

User's Guide

AVAYA™ X330W2-DS1

MULTISERVICE WAN ACCESS ROUTER MODULE

SOFTWARE VERSION 3.9

Contents

List of Tables	ix
List of Figures	xi
Preface	I
About This Guide	I
Objectives	I
Audience	I
Conventions used in the Documentation	I
CLI	I
Notes, Cautions and Warnings	II
Before You Install	II
Notice	II
Your Responsibility for Your System’s Security	II
Important Safety Information	III
Requirements and Specifications	III
Technical Specifications	III
Power & Heat Dissipation	IV
X330WAN Standards Supported	IV
Standards and Compliance	V
Safety Standards Compliance	VI
Electromagnetic Compatibility Standards	VI
Telecommunication Standards	VII
NEBS Compliance Standards	VIII
How to Contact Us	VIII
Chapter 1 Overview	1
Branch Office Connectivity to Headquarters	1
Small/Medium Business Connectivity Directly to a Service Provider	1
Functional Concepts	2
WAN Access	2
Routing	2
Security	2
Convergence	2
Features	3
Layer 1 Features	3
Layer 2 Features	3
Layer 3 Features	4

	Convergence Features	4
	QoS Features	5
	Policy	5
	Controlling Network Access to the X330WAN	6
	Avaya X330WAN Network Management	7
	Command Line Interface (CLI)	7
	Avaya P330 Device Manager (Embedded Web)	7
	VisAbility™	7
	Interfaces.....	8
	Physical Interfaces	8
	Virtual Interfaces	8
	Data Flow	10
	Front Panels and LEDs	10
	X330W-2DS1 Front Panel	11
	X330WAN LEDs	11
Chapter 2	Installation.....	13
	Safety Information	13
	Device Support	13
	Before You Install	13
	Installing an X330WAN Module into an Avaya P330 Switch	14
	Power On Self Test	14
	Avaya P330 LEDs	15
	Removing an X330WAN Module from an Avaya P330 Switch	16
Chapter 3	Initial Configuration.....	19
	Connecting the X330WAN	19
	Connecting the E1/T1 Ports	19
	Connecting the Ethernet Port	19
	Connecting the Console Port	19
	Console Pin Assignments	20
	Configuring the X330WAN	21
	Establishing a Serial Connection	21
	Establishing a Modem Connection	22
	Checking the Modem Configuration	23
	Configuring Fast Ethernet Interfaces	23
	Configuring E1/T1 Interfaces	23
	Configuring Loopback Interfaces	26
	Checking the Loopback/Fast Ethernet/T1/E1/IP Interface	26
	Configuration	26
	Saving Your Configuration	27
	Establishing a Telnet Connection	27
	X330WAN Default Settings	28
Chapter 4	Common Configurations	29

	Connecting Branch Offices to Headquarters	29
	Connecting a Small Office to the Internet	31
	Using the X330WAN with Security	32
Chapter 5	Troubleshooting	33
	Monitoring Traffic	33
	Handling E1/T1 Alarms	33
	Alarm Conditions	34
	LOS	34
	LOF/Red	34
	High Ber/Major	35
	RAI/Yellow	35
	AIS/Blue	35
	Alarm Detection	36
	Using Loopbacks	36
	Troubleshooting VoIP Transmission	37
Chapter 6	Embedded Web Manager	39
	System Requirements	39
	Running the Embedded Manager	40
	Installing the Java Plug-in	42
	Installing the On-Line Help and Java Plug-In on your Web Site	43
	Documentation and Online Help	43
	Software Download	43
Chapter 7	X330WAN CLI Commands	45
	Introduction: About CLI	45
	X330WAN CLI Prompts	46
	General: Device Commands	47
	clear screen	47
	clear snmp trap	47
	clear timezone	47
	copy running-config startup-config	47
	copy running-config tftp	48
	copy startup-config tftp	48
	copy tftp startup-config	48
	copy tftp EW_archive	49
	copy tftp SW_image	49
	dir	50
	erase startup-config	51
	get time	51
	hostname	51
	no hostname	52
	nvram initialize	52
	reset	52

set boot bank	53
set logout	53
set snmp trap	54
set snmp trap auth	55
set system contact	55
set system location	55
set system name	56
set time client	56
set time protocol	56
set time server	57
set timezone	57
show boot bank	57
show copy status	58
show dev log file	58
show erase status	58
show image version	59
show module-identity	59
show running-config	59
show snmp	60
show startup-config	60
show system	60
show tftp download software status	61
show tftp download/upload status	61
show time	62
show time parameters	62
show timezone	62
sync time	62
tech	63
terminal length	63
terminal width	63
Layer 3 CLI Commands	64
arp	64
arp timeout	64
clear arp-cache	65
clear ip route	65
default-metric (Interface context)	65
default-metric (Router-OSPF context)	66
default-metric (Router-RIP Mode)	66
distribution-list (Router-RIP Mode)	66
ip address	67
ip admin-state (Interface context)	68
ip bootp-dhcp network (Interface context)	68
ip bootp-dhcp relay	68
ip bootp-dhcp server (Interface context)	69

ip broadcast-address (Interface Context)	69
ip default-gateway	70
ip directed-broadcast (Interface context)	71
ip icmp-errors	71
ip max-arp-entries	71
ip max-route-entries	72
ip netbios-rebroadcast (Interface context)	72
ip netmask-format	73
ip ospf authentication-key (Interface context)	73
ip ospf cost (Interface context)	74
ip ospf dead-interval (Interface context)	74
ip ospf hello-interval (Interface Mode)	74
ip ospf priority (Interface Mode)	75
ip ospf router-id	75
ip proxy-arp (Interface context)	76
ip redirect (Interface context)	76
ip rip authentication key (Interface context)	77
ip rip authentication mode (Interface context)	77
ip rip default-route-mode (Interface context)	78
ip rip poison-reverse (Interface Context)	78
ip rip rip-version (Interface context)	79
ip rip send-receive (Interface context)	79
ip rip split-horizon (Interface Context)	80
ip route	81
ip routing	82
ip routing-mode (Interface Context) ???	82
ip vrrp (Interface Context)	82
(ip vrrp) address	83
(ip vrrp) auth-key	83
(ip vrrp) override addr owner	84
(ip vrrp) preempt	84
(ip vrrp) primary	85
(ip vrrp) priority	85
(ip vrrp) timer	86
network (Router-OSPF context)	86
network (Router-RIP Context)	87
ping	87
redistribute (Router-OSPF context)	88
redistribute (Router-RIP context)	88
router ospf	89
router rip	89
router vrrp	89
show ip arp	89
show ip icmp	90

show ip interface	91
show ip ospf	92
show ip ospf database	92
show ip ospf interface	93
show ip ospf neighbor	93
show ip protocols	94
show ip reverse-arp	95
show ip route	96
show ip route best-match	96
show ip route static	96
show ip route summary	97
show ip vrrp detail	98
timers basic (Router-RIP context)	99
timers spf (Router-OSPF context)	100
traceroute	100
Policy CLI Commands	101
ip access-default-action	101
ip access-group	101
ip access-list	102
ip access-list-cookie	103
ip access-list-copy	103
ip access-list-dscp operation	104
ip access-list-dscp name	104
ip access-list-dscp precedence	105
ip access-list-dscp trust	105
ip access-list-name	106
ip access-list-owner	106
ip composite-op access	107
ip composite-op dscp	107
ip composite-op name	108
ip composite-op notify	108
ip composite-op priority	109
ip distribution access-default-action	110
ip distribution access-list	110
ip distribution access-list-cookie	111
ip distribution access-list-copy	111
ip distribution access-list-name	112
ip distribution access-list-owner	112
ip simulate	113
no ip composite-op	114
no ip distribution access-list	114
set qos policy-source	115
show ip access-group	115
show ip access-list-dscp	116

show ip access-lists	117
show ip access-lists details	117
show ip access-list-summary	118
show ip active-access-groups	118
show ip composite-op	118
validate-group	119
WAN CLI Commands	120
async mode interactive (Console interface context)	120
async mode terminal (Console interface context)	120
async reset-modem (FastEthernet interface context)	120
autoneg	120
bandwidth (Interface context)	120
cablelength long (Controller Context)	121
cablelength short (Controller Context)	122
channel-group (Controller context)	123
clear fragment	124
clock source (Controller Context)	124
controller	125
description (Controller context)	125
description (Interface context)	126
ds-mode	126
duplex (FastEthernet interface context)	127
encapsulation ppp (Serial interface context)	128
fragment chain	128
fdl	128
fragment size	129
fragment timeout	129
framing (Controller context)	130
interface Console	131
interface FabricFastEthernet	131
interface FastEthernet	132
interface Loopback	132
interface Serial	133
keepalive (Serial interface context)	133
linecode (Controller context)	133
loopback diag (Controller Context only)	134
loopback local(Controller context)	135
loopback remote (Controller context)	135
mtu (Serial interface context)	136
no channel group (Controller context)	136
no loopback (Controller context)	136
ppp authentication (Console interface context)	137
ppp timeout ncp (Serial interface context)	137
ppp timeout retry (Serial interface context)	138

queue-limit (Serial interface context)	138
remote (Controller context)	138
show controllers	139
show controllers remote	143
show fragment	144
show interfaces	144
show ip distribution access-lists	146
show line console	146
show logout	147
show queueing	147
shutdown (Controller context)	148
shutdown (Interface context)	148
speed (Console context)	148
speed (FastEthernet interface context)	149
timeout absolute (Console interface context)	149
voip-queue (Serial interface context)	150
How to Contact Us	151
In the United States	151
In the EMEA (Europe, Middle East and Africa) Region	151
In the AP (Asia Pacific) Region	153
In the CALA (Caribbean and Latin America) Region	153

