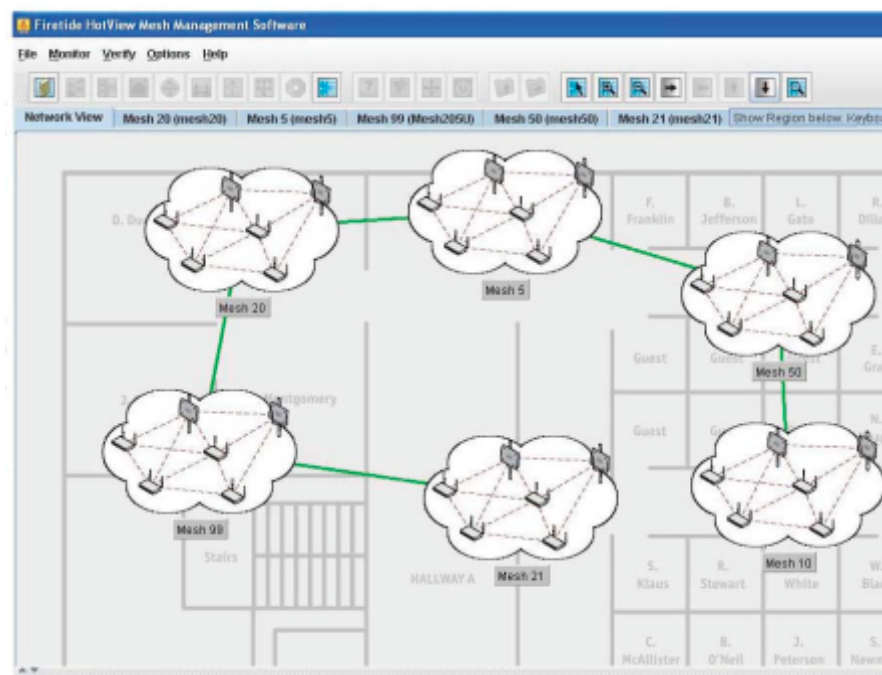
**Ethernet Port Statistics**

Port	Input Packets	Output Packets	Input Bytes	Output Bytes	Packet Collisions	Receive Errors
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0

**Radio Statistics**

Link Quality	RSSI (dBm)	Noise (dBm)	Input Packets	Output Packets	Input Bytes	Output Bytes	Transmit Err	Receive Err	Retransmits	Retransmits	Retransmits	Dropped Pkts
100	-77	-96	188088	184325	9114831	15595886	643	81101	0	0	0	874

Exportable real-time mesh node statistics



HotView Pro enables management and interconnection of multiple mesh networks

Mesh 1

Jump To Mesh Tab...

Move Mesh...

Logout Of Mesh...

**Mesh Summary**

Mesh Name	: ALPHA_MESH
IP Address	: 10.0.3.5
ESSID	: #MeshLgCorp2
Radio Mode	: 5.725-5.850 GHz OFDM
Radio Channel	: 157
WEP Security	: enabled
AES Security	: enabled
Multi hop Optimization	: disabled
RSSI Threshold	: -85
Hysteresis Window	: 3
Country Code	: United States (840)

Mesh configuration



## HotView Pro™ Mesh Management Software



Custom backgrounds such as this city map can be imported to show relative locations of mesh nodes on floor plans and maps.

### Simple Mesh Set-up and Configuration

**HotPort Mesh Configuration** — The various default settings for a HotPort mesh can be changed mesh-wide with a single action. Mesh-wide configuration parameters include radio mode and channels, Extended Service Set Identifier (ESSID), country code (not applicable for HotPort Public Safety systems), mesh IP address, and the traffic encryption type and strength.

**Individual Node Configuration** — HotView Pro also provides centralized control over all nodes in the HotPort mesh network(s). Administrators can view details in a drop-down node summary display, and make changes to the node's configuration of Ethernet ports, assigned name and location description, and transmit power setting. If a node should become "lost" due to power failure or DFS, for example, HotView enables the mesh to find the lost node and bring its configuration up to date.

**Custom Backgrounds** — Views can be customized with an imported background bitmap image, such as a floorplan, campus or street map, or aerial photograph. The individual nodes are then "dragged and dropped" to their real-world physical location. The resulting display shows the actual layout of the mesh topology, complete with lines indicating the many links or hops (wireless or wired) among all nodes. This powerful mesh-wide view is frequently used when adding new nodes or changing the location of existing ones, as well as for monitoring, optimizing, or troubleshooting a HotPort mesh.

### HotView and HotView Pro Feature Summary

Firetide provides two options for managing HotPort mesh networks and HotPoint access points. Basic configuration, monitoring and management are included with each HotPort mesh node via integrated HotView software. The optional HotView Pro Management Software provides powerful centralized control for multiple mesh networks and larger mesh environments such as enterprise, metropolitan, and campus networks.

Feature or Function	HotView	HotView Pro
<b>MANAGEMENT &amp; CONTROL</b>		
Architecture	Integrated	Client/Server
Mesh/Node Configuration Settings	Yes	Yes
MultiMesh Management	–	Yes
Concurrent Administrators	One	Multiple
SNMP Management	–	Yes
Web-based Client	–	Yes
Node Statistics & Fault Log	When Active	Persistent
Database / Export	–	Yes
Background Image Import	Yes	Yes
Inventory Management	Yes	Yes
<b>OPTIMAL PERFORMANCE</b>		
Class of Service Traffic Prioritization	Yes	Yes
802.1p based QoS	Yes	Yes
Congestion Control	Yes	Yes
Link Elimination	Yes	Yes
Transmit Data Rate Control	Yes	Yes
Transmit Power / Multi-Hop / RSSI Threshold	Yes	Yes
EthernetDirect	–	Yes
Static Route Assignments	–	Yes
Bandwidth Metrics	Yes	EN link speed
Broadcast Containment	–	Yes
Load Balancing	–	Yes
<b>FLEXIBLE DEPLOYMENT</b>		
Extended Range	Yes	Yes
MeshBridge Integration	–	Yes
NGI(s) & Gateway Server Internetworking	–	Yes
Mesh Software Update	Yes	Yes
HotPort/Public Safety (4.9 GHz)	Yes (USA only)	Yes (USA only)
Node Statistics Refresh	Yes	Yes
Node Recovery	Yes	Yes
Selectable Upgrades	Yes	Yes
Gateway Server Redundancy	–	Yes
<b>MAXIMUM SECURITY</b>		
Virtual LANs	Yes	Yes
AES/WPA2/WEP Encryption & Access Control	Yes	Yes
ESSID Encryption	Yes	Yes
Signed Certificates	–	Yes

### Other Firetide Mesh Products



HotPort Outdoor Mesh Nodes



HotPort Indoor Mesh Nodes



HotPort 4.9 GHz Public Safety Mesh Network



Antennas and Accessories



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