DATACOM

DmOS

DATACOM OPERATING SYSTEM

VERSION 8.4.0

DATASHEET

134.4918.23 – January/2023

DMOS – Datacom Operating System

DmOS (DATACOM Operating System) is a Network Operating System developed to meeting high availability, scalability, compatibility and performance applications. DmOS was developed within the most modern concepts of modularity, which guarantees portability characteristics for different hardware architectures, as well as the ability to quickly incorporate technological and functional new features. The management of equipment based on the DmOS operating system can be done through the traditional CLI standard, as well as through the modern NETCONF / YANG standards, allowing integration with different platforms.

The Operational System provides a rich set of L2, IP / MPLS and GPON allowing it to be used in a variety of network solutions, whether in access, aggregation or core environments from telecom service providers to corporate network applications.

Supported platforms

DmOS equips several devices from Ethernet Switches and GPON product lines. The Switches line contains models for applications ranging from access to the core, with high capacity and value added, with interfaces up to 100Gbps.

The GPON product line has OLTs with 4, 8, 16 and 32 GPON interfaces, with support for expansion up to 64 GPON interfaces through the 32GPON Line Card, providing a compact and high-capacity solution for access networks for applications such as Broadband, Triple Play services, mobile backhaul, enterprise interconnection over LAN-to-LAN and cloud connectivity.

- Modular Operating System
- High Availability
- Scalability and Performance
- Portability and Compatibility
- One single Operating System for all network equipment
- Rich set of L2 protocols: LACP, ERPS, EAPS, L2CP, xSTP and beyond
- Static and dynamic routing via BGP, OSPF and GW redundancy using VRRP
- Dual-stack IPv4 and IPv6
- L2VPN, L3VPN and RSVP tunnels for MPLS solutions
- GPON protocols and features
- Integrated security for user authentication via RADIUS and TACACS+
- Management and configuration using DmVIEW and CLI Templates

Linha GPON

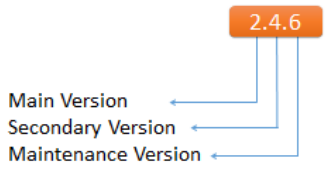
- DM4610 OLT 4GPON+4GX+2XS
- DM4610 OLT 8GPON+4GT+2XS
- DM4611 OLT 4GPON+2GT+2XS
- DM4612 OLT 8GPON+2GT+2XS
- DM4615 OLT 16GPON+4GT+4XS
- DM4618 OLT

Linha SWITCH

- DM4050 24GX+6XS
- DM4050 24GT+6XS
- DM4170 24GX+12XS
- DM4170 24GX+4XS+2QX
- DM4250 24XS+2QX
- DM4270 24XS+3CX
- DM4270 48XS+6CX
- DM4360 4GT+4GX
- DM4370 4GT+4GX+4XS
- DM4380 12XS+3CX
- DM4770 16CX
- DM4770 32CX

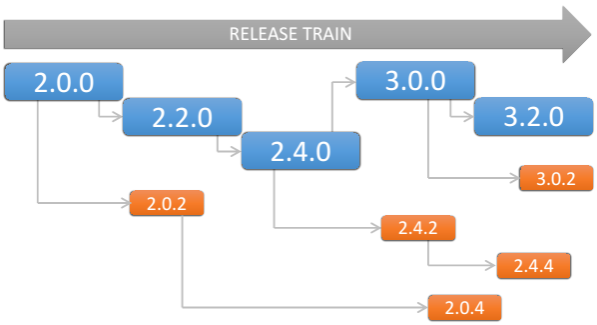
DmOS Releases

DmOS uses standard formatting to identify the versions available to customers. This format uses three identifiers X.Y.Z that represent the Main, Secondary, and Maintenance versions.



Software development is performed by agile methods and TDD (Test Driven Development) methodology. Verification and automated testing ensure the highest quality of deliveries and minimum regressions.

DmOS versions are developed through continuous delivery approach, releasing periodic versions focused in business or maintenance versions when there is a need to address issues detected internally or by customers.



DmOS Benefits

DmOS is a Network Operating System that aims to accelerate the deployment of services and applications in networks as it is unique to many DATACOM product platforms. It allows that once a protocol has been developed, all others products will have support to the same protocol.

The cost reduction in training is a differential since the technical qualification for Engineers and Technicians is the same for all products that support the DmOS.

It allows operating processes unification and simplification, adopting the same procedures for several network equipment. Through the use of rollback and commits configuration, DmOS provides less operational risk during network configuration in critical environments such as large telecommunication providers.

Architecture and High Availability

The modular architecture and the layered software enable independent development of software modules, making them more robust, resilient, flexible, scalable and portable.

DmOS is able to adjust to different applications and product models through its agnostic architecture to processors and the use of a hardware abstraction layer. This flexibility enables portability and reuse in GPON OLTs, Metro Ethernet Switches from small Ethernet Demarcation Device to high-availability modular chassis, with a seamless user experience.

High availability is achieved through the development of modular, independent and fault-tolerant components and processes that are self-recoverable in case of problems.

Management

DmOS equipment can be managed in a standardized and comprehensive way through DmView, the management software for the entire DATACOM product line. DmView presents its status and configuration screens dynamically, without the need of updating it when new features and applications are integrated into DmOS, substantially reducing the maintenance costs of the Management software. DmView also provides DmOS automation operations through the CLI Templates functionality for infrastructure deployment, service provisioning and troubleshooting across multiple devices simultaneously, reducing downtime and potential errors from activation and maintenance services.

DmOS updates can be performed through TFTP, SCP or HTTP protocols. Connectivity for configuration and verification of network elements is achieved through NETCONF, SSH and TELNET. Features such as Syslog, SNMP and SNTP are supported to enable centralized and synchronized network management.

RDM (Remote Devices Management) is a proprietary DATACOM protocol and it is available for some specific platforms. RDM allows you to manage remote devices without the need to configure these devices. This allows the customer to take the equipment out of the box and be able to access the device without the need for configuration, reducing the operational cost, speeding up the delivery of new services to customers.

SWITCHING L2

Several layer 2 protocols are available to optimize, protect and manipulate Ethernet frames. Protocols such as **EAPS**, **ERPS** and the **STP** family can be configured to keep network resilient to undesirable loops and failed links. The **L2CP** protocol (Layer 2 Control Protocol) tunnels network control protocols, allowing the development of LAN-to-LAN services transparently.

Additional features such as **QinQ** and **VLAN-Translate** allow L2 traffic manipulation allowing ISPs to keep Private VLAN of clients and forwarding them in transparent mode across the metro networks.