List of Tables

Table 1.1	X330WAN LED Descriptions	11
Table 3.1	Pinout of the Required Connection for Console Communications	20
Table 3.2	X330WAN Default Settings	28
Table 5.1	Alarms.....	33
Table 7.1	X330WAN-2DS1 CLI Prompts	46

List of Figures

Figure 1.1	Serial Interfaces.....	9
Figure 1.2	Fabric Fast Ethernet Interfaces	9
Figure 1.3	Fast Ethernet Interfaces	10
Figure 1.4	X330W-2DS1 Front Panel	11
Figure 2.1	LED Indicators for a WAN Access Router Module on the Avaya P330 Front Panel1	16
Figure 4.1	Branch Office to Headquarters.....	29
Figure 4.2	Small Office to the Internet	31
Figure 4.3	X330WAN with Security	32
Figure 6.1	The Welcome Page	40
Figure 6.2	Web-based Manager	41
Figure 7.1	X330WAN CLI Contexts	46

Preface

About This Guide

This guide describes the functioning and features of the X330WAN expansion module, and its basic and common configurations. The commands specific to the X330WAN module are listed and described in a separate chapter of this guide, as well as included in the basic and common configuration chapters.

Objectives

The purpose of this guide is to describe the concepts used in the X330WAN, and provide the necessary information to configure and manage the X330WAN module.

Audience

This guide is intended for customers of Avaya who have networking experience, and are familiar with router-based internetworking.

Conventions used in the Documentation

Documentation for this product uses the following conventions to convey instructions and information:

CLI

- Mandatory keywords are in the **computer bold** font.
- Information displayed on screen is displayed in `computer` font.
- Variables that you supply are in pointed brackets `<>`.
- Optional keywords are in square brackets `[]`.
- Alternative but mandatory keywords are grouped in braces `{}` and separated by a vertical bar `|`.
- Lists of parameters from which you should choose are enclosed in square brackets `[]` and separated by a vertical bar `|`.
- If you enter an alphanumeric string of two words or more, enclose the string in inverted commas.

Notes, Cautions and Warnings



Note: Notes contain helpful information or hints or reference to material in other documentation.



Caution: You should take care. You could do something that may damage equipment or result in loss of data.



Warning: This means danger. Failure to follow the instructions or warnings may result in bodily injury. You should ensure that you are qualified for this task and have read and understood *all* the instructions

Before You Install

Notice

Every effort was made to ensure that the information in this book was complete and accurate at the time of printing. However, information is subject to change.

Your Responsibility for Your System's Security

Toll fraud is the unauthorized use of your telecommunications system by an unauthorized party, for example, persons other than your company's employees, agents, subcontractors, or persons working on your company's behalf. Note that there may be a risk of toll fraud associated with your telecommunications system and, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services. You and your system manager are responsible for the security of your system, such as programming and configuring your equipment to prevent unauthorized use. The system manager is also responsible for reading all installation, instruction, and system administration documents provided with this Product in order to fully understand the features that can introduce risk of toll fraud and the steps that can be taken to reduce that risk. Avaya does not warrant that this product is immune from or will prevent unauthorized use of common-carrier telecommunication services or facilities accessed through or connected to it. Avaya will not be responsible for any charges that result from such unauthorized use.

If you suspect that you are being victimized by toll fraud and require assistance, contact the Toll Fraud Intervention Hotline at +1 800 643 2353 or contact your local Avaya representative.

Important Safety Information

You must read the following safety information before carrying out any installation or removal of components, or any maintenance procedures.



Warning: Warnings contain directions that you must follow for your personal safety. Follow all instructions carefully.



Caution: The Avaya P330 switches and modules contain components sensitive to electrostatic discharge. Do not touch the circuit board unless instructed to do so.

Please read the following safety information thoroughly in conjunction with the safety information supplied with the Switch before installing an X330WAN.

- This unit operates under SELV (Safety Extra Low Voltage) conditions, according to IEC 950, the conditions of which are maintained only if the equipment to which it is installed is also operational under SELV.

Requirements and Specifications

This section provides the technical requirements and specifications of the X330WAN.

Technical Specifications

This section provides the technical specifications for all Avaya X330WAN access router modules currently available.

The following table shows the X330WAN operating specifications.

Item	Value
Operating Temperature	-5 to 50° C (23–122°F)
Operating Humidity	5% to 95% relative humidity, non-condensing
Mechanical Shocks	TR-NWT-000063 - Network Equipment Building System, Generic Equipment Requirements, chapters: 4.4.1 Shock Criteria 4.4.2 Vibration Criteria 5.4.1 Shock and Vibration Test Methods

Power & Heat Dissipation

The power and heat dissipation statistics for the X330WAN are listed below.

- Power for the X330WAN comes from the P330. The X330WAN requires 45 Watts.
- Heat dissipation: the X330WAN conforms to the P330 operating temperature range.

X330WAN Standards Supported

This section provides lists of the standards supported by the X330WAN.

The following table shows the X330WAN ANSI standards supported.

ANSI #	Details
T1.231	T1
T1.403	T1

The following table shows the X330WAN ITU-T standards supported.

ITU-T #	Details
G.703	E1
G.704	E1

The following table shows the X330WAN RFC standards supported.

RFC #	Details
791	Internet Protocol Datagram Reassembly Algorithms
792	Internet Control Message Protocol (ICMP)
826	Ethernet Address Resolution Protocol (ARP)
894	Standard for the transmission of IP datagrams over Ethernet
951	Bootstrap Protocol
1058	Routing Information Protocol (RIP)
1213	MIB-II, System Group IP MIB, SNMP, TCP, UDP, ICMP
1215	Defining Traps for use with the SNMP

RFC #	Details
1471	Definitions of Managed Objects for the IP Network Control Protocol of the Point-to-Point Protocol
1473	Definitions of Managed Objects for the IP Network Control Protocol for the Point-to-Point Protocol
1533	DHCP Options and BOOTP Vendor Extensions
1534	Interoperation Between DHCP and BOOTP
1541	Dynamic Host Configuration Protocol (DHCP)
1542	Clarifications and Extensions for the Bootstrap Protocol
1724	RIP2
1757	Monitoring and Statistics
1812	IPv4
1850	OSPF Version 2 Management Information Base
1858	Security Considerations for IP Fragment Filtering
2096	ipCidRoute Table
2338	VRRP
2494	Definitions of Managed Objects for the DS0 and DS0 Bundle Interface Type
2495	Definitions of Managed Objects for the DS1, E1, DS2, and E2 Interface Types
2508	Compressing IP/UDP/RTP Headers for Low-Speed Serial Links
2863	The Interfaces Group MIB
3128	Protection Against a Variant of the Tiny Fragment Attack

Standards and Compliance

The X330WAN has undergone all required regulatory compliance test procedures (EMC, Telco, Safety) for Type Approval in the following countries:

- USA
- Canada
- European Union

- Japan
- China
- South Korea
- Brazil
- Mexico
- Israel

Safety Standards Compliance

The following table shows the safety standards compliance for the X330WAN.

Certification	Description
CE	Europe
EN60950	Western Europe Amendments A1,A2,A3 - Effective now. Amendments A4,A11 - Effective August 1st 2003.
UL60950	
Global IEC, CB Schema report IEC 950	IEC 950 with country deviations for: EU, Japan, South Korea, Brazil, and China
NOM 16 and 19	Mexico

Electromagnetic Compatibility Standards

The following table shows the X330WAN compliance with EMC standards.

