Tropos 7320
Outdoor mesh router

The Tropos 7320 outdoor mesh router is a full-feature wireless networking platform designed to deliver high performance in outdoor environments. Architected to provide maximum flexibility and configurability, the router delivers significant performance increases through support for the 802.11n standard, a next-generation high-sensitivity radio design, and the incorporation of patented new features into the industry-leading Tropos Mesh OS.

Features and benefits

Software
– Decentralized architecture optimizes throughput in realtime and ensures scalability
– Dynamic selection of optimal end-to-end path delivers the highest performance
– Network performance and capacity maximized by automatic optimization of power and rate on per-connection and per-packet basis

Platform
– Support for 802.11n features deliver significant performance enhancements
– Flexible, modular form factor can be customized with user-selected antennas
– Supports the industry's widest array of power input options
– Ideal for providing source PoE to co-located devices

A high-capacity solution capable of simultaneous support for multiple network applications, the Tropos 7320 router is designed to meet the demanding needs of municipalities and utilities, as well as enterprise, industrial, and military entities. The platform provides a reliable communicationsfoundation for deploying concurrent implementations of public safety, intelligent transportation systems, video surveillance, and utility metering systems. The Tropos 7320 router can either serve as a gateway interface for capacity injection into the network, or as a node to extend or reinforce network connectivity.

Designed for creating or expanding higher-capacity networks, the Tropos 7320 router is a dual-band unit with one 2.4 GHz and one 5 GHz radio that supports meshing and client connectivity at both frequencies. The platform provides superior performance and resiliency, and enables the network to be scaled to the highest-capacity configurations through deployment of additional Tropos routers.

The high-capacity unit has two Ethernet ports that can be used for a variety of purposes:

– Gateway configurations where device connectivity is needed for capacity injection into the network
– Attachment of client devices requiring power over Ethernet (PoE), such as cellular point-to-point wireless products used for capacity injection; video cameras; or advanced meter reading/advanced metering infrastructure (AMR/AMI) collectors

The Tropos 7320 router is preconfigured with multiple omnidirectional antennas for high-performance 802.11n connectivity. For increased flexibility, the omnidirectional antennas can easily be replaced with optional high-gain sector or patch antennas for enhanced coverage.

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802.11n features deliver network-wide performance enhancements

