

OptiSwitch® Carrier Ethernet Features' Matrix

OptiSwitch® Carrier Ethernet Features Matrix												
Feature		OS904	OS906	OS912	OS910-M	OS930	OS9124-410G	OS940	OS940M	OS904-MBH	OS904-MBH-4 & 4A	
Physical	10/100/1000Base-T				6							
	Tri-Mode ports: 10/100/1000Base-T or 100/1000Base-FX SFP	2	6	12	2		4	12	12	2	2	
	100/1000Base-FX SFP	2			2					2	2	
	100/1000/2500Base-FX SFP						16					
	10G-Base-X XFP (LAN / WAN - OC192)					3	4	4	4			
	Internal ports (e-ports included)	8	18	12	10	1		12	12	20	20	
	T1/E1 CES Ports (MEF 3, 8, CESoPSN, SAToP, PWE3, TDMoIP)				4 ports (up to 8 per chassis)			4	4		4	
	OC-3-STM-1 CES (MEF 3, 8, CESoPSN, SAToP, PWE3)				2 ports active & backup (up to two modules)			2 ports active & backup	2 ports active & backup			
	# CES sessions (in framed mode)				64 (32 per 4E1/T1 CsS module)			32 using 4E1/T1 CES module	32 using 4E1/T1 CES module		64	
	Hot Swappable SFP / XFP Optics	Short/Long Haul, Multi-rate, BX & WDM	Short/Long Haul, Multi-rate, xWDM	Short/Long Haul, Multi-rate, BX & xWDM	Short/Long Haul, Multi-rate, BX & xWDM	Short/Long Haul, Multi-rate, BX & xWDM	Short/Long Haul, Multi-rate, xWDM	Short/Long Haul, Multi-rate, xWDM	Short/Long Haul, Multi-rate, xWDM	Short/Long Haul, Multi-rate, xWDM	Short/Long Haul, Multi-rate, BX & WDM	Short/Long Haul, Multi-rate, BX & WDM
	Fans	1 (temp > 60°C)	1, 2 (for 2 PS)	2	3	3	7 (fan tray)	3 (can be disabled)	3 (can be disabled)	1 (temp > 60°C)	1 (temp > 60°C)	
	Existence of hardened temperature model (-10C to +65C)	✓	✓									
	Existence of extreme hardened temperature model (-40C to +65C)	✓									✓	
Power Supply AC=A, DC=D, Dual-Red.=2 H=Hot-swap PS, External PS via 5v connector = Ext	A, D	A, D, 2A,2D	2A,2D	H - A,D,2A,2D,	H - A,D,2A,2D	H-A,D,2A,2D	H-A,D,2A,2D	H-A,D,2A,2D	A, D	A, D, E		
Layer 2 & 2.5 Features	Bandwidth (Gbps) / Forwarding Rate (Mpps). Non-blocking Architecture	8Gbps / 11.6Mpps	12Gbps/17.4Mpps	24Gbps/34.8Mpps	20Gbps/17.4Mpps	60Gbps/86.9Mpps	200Gbps/95Mpps	128Gbps/107.1Mpps	128Gbps/107.1Mpps	8Gbps / 11.6Mpps	8Gbps / 11.6Mpps	
	Active #VLAN, #MAC	4K/4K	4K/4K	4K/4K	4K/4K	4K/4K	4K/4K	4K/4K	4K/4K	4K/4K	4K/4K	
	#MAC (LT size)	16K	16K	16K	16K	16K	32K	16K	16K	16K	16K	
	Counters	16	16	16	16	16	16K	4k	4k	16	16	
	Counter Blocks	N/A	N/A	N/A	N/A	N/A	8	2	2	N/A	N/A	
	#Traffic-Conditioners (also know as policers or rate limiters)	256	256	256	256	256	1k	2k ingress 512 egress	2k ingress 512 egress	256	256	
	Max ACL rules	1k	1k	1k	1k	1k	8k	3k	3k	1k	1k	
	#buffers / #descriptors	4k/4k	4k/4k	4k/4k	4k/4k	4k/4k	8k/8k	6k/6k	6k/6k	4k/4k	4k/4k	
	MEF Services and Certifications	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA), 21	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA), 21	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA), 21	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA) CES MEF-18, 21	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA), 21	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA), CES MEF-18, 21	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA), 21	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA), 21	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA), 21, 22 (MBH IA)	EPL, E-Line, E-LAN, E-Tree; MEF 9, 14, 17 (OAM IA), CES MEF-18, 21, 22 (MBH IA)	
	All ports can serve as UNI/NNI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Jumbo Frames (up to 16,000 bytes) on all ports (per port/EVC)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Configurable Ethertype values	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	TLS, Q-in-Q, (802.1Q/802.1ad) - Selective VLAN based on ACL + tag range rules	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	VLAN Translation based on double tagged frames - inner/outer VLAN / 802.1p	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	tag swap over multi-point EVC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	VLAN Multiplexing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
VLAN Bundling (All-to-one)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Transparent Cross-Connect Mode (no mac learning)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		











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Layer 2 & 2.5 Features	Uni-Directional Link Detection Protocol (UDLD)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Link Layer Discovery Protocol (LLDP)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	<50mSec Protection (1:1 Link and Device Protection), LACP 1+1 (802.3ad)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	MSTP (802.1s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	ERPS - G.8032/Y.1344) amendment 1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Link fault reflection - bi-directional link integrity	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Protection and fault recovery based on Service OAM messages/alarms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Tunnel/Filter of L2 Protocols (CDP, VTP, DTP, PAGP, UDLD, LACP, PVST+, STP, BPDU, LAMP, EFM, 802.1x, E-LMI, LLDP, GARP)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	MPLS Services: L2VPN Psuedowires (LER), RSVP-TE, LDP, CR-LDP, E-LSP, OSPF-TE, ISIS-TE, PW-STATUS	✓	✓	✓	✓	✓	✓	✓	✓ LSR as well	✓ LSR as well	✓	✓
