

## Lantech OS3/OS4 Switches

Complete Layer 2 management switch with optional software package  
of IEC 62443, L3 Lite, L3, NAT, and IEC 61375-2-5 ETBN



### OVERVIEW

Lantech OS3/OS4 switch is powerful with complete Layer 2 management features and optional upgradable for future expansion, such as Layer 3 Lite, Layer 3, IEC61375-2-5 (ETBN), R-NAT, hardware NAT, PTP, etc.

#### **Support Restful API\* for better switch performance; Auto-provisioning\* for firmware/configuration update**

The switch supports Restful API\* that uses JSON format to access and use data for GET, PUT, POST and DELETE types to avoid traditional SNMP management occupying CPU utilization. It also supports auto-provisioning for switch to auto-check the latest software image and configuration through TFTP server.

#### **DDoS security to protect switch and server; Optional IEC 62443 compliance with free one year service**

Lantech OS3/4 platform is designed with high standard of cybersecurity to prevent the threats from network attack such as DDoS attacks and 802.1X security authentication. The optional cybersecurity IEC 62443 features include DHCP snooping, prevention of DDoS attack, Dynamic ARP Inspection, IPSource Guard, Port Security, Vulnerability checking, Encrypted file, Public keys, Strength password, Account management, Penetration and Stress test, and many more with up to 90 security measures.

MAC-based port authentication is an alternative approach to 802.1x for authenticating hosts connected to a port. By authenticating based on the host's source MAC address, the host is not required to run a user for the 802.1x protocol. The RADIUS server that performs the authentication will inform the switch if this MAC can be registered in the MAC address table of switch.

#### **Optional IEEE 1588 PTP V2 and 802.1AS for precise time protocol (OS4 only)**

The Precision Time Protocol (PTP) is a protocol used to synchronize clocks throughout a network. The PTP V2 and gPTP supports transparent clock and two step processing that improves network time accuracy and precision.

#### **DHCP option 82 & Port based, Mac based DHCP, Option 7/66, DHCP Snooping, IPv6 DHCP basic server**

DHCP server can assign dedicated IP address by MAC or by port (Port based for single switch), it also can assign IP address by port for multiple switches with single DHCP option82 server. DHCP Snooping is supported. DHCP option66 server can offer IP address of TFTP server to DHCP client for VOIP application while DHCP option7 can offer IP address of logging server. Basic Ipv6 DHCP service can be supported.

#### **User friendly GUI, Auto topology drawing**

The user-friendly UI, innovative auto topology drawing and topology demo makes OS3/OS4 Ethernet switches much easier to get hands-on. The complete CLI enables professional engineer to configure setting by command line.

**Enhanced G.8032 ring, 8 MSTI MSTP; MRP ring**

Lantech OS3/OS4 Ethernet switches features enhanced G.8032 ring which can be self-healed in less than 20ms for single ring topology protection covering multicast packets. It also supports various ring topologies that covers enhanced ring and basic ring by easy setup than others. It supports MSTP that allows RSTP over VLAN for redundant links with 8 MSTI. MRP (Media Redundancy Protocol) can be supported for industrial automation networks.

**Enhanced Storm control**

Storm control prevents traffic on a LAN from being disrupted by a broadcast, multicast, or unicast storm on one of the physical interfaces and the detection is more precise and reaction is more efficient.

**Protocol based VLAN; Subnet based VLAN; QinQ, QoS and GVRP**

It supports the QinQ, QoS and GVRP for large VLAN segmentation. The protocol-based VLAN processes traffic based on protocol. It filters IP traffic from nearby end-stations using a particular protocol such as IP, IPX, ARP or other Ethernet-types in a Hex value. Subnet based VLANs group traffics into logical VLANs based on the source IP address and IP subnet. The above features can help to build VLAN in the network mixed with managed and un-managed switch as to define packets to which VLAN group based on protocol or subnet.

**IGMPv3, GMRP, router port, MLD Snooping, static multicast forwarding and multicast Ring protection**

The unique multicast protection under enhanced G.8032 ring can offer immediate self-recovery instead of waiting for IGMP table timeout. It also supports IGMPv3, GMRP, router port, MLD snooping and static multicast forwarding binding by ports for video surveillance application.

