BROCADE MOBILITY 650 ACCESS POINT

CAMPUS NETWORK

Multipurpose 802.11n Access Point Reduces Mobile Access Costs

HIGHLIGHTS

- Eliminates controller bottlenecks and lays the foundation for 802.11ac with Distributed AP Forwarding
- Helps reduce operational costs by providing remote management support with built-in remote Radio Frequency (RF) scanning
- Delivers optimal performance with standard Power over Ethernet (PoE) capabilities, helping to ensure always-on access
- Helps ensure consistent and reliable service delivery with self-healing capabilities
- Provides secure and preemptive client roaming by leveraging device mobility and 24 dBm radio
- Reduces network intrusion risk with a dedicated security sensor and continuous monitoring of wireless networks

For small and medium-size enterprises, lowering the costs of mobility capabilities must be balanced with the need for a secure and high-quality user experience. As a component of the Brocade® HyperEdge™ Architecture, the Brocade Mobility 650 Access Point (AP), a thin (dependent) multipurpose AP, meets all of these needs.

The intelligent Brocade Mobility 650 uses Distributed AP Forwarding to understand and forward local traffic. This efficient wireless architecture eliminates the need for all data traffic to route to the wired network core before reaching its destination. This architecture is also ideal for the increased AP bandwidth and performance demands expected from the 802.11ac standard.

Designed to lower the cost of deploying and operating a secure, reliable 802.11n Wireless LAN (WLAN), this highly efficient AP offers simultaneous WLAN access and sensing, remote over-the-air help-desk support, and the comprehensive, wireless intrusion-prevention features that nimble organizations require.

Working in conjunction with the Brocade Mobility 650, Brocade Mobility controllers minimize common problems—such as building attenuation, electronic interference, or suboptimal AP placement—that can interfere with network availability. Brocade Mobility controllers automatically optimize power and channel selection with SmartRF capabilities, so each user receives always-on, high-quality mobile data and service access.

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BROCADE HYPEREDGE ARCHITECTURE

The Brocade HyperEdge™ Architecture brings campus networks into the modern era to better support mobility, security, and application agility. This evolutionary architecture integrates innovative wired and wireless technologies to streamline application deployment, simplify network management, and reduce operating costs.

The HyperEdge Architecture enables organizations to build networks that are:

- **Agile:** By eliminating Spanning Tree Protocol (STP) between HyperEdge Domain switches through a flatter Layer 2 design, the HyperEdge Architecture increases link utilization and reduces application deployment complexity. The Distributed AP Forwarding functionality of Brocade wireless Access Points (APs) efficiently secures and directs mobile traffic at the network edge without tunneling data back to a central controller at the network core.
- **Automated:** By grouping premium and entry-level switches with intelligent wireless APs into a consolidated management domain, HyperEdge Domains eliminate the need to provision and manage devices individually—simplifying network deployment and management.
- **Cost-effective:** The HyperEdge Architecture enables the propagation of advanced features and services from premium switches to entry-level switches, allowing IT organizations to purchase only what they need today and add intelligent services as the business evolves. Further cost savings is achieved with Brocade wireless solutions using controller-less or controller-shared license deployment options.

ALWAYS-ON, HIGH-QUALITY ACCESS IS AUTOMATIC

The Brocade Mobility 650 leverages self-healing capabilities to continuously optimize network availability. Its central and preemptive intelligence dynamically senses weak or failing signals, securely moves mobile users to alternate APs, and boosts signal power to automatically fill Radio Frequency (RF) holes and ensure uninterrupted mobile user access. Full 802.11n performance is achieved with built-in Power over Ethernet (PoE) capabilities (802.3af).

SELF-LEARNING ACCESS POINTS DEPLOY IN MINUTES

The Brocade Mobility 650 derives its intelligence from a Brocade Mobility controller, so installation is plug-and-play for optimal service in existing and new WLANs. Brocade Mobility controllers discover and self-learn Brocade Mobility 650 APs on the network and automatically download all configuration parameters and firmware, greatly reducing installation, maintenance, and troubleshooting costs for Layer 2 and Layer 3 deployments.

VIRTUAL LAN BOOSTS DEVICE AND NETWORK PERFORMANCE

The Brocade Mobility 650 forwards traffic directly, eliminating controller bottlenecks for improved 802.11n performance and a high-quality user experience.

The Brocade Mobility 650 provides a VLAN feature through a switch/controller to automatically accelerate device and network performance. Each Brocade Mobility 650 can be virtualized into four unique VLANs, which can be customized to direct broadcast traffic to the intended recipient. This option reduces the wireless network traffic traversing to/from the network core while improving device performance and battery life up to 25 percent. This VLAN flexibility also reduces the overall number of APs required to provide unique device services.