Link aggregation is achived through **PortChannel** (IEEE 802.3AD) in a static or dynamic way by (**LACP** - Link Aggregation Control Protocol), allowing to increase bandwidth through logical links.

Traffic Load Balancing

Load-balancing modes are available to forward L2, L3 and MPLS traffic when multiple links are available between the source and destination.

For L2 Layer traffic, load balance modes based on MAC addresses are available and for L3 and L4 Layer traffic, load balance modes based on IP addresses and TCP/UDP ports are supported. For MPLS traffic the **Enhanced** and **Dynamic** modes can be used.

Enhanced mode checks each packet and performs the load balance by MAC, IP addressing, L4 Ports and MPLS labels. **Dynamic** mode analyzes the traffic load periodically of each link and tries to even out the distribution between each LAG member. The Enhanced and Dynamic modes can be used to balance the traffic of L2, L3, L4 layers and MPLS labels too.

ECMP (Equal-Cost Multi-Path) is available for OSPFv2 and OSPFv3 protocols. ECMP is based on parameters such as IP addresses, UDP/TCP Ports and VLAN to calculate the hash and forward the traffic between different links.

For more efficient balancing of MPLS traffic, **FAT** is available on L2VPNs, increasing the variability in MPLS traffic.

ROUTING IP

The DmOS platform allows the use of static routing or dynamic routing through protocols such as **BGP** and **OSPF**, in both IPv4 and IPv6 addressing. **VRRPv2** and **VRRPv3** are also supported and eliminate the single point of failure by providing one or more gateways to the network.

MPLS

DmOS supports the creation of **TE** and **non-TE MPLS** VPNs for different applications and topologies. The signaling of these VPN's is carried out through the **LDP** protocol. The transport of MPLS traffic can use the **LDP** protocol to create LSPs that follow the IGP, or the **RSVP** protocol that makes it possible to carry out Traffic Engineering according to the needs of each network.

For the transport of L2 services, VPNs of the **VPWS** and **VPLS** type are supported. These VPNs support point-to-point and multipoint **TLS** connections respectively.

For the transport of L3 services, VPNs of the **L3VPN** type are supported. The **VRF** and **MP-iBGP** functionalities enable the creation of the MPLS infrastructure that aims to provide connectivity for IP services through an MPLS network.

GPON

DmOS offers a complete GPON solution and unifies advanced functions of Ethernet networks and GPON networks into a single software platform. The ONUs configuration is performed remotely by the OLTs through the OMCI protocol according to ITU-T standards. Applications as **1:1, N:1** and **TLS** diversify possible GPON solutions with **Harpin Turn** available for TLS applications.

ONUs automatic provisioning through pre-defined profiles is available and is extremely useful in large-scale configurations. Protocols such as **PPPoE IA** and **DHCP** are supported, including the **provisioning ONU's FXS** ports to provide **VoIP** services.

QOS – QUALITY OF SERVICE

ACLs can be configured to classify packages by various match types, such as: DSCP, MAC, VLAN, Port, and IP.

WFQ and **SP** packet scheduling algorithms are available for packet prioritization with the possibility of performing **DSCP mapping to CoS**, as well as traffic limitation features such as **Traffic Shapper** and **Policer**.

SECURITY

DmOS uses administrator (admin), configuration (config), and audit (user) privilege levels for user registration, which can be done either locally through **Local Users** or through servers using the **RADIUS** and **TACACS+** protocols, allowing centrally user management. For access networks, **Storm Control** functionality is important and prevents Unicast, Multicast and Broadcast attacks on the network equipment interfaces.

ACLs are available to provide traffic flow control, restrict routing updates, CPU protection, decide which traffic types are routed or blocked, and, mainly, provide network security.

OAM

TWAMP and **CFM** protocols can be configured to monitor L3 and L2 networks performance ensuring end-to-end connectivity through multiple network equipment. **sFlow** is available to monitoring data traffic on network, as well as the LLDP protocol for discovering directly connected neighbors.

In order to guarantee the stable operation of the network, it is possible to configure the **EFM** (Ethernet in the First Mile - IEEE 802.3ah). This protocol aims to monitor the link status through OAMPDUs notifications. Upon detecting an event on an interface, EFM blocks that interface and sends a notification to assist network administrators.

TRAFFIC ANALYSIS

DmOS software platform has the infrastructure to allow the user to monitor the traffic sent or received by the equipment. The CLI presents transmission and reception rate of packets that are in an interface at that moment. It is also possible to perform traffic mirroring for troubleshooting issues through the **Port Mirror** functionality, as well as basic traffic-type statistics commands such as Unicast, Multicast and Broadcast per interface.

DmOS allows L2 flows loop through the **Traffic Loop** functionality to meet RFC2544 tests or other traffic testing to validate the circuit delivery to the client.

Task Programming

It is possible to schedule tasks such as copies of configuration backup, firmware update and more through **Assistant-Task** functionality.

Fault Monitoring

Alarms to indicate faults in the equipment or in the network are available, mainly related to hardware devices such as CPU, Memory, FANs and PSUs.

For troubleshooting, in addition to standard protocol commands it is possible to use **Ping** and **Traceroute** tools and a complete report of the equipment through **show tech-support**.

SUPPORTED PROTOCOLS AND STANDARDS

MANAGEMENT AND SERVICES

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
DATABASE	File handling (load, copy, save) by TFTP/SCP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Support for configuration commit/rollback operations	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Remote reboot	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Device Inventory	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Banner	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DHCP	DHCP IPv4 L3-Relay (Interface-L3)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
MIBs	IETF - RFC1213 - Management Information Base for Network Management of TCP/IP-based internets: MIB-II (Obsoletes RFC 1158)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6933 - Entity MIB (Version 4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	DmOS-EAPS – DATACOM Proprietary MIB	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	DmOS-ERPS – DATACOM Proprietary MIB	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
NETCONF YANGs	IETF - RFC4742 - Using the NETCONF Configuration Protocol over SSH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC5277 - NETCONF Event Notifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC5717 - Partial Lock Remote Procedure Call (RPC) for NETCONF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6020 - YANG - A Data Modeling Language for the Network Configuration Protocol (NET-CONF)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6021 - Common YANG Data Types	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6022 - YANG Module for NETCONF Monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6241 - Network Configuration Protocol (NETCONF) (Obsoletes RFC 4741)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6242 - Using the NETCONF Configuration Protocol over Secure Shell (SSH)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6243 - With-defaults capability for NETCONF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6470 - NETCONF Base Notifications	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6536 - NETCONF Access Control Model	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC6991 - Common YANG Data Types (Obsoletes RFC 6021)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OUT-OF-BAND IN-BAND	Device Management through IPv4 address	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Out-of-Band Management (Management port)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	In-band management (Ethernet ports)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Management traffic segmentation using a dedicated VLAN	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SYSLOG	Syslog - Local	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Syslog IPv4 – Remote	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