**Support NTP, SNTP server with built-in RTC clock source (RTC is subject to model variant)**

The support of NTP/SNTP is able to synchronize system clock in Internet. Lantech OS3/OS4 switch supports NTP server & server/client mode. The switch also built-in a real-time clock (RTC) for measurement the passage of time with a NTP server. (RTC is subject to model variant)

**Enhanced environmental monitoring for switch inside information**

The enhanced environmental monitoring can detect switch overall temperature, total power load, actual input voltage and current. It can send the SNMP traps alert when abnormal. (Subject to model variant)

**Optional Layer3 Lite / Layer3 to be upgradable**

Lantech OS3/OS4 platform is optional upgradable to L3 Lite or L3 for future expansion. The optional L3L/L3 supports enhanced routing functionality, including RIP v1/v2, OSPF, DVMRP, PIM, Static NAT, PAT, Port forwarding, etc. It provides better network performance for large scale applications. (NAT is only available on OS4-L3 platform)

**Optional TTDP and R-NAT protocol for train application (EN50155 models)**

Lantech OS3/OS4 platform complies with IEC 61375-3-4 (ECN) standard. The support of Ethernet Consist Network allows interconnection between end devices located in single consist of train and interoperability with IEC61375-2-5 (ETBN). The optional TTDP (Train Topology Discovery Protocol) can assign IP and Gateway IP automatically when train network topology is changed due to the adjustment of train cars. Exclusive DHCP and VLAN over TTDP can help bind device with certain IP assignment and segment VLAN in ECN network. The optional R-NAT (Railway-Network Address Translation) is under TTDP that simplifies the management of network address translation between ETB and ECN. (R-NAT is only available on OS4-L3 platform)

## L2 SPECIFICATIONS

### Manageability / Network

Management	SNMP v1 v2c, v3/ Web/ Telnet/ CLI
User friendly UI	<ul style="list-style-type: none"> <li>Auto topology drawing</li> <li>Topology demo</li> <li>Complete CLI for professional setting</li> </ul>
SNMP MIB	<ul style="list-style-type: none"> <li>MIBII</li> <li>MIB</li> <li>SNMP MIB</li> <li>Bridge MIB</li> <li>IF MIB</li> <li>RMON MIB</li> <li>Private MIB</li> </ul>
SNMP Trap	<p>Up to 5 trap stations; trap types including:</p> <ul style="list-style-type: none"> <li>Device cold start</li> <li>Authorization failure</li> <li>Port link up/link down</li> <li>DI/DO open/close</li> <li>Typology change (ITU ring)</li> <li>Power failure</li> <li>Environmental abnormal</li> </ul>
Firmware Update	Supports TFTP firmware update, TFTP backup and restore; HTTP firmware upgrade; USB firmware update
Configuration import and export	Supports editable configuration file for system quick installation; Support factory reset ping to restore all settings back to factory default
DHCP	Provide DHCP Client/ DHCP Server/DHCP Option 82/Port based DHCP; DHCP Snooping, DHCP Option 66; DHCP Option 7/66/61/PXE; basic IPv6 DHCP server; IPv6 port based DHCP
Mac based DHCP Server	Assign IP address by Mac in DHCP network
DNS	Provide DNS client feature and can set Primary and Secondary DNS server
System Log	Supports System log record and remote system log server
PXE	Offer IP address of TFTP server
LLDP	Supports LLDP to allow switch to advise its identification and capability on the LAN
CDP	Cisco Discovery Protocol for topology mapping
Remote Admin	Supports 10 IP addresses that have permission to access the switch management and to prevent unauthorized intruder

### Redundancy / Protection

ITU G.8032	<ul style="list-style-type: none"> <li>Support ITU G.8032 for Ring protection in less than 20ms for self-heal recovery (single ring enhanced mode)</li> <li>Support basic single ring &amp; enhanced ring</li> <li>Enhanced G.8032 ring configuration with ease</li> <li>Cover multicast &amp; data packets protection</li> </ul>
Spanning Tree	Supports IEEE802.1d Spanning Tree and IEEE802.1w Rapid Spanning Tree, IEEE802.1s Multiple Spanning Tree 8 MSTI; Supports BPDU guard/Root guard/Aggregation port
Protection	<ul style="list-style-type: none"> <li>Miss-wiring avoidance</li> <li>Node failure protection</li> <li>Loop protection</li> </ul>