The Tropos 7320 mesh router is designed to utilize the powerful capabilities of the 802.11n standard, which delivers performance increases in coverage, capacity, and reliability. This breakthrough technology improves receive link signal strength and client connectivity not just for 802.11n clients, but for 802.11b/g clients as well. Client connection reliability is enhanced by combining multiple signals from multiple antennas, instead of relying on signals received from a single antenna. The result is increased throughput, higher network capacity, and reduced latency across the network.
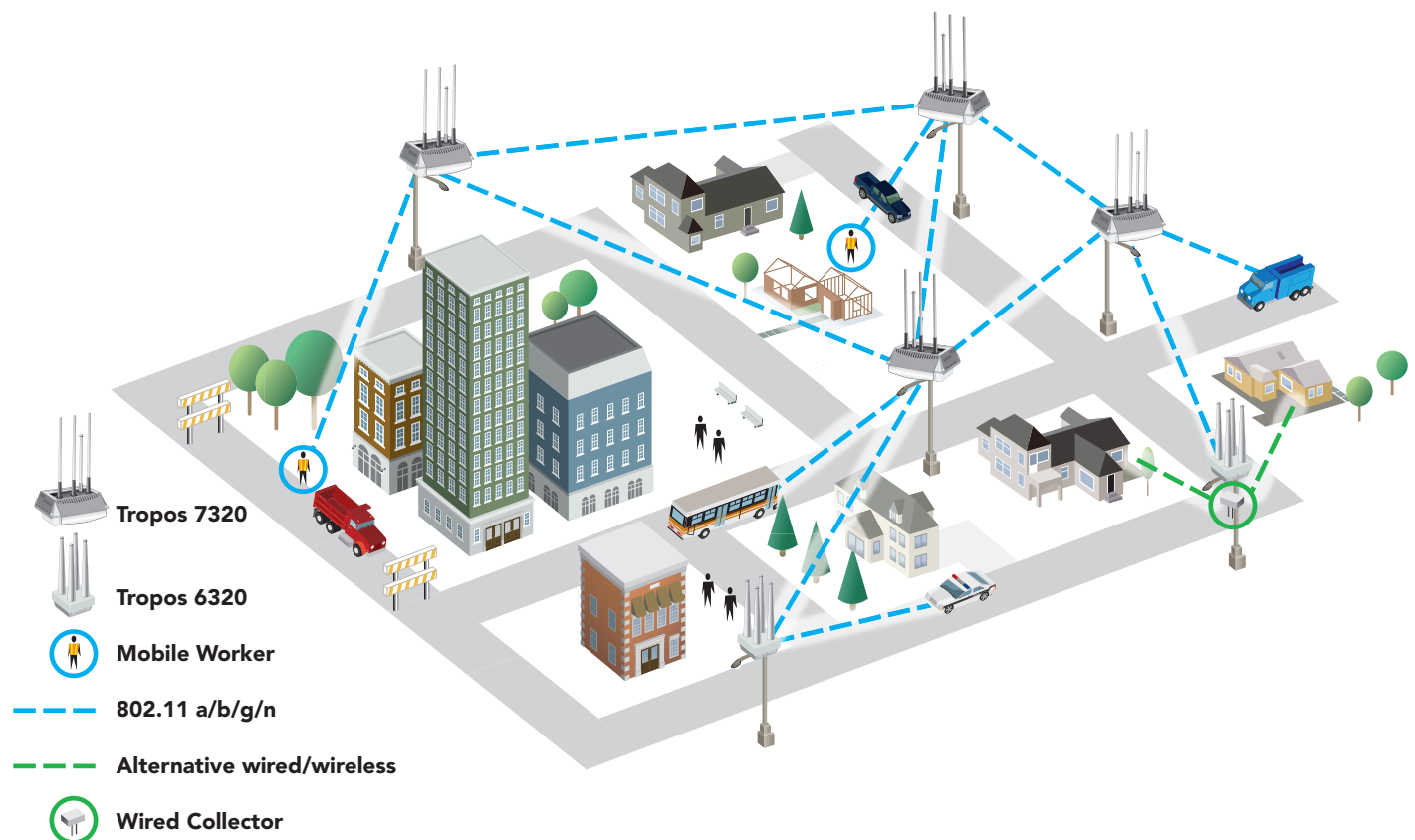
Tropos Mesh OS

The Tropos Mesh OS is the cornerstone of the decentralized Tropos system architecture. A common software platform that runs on each router across the network, the Tropos Mesh OS leverages the router's on-board intelligence to monitor and maximize performance. Unlike controller-based architectures that suffer bandwidth losses as control traffic is passed back and forth between network nodes and the central site, the distributed Tropos system architecture uses efficient on-board processing at the device level to minimize networkcongestion and adapt on a real-time, packet-by-packet scale. This distributed approach optimizes performance and throughput byminimizing control traffic, delivers a highly scalable solution, and helps provide a quality user experience for network clients.

PWRP

The cornerstone of the Tropos Mesh OS is the patented Predictive Wireless Routing Protocol (PWRP™), which continually analyzes the quality of active and inactive mesh links to dynamically configure the ideal combination of paths to optimize network performance. Upon deployment, the routers automatically discover one another, and quickly determine the optimal route to the gateways that inject capacity into the network. Optimal links are chosen on the basis of throughput, packet success, signal-to-noise ratios, and other key criteria.

