

## eMerge 1/10G series (EM2)

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### SDN IP media switches with NAT

**eMerge 1/10G is a series of next-generation SDN controlled switches, specifically designed to aggregate IP media streams at the network edge and provide advanced NAT capability.**

The eMerge 1/10G series mark 2 provides the same feature set as the established 10G series and is a major hardware and software upgrade of the previous 1G series.

Commonly eMerge 1/10G is used as audio leaf nodes in a spine/leaf LAN fabric but can also be used as part of a WAN infrastructure for transport of compressed streams.

Each eMerge 1/10G switch offers full line rate switching capacity. The switches may be SDN controlled from NeviON's VideoIPath control system. This includes flexible programming of NAT rules.

#### Applications:

- Handoff media streams to third-party networks using NAT
- Unidirectional forwarding of streams (media firewall)
- Adapt stream addressing towards unmanaged devices using NAT
- Transparent forwarding of streams

#### Key features:

- High-performance line-rate switching capacity
- 1/10G interface support
- Advanced high-capacity NAT support (layer 2-4)
- Fully SDN programmable using Openflow 1.3
- Redundant power-supplies and field replaceable fans



## High-performance

eMerge 1GE series switches are designed based Carrier Grade high-performance chip that supports up to 880 Gbps throughput.

## Energy saving

Intelligent FAN adjustment and real-time power consumption monitoring technology are provided for the cost of maintenance redundancy and help to build a green and energy saving data center.

## Customizable profiles

The Flexible Table Management (FTM) technology offers multiple table size configuration profiles as optimized choices for different network scenarios. Support up to 32K MAC address tables. Support up to 8K IP routing tables.

## High reliability

eMerge 1GE is powered by Hot-swappable power modules which supports AC/DC 1+1 redundancy. Fans support N+1 redundancy. Real-time environment monitoring technology to detect the chipset temperature, status of fan and power, etc.

## Software defined networking

Support OpenFlow specification 1.3.x/1.4.x. Support up to 4.5K wildcard match flows with complete match field and stats. Support L2 to L4 complete matching fields. Support per flow multiple actions.

## Hybrid

eMerge 1GE supports both SDN and normal pipeline processing. This may be used to combine SDN control of media traffic with normal switching of data services such as in-band management and control signals.

## QoS control

eMerge 1GE provides 13 hardware queues per-port (8 unicast queues, 4 multicast queues, and 1 monitor queue). Support multi-stage scheduling technology such as WDRR (Weighted Deficit Round Robin) / SP (Strict Priority) and TD (Tail Drop) / WRED (Weighted Random Early Detection) to prevent congestion. Support flexible queue scheduling mechanism to do the shaping for queue or port traffic.

Ingress and egress policer provide intelligent bandwidth monitoring, which support to adjust the granularity according to the port speed. Both srTCM (Single Rate Three Color Marker) and trTCM (Two Rate Three Color Marker) can be supported.

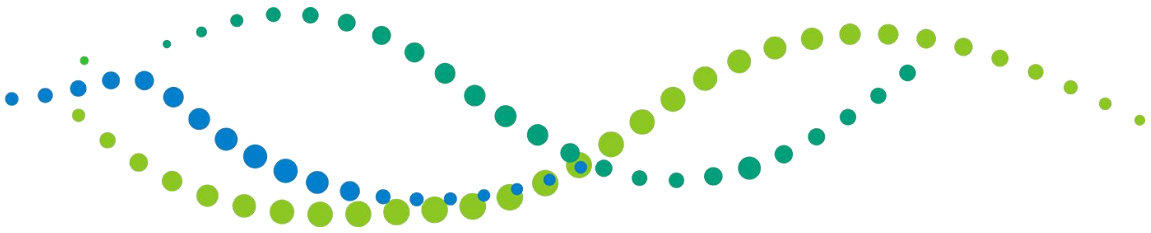
## Management

Support varied management interfaces, include console port / in-band network ports / out-of-band network port / USB port. Support SNMP v1/v2/v3, Support CLI (Command Line Interface), web management, Telnet and FTP connection. Support OAM to make management more convenient, and support SSH2.0, SSL, etc. to ensure security of management.