### PoE (PoE models)

PoE Management	PoE Detection to check if PD hangs then restart the PD
Per Port PoE Status	On/ Off, voltage, current, watts, temperature

### Security

IEC62443-4-2 Cybersecurity ready**	<ul style="list-style-type: none"> <li>Cybersecurity</li> <li>Vulnerability checking</li> <li>Identification and authentication</li> <li>Resource availability</li> </ul>
Prevention of DDoS/DoS attack	<ul style="list-style-type: none"> <li>Suspicious Packets DoS/DDoS Attacks</li> <li>Network DoS/DDoS Attacks</li> </ul>
Network Security	<p>Support 10 IP addresses that have permission to access the switch management and to prevent unauthorized intruder.</p> <p>802.1X access control for port based and MAC based authentication/static MAC-Port binding</p> <p>Ingress/Egress ACL L2/L3</p> <p>SSL/SSH v2 for Management</p> <p>HTTPS for secure access to the web interface</p> <p>TACACS+ for Authentication</p>
Login Security	Supports IEEE802.1X Authentication/RADIUS

### Switching

VLAN	<p>Port Based VLAN</p> <p>IEEE 802.1Q Tag VLAN (256 entries)/ VLAN ID (Up to 4K, VLAN ID can be assigned from 1 to 4096)</p> <p>GVRP, QinQ, QoS (Max 32 entries; Max 7 entries when QoS by VLAN)</p>
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	Protocol based VLAN Ipv4 Subnet based VLAN
IGMP	Support IGMP snooping v1, v2, v3; Supports IGMP static route; 1024 multicast groups; IGMP router port; IGMP query; GMRP
MLD Snooping	Support Ipv6 Multicast stream
Static multicast forwarding	Static multicast forwarding forward reversed IGMP flow with multicast packets binding with ports for IP surveillance application
<b>QoS</b>	
Quality of Service	The quality of service determined by port, Tag and Ipv4 Type of service, Ipv4 Differentiated Services Code Points – DSCP
Class of Service	Support IEEE802.1p class of service, per port provides 8 priority queues
Bandwidth Control	Support ingress packet filter and egress* packet limit. The egress rate control supports all of packet type. Ingress filter packet type combination rules are Broadcast/Multicast/Flooded Unicast packet, Broadcast/Multicast packet, Broadcast packet only and all types of packet. The packet filter rate can be set an accurate value through the pull-down menu for the ingress packet filter and the egress packet limit.
Port Trunk with LACP	LACP Port Trunk: 8 Trunk groups
<b>Port</b>	
Port Mirror	Support 3 mirroring types: "RX, TX and Both packet"

Enhanced Storm Control	prevents traffic on a LAN from being disrupted by a broadcast, multicast, or unicast storm on one of the physical interfaces
<b>System</b>	
Enhanced Environmental Monitoring	System status for actual input voltage, current, total power load and ambient temperature to be shown in GUI and sent alerting if any abnormal status
Dual Image Firmware	Support dual image firmware function
<b>Time Management</b>	
NTP/SNTP	Supports NTP/SNTP to synchronize system clock in Internet Supports NTP server & server/client mode NTP server support Primary and Backup in client mode Support NTP Time Re-correct without battery Built-in RTC clock can be clock source for NTP server (RTC is subject to model variant)
PTP/gPTP** (OS4 only)	IEEE 1588 PTP V2 & 802.1AS; Transparent clock and two step processing
Diagnostic	Support Ping, ARP table and DDM information
<b>Train Protocol (EN50155 models)</b>	
ECN	Complies with IEC 61375-3-4 (ECN) standard.