MANAGEMENT AND SERVICES (continued from previous page)

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
TELNET	Telnet Client (IPv4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Telnet Server for CLI access (IPv4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC854 - TELNET Protocol Specification	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TFTP	TFTP Client (IPv4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC783 - The TFTP Protocol (Revision 2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LOCAL USERS	Local user accounts with privilege levels	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SCRIPTING	Batch actions (assistance task)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SNMP	Interface Index (ifIndex) Persistence (SNMP)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Internal equipment temperatures available in SNMP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC1157 - A Simple Network Management Protocol (SNMPv1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC1215 - A Convention for Defining Traps for use with the SNMP - TRAPS MIB	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC1441 - Introduction to version 2 of the Internet-standard Network Management Framework (SNMPv2)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC1901 to RFC1908 - SNMPv2c	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC3410 to RFC3418 - SNMPv3 agent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VLAN traffic monitoring by SNMP	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
SOFTWARE MANAGEMENT	Firmware (FW) Update by HTTP, TFTP, SCP (IPv4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Firmware rollback	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SNTP	IETF - RFC2030 - Simple Network Time Protocol (SNTP) Version 4 for IPv4, IPv6 and OSI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
FEATURE LICENSING	Support for a licensing mechanism to enable/disable groups of features	✓	-	-	-	-	✓	✓	✓	✓	✓
LINE CARD	Line Card Provisioning	-	-	✓	-	-	-	-	-	-	-

INTERFACES, MONITORING AND TRAFFIC ANALYSIS

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
ETHERNET INTERFACES	Transceivers Digital Diagnostics (SFF-8472)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IEEE - 802.3x - Flow Control (Pause Frames)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Configurable MTU per Ethernet port	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Link Flap Detection	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Backup Link	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
ALARMS	Alarm for CPU overload	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Alarm for low memory available	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Alarm for PSU Unsupported	-	-	-	-	-	-	-	-	✓	-
	Alarm for Line Card	-	-	✓	-	-	-	-	-	-	-
PING	IETF - RFC792 - Internet Control Message Protocol (ICMP) (Ping IPv4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC4443 - Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification (Ping IPv6) (obsoletes RFC2463 and RFC1885)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PORT MIRROR	Port traffic mirroring	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
STATISTICS COUNTERS	Packet counters for ETH Interfaces (egres/ingress mode) – User Config	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Packet counters per VLANs	✓	-	-	✓	✓	✓	✓	✓	✓	✓
	Show interface statistics per interface	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SYSTEM MONITORING	CPU usage available for user consulting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	System Memory usage available for user consulting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CPU usage and system memory available in SNMP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Support for Up Time reporting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Dying gasp	-	-	-	-	-	✓	-	-	-	-
HARDWARE MONITORING	PSU Monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	FAN monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Temperature monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TRACEROUTE	Traceroute IPv4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Traceroute IPv6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TRAFFIC LOOP	L2 Traffic Loop	✓	✓	-	✓	✓	✓	-	✓	-	-
TRAFFIC MONITORING	Show interfaces table utilization bandwidth	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Sniffer tcpdump – CPU packets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

INTERFACES, MONITORING AND TRAFFIC ANALYSIS

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
DEBUG	Debugging	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
sFlow	IETF - RFC3176 - InMon Corporation's sFlow: A Method for Monitoring Traffic in Switched and Routed Networks (SFLOW)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓

OAM - OPERATION, ADMINISTRATION AND MANAGEMENT

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
CFM	IEEE - 802.1ag - Connectivity Fault Management (CFM) - Continuity Check Protocol	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IEEE - 802.1ag - Connectivity Fault Management (CFM) - Linktrace Protocol	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IEEE - 802.1ag - Connectivity Fault Management (CFM) - Loopback Protocol	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
TWAMP	IETF - RFC5357 - A Two-Way Active Measurement Protocol - TWAMP Session-Reflector and Server (Responder)	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC5357 - A Two-Way Active Measurement Protocol - TWAMP Session-Sender and Control-Client (Controller)	-	-	-	✓	✓	✓	✓	✓	✓	✓
EFM	IEEE - 802.3ah - Link Monitoring (EFM)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
LLDP	IEEE - 802.1AB - LLDP (Link Layer Discovery Protocol)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
LOOPBACK DETECTION	Loopback Detection	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
Y.1731	ITU-T - Y.1731 - Fault Management - Ethernet alarm indication signal (ETH-AIS)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	ITU-T - Y.1731 - Fault Management - Ethernet continuity check (ETH-CC)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	ITU-T - Y.1731 - Performance Monitoring - Frame delay measurement (ETH-DM)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
BFD	BFD for OSPF IPv4	-	-	-	✓	✓	✓	✓	✓	✓	✓
RDM	RDM - Remote Devices Management (only client mode)	-	-	-	-	-	✓	-	-	-	-

SWITCHING

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
AGING TIME	Configurable global MAC table aging time	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EAPS	IETF - RFC3619 - EAPS	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
ERPS	ITU-T - G.8032v2 - Ethernet ring protection switching (ERPS)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
L2CP	L2CP - Layer 2 Protocol Tunneling Protocols	-	-	-	✓	✓	✓	✓	✓	✓	✓
	BPDU transparency for ethernet ports	-	-	-	✓	✓	✓	✓	✓	✓	✓
	L2CP - Layer 2 Protocol Tunneling (cisco mode)	-	-	-	✓	✓	✓	✓	✓	✓	✓
LAG Port-Channel	Link Aggregation - LAG / Port channel (IEEE 802.1AX/802.3ad)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Support for LACP on Link Aggregations (IEEE 802.1AX/802.3ad)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Link Aggregation - OID SNMP for LAG counters	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Port Channel load balancing: Dynamic (Flows)	-	-	-	-	-	-	✓	✓	✓	✓
	Port Channel load balancing: Enhanced (MPLS, IP, MAC and Ports)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Port Channel load balancing: Source IP and Destination IP (IP and TCP/UDP Ports)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Port Channel load balancing: Source MAC and Destination MAC (MAC, VLAN and Ethertype)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Port Channel load balancing: Source IP (IP and TCP/UDP Ports)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Port Channel load balancing: Source MAC (MAC, VLAN and Ethertype)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Port Channel load balancing: Destination IP (IP and TCP/UDP Ports)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Port Channel load balancing: Destination MAC (MAC, VLAN and Ethertype)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
QinQ	IEEE - 802.1ad - Double Tagging (Q-in-Q)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Selective Q-in-Q	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
VLAN	IEEE - 802.1D - MAC bridges	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IEEE - 802.1Q - Virtual Bridged LAN (VLAN)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VLAN Dual-Mode – Receive/Ttransmit both tagged/untagged traffic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Native VLAN	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Port-based VLAN (with port overlap)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	VLAN translate	✓	-	-	✓	✓	✓	✓	✓	✓	✓
	TPID on interface	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	PCP on vlan-mapping	✓	✓	-	✓	✓	✓	✓	✓	✓	✓