PWRP performs a range of key tasks across the wireless network:

– Streamlines deployments and preserves performance by dynamically configuring and optimizing mesh connections
– Improves throughput by selecting optimal routing paths
– Enhances network resiliency by providing graceful rerouting of traffic in the event of RF interference, backhaul failures, or other disruptions in the wireless mesh
– Supports client mobility without the need for special client hardware, software, or network reconfigurations
– Enables the network to be scaled to thousands of nodes covering the largest geographical areas in the industry

Tropos 7320

Tropos 6320

Mobile Worker

802.11 a/b/g/n

Alternative wired/wireless

Wired Collector

Tropos fixed and mobile routers can be used for securely operating a wide range of services

PowerCurve

A distributed algorithm that leverages the Tropos PWRP communication protocol, PowerCurve maximizes network performance and capacity by automatically optimizing power and rate parameters on a per-connection and per-packet basis. This advanced, distributed algorithm continually adjusts transmit power to maximize the number of wireless links that can operate concurrently. Unlike alternative approaches where transmit power is configured as a static setting, PowerCurve tightly couples power and bit rate control. This enables the router to make continuous and dynamic adjustments that can enhance throughput and provide a better user experience.

PowerCurve delivers the following key benefits:

– Dynamically monitors and adjusts power and rate per-packet, per-link, to deliver maximum capacity
– Enhances network reliability, capacity and scalability beyond the capabilities of controller-based architectures
– Streamlines network planning, deployment and optimization

Airtime Congestion Control

Airtime Congestion Control (ACC) technology enables networks to be operated closer to their capacity limits by detecting signs of congestion and dynamically adjusting airtime resource allocation to clients. ACC is unlike traditional rate limiting in two important ways. First, instead of limiting traffic during congestion-free periods, ACC activates only when performance-impacting congestion is detected and returns to a monitoring state afterward. Second, it is mesh- and wireless-aware, distributing air time resources equally among clients during a congestion event rather than applying fixed throughput caps. By allowing networks to carry heavy traffic loads without crossing over into a saturated state, ACC actually increases usable capacity.

– Deterministic allocation of airtime resources enables networks to run at higher capacity without congestion
– Monitors airtime availability to deliver more efficient network utilization than systems relying on limiting traffic levels
– Provides fair network access to all users, enabling Tropos to surpass traditional broadband wireless network capacity

SmartChannel

Designed to optimize performance in both single- and dual-radio networks, this distributed algorithm continually samples all available channels to analyze link performance and interference trends. The channel decision logic is integrated into the PWRP routing algorithms so that end-to-end path qualities are assessed on alternate channels. In dual-radio systems, fine-grained channel plans are implemented within individual clusters to optimize each cell for client coverage and spectral reuse.

– Provides continuous monitoring of all channels to detect intermittent noise sources
– Non-disruptive to user traffic and sessions
– Avoids interference and enhances network capacity and reliability

Advanced network management platform delivers optimized edge-to-edge visibility

Tropos Control is a standards-based network management system designed to achieve peak performance and reliability. Designed around an intuitive web-based interface, the software facilitates the remote management of Tropos mesh networks, and is ideal for dynamically deploying and configuring networks ranging in size from tens to thousands of Tropos mesh routers. Tropos Control minimizes planning, deployment, and operating costs, and increases the efficiency of management personnel by performing complex tasks such as global provisioning and software updates across the network in a single session.

– Streamlines tasks such as monitoring network health, statistical network performance analysis, and performance optimization
– Provides macro-level visibility as well as granular real-time and historical detail on usage, link quality, capacity, and network reliability
– Network health dashboard provides at-a-glance views of network traffic, performance, and alarms with links to instantly drill down to relevant statistical information
– Wireless-aware provisioning for guaranteed configuration changes and software updates over dynamically changing links
– Detailed historical database of RF environmental data, network performance and client connectivity enables fast root-cause diagnosis
– Assists network managers to plan expansion and optimization strategies based on analysis of network trends and detailed historical information

Resilient, high-performance networks from Tropos – the wireless IP broadband market leader

As the leader in wireless IP broadband mesh networking solutions, Tropos is the right choice for organizations interested in deploying a robust infrastructure capable of with standing the harshest outdoor environments. Designed to contain costs and enhance productivity, Tropos technology provides the backbone for top-performing outdoor wireless IP networks across the globe. As the industry continues to evolve, Tropos is poised to extend its market leadership through the introduction of innovative products, and functionality.