Certification	Description
FCC Part 15, Class A and Class B	USA Outdoors. Note: Class B compliance is obtained with one X330WAN module in a stack of P330 switches. More than one expansion module per stack might cause deviation from Class B compliance.
IECS 003, Class B	Canada.
EN55022(1998) Class B Based on CISPR 22.	Europe. Radiation and Conducted Emissions. Note: P330 switches are certified as Class A.

Certification	Description
EN55024 Based on CISPR 24.	Europe. Immunity Characteristics. Includes: <ul style="list-style-type: none"> • IEC61000-4-2 - Electrostatic discharge • IEC61000-4-3 - Radiated immunity • IEC61000-4-4 - Fast transient • IEC61000-4-5 - Surge immunity • IEC61000-4-6 - Immunity to conducted disturbances • IEC61000-4-8 - Power frequency magnetic field immunity • IEC61000-4-11 - Voltage dips.
EN61000-3-2	Power supply - harmonic current.
EN61000-3-3	Power supply - flicker.
VCCI Class B	Japan.

Telecommunication Standards

The following table shows the X330WAN compliance with Network standards.

Certification	Description
FCC Part 68	USA. Protection of telephone networks from harm caused by terminal equipment/wiring.
CS03	Industry Canada. Similar to FCC Part 68.
TBR12	Europe. Unstructured 2048 Kbps digital leased line - terminal equipment requirements.
TBR13	Europe. Structured 2048 Kbps digital leased line - terminal equipment requirements.
JATE	Japan.

NEBS Compliance Standards

The following table shows the X330WAN compliance with NEBS standards.

Certification	Description
NEBS level 3	USA Electrical and Physical.

How to Contact Us

If you need additional help, the following services are available. You may need to purchase an extended service agreement to use some of these services. Contact your Avaya representative for more information.

To contact Avaya's technical support, please call:

- From the United States: 1-800-237-0016, press 0, then press 73300
- From South America and Central & Latin America (CALA): 1-727-217-2425 for Spanish
- Outside North America: +972-3-645-8458

For updated information, visit <http://www.avaya.com/support>.

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Overview

Avaya presents the X330WAN, a series of WAN Edge Router expansion modules for the P330 Stackable Switching System and G700 Gateway. The X330WAN is part of Avaya's Converged Networks Solution that includes IP telephones, data switches and IP exchanges.

Each X330WAN access router module contains its own powerful onboard CPU and software, which functions as a dedicated WAN Edge Router.

The X330WAN is designed around the following concepts:

- WAN access
- Routing
- Security
- Convergence

The first of the X330WAN series is the X330W-2DS1 access router module, with 2 E1/T1 interfaces, a single 10/100Base-T Fast Ethernet port, and a serial Console port.

The primary uses of the X330WAN are the following:

- Branch Office connectivity to Headquarters.
- Small/Medium Business connectivity directly to an ISP (Internet Service Provider).

Branch Office Connectivity to Headquarters

The X330WAN enables connecting the LAN of branch offices based on the P330 switch to the headquarters office, connecting to the corporate WAN. Each branch office in this solution would use the Internet services supplied via the headquarters ISP, or connect directly to the Internet independently.

Installing an X330 WAN Access Router in a G700 Gateway, provides cost-effective and space-saving IP Telephony and WAN routing for SMEs.

The G700 and P330 can be stacked together, to provide a comprehensive converged solution.

Small/Medium Business Connectivity Directly to a Service Provider

The X330WAN access router enables SMEs (Small/Medium Enterprises) to connect their LAN directly to an ISP using a P330 switch. This solution provides independence and flexibility to the SMEs in the flow of data and other Internet services.

Functional Concepts

One basis for success in today's business world is combining resources. The X330WAN supplies you with combined required access functionality for branch offices and SMEs. The X330WAN was designed and developed to include all of the functions necessary for branch offices and SMEs.

The following sections describe the overall concepts that together comprise the functioning of the X330WAN access router.

For examples of common configurations using the following concepts, refer to Chapter 4: *Common Configurations*.

WAN Access

WAN access provides a link for routing packets between their WAN and Ethernet/LAN interfaces, enabling heavy data transfer. WAN access can connect branch offices to headquarters, and provide fast access to the Internet and e-mail. When combined with the Avaya G700 Gateway or to the Avaya DEFINITY VoIP services are provided.

Routing

The X330WAN access router modules provides routing capabilities in a P330 device. They route packets between their WAN and Ethernet/LAN interfaces. The X330WAN access router modules' routing software is based on the routing software of the Avaya P333R and P333R-LB. It provides support for the major routing protocols. It also provides a L3/L4 Policy classifier working per Layer 2 interface/direction, controlling access and QoS (tagging and mapping to internal queuing mechanism). The X330WAN independently controls all traffic flow in the P330 from the LAN to the WAN.

Security

The X330WAN currently contains the infrastructure for all security functionality planned for future releases, such as Firewall and VPN. Licenses will be issued for different security options, when development is completed.

Security currently can be achieved with the X330WAN for the initial release by connecting the Fast Ethernet port of the X330WAN via an external firewall to a port on the P330 switch. The X330WAN module is connected to the Internet via it's WAN ports.

Convergence

The X330WAN enables a combined data and VoIP solution when used in conjunction with a VoIP gateway, such as the G700. This is achieved by connecting the G700 to the LAN's P330 stack, and inserting the X330WAN in one of the

expansion slots, either of the P330 stack or of the G700. Standard IP phones can be connected to the P330 stack, or Avaya Legacy phones can be connected directly to the G700 Gateway. In this solution the X330WAN provides access to the corporate WAN, while end-to-end QoS and Policy ensure that the IP telephony functions flawlessly.

Features

An Avaya P330 stack may have X330WAN access router modules inserted in each of the switches in the stack with an expansion slot. A maximum stack configuration of 10 P334T switches using the X330W-2DS1 provides 480 Ethernet 10/100 ports, and 20 E1/T1 ports. The X330W-2DS1 is the first product of the X330WAN series. The following is a list of X330W-2DS1 features.

Layer 1 Features

- 2 channelized/fractionalized E1/T1 ports, RJ-48 connectors.
- 10/100Base-T Auto Negotiation Fast Ethernet port.
- 100 Mbps, Full Duplex Fabric Fast Ethernet interface (for internal connection to the P330).
- Serial RS-232, RJ-45 port for console and dial-in modem connection.

Layer 2 Features

- PPP over channeled and fractional E1/T1. The X330WAN has the ability to map several PPP sessions to a single E1/T1 interface.
- Support for up to 253 VLANs on the Fabric Fast Ethernet LAN interface. Any combination of these VLANs can be configured to the X330WAN module.
- Auto-Negotiation - the 10/100 port on the X330WAN supports Auto-Negotiation which automatically detects and supports the duplex mode and speed of a connected device. This means that you can simply connect the X330WAN to Ethernet or Fast Ethernet equipment at full or half duplex without configuration.
- VLANs - VLANs assigned on the Fabric Fast Ethernet port enable the X330WAN to perform inter-VLAN routing. This enables the user to configure specific VLANs to access the X330WAN, while the remaining VLANs are denied access to the WAN.

Layer 3 Features

- Supports RIP v1/v2 routing protocols
- Supports Single Area OSPF routing protocol - the X330WAN can be configured as an OSPF Autonomous System Boundary Router (ASBR) by configuration of route redistribution. The X330WAN can be installed in the OSPF backbone area (area 0.0.0.0) or in any OSPF area that is part of a multiple areas network. The X330WAN cannot be configured to be an OSPF area border router itself.
- Supports VRRP redundancy protocol - supported only on the X330WAN's LAN (Fast Ethernet and Fabric Fast Ethernet) ports.
- Supports Equal-Cost MultiPath (ECMP) - allows load balancing by splitting traffic between several equivalent paths.
- Supports Distribution Lists - these lists define which routers are trusted regarding OSPF. Routing information is only allowed to be transmitted to or received from the trusted routers.

Convergence Features

- Priority queueing - the X330WAN supports the ability to separate traffic into 4 strict priority queues per interface. The assignment of placement in the queues is performed using Policy.
- Guaranteed delay for VoIP traffic - the X330WAN supports VoIP Queue mode. In this mode traffic labelled as voice traffic receives preference to all other traffic. The X330WAN default mode is optimized for the G.729 codec.
- Random Early Detect (RED) - the X330WAN uses RED in order to improve the performance of the network when overloaded. RED sends signals to transmitting hosts stating that the bandwidth is limited, and that they should reduce their transmission speed.
- RTP Header Compression - The Real Time Protocol (RTP) is the basis of common VoIP traffic. RTP runs over UDP, and incurs a 12-byte header on top of other (IP, UDP) headers. Running on PPP or Frame-Relay, this protocol can be compressed.
X330WAN RTP Header Compression process is based on the fact that the packet order on a PPP link is preserved. As a result, many times only the "deltas" from the previous packet's header needs to be sent, and not the full header. Moreover, since the "deltas" are often constant, the second order "delta" is 0 and does not need to be transmitted. In many cases, all three headers (IP+UDP+RTP~40 bytes) can be reduced to a size of 2-4 bytes.
- Fragmentation and Reassembly - the X330WAN supports:
 - Fragmentation of IP packets according to RFC 791.
 - Reassembly of IP packets destined only to the X330WAN (i.e., packets that have its IP address as their destination address).