\*Future release

\*\*Optional

\*\*\*Annual license

## Upgradable Package

**L3L & L3 SPECIFICATIONS**

<b>Unicast Routing</b>	
RIP v1/v2 (L3 only)	Support RIP Redistribute <ul style="list-style-type: none"> <li>Static routes</li> <li>Route-map</li> <li>Metric</li> </ul> Support Enhanced Redistributing Routing Protocols <ul style="list-style-type: none"> <li>Between routing protocols (RIP, OSPF, EIGRP, BGP).</li> <li>Directly connected routes can be redistributed into a routing protocol.</li> <li>Support OSPF and RIP running simultaneously in the same system (but need to be in different interfaces)</li> </ul> Support Equal-cost multi-path routing (ECMP) for RIP
OSPF	Support OSPF Area <ul style="list-style-type: none"> <li>Standard Area</li> <li>Stub Area</li> <li>Stub no-summary Area</li> </ul> Support Equal-cost multi-path routing (ECMP)
Static Route	Up to 32
<b>Multicast Routing</b>	
DVMRP (L3 only)	Distance Vector Multicast Routing Protocol (DVMRP) is a routing protocol used to share information between routers to facilitate the transportation of IP multicast packets among networks.
PIM (Protocol Independent Multicast)	PIM-SM (Sparse Mode) PIM-BSR (Bootstrap) PIM-DM (Dense Mode)

	PIM-SSM (Source-Specific Multicast Mode)
<b>Routing</b>	
VRRP (RFC3768)	For Routing Redundancy  Combine Max. 2 gateways as single virtual gateway
<b>VLAN</b>	
Inter-VLAN routing	Support dynamic routing and static routing
Router-on-a-stick	Route traffic between different VLAN groups via VLAN trunking port.
<b>NAT** (OS4-L3 only)</b>	
Hardware NAT	Max 384 clients
Static NAT	Max 128 connections; 1 to 1
PAT (port address translation)	Max 256 connections; 1 to many; many to 1; Port forwarding
<b>Train (EN50155 models)</b>	
TTDP**	TTDP (Train Topology Discovery Protocol) complies with IEC 61375-2-5 (ETBN) standard.
DHCP for TTDP**	Support Option 66/82
R-NAT** (OS4-L3 only)	Support Railway-Network Address Translation
<b>Others</b>	
Rescue mode	Offer repairing ability to repair operating system if booting image of switch is damaged.
IP based port	Support

