The Broadcom® FASTPATH® production-ready networking software helps manufacturers achieve record-setting time-to-market performance for introducing new Ethernet products. In part, this advantage comes from the extensive feature set and integration capabilities that give Broadcom’s software unprecedented application flexibility.

FASTPATH supports a broad array of field-proven Ethernet solutions, including:
- Fixed and stackable switches for Enterprise network wiring closets
- Blade-server and top-of-rack switches for Enterprise data centers
- 10GbE switches and ATCA chassis solutions
- Carrier Ethernet solutions for next-generation business and consumer networks

FASTPATH operates on the Linux operating system and has been integrated with Broadcom’s market-leading switching silicon.

FASTPATH software supports numerous industry RFCs, standards and protocols. FASTPATH Release 7.3 includes the following software modules:
- Stacking
- Switching
- Routing
- BGP
- Quality of Service
- Multicast
- IPv6 Routing
- Management
- Metro
- Data Center

A 48-port managed Ethernet switch developed with FASTPATH can provide full-featured Layer 2 switching with Layer 3 IPv4/IPv6 routing and advanced Quality of Service functionality in fixed or stackable configurations.
STACKING

Features
- Redundant Management Unit support
- Single IP address management
- Automatic election of management control unit
- Distribution of code and configuration throughout stack
- Hot-plug support: optional modules and stack units
- Offline configuration of modules and stack units
- Stack Template Manager to enable stacking switches with differing hardware capabilities

SWITCHING

Core Features
- IEEE 802.3 10BASE-T
- IEEE 802.3u 100BASE-T
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3ac VLAN tagging
- IEEE 802.3ad Link aggregation
- IEEE 802.3ae 10 GbE
- IEEE 802.1ak Multiple Registration Protocol (MRP)
- IEEE 802.1S Multiple Spanning Tree Protocol (MSTP)
- IEEE 802.1W Rapid Spanning Tree
- GARP Generic Attribute Registration Protocol
- GMRP Dynamic Multicast Registration
- GVRP Dynamic VLAN Registration
- VPC Virtual Port Channel (MLAG)
- IEEE 802.1Qat Multiple Stream Reservation Protocol (MSRP)
- IEEE 802.1Qav Forwarding and Queuing Enhancements for Time-Sensitive Streams
- IEEE 801.1Qbb Priority-based Flow Control
- IEEE 802.1v Protocol-based VLANs
- IEEE 802.1p Ethernet priority with user provisioning and mapping
- IEEE 802.1X Port-based authentication and supplicant support
- IEEE 802.3x Flow control
- RFC 4541 IGMP Snooping and MLD Snooping
- RFC 5171 UniDirectional Link Detection (UDLD) Protocol
- IEEE 802.1AB LLDP Link Layer Discovery Protocol (LLDP)
- ANSI/TIA-1057 LLDP-Media Endpoint Discovery (MED)

Additional Layer 2 Functionality
- Authentication, Authorization, and Accounting (AAA)
- Broadcast/Multicast/Unicast storm recovery
- Double VLAN/VMAN tagging
- Independent VLAN Learning (IVL) support
- IPv6 Classification APIs
- Jumbo Ethernet frames
- Port mirroring
- Static MAC filtering
- IGMP and MLD snooping querier
- Port MAC locking
- Protected ports
- Voice VLANs
- IP subnet-based VLANs
- MAC-based VLANs
- DHCP snooping (IPv4 and IPv6)
- IP source guard (IPv4 and IPv6)
- Dynamic ARP Inspection
- MAC Authentication Bypass
- RSPAN
- MGMD snooping SSM

System Facilities
- Event and Error Logging Facility
- Run-time and configuration download capability
- Ping utility
- Xmodem
- Authentication Tiering
- FTP transfers via IPv4/IPv6
- Malicious code detection

RFC 768 UDP
RFC 783 TFTP
RFC 791 IP
RFC 792 ICMP
RFC 793 TCP
RFC 826 ARP
RFC 894 Transmission of IP datagrams over Ethernet networks
RFC 896 Congestion control in IP/TCP networks
RFC 951 BootP
RFC 1034 Domain names - concepts and facilities
RFC 1035 Domain names - implementation and specification
RFC 1321 Message digest algorithm
RFC 1534 Interop. between BootP and DHCP
RFC 2021 Remote Network Monitoring Management Information base Version 2
RFC 2030 Simple Network Time Protocol (SNTP) v4 for IPv4, IPv6, and OSI
RFC 2131 DHCP Client/Server
**System Facilities (Continued)**