SWITCHING (continued from previous page)

Group	Feature	OLTs			SWITCHES						
		DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
xSTP	IEEE - 802.1D - Spanning Tree Protocol (STP)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IEEE - 802.1w - Rapid Spanning Tree Protocol (RSTP)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IEEE - 802.1s - Multiple Spanning Tree Protocol (MSTP)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	xSTP - BPDU Guard	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	xSTP - Root Guard/Restricted Role	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
MAC	MAC Learning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	MAC Learning per port (enable / disable)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	MAC Address Limit per VLAN	✓	✓	-	✓	✓	✓	-	✓	-	-

ROUTING

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
BGP	IETF - RFC2385 - Protection of BGP Sessions via the TCP MD5 Signature Option	-	-	-	✓	✓	✓	✓	✓	✓	✓
	BGP IP Prefix Lists	-	-	-	✓	✓	✓	✓	✓	✓	✓
	BGP Route Map	-	-	-	✓	✓	✓	✓	✓	✓	✓
	BGP Community Route Map	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2918 - Route Refresh Capability for BGP-4	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC4456 - BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP) (obsoletes RFC1966 and RFC2796)	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC4271 - A Border Gateway Protocol 4 (BGP-4) (obsoletes RFC1771)	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC1997 - BGP Communities Attribute - IPv4/IPv6	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC4893 - BGP Support for Four-octet AS Number Space	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2545 - Use of BGP-4 Multiprotocol Extensions for IPv6 Inter-Domain Routing	-	-	-	✓	✓	✓	✓	✓	✓	✓
IP SERVICES	IP Routing: IPv4/IPv6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC826 - An Ethernet Address Resolution Protocol (ARP)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC894 - A Standard for the Transmission of IP Datagrams over Ethernet Networks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC3021 - Using 31-Bit Prefixes on IPv4 Point-to-Point Links	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC1700 - ASSIGNED NUMBERS	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC4632 - Classless Inter-domainRouting (CIDR): The Internet Address Assignment and Aggregation Plan	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC791 - Internet Protocol (IP)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC4291 - IP Version 6 Addressing Architecture (obsoletes RFC3513 e RFC2373)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2460 - Internet Protocol, Version 6 (IPv6) Specification (obsoletes RFC1883)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2464 - Transmission of IPv6 packets over Ethernet networks (obsoletes RFC1972)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC5396 - Textual Representation of Autonomous System (AS) Numbers	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC793 - Transmission Control Protocol (TCP)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Wirespeed L3 routing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Routes redistribution between L3 protocols	-	-	-	✓	✓	✓	✓	✓	✓	✓

ROUTING (continued from previous page)

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
IP SERVICES	ECMP - Equal-Cost Multi-Path (only for OSPF)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Secondary IPv4 addresses	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC4861 - Neighbor Discovery for IP version 6 (IPv6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC4862 - IPv6 Stateless Address Autoconfguration	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC 3587 - IPv6 Global Unicast Address Format	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC 3246 - An Expedited Forwarding PHB (Per-Hop Behavior)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC 2597 - Assured Forwarding PHB Group	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
OSPF	IETF - RFC2328 - OSPF Version 2 (obsoletes RFC2178, RC1583, RFC1247 e RFC1131)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	MD5 Authentication for OSPFv2 (RFC2328 - Apendix D)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC5340 - OSPF for IPv6 - OSPFv3 (obsoletes RFC2740)	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC5250 - The OSPF Opaque LSA Option (obsoletes RFC2370)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC3101 - The OSPF Not-So-Stubby Area (NSSA) Option (obsoletes RFC1587)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	OSPF Prefix Lists Filter	-	-	✓	✓	✓	✓	✓	✓	✓	✓
STATIC ROUTING	Static Routing IPv4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Static Routing IPv6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VLAN ROUTING	Routing between VLANs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Configurable L3 MTU per VLAN	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VRRP	IETF - RFC3768 - Virtual Router Redundancy Protocol (VRRPv2) (obsoletes RFC2338)	-	-	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC5798 - Virtual Router Redundancy Protocol (VRRP) Version 3 for IPv4 and IPv6	-	-	-	✓	✓	✓	✓	✓	✓	✓
VRF	VRF-Lite (Virtual Routing Forwarding) IPv4/IPv6	-	-	-	-	✓	✓	✓	✓	✓	✓
PBR	Policy Based Routing IPv4 (PBR IPv4)	✓	-	-	✓	✓	-	✓	✓	✓	✓

MPLS

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
L2VPN	IETF - RFC4447 and RFC4448 - VPWS Virtual Pseudo Wire Service using LDP	ML	-	-	-	-	ML	ML	ML	ML	ML
	VPWS with Backup PW (only for LDP)	ML	-	-	-	-	ML	ML	ML	ML	ML
	VPWS in GPON Serviceport	ML	-	-	-	-	-	-	-	-	-
	VPLS in GPON Service-port	ML	-	-	-	-	-	-	-	-	-
	IETF - RFC4762 - VPLS Virtual Private LAN Service using LDP	ML	-	-	-	-	ML	ML	ML	ML	ML
	VPLS TLS (Transparent LAN Service)	ML	-	-	-	-	ML	ML	ML	ML	ML
	VPLS MAC Limit Tunning	ML	-	-	-	-	ML	ML	ML	ML	ML
	IETF - RFC6391 - Flow-Aware Transport of Pseudowires over an MPLS Packet Switched Network	-	-	-	-	-	ML	ML	ML	ML	ML
	Selective QinQ for VPWS and VPLS	ML	-	-	-	-	ML	ML	ML	ML	ML
	Selective Encapsulation for VPWS and VPLS – Untagged Traffic	ML	-	-	-	-	ML	ML	ML	ML	ML
L3VPN	IETF - RFC4364 - BGP/MPLS IP Virtual Private Networks (VPNs) (obsoletes RFC2547)	-	-	-	-	-	ML	ML	ML	ML	ML
	IPv6 VPN Provider Edge over MPLS (6VPE)	-	-	-	-	-	ML	ML	ML	ML	ML
LDP	IETF - RFC5036 - LDP Specification (obsoletes RFC3036)	ML	-	-	-	-	ML	ML	ML	ML	ML
	MD5 authentications for LDP sessions (reference to RFC5036)	ML	-	-	-	-	ML	ML	ML	ML	ML
RSVP	RFC 2205 - Resource ReSerVation Protocol (RSVP)	-	-	-	-	-	ML	ML	ML	ML	ML