Fragmented IP packets with destinations other than this X330WAN will NOT be reassembled by this X330WAN.

Reassembly is associated with the following user configurable parameters:

- The number of maximum possible concurrent reassembled packets:
Min=0; Max=200; Default=100.
- The time, in seconds, to wait for a packet to be reassembled:
Min=5; Max=120; Default=10.
- The maximum number of fragments allowed per packet:
Min=2; Max=2048; Default=64.

In addition, it is possible to restore the reassembly parameters to their default values. This discards all packets currently waiting to be reassembled.

- Access Control and QoS per interface and direction - the X330WAN supports individual Access Control and QoS lists per interface, and per direction. This enables the user to configure access and QoS for each direction (transmit/receive) of each session.

QoS Features

Efficient use of QoS enables the X330WAN to assign the proper priority to different incoming and outgoing traffic flows to minimize the affect of one flow on the other, and to prevent a low priority traffic flow from affecting a high priority traffic flow and the like. To achieve this, the X330WAN implements multiple receiving queues and configurable transmitting queues (4 queues per interface).

Priority queuing is implemented among the four queues on each interface:

- Voice (highest priority)
- High priority data
- Better than best effort
- Best effort (low priority)

To insure minimal affect of one flow to the other, the following priority order (from highest to lowest) is always maintained:

- Transmit tasks - highest priority.
- Receive tasks - medium priority.
- Router tasks - lowest priority.



Note: You can adjust the queue length for different needs. Queue length should always be kept a small as possible, while still maintaining a flow. It is recommended to always use the default queue length, as this is the optimal calculated length.

Policy

In the X330WAN a policy list contains:

- A set of classification rules based on a source IP, destination IP, source port, destination port, protocol, and TCP Established bit. The IP addresses can include wildcards.

- A set of possible actions arranged in a Composite Operations Table.
- A set of DSCP mappings.

Several policy lists can be activated concurrently, with each list applied to a different interface and direction.

Each Serial interface (PPP session), the Fast Ethernet port, and the FabricFastEthernet interface can have an ingress and egress active Policy list. For the FabricFastEthernet interface, this list applies to all L2 interfaces (VLANs) mapped to this interface.

A default Policy list (list 0) is always present and active until a different Policy list is activated. The default list has one rule (permit all), a default DSCP mapping, and a default Composite Operations table.

Whenever a new Policy list is created, it contains a copy of the list 0 components.

Policy rules and the Composite Operations Table include the following actions:

- Access Control actions (for all types of interfaces):
 - Drop
 - Drop and Notify
 - Forwarding
- QoS actions:
 - DSCP coloring (value changing) for all types of interfaces.
 - Priority tag modifications for:
 - Packets that traverse the inband LAN or the Ethernet port. This will be marked as the IEEE 802.1p tag in the packet (only on the FabricFastEthernet interface).
 - Classification into one of the 4 transmit queues.

The Composite Operation Table contains pre-defined entries for the basic policies that existed in the P333R. These entries are created by the agent for each Access List and are Read Only.

Controlling Network Access to the X330WAN

Using Policy lists, you can control all traffic designated to and from the X330WAN's CPU, including management and routing protocols traffic. By activating Policy rules defined for a Loopback interface, you can control all traffic entering/leaving the CPU from/to all X330WAN interfaces. Rules governing traffic to the CPU can be defined at a single point, regardless of the actual interface which the packet entered and the specific IP address being managed.



Note: A Policy list activated on a Loopback interface does not apply to packets routed by the CPU.

Avaya X330WAN Network Management

Comprehensive network management is a key component of today's networks. Avaya provides multiple ways of managing the X330WAN to suit your needs.

Command Line Interface (CLI)

The Avaya P330 CLI provides a terminal type configuration tool for local or remote configuration of X330WAN features and functions. X330WAN configurations are saved in the format of CLI commands.

The CLI is accessed by performing one of the following:

- Telnet to one of the IP interfaces of the X330WAN.
- Use the **session wan** command from the Layer 2 agent of the stack.
- Use the serial Console port on the X330WAN.

Avaya P330 Device Manager (Embedded Web)

The built-in Avaya P330 Device Manager (Embedded Web Manager) allows you to manage an X330WAN using a Web browser without purchasing additional software. This application works with the Microsoft® Internet Explorer and Netscape® Navigator web browsers and Sun Microsystems Java™ Plug-in.

The Device Manager is accessed by performing one of the following:

- Using your Web browser, browse to the IP interface configured on the X330WAN.
- Using your Web browser, browse to the Layer 2 agent (stack) IP address.

For more information on the Embedded Web Manager, refer to Chapter 6, Embedded Web Manager.

VisAbility™

When you need extra control and monitoring or wish to manage other Avaya LAN backbone and wireless equipment, then the Avaya Multiservice Network Manager (MSNM) is the answer. This suite provides the ease-of-use and features necessary for optimal network utilization. MSNM supports the following operating environments:

- Windows NT®/2000 and Solaris 8.
- Stand-Alone mode with Windows® NT®/2000.
- HP OpenView for Windows NT/2000 and Solaris 8.

Interfaces

The X330WAN includes Physical and Virtual interfaces.

Physical Interfaces

The following are the X330WAN physical interfaces:

- **WAN Interfaces** – 2 ports, configurable for E1 or T1.
- **LAN Interface** – FastEthernet interface.
This interface is an autosensing 10/100Mbps Ethernet port. It can be used to connect to a LAN or to a firewall/VPN.
- **P330 Switching Fabric** – FabricFastEthernet interface.
This is an internal 100Mbps connection to the P330 switching fabric. It supports VLANs, and is compatible with the P330.
When connecting the X330WAN in Access-Router Only mode (e.g., no VPN or firewall), this interface can be used to connect to the hosting P330 switch.
- **Console Interface** – used to connect a terminal for local management, or a modem for remote management.

Virtual Interfaces

The following are the X330WAN virtual interfaces:

- **Loopback** – This interface is a logical interface that is not mapped to any physical interface. Its purpose is to represent the router with an IP address that is always reachable. This is mainly used for network troubleshooting. It also provides a 'Router ID' in the OSPF routing protocol.
Since the Loopback Interface is not connected to any physical interface, an entry in the routing table cannot have the loopback interface's subnet as its next hop.



Note: The first interface created in the X330WAN should be an IP interface defined over the Loopback interface.

- **VLAN (on the FabricFastEthernet Interface)** – The P330 can have multiple VLANs defined within its switching fabric. To connect to the switching fabric, the X330WAN supports up to 253 VLANs.
- **Serial Link** – This is a virtual interface that is created over a portion of an E1 or a T1.
This interface is used to directly connect the X330WAN to another device at the other end of a leased line, and supports Encapsulation PPP and Frame Relay protocols.

Figure 1.1 provides a graphic representation of the serial interfaces.

Figure 1.1 Serial Interfaces

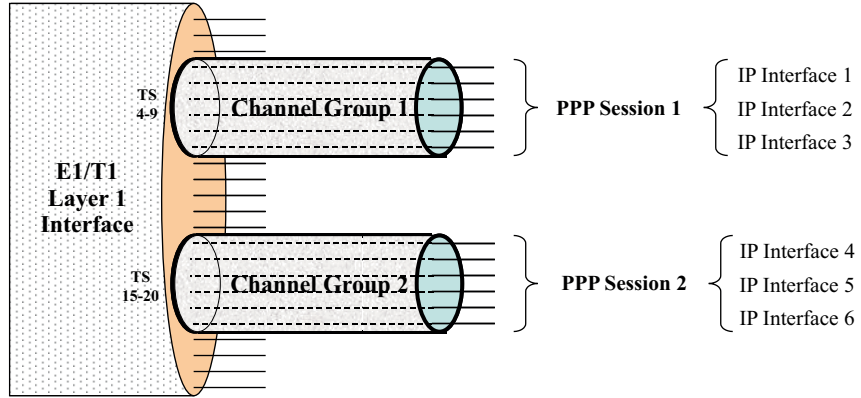


Figure 1.2 provides a graphic representation of the Fabric Fast Ethernet interfaces.