<table>
<thead>
<tr>
<th>RFC</th>
<th>Description</th>
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<tbody>
<tr>
<td>2132</td>
<td>DHCP options and BootP vendor extension</td>
</tr>
<tr>
<td>2819</td>
<td>Remote Network Monitoring Management Information Base</td>
</tr>
<tr>
<td>2865</td>
<td>RADIUS client</td>
</tr>
<tr>
<td>2866</td>
<td>RADIUS accounting</td>
</tr>
<tr>
<td>2868</td>
<td>RADIUS attributes for tunnel protocol support</td>
</tr>
<tr>
<td>2869</td>
<td>RADIUS Extensions - Support for Extensible Authentication Protocol (EAP)</td>
</tr>
<tr>
<td>3164</td>
<td>The BSD syslog protocol</td>
</tr>
<tr>
<td>3580</td>
<td>IEEE 802.1X RADIUS usage guidelines</td>
</tr>
</tbody>
</table>

**Switching MIBs**

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<thead>
<tr>
<th>RFC</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1213</td>
<td>MIB II</td>
</tr>
<tr>
<td>1493</td>
<td>P-Bridge MIB</td>
</tr>
<tr>
<td>1612</td>
<td>DNS resolver MIB extensions</td>
</tr>
<tr>
<td>1643</td>
<td>Ethernet-like MIB</td>
</tr>
<tr>
<td>2011</td>
<td>IP MIB</td>
</tr>
<tr>
<td>2233</td>
<td>Interfaces group MIB using SMI v2</td>
</tr>
<tr>
<td>2613</td>
<td>SMON MIB</td>
</tr>
<tr>
<td>2618</td>
<td>RADIUS authentication client MIB</td>
</tr>
<tr>
<td>2620</td>
<td>RADIUS accounting MIB</td>
</tr>
<tr>
<td>2674</td>
<td>Q-Bridge-MIB</td>
</tr>
<tr>
<td>2737</td>
<td>Entity MIB version 2</td>
</tr>
<tr>
<td>2819</td>
<td>RMON groups 1, 2, 3, and 9</td>
</tr>
<tr>
<td>2863</td>
<td>IF-MIB</td>
</tr>
<tr>
<td>2925</td>
<td>Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations</td>
</tr>
<tr>
<td>3273</td>
<td>RMON Groups 1, 2, and 3</td>
</tr>
<tr>
<td>3291</td>
<td>INET-ADDRESS-MIB</td>
</tr>
<tr>
<td>3434</td>
<td>RMON Groups 1, 2, and 3</td>
</tr>
<tr>
<td>3577</td>
<td>RMON family of MIB modules</td>
</tr>
<tr>
<td>4022</td>
<td>TCP-MIB</td>
</tr>
<tr>
<td>4113</td>
<td>UDP-MIB</td>
</tr>
</tbody>
</table>

**RFCs**

- RFC 1027: Using ARP to implement transparent subnet gateways (Proxy ARP)
- RFC 1256: ICMP router discovery messages
- RFC 1765: OSPF database overflow
- RFC 1812: Requirements for IP version 4 routers
- RFC 2082: RIP-2 MD5 authentication
- RFC 2131: DHCP relay
- RFC 2328: OSPFv2
- RFC 2370: OSPF Opaque LSA Option
- RFC 2453: RIP v2
- RFC 3021: Using 31-Bit Prefixes on IPv4 Point-to-Point Links
- RFC 3046: DHCP/BootP relay
- RFC 3101: The OSPF “not so stubby area” (NSSA) option
- RFC 3137: OSPF stub router advertisement
- RFC 3623: Graceful OSPF restart
- RFC 3768: Virtual Router Redundancy Protocol (VRRP)
- RFC 5187: OSPFv3 Graceful Restart
- RFC 5340: OSPF for IPv6
- RFC 6860: Hiding Transit-Only Networks in OSPF

**Core Features**

- ECMP
- ICMP Throttling
- Loopback interfaces
- Multinetting
- OSPF
- ARP and Proxy ARP
- RIP
- Route redistribution across RIP and OSPF
- Static routing
- VLAN and port-based routing
- VRRP
- UDP Relay/IP Helper
- Policy-Based Routing