MULTICAST

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
IGMP	IGMPv2 snooping (without Querier mode)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IGMPv3 snooping (without Querier mode)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IGMP snooping with proxy report	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IGMP Quick Leave function (zapping time lower than 1 second)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC1112 - Host Extensions for IP Multicasting - IGMPv1 Snooping	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2236 - Internet Group Management Protocol, Version 2 - IGMPv2	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC3376 - Internet Group Management Protocol, Version 3 - IGMPv3	✓	✓	-	✓	✓	✓	✓	✓	✓	✓

QoS – QUALITY OF SERVICE

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
CLASSIFICATION	Traffic Classes (8 active priorities)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Packet QoS classification by IEEE 802.1p P-bit (PCP)										
	Packet QoS classification by IP Precedence (DSCP)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Packet QoS classification by Source/Destination MAC	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Packet QoS classification by VLAN ID	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Packet QoS classification by Source Ethernet Port	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Packet QoS classification by ACL filter action	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Packet QoS classification by Source/Destination IP	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Packet QoS classification by IP Precedence (DSCP) - IPv6	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Packet QoS classification by MPLS EXP	✓	✓	-	-	-	✓	✓	✓	✓	✓
REMARKING AND MAPPING	IETF - RFC2474 - Definition of the Differentiated Services Field (DS Field) in the IPv4 Headers (DSCP Remarking for IPv4)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	P-bit (PCP) marking (IEEE 802.1p) according to the following criteria: VLAN TPID, Ethertype, Port and P-bit	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2697 - A Single Rate Three Color Marker	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2698 - A Two Rate Three Color Marker	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	DSCP to COS mapping	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2475 - An Architecture for Differentiated Services	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
SCHEDULERS	QoS Packet Scheduler - Strict Priority (SP) / Low Latency Queueing (LLQ)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	QoS Packet Scheduler - Weighted Fair Queue (WFQ)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
TRAFFIC POLICING	Policing by vlan and PCP	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Policing by inner vlan	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Policing by DSCP	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	hQoS – Hierarchical Policers/meters QoS (only for ingress mode)	✓	✓	-	✓	✓	✓	-	-	-	-
	Counters for policers	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
TRAFFIC SHAPING	Rate Limit on Egress Interface	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Rate Limit on Ingress Interface	✓	✓	-	✓	✓	✓	-	✓	-	-

SECURITY

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
ACLs	IPv4 Access list - Manually configured	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	ACL Match	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	ACL – Actions: Deny, Permit and Set	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	ACL – Match Layer2 (MAC address, Ethertype, PCP, VLAN, inner PCP and inner VLAN)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	ACL – Match Layer3 (IPv4/IPv6 addresses, IP Protocol, DSCP, ToS, TCP/UDP Port, PCP, VLAN, inner PCP and inner VLAN)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
CPU-DOS-PROTECTION	CPU DoS Protection - Multiple CPU queues	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	CPU DoS Protection - Global Rate-limit	✓	✓	-	-	-	✓	✓	✓	✓	✓
	CPU DoS Protection - Rate limit for Protocols	✓	✓	-	-	-	✓	✓	✓	✓	✓
IP SPOOFING	IP spoofing protection mechanisms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PASSWORD RECOVERY	Root password recovery	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
PORT SECURITY	MAC Address Limit per Port (Port Security Lite)	✓	✓	-	✓	✓	✓	-	✓	-	-
RADIUS	CLI access authentication throught RADIUS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2865 - Remote Authentication Dial In User Service (RADIUS) (obsoletes RFC 2138)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - RFC2866 - RADIUS Accounting (obsoletes RFC2139)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SSH	SSHv2 Server for CLI access	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SSHv2 Client	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STORM-CONTROL	Storm Control protection for Unicast, Broadcast e Multicast	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
TACACS+	IETF - draft-grant-tacacs-02 - The TACACS+ Protocol - Authentication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - draft-grant-tacacs-02 - The TACACS+ Protocol - Authorization	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	IETF - draft-grant-tacacs-02 - The TACACS+ Protocol - Accounting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

VRF - PROTOCOLS AND SERVICES SUPPORTED

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
SERVICES	Out-of-Band Management (Management port)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	In-band management (Ethernet ports)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	DHCP IPv4 L3-Relay (Interface-L3)	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	Firmware (FW) Update by HTTP, TFTP, SCP (IPv4)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Syslog IPv4 – Remote	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SNMPv2/v3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SNTP - Simple Network Time Protocol for IPv4 and IPv6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
OAM	TWAMP Sender and Reflector	-	-	-	✓	✓	✓	✓	✓	✓	✓
L3 PROTOCOLS	Static IP Routing – IPv4 and IPv6	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	OSPF – only IPv4	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
	BGP – IPv4 and IPv6	-	-	-	✓	✓	✓	✓	✓	✓	✓
SECURITY	TACACS+ (IPv4) – Authentication, Authorization and Accounting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	RADIUS (IPv6) – Authentication, Authorization and Accounting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SSHv2 Client andServer (IPv4/IPv6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TRAFFIC ANALYSIS	Ping IPv4/IPv6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Traceroute IPv4/IPv6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