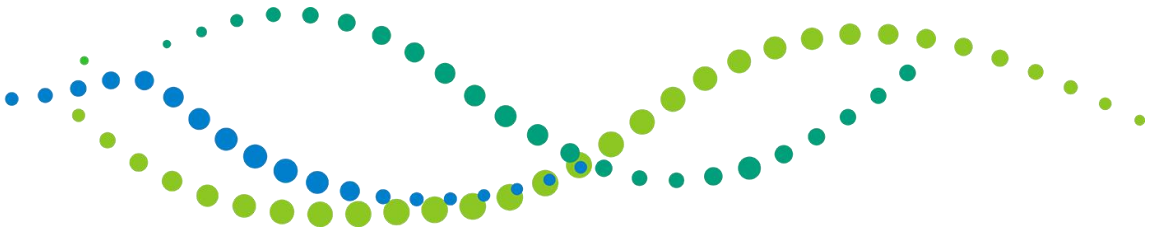
## System Specifications

Items		EM-GE2-48T4X	EM-GE2-48S4X
Size (H×W×D)		4.36 x 44.0 x 37.0cm (1.73 x 17.5 x 14.6 in.)	4.36 x 44.0 x 37.0cm (1.73 x 17.5 x 14.6 in.)
Weight		5.1KG	6.25KG
RS-232 Serial Ports		1 RJ-45 port located at the left side of front panel	
Management Ports		1 RJ-45 outband management port located at the left side of front panel	
USB Ports		1 Type-A USB port located at the left side of front panel	
10/100/1000 Base-T Ports		48	-
SFP Ports		-	48
SFP+ Ports		4	4
QSFP+ Ports		-	-
QSFP28 Ports		-	-
POE Ports		-	-
Latency		Min: 660ns Max: 960ns	
CPU		SOC(Dual core/ARM A53)	
Memory		2 GB	
Flash		8 GB (eMMC)	
Packet Buffer Memory		9 MB	
Power supply	AC	Operating Voltage: 100 ~ 240V; 50/60H Maximum Voltage : 90 ~ 264V; 47~63Hz	
	DC	Operating Voltage : -48 ~ -60V	
Hot-swap Power Supplies		2 (1+1 redundant)	
Airflow Option		Front-Rear	
Hot-swappable Fans		3 fixed fan	
Typical Power Draw		52W	65W
Max Power Draw		55W	70W
MTBF(Hour)		204935	189901
MTBF(Year)		23.39	21.68