	H-VPLS Services: H-VPLS Spoke MTU-s, MAC Withdrawal	✓	✓	✓	✓	✓	✓	✓	✓ LSR as well	✓ LSR as well	✓	✓
# MPLS tunnels	1k	1k	1k	1k	1k	1k	1k	0.5K	0.5K	1k	1k	
MPLS-TP	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	
LAN/WAN 10GE Conversion (10GE/OC192)	N/A	N/A	N/A	N/A	✓	✓	✓	✓	✓	N/A	N/A	
Layer 3	Protocols: RIPv1/2, OSPF, BGP-4, IS-IS, VRRP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Longest Prefix Match (LPM) / Next-Hop (NH) Tables	4k / 4k	4k / 4k	4k / 4k	4k / 4k	4k / 4k	16K / 16K	13K / 4K	13K / 4K	4k / 4k	4k / 4k	
	IGMP Snooping v2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	IGMP entries	1000	1000	1000	1000	1000	1000	1000	1000	1000	1020	
	Static Configuration	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	PIM-SM	✓	✓	✓	✓	✓	Future SW Release	Future SW Release	Future SW Release	✓	✓	
	# Multicast groups - PIM-SM	1k	1k	1k	1k	1k	Future SW Release	Future SW Release	Future SW Release	1k	1k	
	# Multicast Link List (MLL) - PIM-SM	8k	8k	8k	8k	8k	Future SW Release	Future SW Release	Future SW Release	8k	8k	
	IPv6 management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	IPv6 routing	HW Ready	HW Ready	HW Ready	HW Ready	HW Ready	HW Ready	HW Ready	HW Ready	HW Ready	HW Ready	
Traffic Management	Hierarchical QoS (H-QoS)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	CIR/EIR bandwidth granularity (64Kbps steps)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	802.1p and DSCP QoS Queues no. (per port)	8	8	8	8	8	8	8	8	8	8	
	Classification by physical port, MAC, Ethertype, protocol, VLAN, IP/TCP/UDP, 802.1p (VPT), DiffServ (IPv4 & IPv6 TC)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Marking/remarking profiles between layers (802.1p, IP ToS / DSCP & MPLS EXP Bits)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Scheduling Strict Priority and 2 levels SDWRR	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Egress Shaping (per port/queue)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Ingress Shaping (per port/queue)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	In-service circuit parameters changes (on-the-fly ACLs)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	Per flow SLA metrics (Traffic Conditioner per Service/total Services)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Statistics of L2 control protocols (STP, LACP, 802.3ah)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

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OAM Features	Link OAM -802.3ah EFM (Discovery, config, fault, loopback & D. Gasp)	✓	✓	✓	✓	✓	No Dying Gasp	✓	✓	✓	✓
	Service OAM 802.1ag CFM - MEP and MIP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Service OAM ITU-T Y.1731 PM (Latency, Jitter & Loss per service - LMM) - Nano seconds accuracy	✓	✓	✓	milli-sec accuracy	milli-sec accuracy	✓	✓	✓	✓	✓
	Number of parallel OAM tests via FPGA	4	4	4	NA	NA	64	64	64	4	4
	Multi-point Service OAM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Service Availability measurement (Y.1563, MEF 10.2)	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release
	Service Resiliency (MEF 10.2.1)	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release
	Automatic Scheduling for PM tests to increase utilization	✓	✓	✓	NA	NA	✓	✓	✓	✓	✓
	IP SLA - Hardware-based measurement for IP VPN (L3) Networks - Nano seconds accuracy	✓	✓	✓	milli-sec accuracy	milli-sec accuracy	✓	✓	✓	✓	✓
	L2 Loopback with MAC swapping (per port/EVC)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	L2 Loopbacks per L2, L3, L4 headers (sr/dest swap)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Remote service/flow Mirroring (per Port/VLAN/flow in/out) - Sniffing be set per any ACL classification fields	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Link Integrity Notification (LIN)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Optical Level Monitoring (Digital Diagnostics)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Copper cable testing (copper TDR)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Ping, Trace Route, DNS lookup, TCP Dump (sniffer)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Interoperability with 3rd party head-end testers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	RFC 2544 Test Head - throughput measurement, loss