GPON

		OLTs			SWITCHES						
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
GPON BANDWIDTH CONTROL	Bandwidth control status	✓	✓	✓	-	-	-	-	-	-	-
	DBA (dynamic bandwidth allocation) por NSR (Non-Status Reporting)	✓	✓	✓	-	-	-	-	-	-	-
	DBA (dynamic bandwidth allocation) using SR (Status Reporting)	✓	✓	✓	-	-	-	-	-	-	-
	SBA (static bandwidth allocation)	✓	✓	✓	-	-	-	-	-	-	-
GPON INTERFACES	AES (advanced encryption standard) 128 bits - dowstream	✓	✓	✓	-	-	-	-	-	-	-
	FEC (forward error correction) – downstream and upstream	✓	✓	✓	-	-	-	-	-	-	-
	GPON Laser Class B+	✓	✓	✓	-	-	-	-	-	-	-
	GPON Laser Class C+	✓	✓	✓	-	-	-	-	-	-	-
	GPON maximum reach of 60 Km	✓	✓	✓	-	-	-	-	-	-	-
GPON MONITORING	Alarms - comply with ITU-T G.984.3 (chapter 11)	✓	✓	✓	-	-	-	-	-	-	-
	GPON link monitoring comply with ITU-T G.984.2 Amd 2	✓	✓	✓	-	-	-	-	-	-	-
	GPON Performance available for user consulting (packet counters)	✓	✓	✓	-	-	-	-	-	-	-
	GEM Port Performance available for user consulting (packet counters)	✓	✓	✓	-	-	-	-	-	-	-
	GEM Port Performance monitoring available in SNMP	✓	✓	✓	-	-	-	-	-	-	-
	ONU Ethernet UNI available for user consulting (packet counters)	✓	✓	✓	-	-	-	-	-	-	-
	ONU information colletion available in SNMP	✓	✓	✓	-	-	-	-	-	-	-
	RSSI information (power level of ONU received at OLT)	✓	✓	✓	-	-	-	-	-	-	-
GPON SERVICES	BPDU transparency for GPON	✓	✓	✓	-	-	-	-	-	-	-
	DHCP IPv4 L2-Relay (VLAN)	✓	✓	✓	-	-	-	-	-	-	-
	DHCP IPv6 L2-Relay (VLAN)	✓	✓	✓	-	-	-	-	-	-	-
	DHCP IPv4 L2-Relay (VLAN) - Agent information (option 82)	✓	✓	✓	-	-	-	-	-	-	-
	PPPoE IA - Intermediate Agent	✓	✓	✓	-	-	-	-	-	-	-
	PPPoE IA – Circuit-ID configurable	✓	✓	✓	-	-	-	-	-	-	-
	IETF - RFC2516 - A Method for Transmitting PPP Over Ethernet (PPPoE)	✓	✓	✓	-	-	-	-	-	-	-
	GPON User isolation (N:1)	✓	✓	✓	-	-	-	-	-	-	-
	Hairpin turn (TLS)	✓	✓	✓	-	-	-	-	-	-	-
	Service-port - VLAN translate (GEM Port)	✓	✓	✓	-	-	-	-	-	-	-
	VEIP - Virtual Ethernet Interface Point	✓	✓	✓	-	-	-	-	-	-	-
GPON STANDARDS	Broadband Forum: TR-156 Using GPON Access in the context of TR101	✓	✓	✓	-	-	-	-	-	-	-
	Broadband Forum: TR-167 - GPON-fed TR-101 Ethernet Access Node	✓	✓	✓	-	-	-	-	-	-	-
	Broadband Forum: TR-255 - GPON Interoperability Test Plan	✓	✓	✓	-	-	-	-	-	-	-
	ITU-T - G.984.1 - Gigabit-capable Passive Optical Networks (GPON): General characteristics	✓	✓	✓	-	-	-	-	-	-	-

GPON (continued from previous page)

Group	Feature	OLTs			SWITCHES						
		DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
GPON STANDARDS	ITU-T - G.984.2 - Gigabit-capable Passive Optical Networks (GPON): Physical Media Dependent (PMD) layer specification	✓	✓	✓	-	-	-	-	-	-	-
	ITU-T - G.984.2 Amendment 1 - G-PON Physical Media Dependent (PMD) layer specification Amendment 1	✓	✓	✓	-	-	-	-	-	-	-
	ITU-T - G.984.3 - Gigabit-capable Passive Optical Networks (G-PON): Transmission convergence layer specification	✓	✓	✓	-	-	-	-	-	-	-
	ITU-T - G.984.4 - Gigabit-capable Passive Optical Networks (G-PON): ONT management and control interface specification	✓	✓	✓	-	-	-	-	-	-	-
	ITU-T - G.984.4 and G.988 - ONU management and control interface (OMCI) specification	✓	✓	✓	-	-	-	-	-	-	-
	ITU-T - G.984.7 - Gigabit-capable passive optical networks (GPON): Long reach	✓	✓	✓	-	-	-	-	-	-	-
ONU	GEM Port mapping	✓	✓	✓	-	-	-	-	-	-	-
	GPON Profile-based ONU configuration	✓	✓	✓	-	-	-	-	-	-	-
	MAC addresses limit configurable per port in ONU	✓	✓	✓	-	-	-	-	-	-	-
	ONU DHCP (configurable)	✓	✓	✓	-	-	-	-	-	-	-
	ONU Ethernet Ports attributes settings (negotiation, speed and duplex)	✓	✓	✓	-	-	-	-	-	-	-
	ONU Firmware upgrade	✓	✓	✓	-	-	-	-	-	-	-
	ONU GEM Port rate control	✓	✓	✓	-	-	-	-	-	-	-
	ONU in-band management over PON Link (IPHOST)	✓	✓	✓	-	-	-	-	-	-	-
	ONU native VLAN port configuration for Ethernet interfaces	✓	✓	✓	-	-	-	-	-	-	-
	ONU Residential gateway (RG-Profile)	✓	✓	✓	-	-	-	-	-	-	-
	ONU Static IPv4 and default gateway (configurable)	✓	✓	✓	-	-	-	-	-	-	-
	ONU VLAN mapping (VLAN translate)	✓	✓	✓	-	-	-	-	-	-	-
	Rogue ONU Isolation	✓	✓	✓	-	-	-	-	-	-	-
	Third-Party ONU Interoperability	✓	✓	✓	-	-	-	-	-	-	-
	ONU distance information	✓	✓	✓	-	-	-	-	-	-	-
ONU ACTIVATION	Automatic ONU discovery	✓	✓	✓	-	-	-	-	-	-	-
	ONU activation using password	✓	✓	✓	-	-	-	-	-	-	-
	ONU activation using serial number	✓	✓	✓	-	-	-	-	-	-	-
	ONU activation using serial number and password	✓	✓	✓	-	-	-	-	-	-	-

GPON (continued from previous page)

Group	Feature	OLTs			SWITCHES						
		DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270	DM4770
ONU ACTIVATION	ONU automatic provisioning	✓	✓	✓	-	-	-	-	-	-	-
	ONU Pre-Provisioning	✓	✓	✓	-	-	-	-	-	-	-
	Provisioning ONU FXS ports (VoIP/SIP)	✓	✓	✓	-	-	-	-	-	-	-
	Support T-CONT types 1, 2, 3, 4 and 5	✓	✓	✓	-	-	-	-	-	-	-

Legend	
✓	Supported
-	Not supported
ML	Supports through MPLS license separately purchased, except model DM4360 which already contains the MPLS functionality included in the product

The platform **DM4610 OLT 8GPON+8GX+4GT+2XS** (P/N 800.5081.xx) has as LTS release (Long-Term Support) the **DmOS 5.0**. Therefore, to consult the features for this platform check the DmOS 5.0 Datasheet.

