

Product Summary		
1. Basic		
Product Name		V330-52TX-RD
Product Positioning		SDN (Data Center TOR access, Enterprise network, Metro network access or aggregation)
Switching Method		Store and Forwarding
CPU Model/ Frequency		Cavium CN5010-500BG564-CP-G/500MHz
Flash		64MB
Memory		256MB
Hardware Configuration	Main Board Spec	48 x GE RJ45/SFP ports + Uplink ports expansion slot
	NM-4SFP+ 10GE Sub Card	Support
	Console Type	RJ45
	Outband Eth Management Port	1 RJ45 100M Eth port
	Inband Eth Management Port	Support
	USB Ports	1 (For Data Storage)
2. Performance Spec		
Switching Capacity		176Gbps
3. Hardware and Software Description		
Hardware Architecure		<ul style="list-style-type: none"> <li>• Standard 1U 19" rack mountable</li> <li>• 48x10/100/1000 Base-T or 48x100/1000 Base-X Ethernet Port</li> <li>• Modular Uplink ( 4x10G SFP+ Ethernet Port )</li> </ul>
If Uplink network card support hot plug ?		Not Support
Software upgrade method		Through TFTP/FTP or USB
4. The Power Supply and Power Requirements		
Type of Power Supply	AC	Support
Power supply range	AC	Operating Voltage: 100 ~ 240V; 50/60Hz Maximum Voltage: 90 ~ 264V; 47~63Hz
Dual Power Input ?		Support
The power supply module is pluggable ?		Support
Maximum power consumption		85W
5. Overcurrent and overvoltage protection		
Whether the equipment installation overcurrent, overvoltage protector ?		Inside the Power supply module
Surge protection level		2 KV
6. Others		
Hardware Size (HxWxD) in.		V330-52TX-RD: 4.36 x 44.0 x 33.0 cm (1.73 x 17.5 x 12.9 in.)
Weight (kg)		V330-52TX-RD: 5.5 kg (One PSU, one 4x10GE SFP+ Card )
Cooling Mode		Fan cooling (Front-to-back airflow)
Noise		< 50 dB
Quantity of Fans		4 (3 + 1 Backup)
Whether to support the fan module pluggable?		Support
If the fan support intelligent speed control function ?		Support
Operating Temperature Range		Operating temperature: 0 to 45 °C (Long term) -5 to 55 °C (Short term)
Relative Humidity		10 to 90%, non-condensing



## Network Module Summary

### 1. Basic

Network Module Name	NM-4SFP+
Port Configuration	4 x 10GE SFP+ ports
Hardware Size (H×W×D) in.	2.2 x 7.60 x 16.0 cm (0.87 x 2.99 x 6.29 in.)
Weight (kg)	0.2 kg
Rated Input Voltage	3.3VDC, 1.8VDC, 1.2VDC (From the main board of the V330-48T or V330-
Operating Temperature Range	Operating temperature: 0 to 45 °C (Long term) -5 to 55 °C (Short term)
Relative Humidity	10 to 90%, non-condensing

## Power Supply Module Summary

### 1. Basic

<b>Product Name</b>		PWR-AC
<b>Input and Output Specification</b>	<b>PWR-AC</b>	Operating Input Voltage: 100 ~ 240V; 50/60Hz Maximum Input Voltage: 90 ~ 264V; 47~63Hz Output Voltage: + 12VDC Output Max Power: 150W
<b>Hardware Size (H×W×D) in</b>		4.11 x 10.16 x 17.7cm (1.62 x 4 x 6.96 in.)
<b>Weight (kg)</b>		0.5 kg
<b>Cooling Mode</b>		Fan cooling
<b>Noise</b>		< 45 dB
<b>Operating Temperature Range</b>		Operating temperature: 0 to 45 °C (Long term) -5 to 55 °C (Short term)
<b>Relative Humidity</b>		10 to 90%, non-condensing

Software Features List			
Attribute		Description	Notes
Ethernet basic features	Ethernet	Ethernet interface operating modes: full duplex, half duplex, and auto-negotiation Ethernet interface operating rates: 10 Mbit/s, 100 Mbit/s, 1000 Mbit/s, 10 Gbit/s, and auto-negotiation	
Platform	OS	Debian Linux 7.2	
OpenFlow features	Port	Physical port GRE tunnel port IN_PORT CONTROLLER ALL	
	Match fields	Incoming port MAC SA MAC DA VLAN ID VLAN PCP L2 Type IP SA IP DA IP ToS L3 protocol TCP/UDP source port number TCP/UDP destination Port number GRE tunnel ID	
	Actions	Push VLAN ID Pop VLAN ID Set-field action for the following fields: source MAC address destination MAC address IPv4 destination address TCP or UDP destination port tunnel id	
	Instructions	Write-action Apply-action	
	Message types	Symmetric messages: hello echo request echo reply experimenter	
		Controller to Switch messages: handshake switch configuration flow table configuration modify state message queue configuration message packet-out message barrier message role request message set asynchronous configuration message	flow table configuration is reserved for future usage by OpenFlow spec 1.3
		Asynchronous messages: packet in flow removed port status error	
	Statistic	Description	
		Flow stats request: Match table id out port	
		Flow stats reply: table_id Match priority duration sec duration nsec packet_count byte_count actions	
		Agg flow stats request: table id out port	
		Agg flow stats reply: packet_count byte_count flow_count	
		Table stats reply: table_id name wildcards max_entries active_count lookup_count matched_count	
		Port stats: port_no rx_packets tx_packets rx_bytes tx_bytes rx_errors tx_errors rx_frame_err rx_over_err rx_crc_err collisions	
	OpenFlow channel connections	TCP Connection TLS connection	
GRE	GRE tunnel	Tunnel L2 over GRE	
	NvGRE	NvGRE	Not support GRE key as the entropy label to participate in ECMP path selection

**Performance & Spec Table**

Classification	Feature	Sub Feaure	Spec	Notes
Openflow	Controller	(Connected and managed at the same time)	3	
		Recommended controller	Ryu controller Floodlight	<b>Ryu is the only controller that fully supports OpenFlow spec 1.3</b>
		Connect number of Controller	3	
		Controller connect speed	5s	
		Controller delete speed	2s	
	Flow entry	Port/L2/L3/L4 combination	2.5K	
		Ether-type	10 types/2.5K (except fo ip,	
		GRE tunnel id+port combination Num (match)	150 different combination	
	Multi-action	Output per flow(Total)	64	
		Output physical port per flow	64	
		Output physical port per flow (with modify)		
		Output gre tunnel port per flow	64	
		Output gre tunnel port per flow (with set tunnel id)		
		Output per system(Total)	15K	
		Output physical port per system	15K	
		Output physical port per system (with modify)		
		Output gre tunnel port per system	4k	
		Output gre tunnel port per system (with set tunnel id)		
	GRE tunnel capacity	GRE tunnel id (match)	150 (tunnel port + tunnel id)	
		GRE set tunnel id per system	4k	
		GRE tunnel port number	63	
	Flow entry learning speed	Best case	1000 flows/s	
	Flow entry delete speed	Best Case	2000 flows/s	
	Hard time	Hard time accuracy	5s	
	Idle time	Idle time accuracy	10s	
	Flow table	Flow table number	1	
System	Jumboframe	Max packet size	9600 Bytes	
	Swiching Capacity	88G forwarding performance	Pass	
	Forwarding Latency	1GE port	2408ns (64bytes) 2416ns (1518bytes)	
		10G port	1749ns (64bytes) 1966ns (1518bytes)	