**System Facilities (Continued)**

<table>
<thead>
<tr>
<th>RFC</th>
<th>Description</th>
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<tbody>
<tr>
<td>3101</td>
<td>The OSPF “not so stubby area” (NSSA) option</td>
</tr>
<tr>
<td>3137</td>
<td>OSPF stub router advertisement</td>
</tr>
<tr>
<td>3623</td>
<td>Graceful OSPF restart</td>
</tr>
<tr>
<td>3768</td>
<td>Virtual Router Redundancy Protocol (VRRP)</td>
</tr>
<tr>
<td>5187</td>
<td>OSPFv3 Graceful Restart</td>
</tr>
<tr>
<td>5340</td>
<td>OSPF for IPv6</td>
</tr>
<tr>
<td>6860</td>
<td>Hiding Transit-Only Networks in OSPF</td>
</tr>
</tbody>
</table>
**Routing MIBs**

- RFC 1724  RIP v2 MIB extension
- RFC 1850  OSPF MIB
- RFC 2096  IP Forwarding Table MIB
- RFC 2787  VRRP MIB
- RFC 3636  MAU MIB

**FastPath Enterprise MIB supporting Routing features**

**BGP MIBs**

- RFC 1997  BGP Communities Attribute
- RFC 2385  Protection of BGP Sessions via the TCP MD5 Signature Option
- RFC 2545  BGP-4 multiprotocol extensions for IPv6 inter-domain routing
- RFC 2918  Route Refresh Capability for BGP-4
- RFC 4271  A Border Gateway Protocol 4 (BGP-4)
- RFC 4456  BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)
- RFC 4486  Subcodes for BGP Cease Notification Message
- RFC 4760  Multiprotocol Extensions for BGP-4
- RFC 5492  Capabilities Advertisement with BGP-4

**BGP4 MIBs**

- RFC 4273  Definitions of Managed Objects for BGP-4
- RFC 5492  FASTPATH Enterprise MIB supporting BGP features

**Quality of Service**

**DiffServ Policies and ACLs**

- RFC 1858  Security Considerations for IP Fragment Filtering
- RFC 2474  Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 headers
- RFC 2475  An architecture for differentiated services
- RFC 2597  Assured forwarding Per Hop Behavior (PHB) group
- RFC 3246  An expedited forwarding PHB
- RFC 3260  New terminology and clarifications for DiffServ

**RFCs for DiffServ Policies and ACLs**

- Permit/deny actions for inbound or outbound IP (IPv4 and IPv6) traffic classification based on:
  - Type of Service (ToS) or Differentiated Services (DS) DSCP field
  - Source IP address
  - Destination IP address
  - TCP/UDP source port
  - TCP/UDP destination port
  - IP protocol number
  - IPv6 flow label

**RFCs for Class of Service**

- Autonomous VoIP: Automatic VoIP Class of Service (CoS) settings
  - Direct user configuration of the following:
    - IP DSCP to traffic class mapping
    - IP precedence to traffic class mapping
    - Interface trust mode: IEEE 802.1p, IP precedence, IP DSCP, or untrusted
    - Interface traffic shaping rate
    - Strict priority versus weighted (WRR/WFQ) scheduling per queue
    - Tail drop versus weighted Random Early Detection (WRED) queue depth management

**RFCs for Quality of Service MIBs**

- RFC 3289  MIB for the Differentiated Services Architecture (read only)
- FASTPATH Enterprise MIB supporting DiffServ, ACL and CoS functionality
### Multicast

**Core Features**

<table>
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<tr>
<th>RFC</th>
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<td>RFC 1112</td>
<td>Host extensions for IP multicasting</td>
</tr>
<tr>
<td>RFC 2236</td>
<td>IGMP v2</td>
</tr>
<tr>
<td>RFC 2365</td>
<td>Administratively scoped boundaries</td>
</tr>
<tr>
<td>RFC 2710</td>
<td>MLDv1</td>
</tr>
<tr>
<td>RFC 3376</td>
<td>IGMPv3</td>
</tr>
<tr>
<td>RFC 3810</td>
<td>MLDv2</td>
</tr>
<tr>
<td>RFC 3973</td>
<td>PIM-DM (supports both IPv4 and IPv6)</td>
</tr>
<tr>
<td>RFC 4601</td>
<td>PIM-SM (supports both IPv4 and IPv6)</td>
</tr>
<tr>
<td>Draft-ietf-idmr-dvmrp-v3-10</td>
<td>DVMRP</td>
</tr>
<tr>
<td>Draft-ietf-magma-igmp-proxy-06.txt</td>
<td>IGMP/MLD-based multicast forwarding (IGMP/MLD proxying)</td>
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<tr>
<td>Draft-ietf-magma-igmpv3-and-routing-05.txt</td>
<td>IGMPv3 and multicast routing protocol interaction</td>
</tr>
<tr>
<td>draft-ietf-pim-sm-bsr-05</td>
<td>Bootstrap Router (BSR) Mechanism for PIM</td>
</tr>
<tr>
<td>Static RP configuration</td>
<td></td>
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</table>