DEVICE MOBILITY INCLUDES SECURE ROAMING AND 24 DBM RADIO

The Brocade Mobility 650 supports fast, secure roaming in Layer 2 and Layer 3 deployments. In addition, the network optimizes mobile performance with load balancing, preemptive roaming, and rate scaling. The Brocade Mobility 650 features a powerful 24 dBm radio that can reduce the number of APs needed by increasing coverage, performance, and obstruction penetration far more effectively than 23 dBm radios do.

COMPREHENSIVE SECURITY REDUCES RISKS

The comprehensive Brocade Mobility 650 security capabilities include a Layer 2–7 stateful packet filtering firewall; Authentication, Authorization, and Accounting (AAA); Remote Authentication Dial In User Service (RADIUS); wireless Intrusion Prevention System (IPS) “lite;” Virtual Private Network (VPN) gateway; and location-based access control. The AP’s sensor supports simultaneous multiband sensing (band unlocked) for both 2.4 GHz and 5.0 GHz spectrums. Rogue detection is always on with no time slicing. For advanced security, users can also add Role-Based Access Control (RBAC) and the Motorola AirDefense® wireless IPS for Brocade Mobility.

REMOTE MANAGEMENT SUPPORT HELPS REDUCE OPERATIONAL COSTS

The Brocade Mobility 650 multipurpose architecture enables IT organizations to remotely troubleshoot AP issues—as if the technician were sitting directly under the AP. AirDefense for Brocade Mobility help-desk capabilities supported by the Brocade Mobility 650 include:

- **Advanced troubleshooting:** Enables help-desk technicians to immediately emulate and test user connectivity over the air from a device all the way to the back-end application and isolate the obstruction, even if it is not caused by the WLAN.
- **Spectrum analysis:** Enables help-desk technicians to analyze the local spectrum for interference.
- **Vulnerability analysis:** Enables help-desk technicians to remotely scan for security breaches on the wired or wireless network on a scheduled or periodic basis to help ensure network security and regulatory compliance.

ENABLING HIGH-QUALITY VOICE COMMUNICATIONS

The Brocade Mobility 650 supports Voice over Wireless LAN (VoWLAN) services, such as Quality of Service (QoS), which ensure toll-quality audio—even with multiple VoWLAN calls. In addition, locationing services over 802.11n provide the ability to locate and track people or assets, or control network and application access with features that provide hotspot and guest access authorization.

CONSOLIDATED NETWORK MANAGEMENT

To reduce complexity and the costs of managing campus environments, Brocade Network Advisor works seamlessly within the HyperEdge Architecture to discover, manage, and deploy configurations to groups of IP devices. By using the Brocade Network Advisor Device Configuration Manager tool, organizations can configure VLANs, manage wireless AP realms, group WLAN switches into domains for Layer 3 mobility support, or execute Command Line Interface (CLI) commands on specific devices or groups of devices. Brocade Network Advisor centralizes management of the entire family of Brocade wired and Brocade Mobility wireless products, including Brocade Mobility 650 APs and Brocade Mobility wireless controllers.

BROCADE GLOBAL SERVICES

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, network monitoring services, and education, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

CLOUD-OPTIMIZED NETWORK ACQUISITION

Brocade helps organizations easily address their information technology requirements by offering flexible network acquisition and support alternatives to meet their financial needs. Organizations can select from purchase, lease, and Brocade Network Subscription options to align network acquisition with their unique capital requirements and risk profiles. To learn more, visit www.Brocade.com/CapitalSolutions.

MAXIMIZING INVESTMENTS

To help optimize technology investments, Brocade and its partners offer complete solutions that include professional services, technical support, and education. For more information, contact a Brocade sales partner or visit www.brocade.com.