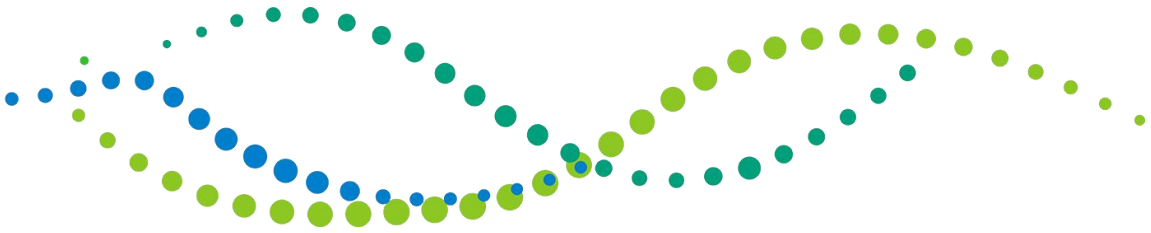


## Service specifications

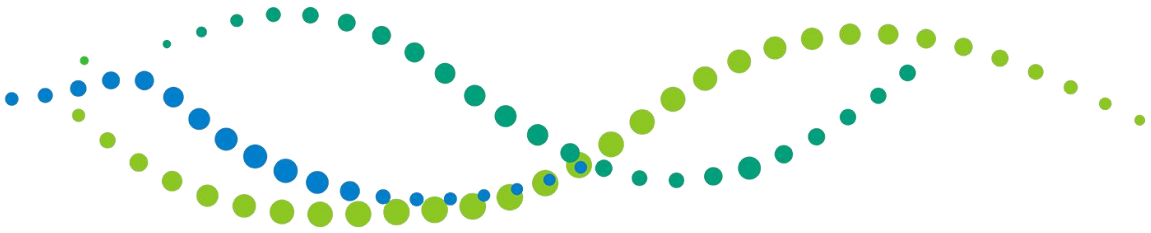
Features		EM-GE2-48T4X	EM-GE2-48T4X
Line speed forwarding	Switching Capacity	176 Gbps	176 Gbps
	Throughput	132 Mpps	132 Mpps
Forward mode		Support store-forward mode and cut-through mode	
Ethernet features		Support full duplex, half duplex, and auto-negotiation duplex Support auto-negotiation port speed Support Jumbo Frame	
VLAN features		Support 4094 VLANs Support VLAN access mode: Access /Trunk/Hybrid Support Default VLAN	
MAC Address Table		Support static MAC address Support dynamic MAC address learning and aging Support black hole MAC address Support MAC Flapping detect	
Link aggregation		Support Static Link aggregation, static active-standby mode, static active-active mode Support Dynamic Link aggregation (LACP) Support Static load balancing (SLB) Support dynamic load balancing (DLB)	
Reliability features		Support Software class process monitoring(Sysmon) Support Hardware Watch Dog Support G.8032 Support CFM	
ARP features		Support static ARP Support dynamic ARP learning and aging Support Gratuitous ARP Support basic ARP-Proxy	
IPv4 forwarding		Support IPv4 static routes Support uRPF check Support OSPFv2 Support ICMP redirect, Support ICMP unreachable message Support ECMP Support IGMP snooping	



<p>QOS features</p>	<ul style="list-style-type: none"> <li>Support traffic classification based on COS/DSCP (simple classification)</li> <li>Support traffic classification based on ACL ( complex classification)</li> <li>Support queue scheduling based on traffic classification</li> <li>Support Remark the priority fields(COS/DSCP) of the packet</li> <li>Support flow redirection</li> <li>Support flow mirror</li> <li>Support traffic policing</li> <li>Support traffic shaping</li> <li>Support traffic statistics</li> <li>Support SP(Strict Priority) scheduling</li> <li>Support WDRR (Weighted Deficit Round Robin) scheduling</li> <li>Support SP + WDRR mixed scheduling</li> <li>Support TD(Tail Drop)</li> <li>Support WRED (Weighted Random Early Detection)</li> </ul>
<p>Security features</p>	<ul style="list-style-type: none"> <li>Support SSH</li> <li>Support Radius</li> <li>Support TACAS+</li> <li>Support AAA</li> <li>Support COPP</li> <li>Support ARP Limit</li> <li>Support access control list(ACL)</li> <li>Support traffic classification based on source and destination IP / source and destination MAC / source and destination layer for protocol num / VLAN ID</li> <li>Support ACL active based on Time-Range</li> <li>Support Prevent DDOS attack</li> <li>Support ACL filtering Telnet/SSH login</li> <li>Support block abnormal users</li> <li>Support Link-Flapping detection</li> </ul>
<p>Configuration and maintenance</p>	<ul style="list-style-type: none"> <li>Support DHCP Relay</li> <li>Support DHCP Client</li> <li>Support RMON</li> <li>Support sFlow</li> <li>Support IP SLA</li> <li>Support IPFIX</li> <li>Support NTP</li> <li>Support port Errdisable state detection and recovery</li> <li>Support hardware loopback (internal/external)</li> <li>Support to configure system time</li> <li>Support to configure time zone</li> </ul>