Figure 1.2 Fabric Fast Ethernet Interfaces

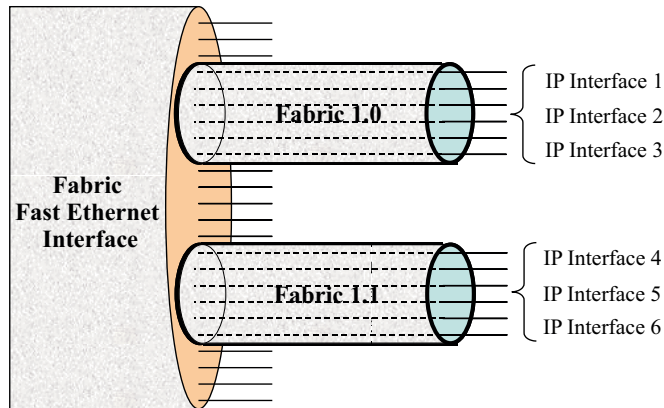
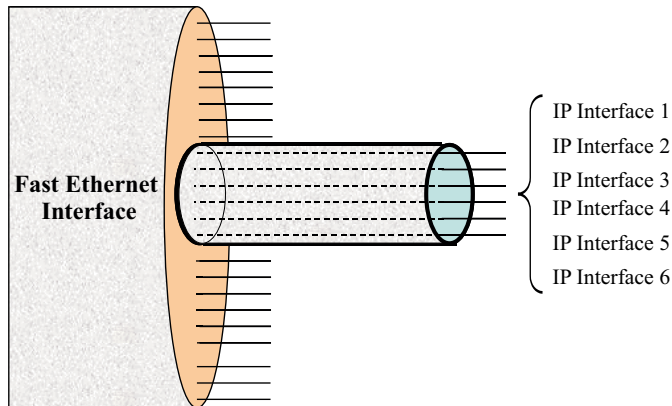


Figure 1.3 provides a graphic representation of the Fast Ethernet interfaces.

Figure 1.3 Fast Ethernet Interfaces



Note: One or more IP interfaces can be defined over each virtual, Fast Ethernet, or Fabric Fast Ethernet interfaces.

Data Flow

The X330WAN has the following major traffic paths:

- WAN to LAN (external) – The X330WAN can route WAN traffic through a firewall and/or a Virtual Private Network.
- WAN to LAN (internal) – The X330WAN can route WAN traffic directly to/from the LAN.

Front Panels and LEDs

This section illustrates the front panels of the various available X330WAN access router modules and describes their LED functions.

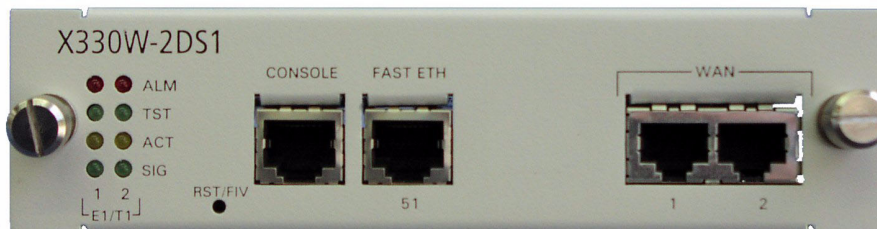
An X330WAN front panel contains LEDs, WAN and Ethernet connectors, and a console connector. The status LEDs provide at-a-glance information.

The front panel LEDs consist of Port LEDs which display information for each port.

X330W-2DS1 Front Panel

On the front panel of the X330W-2DS1, there is a column of four LEDs for each port in the access router module.

Figure 1.4 X330W-2DS1 Front Panel



X330WAN LEDs

The following table describes of the LEDs on the front panel of the X330WAN.

Table 1.1 X330WAN LED Descriptions

LED Name	Color	Description	LED Status
ALM	Red	Alarm	ON – The port is reset or an E1/T1 alarm condition is present.
			OFF – Initialization is successful and the software is running correctly.
TST	Green	Test	ON – Port is being initialized or loopback is active.
			OFF – Port initialization completed and loopback is not active.
ACT	Yellow	Active	ON – At least one PPP session is active.
			OFF – No active PPP session.
SIG	Green	Signal	ON – A signal is detected on the port.
			OFF – No signal is detected on the port.

Installation

This chapter describes the X330WAN installation procedure.

Safety Information



Warning: Installation and removal of the X330WAN must only be implemented by qualified personnel.



Caution: Hold the X330WAN only by the edges to avoid damage from static electricity. Do not touch the top or bottom of the circuit board. If possible, wear a wrist-strap and use an anti-static bag.

Device Support

The X330WAN enables you to connect your Avaya P330 switch to a WAN.

The X330WAN can be inserted into switches of the Avaya P330 product line which include an expansion slot. These include the following Avaya P330 family switches:

- Avaya P333T Embedded S/W Ver. 3.9 and higher
- Avaya P334T Embedded S/W Ver. 3.9 and higher
- Avaya P332MF Embedded S/W Ver. 3.9 and higher
- Avaya P333R Embedded S/W Ver. 3.9 and higher
- Avaya P333R-LB Embedded S/W Ver. 3.9 and higher
- Avaya P333T-PWR Embedded S/W Ver. 3.9 and higher

Before You Install

The X330WAN can only be installed in the above Avaya switches using firmware ver. 3.9 or higher. If you need to upgrade the software, obtain the latest version of the software from <http://www.avaya.com/support> and download it according to the instructions found in the User's Guide that accompanies your Avaya P330 switch.

You can see the firmware version of your Avaya switch using the **"show image version"** command.

Installing an X330WAN Module into an Avaya P330 Switch



Note: Like all other P330 expansion modules, the X330WAN modules are NOT hot swappable. Removing/inserting an X330WAN with the power on resets the enclosing P330 switch.

To install an X330WAN access router module:

- 1 Remove the blanking plate or other sub-module from the P330 switch assigned to house the X330WAN module, if there is one installed.
 - 2 Insert the X330WAN module gently into the slot, ensuring that the lower printed circuit board (PCB) is aligned with the guide rails. The PCB, *not* the metal base plate, fits into the guide rail.
 - 3 Press the X330WAN module in firmly until it is completely inserted into the P330 switch. If the module is not inserted completely, the P330 switch will not successfully reset.
 - 4 Gently tighten the two screws on the front panel of the access router module.
-



Note: The Avaya P330 switch must not be operated with the expansion slot open. The expansion slot should either include a sub-module, or be covered with the supplied blanking plate.

- 5 Power up the P330 switch.
- 6 Follow the post-installation checks, as described in “Power On Self Test” below.

Power On Self Test

When you power up the Avaya P330 switch with a X330WAN module inserted, both perform a self test. This test takes about 40 seconds to complete, and includes:

- Checksum tests of boot and system areas of Flash memory
- System memory tests
- MAC address verification test
- System timer test
- CAM (Contents Addressable Memory) tests
- Console Port tests
- Internal packet forwarding tests
- Switch and sub-module ASIC (Application Specific Integrated Circuit) tests
- Switch and sub-module ASIC memory tests
- Sub-module interface tests
- Sub-module packet forwarding tests

After you insert an X330WAN access router module into a powered P330 switch causing a reset, or after a user-initiated reset is performed, the X330WAN Startup sequence is as follows:

- 1 Ten seconds after startup, the ALM LED lights ON for ten seconds, then switches OFF.
- 2 The TST LED then lights for twenty seconds and afterwards switches off.
- 3 Thirty seconds after startup, the ALM LED lights ON again.



Note: LED Number 51 on the Avaya P330 switch should be ON during the self-test procedure.

The X330WAN module must be inserted completely for the P330 switch to successfully reset.