For further information, visit us on the web at www.abb.com/tropos.

Wireless

- IEEE 802.11b/g/n radio
  - Frequency band: 2.4-2.483 GHz
  - Modulation: 802.11g/n - OFDM (64-QAM, 16-QAM, QPSK, BPSK); 802.11b - DSSS (DBPSK, DQPSK, CCK)
  - TX Power: ETSI/EU 5-20 dBm (EIRP) set in 1 dB units; FCC/IC 21-36 dBm (EIRP) set in 1 dB units
  - 7.4 dBi omnidirectional antennas
  - Media access protocol: CSMA/CA with ACK
  - RX sensitivity:
    -97 dBm @ 1 Mbps
    -96 dBm @ 6 Mbps
    -84 dBm @ 54 Mbps
  - Multi-antenna system: 1-TX x 3-RX
  - Support for 802.11n MRC
- IEEE 802.11a radio
  - Frequency band: 5.725 - 5.850 GHz (FCC/IC) 5.470 - 5.725 GHz with DFS (ETSI/EU)
  - Modulation: 802.11a/n - OFDM (64-QAM, 16-QAM QPSK, BPSK)
  - TX Power: ETSI/EU 15-30 dBm (EIRP) factory-set in 1 dB units; FCC/IC 20-35 dBm (EIRP) factory-set in 1 dB units
  - 9.1dBi omnidirectional antenna
  - Optional 17 dBi sector (or) 19 dBi panel antenna
  - Media access protocol: CSMA/CA with ACK
  - RX sensitivity:
    -94 dBm @ 6 Mbps
    -76 dBm @ 54 Mbps

Networking

- Full 802.11b/g, 802.11a, 802.11n client compatibility
- IEEE 802.3u autosensing 10/100BASE-T Ethernet ports
- IPv4; IPv6-ready
- BGP
- 802.1q VLAN support (ESSID and IP based tagging)
- Support for static and dynamic addressing for wireless and wired clients
- Onboard DHCP server and relay
- Session-persistent mobility across subnets
- Network address translation (NAT)
- IP multicast forwarding, IGMPv3; IGMP proxy
- Automatic rate, power, channel and band control
- PowerCurve
- SmartChannel
- Quality of service
- 802.11e WMM
- 802.1p/q with 4 queues per VLAN and ESSID
- 802.1p and DSCP
- VoIP and VoWiFi support
- Heuristics-based voice classification
- Call admission control
- TSpec classification
- Seamless mobility
- Call reporting
- Rate limiting (airtime and throughput based)
- ACC - Airtime Congestion Control

Management

- RADIUS accounting
- Local and remote management tools via HTTPS
- Identity-based authentication (4 levels)
- Configuration save and restore
- Over the air software updates with rollback
- Command line interface (CLI) via SSH
- SNMP (standard MIBs)
- Wireless network and client monitoring and statistics
- Infrared (IR) port
- Wireless rescue
- Dual image
- Auto recovery

Security

- IPsec VPNs with tunnels to wired client interfaces using AES
- Authentication: WPA, WPA2, 802.11i, RADIUS, 802.1x (includes EAP-TLS, EAP-TTLS, EAP-SIM, PEAP)
- Encryption: open, WEP, TKIP, AES-CCM
- AES encryption of mesh and control traffic
- FIPS 140-2 Level 2 compliant
- NERC CIP 002-009 compliant
- Multiple BSSIDs & ESSIDs (ESSID suppression)
- Integrated firewall
  - Packet filtering based on TCP/UDP port, protocol, SA, DA
  - Peer-to-peer blocking
  - Client access control lists
  - VPN filtering
  - Router access control
- Evil twin detection and reporting
- Denial of service (DoS) attack detection and reporting