ratio (configurable up to wire-speed GigE)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Automated Action Scheduler for operation of any OAM command based on time/day/cycle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Security	UNI flood limit - DoS Protection (broadcast, multicast & unicast rate control)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Learning table limit - #MAC control per EVC		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UNI protected ports - L1 filtering on all frames		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wire-speed ACL's		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ACL for management sessions		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VACM – View-based Access Control RFC2275		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Restricted and controllable configuration access		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Optional console Disable mode		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DHCP Option 82		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Separate Control and Data Plane		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
802.1x Port based authentication		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Link Flap guard		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Link Flap damping		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Protection mechanisms	L1 - hot swappable / dual power supplies (AC Dual-Red.=2A, DC Dual-Red = 2D, H=Hot-swap PS, External PS via 5v connector = Ext)		2A,2D	2A,2D	H - 2A,2D,	H - 2A,2D	H - 2A,2D	H - 2A,2D	H - 2A,2D		Ext
	L2 - port protection (1:1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	L2 - link fault reflection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	L2 - link aggregation (LAG) based on MAC or IP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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Protection mechanisms	L2 - STP/RSTP/MSTP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	L2 - Ring Protection G.8032 ERPS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	L2 - Linear Protection G.8031 ELPS	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release	Future SW Release
	L2.5 - H-VPLS Dual Homing	✓	✓	✓	✓	✓	Future SW Release	Future SW Release	Future SW Release (LSR also)	✓	✓
	L2.5 - MPLS LSP Path Protection	✓	✓	✓	✓	✓	Future SW Release	Future SW Release (LSR also)	Future SW Release (LSR also)	✓	✓
	L3 - Routing based protection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mgmt	Out-of-Band serial console port	RS-232 via RJ45	RS-232 via RJ45	RS-232 via RJ45	RS-232 via RJ45	RS-232 via RJ45	RS-232 via RJ45	RS-232 via RJ45	RS-232 via RJ45	RS-232 via RJ45	RS-232 via RJ45
	Out-of-Band dedicated Ethernet port	RJ45 10/100BaseT	RJ45 10/100BaseT	RJ45 10/100BaseT	RJ45 10/100BaseT	RJ45 10/100BaseT	RJ45 10/100BaseT	RJ45 10/100BaseT	RJ45 10/100BaseT	RJ45 10/100BaseT	RJ45 10/100BaseT
	USB plug for firmware and configuration downloads							future sw support	future sw support		
	In-band Management via VLAN	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	RADIUS/TACACS+, NTPv3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Web Based EMS/NMS	MegaVision / ProVision	MegaVision / ProVision	MegaVision / ProVision	MegaVision / ProVision (not including modules)	MegaVision	MegaVision / ProVision	MegaVision / ProVision	MegaVision / ProVision	MegaVision / ProVision	MegaVision / ProVision
	DHCP, BootP/TFTP automated config	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Telnet, SSH, SNMPv1/2/3, SCP, RMON (4 groups), Remote & internal Syslog	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Upload/Download/Append of configuration file	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Automated Action Scheduler for operation of any command based on time/day/cycle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Clock Synchronization	Physical Layer Synchronized Ethernet (SyncE) according to G.8261 & G.8262 (also G.736, G.742, G.813, G.823, G.824)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓
	Synchronized Status Messages (SSM) Protocol according to G.8264	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓
	Precision and Holdover according to internal Stratum-3 clock	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓
	IEEE1588v2 (Precision Time Protocol - PTP) - Slave mode	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓
	IEEE1588v2 (Precision Time Protocol - PTP) - Master mode	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
	IEEE1588v2 Boundary Clock (BC) support	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
IEEE1588v2 Transparent Clock	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			