**Multicast MIBs**

<table>
<thead>
<tr>
<th>RFC</th>
<th>Description</th>
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<tbody>
<tr>
<td>RFC 2932</td>
<td>IPv4 multicast routing MIB</td>
</tr>
<tr>
<td>RFC 2933</td>
<td>Internet group management protocol MIB</td>
</tr>
<tr>
<td>RFC 5060</td>
<td>PIM standard MIB</td>
</tr>
<tr>
<td>RFC 5240</td>
<td>PIM Bootstrap Router (BSR) MIB</td>
</tr>
<tr>
<td>Draft-ietf-idmr-dvmrp-mib-11</td>
<td>DVMRP standard MIB</td>
</tr>
<tr>
<td>draft-ietf-magma-mgmd-mib-05</td>
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<tr>
<td>draft-ietf-pim-sm-bsr-mib-06</td>
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</tr>
</tbody>
</table>

**FASTPATH Enterprise MIB supporting Multicast features**

### IPv6 Routing

**Core Features**

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<tr>
<th>RFC</th>
<th>Description</th>
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<tbody>
<tr>
<td>RFC 1981</td>
<td>Path MTU for IPv6</td>
</tr>
<tr>
<td>RFC 2460</td>
<td>IPv6 protocol specification</td>
</tr>
<tr>
<td>RFC 2461</td>
<td>Neighbor discovery</td>
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<tr>
<td>RFC 2462</td>
<td>Stateless autoconfiguration</td>
</tr>
<tr>
<td>RFC 2464</td>
<td>IPv6 over Ethernet</td>
</tr>
<tr>
<td>RFC 2711</td>
<td>IPv6 router alert</td>
</tr>
<tr>
<td>RFC 3056</td>
<td>6 to 4 tunnels</td>
</tr>
<tr>
<td>RFC 3315</td>
<td>Dynamic Host Configuration Protocol for IPv6 (DHCPv6) (includes support for both Stateful and Stateless mechanisms)</td>
</tr>
<tr>
<td>RFC 3484</td>
<td>Default address selection for IPv6</td>
</tr>
<tr>
<td>RFC 3493</td>
<td>Basic socket interface for IPv6</td>
</tr>
<tr>
<td>RFC 3513</td>
<td>Addressing architecture for IPv6</td>
</tr>
<tr>
<td>RFC 3542</td>
<td>Advanced sockets API for IPv6</td>
</tr>
<tr>
<td>RFC 3587</td>
<td>IPv6 global unicast address format</td>
</tr>
<tr>
<td>RFC 3633</td>
<td>IPv6 Prefix Options for Dynamic Host Configuration Protocol (DHCP) version 6</td>
</tr>
<tr>
<td>RFC 3736</td>
<td>Stateless DHCPv6</td>
</tr>
<tr>
<td>RFC 4213</td>
<td>Basic transition mechanisms for IPv6</td>
</tr>
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<td>RFC 4291</td>
<td>Addressing architecture for IPv6</td>
</tr>
<tr>
<td>RFC 4443</td>
<td>ICMPv6</td>
</tr>
<tr>
<td>RFC 6164</td>
<td>Using 127-bit IPv6 prefixes on inter-router links</td>
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<tr>
<td>RFC 6583</td>
<td>Operational neighbor discovery problems</td>
</tr>
<tr>
<td></td>
<td>– Dual IPv4/IPv6 TCP/IP stack operation</td>
</tr>
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<td></td>
<td>– ICMPv6 Throttling</td>
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**IPv6 Routing MIBs**

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<tr>
<th>RFC</th>
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<tr>
<td>RFC 2465</td>
<td>IPv6 MIB</td>
</tr>
<tr>
<td>RFC 2466</td>
<td>ICMPv6 MIB</td>
</tr>
<tr>
<td>RFC 3419</td>
<td>Transport address MIB</td>
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</table>