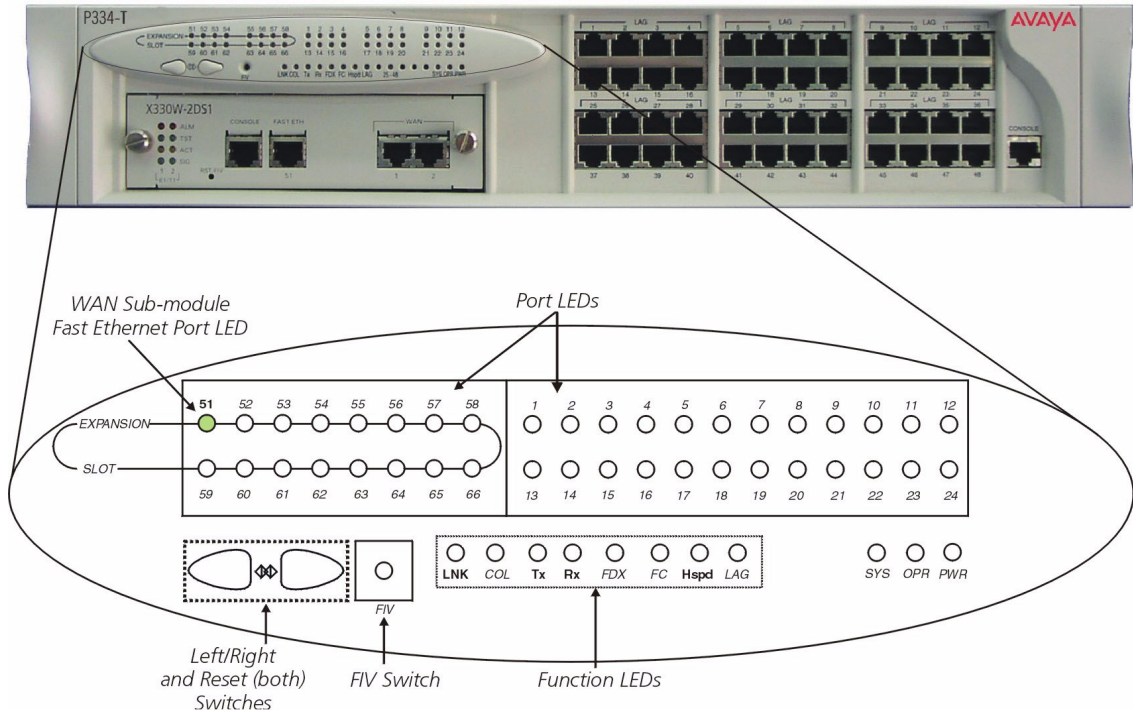
Avaya P330 LEDs

Figure 2.1 shows an Avaya P330 Switch front panel and a detailed view of the LEDs used when an X330WAN is installed. The Avaya P330 Console port is located on the lower right of the P330 switch.

Another group of LEDs is located on the X330WAN itself.

For a description of the X330WAN's front panel LEDs, see "X330WAN LEDs" in Chapter 1, Overview.

Figure 2.1 LED Indicators for a WAN Access Router Module on the Avaya P330 Front Panel



Note: All LEDs light while the P330 resets.

The P330 switch front panel LEDs consist of Port LEDs and Function LEDs. The Port LEDs display information for each port according to the illuminated function LED. The function is selected by pressing the Left/Right switch until the desired parameter LED is illuminated. Pressing the same switch again will move to the next function.

When the X330WAN module is installed inside a P330 switch, Port LED number 51 displays the status of the X330WAN Fast Ethernet port. As a result, only Port LED number 51 illuminates when the X330WAN is in use.

For a description of the other LEDs on the front panel of the Avaya P330 switch, refer to the User's Guide that accompanies your switch.

Removing an X330WAN Module from an Avaya P330 Switch

To remove an X330WAN module from a P330 switch:

- 1 Loosen the screws on the front panel of the X330WAN module that secure the

- module to the P330 switch.
- 2 Grasp the two screw knob and pull gently but firmly towards yourself.
The X330WAN module is removed.
 - 3 Insert another WAN access router module or the blanking plate into the switch.

Initial Configuration

This chapter describes the initial configuration of the X330WAN, and includes the following sections:

- **"Connecting the X330WAN"** - Describes the cables used to connect the X330WAN.
- **"Configuring the X330WAN"** - Describes how to configure an X330WAN Fast Ethernet, T1/E1 interface, or Loopback, and which commands to use to check and save your configuration.
- **"X330WAN Default Settings"** - Lists the default settings of the X330WAN.

Connecting the X330WAN

This section describes the cables used to connect the X330WAN.

Connecting the E1/T1 Ports

To connect a E1/T1 module to a network, use an RJ-48C cable, minimum 26 gauge, to connect the E1/T1 port to an RJ-48C wall jack.

Connecting the Ethernet Port

The X330WAN includes a 10/100Base-T port.

Connect a UTP Category 5 cable with an RJ-45 connector to the 100Base-TX port. The maximum UTP cable length connected to the 10/100Base-T port is 100 m (328 ft.).

You can obtain appropriate cables from your local supplier.

Connecting the Console Port

Each Avaya X330WAN module has one serial port on the front panel for connecting a terminal, a terminal emulator, or a modem.

The serial port on the front panel is labelled "Console" and has an RJ-45 connector. Connect the X330WAN module to a terminal or a terminal emulator using the supplied Console cable and the RJ-45 to DB-9 adaptor. To connect a modem, use the supplied cable and an RJ-45 to DB-25 adaptor.



Note: The cable and two adaptors can be found in the Avaya P330 accessory set, and they are clearly marked.

Console Pin Assignments

For direct Console communications, connect the X330WAN to the Console Terminal using the supplied RJ-45 crossed cable and RJ-45 to DB-9 adapter. The following table shows the pinout from the X330WAN RJ-45 connector to both a DB-9 and DB-25 connector.

Table 3.1 Pinout of the Required Connection for Console Communications

X330WAN RJ-45 Pin	Name	Terminal DB-9 Pin	Modem DB-25 Pin
1	For future use	NC	See note
2	TXD (P330 input)	3	3
3	RXD (P330 output)	2	2
4	CD	4	8
5	GND	5	7
6	DTR	1	20
7	RTS	8	4
8	CTS	7	5



Note: Pin 1 of the Modem DB-25 connector is internally connected to Pin 7 GND.

Configuring the X330WAN

An X330WAN can be configured using the Command Line Interface (CLI) utility, the built-in Avaya P330 Device Manager (Embedded Web), or Avaya MultiService Network Manager™.

For instructions on using the CLI, refer to Chapter 7, "X330WAN CLI Commands." For instructions on using the Device Manager or Avaya MultiService Network Manager™, refer to the Avaya MultiService Network Manager P330 Device Manager User's Guide on the Documentation and Utilities CD.

The CLI is command-line driven and does not have any menus. To activate a configuration option, type the desired command at the prompt and press **Enter**.

The rest of this section describes the following:

- How to establish a Serial and Modem connection using the CLI.
- How to configure an X330WAN Fast Ethernet, T1/E1 interface, or loopback, using the CLI.
- How to check and save your configuration using the CLI.
- How to establish a Telnet session using the CLI.

Establishing a Serial Connection

Perform the following steps to connect a terminal to the Console port of the X330WAN module for configuration of WAN parameters using the CLI:

- 1 Use the supplied serial cable to attach the RJ-45 console connector to the Console port on the X330WAN module. Connect the DB-9 connector to the serial (COM) port on your PC/terminal.
- 2 Use the following serial port settings on the terminal:
 - Baud Rate - 9600 bps
 - Character Size - 8
 - Parity - None
 - Stop Bit - 1
 - Flow Control - None
 - Terminal Emulation - VT-100



Note: The terminal connected to the Console port must be configured with these settings.

- 3 Press **Enter**.
- 4 When prompted for a Login Name, enter the default name **root**.
- 5 When prompted for a password, enter the password **root**.

Establishing a Modem Connection

A PPP connection with a modem can be established only after the X330WAN is configured with an IP address and net-mask. Also, the parameters used in the X330WAN must be compatible with the modem's parameters.

All CLI commands mentioned in this section are described in the Chapter 7, "X330WAN CLI Commands."

To configure a modem interface:

- 1 Connect a terminal to the console port of the X330WAN as described in "Connecting the Console Port" on page 19.
- 2 When prompted for a Login Name, enter the default name **root**.
- 3 When prompted for a password, enter the password **root**. You are now in Supervisor mode.
- 4 At the prompt, type: "**interface Console**" "speed" and press Enter.
- 5 Enter an IP address and subnet mask for the X330WAN to connect via its PPP interface using the "**ip address**" <ip address> <mask> command.



Note: The PPP interface configured with the `interface console` command must be on a different subnet from the router interfaces.

- 6 Set the baud rate, ppp authentication, and ppp time out required to match your modem using the following commands:


```
"speed" <9600|19200|38400>
"ppp authentication" <chap|none|pap>
"timeout absolute" <time>. The time entered is in seconds.
```
- 7 Type: "**async mode interactive**"

The CLI responds with the following:

Entering the Modem mode will occur automatically upon proprietary modem-cable plug-in into the console port. The terminal mode would be restarted automatically upon insertion of proprietary terminal-cable.
- 8 Use the DB-25 to RJ-45 connector to plug the console cable to the modem's DB-25 connector. Plug the other end of the cable RJ-45 connector to the Console port on the X330WAN module.
- 9 The X330WAN enters Modem mode.
- 10 You can now dial into the module from a remote station, and open a Telnet session to the PPP interface IP address configured in step 5.

Checking the Modem Configuration

After establishing a modem connection, use the **"show interface"** console command to display information regarding your network interface. Verify that the output information is correct.