BROCADE MOBILITY 650 AP SPECIFICATIONS

Performance and Supported Configurations	
Radio options	Single radio 802.11a/n or 802.11b/g/n support with 2×3 MIMO or RP-SMA antenna connectors; or dual-radio 802.11a/n and 802.11b/g/n support with 2×3 MIMO or RP-SMA antenna connectors
Mode operation	Thin (dependent) Access Point (AP)
BSSID support	Four BSSIDs per radio
Powered clients	CAM- and PSP-powered clients supported
Concurrent clients	Up to 128 client associations per radio
Traffic Management and Quality of Service	
Quality of Service	Voice prioritization; WMM-power save with TSPEC Admission Control; WMM U-APSD; Layer 1-4 packet classification; 802.1p; 802.11e; 802.11k; DiffServ/TOS, SVP, SIP CAC
Rate limiting	Broadcast/multicast transmit rate control, client rate limiting, per radio client limit
Client load balancing	Neighbor APs share client load by client count or traffic load
Wireless Security	
Wireless IPS/IDS	Rogue detection, radio provides dedicated full-time 24×7 scanning of 2.4 GHz and 5.0 GHz bands for air monitoring, wireless IPS, onboard IDS
Authentication	ACLS; Pre-Shared Keys (PSK); 802.1x/EAP-Transport Layer Security (TLS); Tunneled Transport Layer Security (TTLS); Protected EAP (PEAP); local authentication database, AAA Server; support for RADIUS, LDAP, and ActiveDirectory
Encryption	WEP 40/128 (RC4); WPA-TKIP; WPA2-CCMP (AES); 802.11i WPA2-TKIP; Multi-Cipher support
Guest access	Built-in captive portal; customizable login/welcome pages; URL redirection; support for external authentication and billing systems; client-client transmission disallow
Internet Protocol Security (IPsec) VPN	Supports Data Encryption Standard (DES), 3DES, AES-128, and AES-256 encryption; supports site-to-site VPN capabilities
Stateful firewall	Stateful Layer 3 packet inspection; stateful Layer 2–7 wireless firewall; Access Control Lists (ACLs)
Networking Services	
Layer 2 and Layer 3	802.1D-1999 Ethernet bridging; 802.11-802.3 bridging; 802.1Q VLAN trunking and tagging; DHCP servicer/client, BOOTP client, Dynamic DNS (DynDNS), PPPoE, NAT, LLDP, IP Filtering, Content Filtering (files or URL extensions, HTTP, SMTP, and FTP requests) NAT, ARP/Proxy ARP
Management	
Configuration	Java-based Web user interface, human-readable config file import/export, CLI (RS-232 or Telnet), SSH, HTTP/S, MIB, programmable SNMP v1/v2c/v3 trap support
Statistics	LAN, wireless, and associated stations (accessible via Brocade Mobility Controller Web UI)
Software/firmware updates	File Transfer Protocol (FTP) or Trivial File Transfer Protocol (TFTP), remote auto available
Physical Characteristics (Internal Antenna)	
Dimensions	24.1 cm L × 18.916 cm W × 4.360 cm H (9.5 in. L × 7.5 in. W × 1.7 in. H)
Weight	0.91 kg (2.0 lb)
Housing	Plastic
Available mounting configurations	Ceiling mount (to suspended ceiling T-bars, below tile); wall mount
LED indicators	Two LED indicators with multiple modes indicating 2.4 GHz/5.0 GHz activity, power, adoption, and errors
Ethernet ports	Auto-sensing 10/100/1000 Base-T Ethernet
Lock option	Kensington
Physical Characteristics (External Antenna)	
Dimensions	21.64 cm L × 14.10 cm W × 3.771 cm H (8.5 in. L × 5.6 in. W × 1.5 in. H)
Weight	1.1 kg (2.5 lb)
Housing	Metal, plenum-rated housing (UL2043)
Available mounting configurations	Ceiling mount (above tile); wall mount
LED indicators	Two LED indicators with multiple modes indicating 2.4 GHz/5.0 GHz activity, power, adoption, and errors
Antenna connectors	Six RP-SMA
Ethernet ports	Auto-sensing 10/100/1000 Base-T Ethernet
Lock option	Kensington

BROCADE MOBILITY 650 AP SPECIFICATIONS (CONTINUED)