Debugging features	<p>Support to Debug based on modules</p> <p>Support CPU/memory usage display and alarm</p> <p>Support Device temperature/PSU/FAN/status display and alarm</p> <p>Support user operation logs</p> <p>Support Management of logs, alarms, and debugging information</p> <p>Support detailed diagnostic-information collection</p> <p>Support reboot information logging</p> <p>Support network diagnostics (ping/traceroute)</p> <p>Support mirror: support use port/vlan/cpu as mirror source</p> <p>Support use port/port group/vlan/cpu as mirror destination</p> <p>Support to CPU/From CPU packets statistics</p>
Management features	<p>Support in-band and out-of-band management ports</p> <p>Support privileged user priority and privileged commands</p> <p>Support Network management based on SNMPv1/v2c/v3</p> <p>Support Public and private MIB</p> <p>Support Configuration and management based on WEB UI</p> <p>Support Configuration and management based on RPC-API</p> <p>Support change the system specifications by choose different STM Profiles</p> <p>Support restore factory default configuration</p> <p>Support manual/schedule reboot</p> <p>Support upgrade with the local image file/remote TFTP server</p> <p>Support online upgrade Uboot</p>
File system	<p>Support file system to manage the files and directories</p> <p>Support upload/download files via FTP/TFTP</p> <p>Support transmit files via Xmodem</p>
Hybrid Mode	<p>Support Openflow1.0 /1.2/1.3/1.4</p> <p>Support Flow/Group/Meter Table/Queue</p>
Hybrid Extend	<p>Support L2GRE/NVGRE/VXLAN Tunnel</p> <p>Support VPWS/VPLS/SPME/FLEX MPLSTunnel</p> <p>Support selective QINQ</p> <p>Support V4/V6 packet transform</p> <p>Support Flow UDF Match</p>
MPLS-TP OAM	<p>Support Section OAM(MEP)</p> <p>Support LSP OAM(MEP/MIP)</p> <p>Support PW OAM(MEP)</p> <p>Support Continuity Check, Connectivity Verification</p> <p>Support Loopback discovery/mip/rmep</p> <p>Support two-way DM</p> <p>Support LM based on CCM</p>
G8131	<p>Support Single level protect switching (revertive/non-revertive)</p> <p>Support Single level protect switching (revertive/non-revertive)</p> <p>Support Double level protect switching (revertive/non-revertive)</p>