Protocols Scalability Supported by Platform

PLATAFORMS SCALABILITY		OLTs			SWITCHES							
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270 24XS	DM4270 48XS	DM4770
SECURITY	Maximum number of ACL filters	767	767	-	320	1088	767	1023	1279	1023	1023	1023
	Maximum number of ACL filters (L2 matches)	256	256	-	128	512	256	256	512	256	256	256
	Maximum number of ACL filters (L3 matches)	256	256	-	128	512	256	256	512	256	256	256
	Maximum number of ACL filters (CPU protection)	255	255	-	64	64	255	511	255	511	511	511
	Maximum number of IP Spoofing Protection rules	1024	256	24576	-	-	-	-	-	-	-	-
QoS	Maximum number of WFQ scheduling profile	500	500	-	500	500	500	500	500	500	500	500
	Maximum number of ONU GEM Port Rate Control profiles	1024	1024	1024	-	-	-	-	-	-	-	-
	Maximum number of QoS policer ingress instances	256	256	-	256	256	256	512	256	512	768	768
	Maximum number of QoS policer egress instances	128	128	-	128	256	128	256	256	256	256	256
MANAGEMENT	Maximum number of remote Syslog servers	6	6	6	6	6	6	6	6	6	6	6
	Maximum storage quantity of logs [MBytes]	10	10	10	10	10	10	10	10	10	10	10
	Maximum number of rollback configurations	64	64	64	64	64	64	64	64	64	64	64
	Number of Firmware (FW) images stored in memory (Flash)	2	2	2	2	2	2	2	2	2	2	2
SERVICES	Maximum number of RADIUS servers	1	1	1	1	1	1	1	1	1	1	1
	Maximum number of TACACS servers	5	5	5	5	5	5	5	5	5	5	5
	Maximum number of local users registered	32	32	32	32	32	32	32	32	32	32	32
	Maximum number of TELNET sessions	16	16	16	16	16	16	16	16	16	16	16
	Maximum number of SSH sessions	16	16	16	16	16	16	16	16	16	16	16
	Maximum number of CLI sessions	64	64	64	64	64	64	64	64	64	64	64
	Maximum number of SNMP sessions	64	64	64	64	64	64	64	64	64	64	64
	Maximum number of NETCONF sessions	64	64	64	64	64	64	64	64	64	64	64
	Maximum number of VLANs with enabled DHCP	234	234	234	234	234	234	234	234	234	234	234
	Maximum number of DHCP sessions	2048	2048	24576	1024	1024	1024	1024	1024	1024	1024	1024
	Maximum number of DHCP sessions with filter-by-mac	2048	2048	-	-	-	-	-	-	-	-	-
	Maximum number of DHCP sessions with filter-by-ip	1024	256	-	-	-	-	-	-	-	-	-
	Maximum number of PPPoE sessions	8192	8192	24576	-	-	-	-	-	-	-	-

PLATAFORMS SCALABILITY (continued from previous page)

		OLTs			SWITCHES							
Group	Feature	DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270 24XS	DM4270 48XS	DM4770
MONITORING	Maximum number of TWAMP Controller connections[1]	-	-	-	10	10	10	10	10	10	10	10
	Maximum number of TWAMP Controller test sessions[1]	-	-	-	10	10	10	10	10	10	10	10
	Maximum number of TWAMP Responder simultaneous test sessions[1]	-	-	-	10	10	10	10	10	256	256	256
	Maximum number of TWAMP Responder test sessions[1]	-	-	-	48	48	48	48	48	1024	1024	1024
SWITCHING	Maximum size of Ethernet frame - MTU [Bytes]	16361	12266	-	16338	16338	12266	12262	16338	12262	9390	9390
	MAC Learning Table	64000	32000	-	16000	32000	32000	112000	32000	112000	288000	288000
	Maximum number of RSTP instances	1	1	-	1	1	1	1	1	1	1	1
	Maximum number of MSTP instances	64	64	-	64	64	64	64	64	64	64	64
	Maximum number of EAPS instances	64	64	-	64	64	64	64	64	64	64	64
	Maximum number of ERPS instances	64	64	-	64	64	64	64	64	64	64	64
	Maximum number of VLANs	4094	4094	4094	4094	4094	4094	4094	4094	4094	4094	4094
	Maximum number of VLAN Mapping rules - ingress	4000	-	-	2000	4000	4000	3000	4000	3000	3000	3000
	Maximum number of VLAN Mapping rules - egress	4000	-	-	2000	2000	4000	3000	4000	3000	3000	3000
	Maximum number of addresses that can be limited by the MAC table (per interface or per VLAN)	16000	16000	-	16000	16000	16000	-	16000	-	-	-
	Maximum number of aggregation interfaces - LAG	8	8	8	32	32	8	32	32	32	32	32
	Maximum number of physical interfaces per aggregation interface - LAG	8	4	8	8	8	4	16	16	16	16	16
	Maximum number of VLANs in MA x MEPs	41	32	-	64	128	64	128	128	128	128	128
MULTICAST	Maximum number of Multicast groups	4092	224	-	1022	4096	224	8190	8190	8190	8190	8190
	Number of VLANs with IGMP Snooping configured	8	8	-	8	8	8	8	8	8	8	8
	Maximum number of interfaces per IGMP instance	1024	1024	-	30	30	12	30	30	30	30	30
BFD	Maximum number of BFD sessions	-	-	-	-	-	32	32	32	32	32	32

PLATAFORMS SCALABILITY (continued from previous page)