Environmental Specifications	
Temperature	Operating: 0°C to 50°C (–4°F to 122°F) Storage: –40°C to 70°C (–40°F to 158°F)
Operating humidity	5% to 95% (without condensation)
Altitude	Operating: 2438 m (8000 ft) Storage: 4572 m (15,000 ft)
Electrostatic discharge	+/–15 kV (air), +/–8 kV (contact)
Power Specifications	
Operating voltage	802.3af supply, 48 VDC at 12.95 W (typical), 36 VDC to 57 VDC (range)
Operating current	270 mA (typical)
Integrated Power over Ethernet (PoE)	Standards-based IEEE 802.3af
Radio Specifications	
Wireless medium	Direct-Sequence Spread Spectrum (DSSS), Orthogonal Frequency-Division Multiplexing (OFDM), and 2×3 Spatial Multiplexing (MIMO) with 2 spatial streams
Network standards	802.11a, 802.11b, 802.11g, 802.11n
Channelization	20 MHz and 40 MHz channels
Packet aggregation	A-MSDU, A-MPDU
Interframe spacing	Reduced
MIMO power save	Static and Dynamic
Data rates supported	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b/g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0–15 up to 300 Mbps
Operating channels	5.0 GHz: all channels from 4920 MHz to 5825 MHz 2.4 GHz: channels 1–13 (2412 to 2472 MHz); Channel 14 (2484 MHz), Japan only Actual operating frequencies depend on national regulatory limits.
Operating bands	Federal Communications Commission (FCC) European Union, 2.412 to 2.462 GHz; 2.412 to 2.472 GHz; 5.150 to 5.250 GHz (UNII –1); 5.150 to 5.250 GHz; 5.725 to 5.825 GHz (UNII –3); 5.150 to 5.350 GHz; 5.725 to 5.850 (ISM); 5.470 to 5.725 GHz (Country-specific) Japan, 2.412 to 2.484 GHz; 4.900 to 5.000 GHz; 5.150 to 5.250 GHz
Maximum available transmit power	24 dBm
Transmit power adjustment	1 dB increments
Antenna configuration	2×3 MIMO (transmit on two and receive on all three antennas)
Maximum Radio Transmit Power	
2400 MHz band	Single-antenna composite transmit power: 21 dBm Dual-antenna composite transmit power: 24 dBm
5200 MHz band	Single-antenna composite transmit power: 19 dBm Dual-antenna composite transmit power: 22 dBm
Antenna Specifications	
Type	Integrated 2.4 GHz and 5.2 GHz dual antenna; elements with diversity (internal antenna) Six RSMA connectors for external antennas (not included)
Band	2.4 to 2.5 GHz; 4.90 to 5.85 GHz (actual operating frequencies depend on regulatory rules and certification agency)
Voltage Standing Wave Ratio (VSWR)	Less than 2:1 (internal antenna) Antenna-specific (external antenna)
Gain	2.4 GHz: 2 dBi; 5.0 GHz: 4.8 dBi (internal antenna) Antenna-specific (external antenna)
Regulatory Information	
Safety specifications	UL/cUL 60950-1, IEC/EN60950-1, UL2043 (Plenum), compliance with RoHS Directive 2002/95/EC TUV
EMC specifications	FCC (USA), Industry Canada, CE (Europe), EN 301 489-1, EN 301 489-17, EN60601-1-2, and TELEC (Japan)
Radio approvals	FCC (USA), Industry Canada, CE (Europe- EN 300.328, EN 301.893), TELEC (Japan)

BROCADE MOBILITY 650 AP SPECIFICATIONS (CONTINUED)

Receiver Sensitivity

(typical) at antenna housing connector (metal housing), 2400 MHz band

Rate/MCS	Mode	Average sens (dBm)
1	Legacy	–95
2	Legacy	–94
5.5	Legacy	–93
11	Legacy	–90
6	Legacy	–94
9	Legacy	–94
12	Legacy	–94
18	Legacy	–94
24	Legacy	–90
36	Legacy	–87
48	Legacy	–83
54	Legacy	–82
MCS0	HT20	–94
MCS1	HT20	–93
MCS2	HT20	–91
MCS3	HT20	–87
MCS4	HT20	–84
MCS5	HT20	–80
MCS6	HT20	–79
MCS7	HT20	–77
MCS8	HT20	–94
MCS9	HT20	–91
MCS10	HT20	–88
MCS11	HT20	–85
MCS12	HT20	–82
MCS13	HT20	–78
MCS14	HT20	–77
MCS15	HT20	–75
MCS0	HT40	–88
MCS1	HT40	–88
MCS2	HT40	–87
MCS3	HT40	–84
MCS4	HT40	–82
MCS5	HT40	–77
MCS6	HT40	–76
MCS7	HT40	–74
MCS8	HT40	–88
MCS9	HT40	–87
MCS10	HT40	–85
MCS11	HT40	–82
MCS12	HT40	–79
MCS13	HT40	–75
MCS14	HT40	–73
MCS15	HT40	–71

Receiver Sensitivity

(typical) at antenna housing connector (metal housing), 5200 MHz band

Rate/MCS	Mode	Average sens (dBm)
6	Legacy	–93
9	Legacy	–93
12	Legacy	–93
18	Legacy	–92
24	Legacy	–89
36	Legacy	–86
48	Legacy	–82
54	Legacy	–81
MCS0	HT20	–93
MCS1	HT20	–92
MCS2	HT20	–90
MCS3	HT20	–86
MCS4	HT20	–83
MCS5	HT20	–79
MCS6	HT20	–78
MCS7	HT20	–76
MCS8	HT20	–93
MCS9	HT20	–90
MCS10	HT20	–87
MCS11	HT20	–84
MCS12	HT20	–81
MCS13	HT20	–77
MCS14	HT20	–75
MCS15	HT20	–74
MCS0	HT40	–90
MCS1	HT40	–88
MCS2	HT40	–86
MCS3	HT40	–83
MCS4	HT40	–80
MCS5	HT40	–76
MCS6	HT40	–74
MCS7	HT40	–73
MCS8	HT40	–89
MCS9	HT40	–86
MCS10	HT40	–84
MCS11	HT40	–81
MCS12	HT40	–78
MCS13	HT40	–74
MCS14	HT40	–72
MCS15	HT40	–71

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