\*Future release

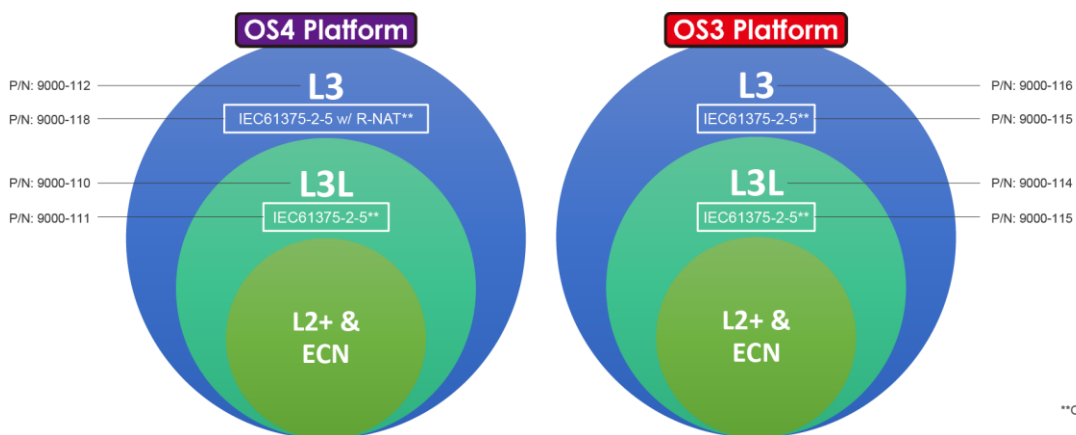
\*\*Optional

## PLATFORMS COMPARISON

	Layer 3	Layer 3 Lite OS4 / OS3	Layer 2 +	OS2	OS1
Unicast Routing: RIP v1/v2	•				
Multicast Routing: DVMRP	•				
Hardware NAT: Static NAT (OS4 only)	•				
Hardware NAT: PAT (OS4 only)	•				
R-NAT** (OS4 only, built-in IEC 61375-2-5)	•**				
Multicast Routing: PIM (DM)	•	•			
Multicast Routing: PIM (SSM)	•	•			
Multicast Routing: PIM (SM)	•	•			
Multicast Routing: PIM (BSR)	•	•			
Unicast Routing: OSPF	•	•			
VRRP (RFC3768)	•	•			
VLAN routing	•	•			
Static Route	•	•			
Rescue Mode	•	•			
TTDP (IEC 61375-2-5)**	•**	•**			
IP based port	•	•			
Static Unicast Routing	•	•			
DHCP pool with per VLAN	•	•			
DHCP for TTDP**	•**	•**			
PTP** (OS4 only)	•**	•**			
Prevention of DDoS/DoS attack	•		•		
Dynamic ARP Inspection	•	•	•		
IPSource Guard	•	•	•		
Port Security	•	•	•		
Remote admin-IP security (25)	•	•	•		
MRP	•	•	•		•
Protocol Based	•	•	•		
Subnet Based	•	•	•		
MLD Snooping	•	•	•		
Port Monitoring	•	•	•		
PXE application	•	•	•		
IP v6 DHCP Server (Basic)	•	•	•		
Dual Image	•	•	•		
ARP inspection	•	•	•		•
BPDUGuard	•	•	•		•
QinQ	•	•	•		•
Remote admin (limitation of accessing way)	•	•	•	•	•
GVRP	•	•	•	•	•
SSL	•	•	•	•	•
Login Security (TACACS+)	•	•	•	•	•**
Login Security (RADIUS)	•	•	•	•	port authentication only
Dual Homing	•	•	•	•	•
SSH	•	•	•	•	•
CDP	•	•	•	•	•
Topology View	•	•	•	•	•
Environment Monitoring	•	•	•	•**	•**
MSTP	•	•	•	•	•
Loop Protection	•	•	•	•	•
IGMP router port	•	•	•	•	•
GMRP	•	•	•	•	•
VLAN based QoS	•	•	•	•	•
MAC based DHCP	•	•	•	•	•
Option82 DHCP Relay	•	•	•	•	•
Option 7/66	•	•	•	option 66 only	option 66 only
DHCP Snooping	•	•	•	•	•
Digital Input/ Output	•	•	•	•	•
Triggered by event of environment	•	•	•	•**	•**
Triggered by event of SFP DDM	•	•	•	•	•
Ping	•	•	•	•	•
ARP	•	•	•	•	•
QoS under 61375-3-4	•	•	•	•	•
Proprietary redundant protocol	ITU-Ring Enhance mode	ITU-Ring Enhance mode	ITU-Ring Enhance mode	ITU-Ring Enhance mode	ITU-Ring Enhance mode
ACL	•	•	•	Ingress only	•
SNMP Trap	•	•	•	•	•
Firmware upgrading	WEB/TFTP/FTP	WEB/TFTP/FTP	WEB/TFTP/FTP	WEB/TFTP/FTP	WEB/TFTP/FTP
Configuration file import/export	WEB/TFTP/FTP	WEB/TFTP/FTP	WEB/TFTP/FTP	WEB/TFTP/FTP	WEB/TFTP/FTP
G.8032 standard					•
Auto Provision	•*	•*	•*		•

## ORDERING INFORMATION

- **OS3 – L3L..... P/N: 9000-114**  
OS3 software platform upgrade to Layer 3 Lite platform
- **OS3 – IEC61375-2-5..... P/N: 9000-115**  
OS3 software platform with IEC-61375-2-5 ETBN (Ethernet Train Backbone Networks) function
- **OS3 – L3..... P/N: 9000-116**  
OS3 software platform with Layer 3 functions incl. L3L
- **OS4 – L3L..... P/N: 9000-110**  
OS4 software platform upgrade to Layer 3 Lite platform
- **OS4 – L3L – IEC61375-2-5.....P/N: 9000-111**  
OS4 software platform with IEC-61375-2-5 ETBN (Ethernet Train Backbone Networks) function (under L3L)
- **OS4 – L3..... P/N: 9000-112**  
OS4 software platform with Layer 3 functions incl. L3L
- **OS4 – L3 – IEC61375-2-5.....P/N: 9000-118**  
OS4 software platform with IEC-61375-2-5 ETBN (Ethernet Train Backbone Networks) function w/ R-NAT (under L3)



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