## Openflow specifications

<p>Openflow match</p>	<p>Ingress_Port            Layer2-Header - Eth_dst            Layer2-Header - Eth_src            Layer2-Header - Eth_type            Layer2-Header - Vlan_id            Layer2-Header - Vlan_pcp            Layer3-Header-IPv4 - Ip_dscp            Layer3-Header-IPv4 - Ip_ecn            Layer3-Header-IPv4 - Ip_protocol            Layer3-Header-IPv4 - Ip_src            Layer3-Header-IPv4 - Ip_dst            Layer4-Header-IPv4 - Tcp_src            Layer4-Header-IPv4 - Tcp_dst            Layer4-Header-IPv4 - Udp_src            Layer4-Header-IPv4 - Udp_dst            Layer4-Header-IPv4 - Sctp_src            Layer4-Header-IPv4 - Sctp_dst            Icmp_IPv4 - ICMPv4_code            Icmp_IPv4 - ICMPv4_code            ARP - ARP_op            ARP - ARP_spa            ARP - ARP_tpa            Mpls_label            Layer3/L4-Header-IPv6 - IPv6_src            Layer3/L4-Header-IPv6 - IPv6_dst            Layer3/L4-Header-IPv6 - IPv6_label            Layer3/L4-Header-IPv6 - ICMPv6_type            Layer3/L4-Header-IPv6 - ICMPv6_code            Layer3/L4-Header-IPv6 - Tcp6_src            Layer3/L4-Header-IPv6 - Tcp6_dst            Layer3/L4-Header-IPv6 - Udp6_src            Layer3/L4-Header-IPv6 - Udp6_dst            Tunnel_id            Oam_session (extend)            Udf_id/udf string (extend)            Mpls_label_num (extend)            Mpls_label0(extend)            Mpls_label1(extend)            Mpls_label2(extend)</p>	<p>Openflow action</p>	<p>Output            Set-Queue            Drop            Group            Push VLAN header            Pop VLAN header            Push MPLS header            Pop MPLS header            Set MPLS TTL            Set IP TTL            Decrement IP TTL            Set-Field - Eth_dst            Set-Field - Eth_src            Set-Field - Vlan_id            Set-Field - Vlan_pcp            Set-Field - Ip_dscp            Set-Field - Ip_ecn            Set-Field - Ip_src            Set-Field - Ip_dst            Set-Field - Tcp_src            Set-Field - Tcp_dst            Set-Field - Udp_src            Set-Field - Udp_dst            Set-Field - Sctp_src            Set-Field - Sctp_dst            Set-Field - ICMPv4_type            Set-Field - ICMPv4_code            Set-Field - ARP_op            Set-Field - ARP_spa            Set-Field - ARP_tpa            Set-Field - ARP_sha            Set-Field - ARP_tha            Set-Field - IPv6_src            Set-Field - IPv6_dst            Set-Field - IPv6_Flabel            Set-Field - ICMPv6_type            Set-Field - ICMPv6_code            Set-Field - Mpls_label            Set-Field - Mpls_tc            Set-Field - Tunnel_id            Push_L2 (Extend)            Pop_L2 (Extend)            Pop_all_mpls (Extend)            Set-Field - oam_inlabel (Extend)            Set-Field - oam_popleft (Extend)            Strip_Header (Extend)</p>
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## Safety and Compliance

Description	Specification
Safety Certifications	Ready to UL to UL 60950, Third Edition Ready to CE Marking Ready to NEBS level 3
Electromagnetic Emissions Certifications	Ready to FCC Part 15 Class A Ready to CE
Warranty	Limited warranty

The switches may be installed in ETSI EN 300 019-1-3 V2.3.2 Class 3.1 environment.

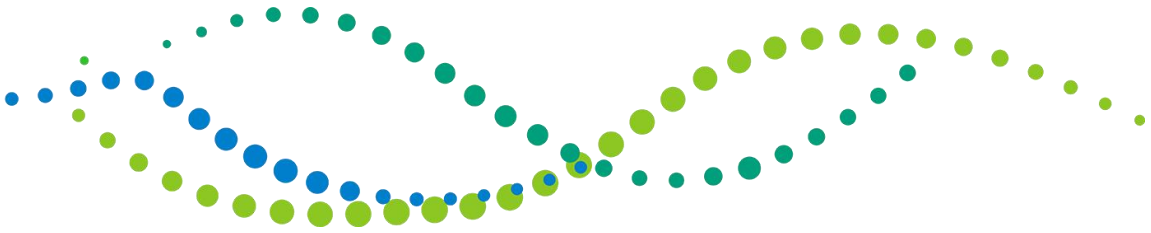
## Environment Specifications

Description	Specification
Operating Temperature	0 to 45 °C
Storage Temperature	-40 to 70 °C
Relative Humidity	0 to 95% (non-condensing)

## Ordering information

Product Name	Description
EM-GE2-48T4X	Standard 1U 19" rack mountable 48x10/100/1000 Base-T ports 4x10GE SFP+ ports Dual modular AC power supply Front-Rear Airflow, fixed FAN
EM-GE2-48S4X	Standard 1U 19" rack mountable 48x1GE SFP ports 4x10GE SFP+ ports Dual modular AC power supply Front-Rear Airflow, fixed FAN





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