### Management

**Core Features**

<table>
<thead>
<tr>
<th>RFC</th>
<th>Description</th>
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<tbody>
<tr>
<td>RFC 854</td>
<td>Telnet</td>
</tr>
<tr>
<td>RFC 855</td>
<td>Telnet option specifications</td>
</tr>
<tr>
<td>RFC 1155</td>
<td>SMI v1</td>
</tr>
<tr>
<td>RFC 1157</td>
<td>SNMP</td>
</tr>
<tr>
<td>RFC 1212</td>
<td>Concise MIB definitions</td>
</tr>
<tr>
<td>RFC 1867</td>
<td>HTML/2.0 forms with file upload extensions</td>
</tr>
<tr>
<td>RFC 1901</td>
<td>Community-based SNMP v2</td>
</tr>
<tr>
<td>RFC 1908</td>
<td>Coexistence between SNMP v1 and SNMP v2</td>
</tr>
<tr>
<td>RFC 2068</td>
<td>HTTP/1.1 protocol as updated by draft-ietf-http-v11-spec-rev-03</td>
</tr>
<tr>
<td>RFC 2271</td>
<td>SNMP framework MIB</td>
</tr>
</tbody>
</table>
Core Features (Continued)

RFC 2295  Transparent content negotiation
RFC 2296  Remote variant selection; RSVA/1.0
RFC 2576  Coexistence between SNMP v1, v2, and v3
RFC 2578  SMI v2
RFC 2579  Textual conventions for SMI v2
RFC 2580  Conformance statements for SMI v2
RFC 2616  HTTP/1.1
RFC 3410  Introduction and applicability statements for Internet-standard
          management framework
RFC 3411  An architecture for describing SNMP management frameworks
RFC 3412  Message processing and dispatching for SNMP
RFC 3413  SNMP v3 applications
RFC 3414  User-based security model for SNMP v3
RFC 3415  View-based access control model for SNMP
RFC 3416  Version 2 of the protocol operations for SNMP
RFC 3417  Transport mappings for SNMP
RFC 3418  Management Information Base for SNMP
          – Configurable management VLAN
          – SSL 3.0 and TLS 1.0
             – RFC 2246: The TLS protocol, version 1.0
             – RFC 2818: HTTP over TLS
             – RFC 3268: AES cipher suites for transport layer security
          – SSH 1.5 and 2.0
             – RFC 4252: The TLS protocol, version 1.0
             – RFC 4251: SSH protocol architecture
             – RFC 4716: SECSH public key file format
             – RFC 4419: Diffie-Hellman group exchange for the SSH
              transport layer protocol
HTML 4.0 Specification, December 1997
Java Plug-in 1.6.0_01 and Java Script 1.3

Advanced Management Features

Industry-standard CLI with the following features:
          – Scripting capability
          – Command completion
          – Context-sensitive help
Optional user password encryption
Multisession telnet server

META

Core Features

IEEE 802.1ad  Provider Bridging with Flexible VLAN Translation
IEEE 802.1ag  Connectivity Fault Management (CFM)
IEEE 802.3ah  Ethernet in the First Mile (EFM)
DSL Forum TR-069  CPE WAN Management Protocol
Layer 2 Protocol Tunneling (L2PT)

Metro MIBs

IEEE8021-CFM-MIB  Connectivity Fault Management MIB
IEEE8021-CFM-MIB  Ethernet in the First Mile (EFM)
IEEE8021-CFM-MIB  Common MIB
Private MIBs  FASTPATH-METRO-DOT1AD-PRIVATE-MIB
Private MIBs  FASTPATH-TR069-PRIVATE-MIB
Private MIBs  FASTPATH-METRO-DOT1AG-PRIVATE-MIB

Data Center

Core Features

IEEE 802.1Qau  Virtual bridged local area networks
                amendment 13: congestion notification (Draft 2.4)
IEEE 802.1Qaz  Enhanced transmission selection for bandwidth sharing between traffic
                classes (Draft 2.4)
ANSI/INCITS Fibre Channel backbone-5 (FC-BB-5)
                Rev 2.0.0 - FIP snooping bridge
OpenFlow Switch Specification 1.0.0

Data Center MIBs

IEEE 802.1  Congestion Management MIB
            (IEEE8021-CN-MIB)
IEEE 802.1  Textual Conventions MIB
            (IEEE8021-TC-MIB)
LLDP V2 TC MIB