Group	Feature	OLTs			SWITCHES							
		DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270 24XS	DM4270 48XS	DM4770
ROUTING	Maximum size of L3 Interface packet – MTU [Bytes]	9198	9198	9198	9198	9198	9198	9198	9198	9198	9198	9198
	Maximum number of routable VLANs	256	256	256	256	256	256	256	256	256	256	256
	Maximum number of IPv4 hosts	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
	Maximum number of IPv6 hosts	1000	1000	-	1000	1000	1000	1000	1000	1000	1000	1000
	Maximum number of IPv4 static routes[2]	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
	Maximum number of IPv6 static routes[2]	500	500	-	500	500	500	500	500	500	500	500
	Maximum number of IPv4 routes[3] – Route Table	28672	1024	28672	1024	16384	1024	128000	32000	128000	168000	168000
	Maximum number of IPv6 routes (/64 and /128)[3] – Route Table	512	512 + 256	-	512 + 256	8192 + 512	512 + 256	32000 + 4000	12000 + 2000	32000 + 4000	42000 + 10000	42000 + 10000
	Maximum number of OSPF adjacencies[4]	32	32	32	32	32	32	32	32	32	32	128
	Maximum number of OSPF areas	32	32	32	32	32	32	32	32	32	32	32
	Maximum number of BGP neighbors	-	-	-	64	64	128	256	256	256	256	256
	Maximum configurable VRFs	-	-	-	-	222	122	222	222	222	222	222
	Maximum number of VRRP groups	-	-	-	32	32	32	32	32	32	32	32
MPLS	Maximum number of LDP Link Sessions	32	-	-	-	-	8	32	32	32	32	32
	Maximum number of LDP Targeted Sessions	256	-	-	-	-	32	256	256	256	256	256
	Maximum number of LSPs [5] (*shared:* LDP + RSVP)	700	-	-	-	-	512	700	700	700	700	700
	Maximum number of L2VPN[6]	256	-	-	-	-	256	256	256	1024	1024	1024
	Maximum number of L2VPN - VPWS[7]	256	-	-	-	-	256	256	256	1024	1024	1024
	Maximum number of L2VPN - VPWS Port Based	8	-	-	-	-	8	12	24	24	48	32
	Maximum number of L2VPN - VPWS VLAN Based	256	-	-	-	-	256	256	256	1024	1024	1024
	Maximum number of L2VPN - VPLS[7]	256	-	-	-	-	32	256	256	1024	1024	1024
	Maximum number of L2VPN - VPLS Port-Based	8	-	-	-	-	8	12	24	24	48	32
	Maximum number of L2VPN - VPLS VLAN Based	256	-	-	-	-	32	256	256	1024	1024	1024
	Maximum number of MACs in L2VPN - VPLS	32000	-	-	-	-	32000	112000	32000	112000	288000	288000
	Maximum number of access interfaces in a L2VPN - VPLS	8	-	-	-	-	16	16	16	16	16	16
	Maximum number of service-ports in a L2VPN - VPLS	1040	-	-	-	-	-	-	-	-	-	-
	Maximum number of PWs[8]	1024	-	-	-	-	736[9]	1024	1024	1024	1024	1024
	Maximum number of RSVP tunnels	-	-	-	-	-	32	32	32	32	32	32
	Maximum number of MPLS TE path options	-	-	-	-	-	32	32	32	32	32	32
	Maximum number of path options per RSVP tunnel	-	-	-	-	-	6	6	6	6	6	6

PLATAFORMS SCALABILITY (continued from previous page)

Group	Feature	OLTs			SWITCHES							
		DM4610 DM4615	DM4611 DM4612	DM4618	DM4050	DM4250	DM4360 DM4370	DM4380	DM4170	DM4270 24XS	DM4270 48XS	DM4770
GPON	Maximum number of VLANs using N:1, 1:1 and TLS services	1024	1024	1024	-	-	-	-	-	-	-	-
	Maximum number of Service VLANs (N:1) with GPON Flood Traffic Blocking	1024	1024	-	-	-	-	-	-	-	-	-
	Maximum size of GPON frame - MTU [Bytes]	2000	2000	2000	-	-	-	-	-	-	-	-
	Maximum number of ONUs per PON link	128	128	128	-	-	-	-	-	-	-	-
	Maximum number of T-CONTs per PON Link	768	768	768	-	-	-	-	-	-	-	-
	Maximum number of T-CONTs per ONU	6	6	6	-	-	-	-	-	-	-	-
	Maximum number of T-CONTs per ONU (traffic type 1)	3	3	3	-	-	-	-	-	-	-	-
	Maximum number of T-CONTs per ONU (traffic type 2 to 5)	4	4	4	-	-	-	-	-	-	-	-
	Maximum number of GEM Port per PON link	2048	2048	2048	-	-	-	-	-	-	-	-
	Maximum number of GEM Port per ONU	16	16	16	-	-	-	-	-	-	-	-
	Maximum number of VEIP interfaces per ONU	1	1	1	-	-	-	-	-	-	-	-
	Maximum number of configurable MAC limit per ONU	255	255	255	-	-	-	-	-	-	-	-
	Maximum number of Service Ports	4096	4096	32768	-	-	-	-	-	-	-	-
	Maximum number of Line Profiles	128	128	128	-	-	-	-	-	-	-	-
	Maximum number of RG Profiles	48	48	48	-	-	-	-	-	-	-	-
	Maximum number of Bandwidth Profiles	32	32	32	-	-	-	-	-	-	-	-
	Maximum number of SIP Agent Profiles	1024	1024	1024	-	-	-	-	-	-	-	-
	Maximum number of POTS ports[10]	2048	2048	4096	-	-	-	-	-	-	-	-
	Maximum number of POTS ports per ONU	4	4	4	-	-	-	-	-	-	-	-

1 The maximum scalability of TWAMP sessions depends on the time intervals that are configured for the tests. Please check the information available in the DmOS Configuration Guide.

2 The values given refer to the maximum number of routes reached when route configurations are used in a single IP version. For mixed scenarios, those using IPv4 and IPv6 / 64 simultaneously, the maximum route values will be lower than those presented.

3 For GPON DM4610 lines the IPv4, IPv6 / 64, and IPv6 / 128 addresses share the same table. For the DM4050 and DM4250 lines, IPv6 addresses with a netmask greater than / 64 are not yet supported. For DM4170 and DM4370 lines, IPv6 / 128 addresses have a separate internal routing table, ie the maximum route scalability for these platforms is incremented respectively by 512 and 256 IPv6 / 128 routes.

4 Maximum number recommended for better system performance

5 a) Total entries in mpls forwarding-table (FTN + ILM).

b) It is recommended to disable the label distribution to FEC prefix in equipment that performs this distribution in LDP session targeted to avoid unnecessary consumption of equipment resources. Datacom equipment already operates in this configuration.

c) Labels for FEC not present in forwarding-table mpls must be in LDP database.

d) The CLI command "**show mpls forwarding-table | include active | count**" can be used to get the table size.

6 Maximum of L2VPN circuits that can be configured regardless of type (VPLS and VPWS). It is not possible to add the values of each characteristic separately.

7 Maximum of VPWS or VPLS circuits independent of the characteristic (Port Based and Vlan Based). It is not possible to add the values of each characteristic separately.

8 Maximum of PWs possible to be configured in L2VPN circuits (VPWS and VPLS).

9 This value is obtained with 32 VPLS with 16 PWs each (512 PWs) and 224 VPWS (224 PWs). It is the maximum number of PWs possible per configuration in the DM4370.

10 For the DM4615 platform, the limit is 2048 POTS ports. For DM4610 platforms the limit is 1024 POTS ports.

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