Configuring Fast Ethernet Interfaces

Before configuring Fast Ethernet interfaces, make sure the X330WAN is inserted in the P330 switch and the power is turned on.

All CLI commands mentioned in this section are described in Chapter 7, "X330WAN CLI Commands."

To configure Fast Ethernet interfaces:

- 1 Type **"interface FastEthernet" 1** to enter the Interface Configuration mode.
The prompt changes to X330WAN-2DS1-N(super-if:FastEthernet1) #
- 2 Use the **"ip address" <ip address> <mask>** command to assign an IP address and subnet mask to the interface.
- 3 Type **exit** to return to Supervisor mode.
The prompt returns to X330WAN-2DS1-N(super) #



Note: For the first interface to be configured the following message appears:

The primary management interface has changed.

For this change to take effect, you need to copy running-config startup-config and then reset the device.

You need to issue the **"copy running-config startup-config"** and **"reset"** commands.



Note: You cannot delete an interface if there is a primary management IP (PMI defined on it).

Configuring E1/T1 Interfaces

Before configuring E1/T1 interfaces, make sure the X330WAN is inserted in the P330 switch and the power is turned on.

All CLI commands mentioned in this section are described in Chapter 7, "X330WAN CLI Commands."

For a list of X330WAN default settings, see "X330WAN Default Settings" on page 28, or use the **"show controllers" [<port>]** command to display all of the current settings.

To configure E1 or T1 interfaces:

- 1 Use the **"show controllers"** [`<port>`] command to check if your controller's mode is configured as E1 or T1.
Use the **"ds-mode"** [`e1|t1`] command to set the controller's mode to E1 or T1. Changing the line type causes the module to reset.
- 2 Use the **"controller"** {`e1|t1`} `<port-number>` command to set the port number to be configured.
The prompt changes to `X330WAN-2DS1-N(super-controller:n)#` where N is the switch number and n is the port number.
- 3 Use the following commands if you want to change the clock source, frame type and linecode parameters from their default settings:
"clock source" {`line|internal`}
"framing" {`sf|esf`} for T1 lines or **"framing"** {`crc4|no-crc4`} for E1 lines.
"linecode" {`ami|b8zs`} for T1 lines or **"linecode"** {`ami|hdb3`} for E1 lines.
"cablelength" {`long|short`} for T1 lines.
If you are working in E1 mode, go to step 4, otherwise go to step 5.
- 4 Use the channel-group `channel-no timeslots timeslot-list` command to specify the channel group and time slots to be mapped. For example, typing **channel group 1 timeslots 1,3-5,7** configures time slots numbered 1, 3-5 and 7 to be mapped in channel-group number 1.
Proceed to step 6.
- 5 Use the channel-group `channel-no timeslots timeslot-list speed <56|64>` command to specify the channel group, time slots to be mapped and DS0 speed in kbps. For example, typing **channel group 1 timeslots 1,3-5,7 speed 64** configures time slots numbered 1, 3-5 and 7 to be mapped in channel-group number 1 and the DS0 speed to 64 kbps.
The default DS0 speed is 56 kbps
- 6 Type **exit** to return to Supervisor mode.
The prompt returns to `X330WAN-2DS1-N(super)#`
- 7 Use the **"interface Serial"** [`port:channel-group[.ip-interface]`] command to configure each channel group as a virtual serial interface. Specify the port number and channel group number to modify.
For example, typing **interface Serial 1:1** configures a serial interface on port number 1 with a channel group number 1.
- 8 Use the **"ip address"** `<ip address><mask>` **ip** command to assign an IP address and subnet mask to the interface.
- 9 Repeat steps 2 through 8 if you want to configure another E1 or T1 interface.
- 10 Type **exit** to return to Supervisor mode.
The prompt returns to `X330WAN-2DS1-N(super)#`



Note: For the first interface to be configured the following message appears:
The primary management interface has changed.
For this change to take effect, you need to copy running-config startup-config and then reset the device.
You need to issue the "**copy running-config startup-config**" and "**reset**" commands.



Note: You cannot delete an interface if there is a primary management IP (PMI defined on it).

Configuring Loopback Interfaces

Before configuring Loopback interfaces, make sure the X330WAN module is inserted in the P330 switch and the power is turned on.

All CLI commands mentioned in this section are described in Chapter 7, "X330WAN CLI Commands."

To configure Loopback interfaces:

- 1 Enter the Interface Loopback mode using the **"interface loopback"** [`<interface number>` [`.ip-interface`]] command.
For example, typing **interface loopback 1** configures a loopback with a Loopback interface number 1.
The prompt changes to `X330WAN-2DS1-N(super-if:Loopbackn) #` where `N` is the switch number and `n` is the loopback interface number.
- 2 Use the **"ip address"** `<ip address>` `<mask>` command to assign an IP address and subnet mask to the interface.
- 3 Type **exit** to return to Supervisor mode.
The prompt returns to `X330WAN-2DS1-N(super) #`



Note: For the first interface to be configured the following message appears: The primary management interface has changed. For this change to take effect, you need to copy running-config startup-config and then reset the device. You need to issue the **"copy running-config startup-config"** and **"reset"** commands.



Note: You cannot delete an interface if there is a primary management IP (PMI defined on it).

Checking the Loopback/Fast Ethernet/T1/E1/IP Interface Configuration

After configuring the new interface, you can perform the following tests to verify that the new interface is operating correctly.

- Use the **"show ip interface"** [`<interface-name>`] [`<IP interface>`] [`<ip-address>`] command to display IP interface configured serial and Ethernet ports.
- Use the **"show controllers"** [`<port>`] command to display the status of the controller for T1/E1 interfaces.
- Use the **"show interfaces"** [`<type>`] [`<identifier>`] command to display information on all interfaces: Fast Ethernet, Fabric, Serial, Console, and

Loopback. Verify that the output information is correct.

- Use the "**show running-config**" command to display the configuration running on the switch.
- Use the "**show startup-config**" command to display the configuration loaded at startup.
- Use the "**ping**" <host> [<interval> [<size>]] command to send ICMP echo request packets to another node on the network. Each node is periodically pinged and checked if an answer was received. This checks host reachability and network connectivity.

Saving Your Configuration

It is advisable to save your configuration.



Note: Your configurations are lost after each reset or after a power failure.

To save your configuration, type "**copy running-config startup-config**". This copies your X330WAN configuration from the current VRAM Running Configuration to the Startup Configuration NVRAM.

Establishing a Telnet Connection

Perform the following steps to establish a Telnet connection to the X330WAN for configuration of WAN parameters. Telnet directly to one of the Router IP addresses:

- 1 Connect your station to the network.
- 2 Verify that you can communicate with the X330WAN using the "**ping**" <host> [<interval> [<size>]] command to the IP of the X330WAN. If there is no response, check the IP address and default gateway of both the X330WAN and the station.
- 3 From the Microsoft Windows[®] taskbar of your PC, click **Start** and then **Run** (or from the DOS prompt of your PC), then start the Telnet session by typing:
telnet <X330WAN_IP_address>
For example: **telnet 149.49.32.134**



Note: You can also Telnet the IP address of the P330 stack. If you Telnet the IP address of the stack, a connection is established with the Switch CLI entity of the Master module of the stack.

If you want to connect to the X330WAN CLI entity, use the "**session**" wan <module number in stack> command.

- 4 When prompted for a Login Name, enter the default name **root**.

- 5 When prompted for a password, enter the User Level password **root** in lower case letters (do NOT use uppercase letters).
- 6 You can now configure the X330WAN.

X330WAN Default Settings

The default settings for the X330WAN and its ports are determined by its firmware. These default settings are subject to change. Newer versions of the software for the X330WAN can be downloaded from the Avaya Network Software Download Web site (<http://www.avaya.com/support>).