Environmental specifications

- Operating temperature range: -40°C to 55°C
- Storage temperature range: -40°C to 85°C
- Weather rating: IP67 - UL 579/IEC 60529 IP67
- Wind survivability: >165 mph
- Wind loading (165 mph): <300 Newtons
- ASTM B117 salt fog rust resistance compliant
- Shock & vibration: ETSI 300-19-2-4 spec T41.E class 4M3
- Transportation: ISTA 2A

Power

– AC power input: 100-480VAC 50/60Hz single and split-phase ANSI/IEEE C62.41 category C3 integrated branch circuit protection
    – AC power consumption: 18 W typical
– DC power input:11-55Vdc,12 W typical
– Power over Ethernet power sourcing capability: 12Vdc, 24Vdc, 48Vdc @ 30 W output (AC powered units only)
– Factory installed Li-Ion battery - optional, AC powered units only
    – Back-up power 2 - 6 hours typical - optional (AC powered units only)
– Power-on and network status LEDs
– Power cables
    – Street light NEMA photo-electric control power tap 100-480 VAC,
      2 wire 4 ft. or 20 ft. power cable
    – Electrical power cord, US/Canada 120 VAC, 15 A, 3 prong 6 ft. or 30 ft.

Physical

– Dimensions (w/o mounting brackets or antennas): 13.00 in (33.02 cm) wide x 8.00 in (20.32 cm) deep x 5.3 in (13.50 cm) high
– Weight: 16 lbs (7.20 kg) max., with mounting brackets

Wireless approvals

– FCC CFR 47 Part 15
– Industry Canada RSS 210
– EN 301 489-17
– EN 300 328
– EN 301 893

Safety approvals

– IEEE 1613
– UL 60950-1
– CSA 22.2 No. 60950-1
– IEC 950
– EN 60950
– UL 1449/IEC 60664-1
– CE

Protection

– Antenna protection: ≤ 0.5µJ for 6kV/3kA @ 8/20µS waveform
– Electrical protection:
    – ANSI/IEEE C62.41, UL 1449-2nd ed., 10kA @ 8/20 µS wave form, 36kA per phase, L-L, L-N, L-PE
    – EN61000-4-5 level 1 & 2 AC surge immunity
    – EN61000-4-4 level 2 electrical fast transient burst immunity
    – EN61000-4-3 level 2 EMC field immunity
    – EN61000-4-2 level 2 (contact), level 3 (air) ESD immunity

Warranty

– One (1) year on parts and labor; return to point of purchase
– Optional standard and premium support packages available

Ordering information

P/N: 73203030 FCC and Canada FCC/IC TX, three 7.4dBi & one 9.1 dBi omni antennas, mounting brackets - AC power

P/N: 73203130 FCC and Canada FCC/IC TX, battery backup, three 7.4 dBi & one 9.1 dBi omni antennas, mounting brackets - AC power

P/N: 73202531 ETSI markets ETSI/EU TX, three 7.4 dBi & one 9.1 dBi omni antennas, mounting brackets - AC power

P/N: 73202631 ETSI markets ETSI/EU TX, battery backup, three 7.4 dBi & one 9.1 dBi omni antennas, mounting brackets - AC power

P/N: 73206000 FCC/IC TX, three 7.4dBi + one 9.1dBi omni antennas, bracket - DC Power

P/N: 73206060 ETSI markets, ETSI/EU TX, three 7.4 dBi & one 9.1 dBi omni antennas, mounting brackets - DC power

P/N: FIPS 1402-7320 software license, hardware for FIPS 140-2

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