Table 3.2 X330WAN Default Settings

Function	Default Setting
Port Speed (Fast Ethernet)	100 Mbps
Port Duplex (Fast Ethernet)	Full Duplex
Auto-Negotiation (Fast Ethernet)	Enabled
WAN mode (WAN)	T1
Framing (WAN)	SF for T1, CRC4 for E1
Linecode (WAN)	AMI for T1, HDB3 for E1
Clock Source (WAN)	line
Cable Length (for T1)	long, gain26, 0db
Speed (for T1)	56
SNMP Community	public
Avaya X330WAN CLI Entry Login	Login name: root Password: root

Common Configurations

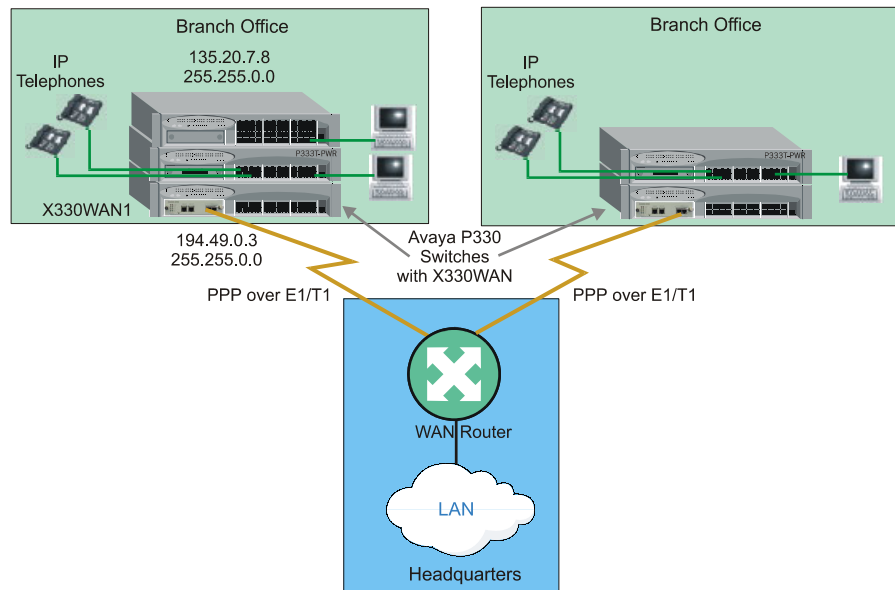
An X330WAN access router module can be used in any situation where E1/T1 WAN connectivity is needed for an office. The following situations are the most common configurations for connecting to a WAN using the P330:

- Connecting Branch Offices to Headquarters
- Connecting a Small Office to the Internet

Connecting Branch Offices to Headquarters

Many companies have a centralized location for their headquarters and small branch offices. It is important that communication between the headquarters and the branches flows quickly. The following figure shows a typical configuration of the network connecting the headquarters with branch offices.

Figure 4.1 Branch Office to Headquarters



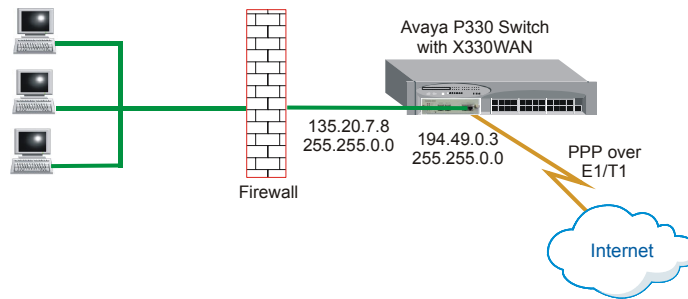
The following configuration file is a result of configuring X330WAN1 as shown in Figure 4.1:

```
controller t1 1
    channel-group 12 timeslots 1-31
!
controller t1 2
!
interface FabricFastEthernet 1
!
interface FabricFastEthernet 1:30
    ip address 135.20.7.8          255.255.0.0
!
interface FastEthernet 1
!
interface Serial 1:12
    encapsulation ppp
    ip address 194.49.1.249      255.255.255.252
ip routing-mode RT_PRIMARY_MGMT
```

Connecting a Small Office to the Internet

A small office requires a reliable and fast connection to the Internet to maintain fast communication times and have access to information on the World Wide Web. The following figure shows a typical configuration of the network connecting a small office to the Internet.

Figure 4.2 Small Office to the Internet



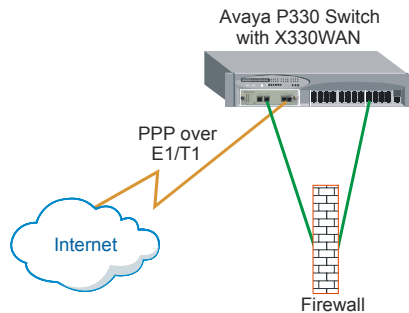
The following configuration file is a result of configuring the X330WAN for the network shown in Figure 4.2:

```
controller t1 1
    channel-group 12 timeslots 1-31
!
controller t1 2
!
interface FabricFastEthernet 1
    shutdown
!
interface FastEthernet 1
    ip address 135.20.7.8          255.255.0.0
!
interface Serial 1:12
    encapsulation ppp
    ip address 194.49.1.249      255.255.255.252
    ip routing-mode RT_PRIMARY_MGMT
```

Using the X330WAN with Security

There are different ways of connecting the X330WAN modules to provide security to the local network. Figure 4.3 shows a typical configuration where the WAN traffic goes through the X330WAN module out to an external firewall and/or VPN, and then enters the LAN

Figure 4.3 X330WAN with Security



The following configuration file is a result of configuring the X330WAN as shown in Figure 4.3:

```
controller t1 1
    channel-group 12 timeslots 1-31
!
controller t1 2
!
interface FabricFastEthernet 1
shutdown
!
interface FastEthernet 1
    ip address 135.20.7.8          255.255.0.0
!
interface Serial 1:12
    encapsulation ppp
    ip address 194.49.1.249      255.255.255.252
    ip routing-mode RT_PRIMARY_MGMT
```

Troubleshooting

This chapter provides an explanation of how to troubleshoot operational difficulties with the X330WAN.

Troubleshooting the X330WAN should be performed according to layers. When a problem appears you should start isolating it by troubleshooting Layer 1 - the controller's alarms and errors first, then Layer 2, and finally Layer 3.

Monitoring Traffic

You can monitor the state of the X330WAN's E1/T1 ports using the **show controllers** command. The command can be entered via the CLI. The resulting output provides information about the state of the E1/T1 controller and reports alarms. In addition, the output provides statistics on the state of the controller over the last 24 hour period. To receive output for a specific port, enter the port number after the **show controllers** command.

For information on the fields in the output from the **show controllers** command, see Chapter 7, "X330WAN CLI Commands."

Handling E1/T1 Alarms

Alarms are reported by the LEDs on the X330WAN and via the CLI. When an alarm condition is detected by an X330WAN, the module sends a signal to all E1/T1 devices to which it is attached. Alarms can therefore be categorized as one of the following:

- **Local Alarm Indication** - Generated by the X330WAN as a result of a line status problem sensed by the X330WAN.
- **Remote Alarm Request** - Received by the X330WAN from the remote module.

The following table provides a list of alarms, the type of alarm, and the alarm condition on the module from which the alarm originates.

Table 5.1 Alarms

Alarm (E1/T1)	Alarm Type	Originating Alarm
LOS/LOS	Local Alarm Indicator	N/A
LOF/Red	Local Alarm Indicator	N/A
High Ber/Major	Local Alarm Indicator	N/A

Table 5.1 Alarms

Alarm (E1/T1)	Alarm Type	Originating Alarm
Low Ber/Minor	Local Alarm Indicator	N/A
RAI/Yellow	Remote Alarm Request	LOS, LOF, BER, AIS
AIS/Blue	Remote Alarm Request	Maintenance request

Alarm Conditions

The following section discusses the different types of alarms, how each alarm type is indicated, and possible corrective actions to end the alarm.

LOS

Definition: Loss of Signal. This alarm is the result of a loss of the clock synchronization signal. The alarm severity is Major.

Indication: The alarm is indicated when the SIG LED is not lit and the ALM LED is lit.

Corrective Actions:

- Check that the E1/T1 cable is properly connected to the E1/T1 ports at both ends of the connection.
- Check the integrity of the cable and pinouts.
- Ensure that the receiving and transmitting pairs are not reversed.
- If regenerators are used, check the integrity of the regenerators.

LOF/Red

Definition: Loss of Frame. This alarm is the result of a loss of the frame synchronization signal. The alarm severity is Major.

Indication: The alarm is indicated when the ALM LED lights.

Corrective Actions:

Ensure that the line settings are compatible on both sides of the line. For example:

- Ensure that both sides of the connection are configured to use the same line code and framing configuration. Use the **show controllers** command to view the current line code. Use the **framing** command to configure the framing mode and the **line code** command to configure the line code.
- For T1 lines, ensure that the line is configured for the cable length in use. Use the **show controllers** command to view the current configuration. Use the **cablelength long** and **cablelength short** commands to change the cable length configuration.

For detailed information on CLI commands, see Chapter 7, "X330WAN CLI Commands."



Note: After clearing the condition causing the LOF alarm, the module will continue to indicate an LOF condition for approximately 10 seconds.

High Ber/Major

Definition: High threshold Bit Error Rating. This alarm is the result of an average error rate of 1 bit per 1000 for 10 seconds. The alarm severity is Major.

Indication: The alarm is indicated using the **show controllers** command from the CLI. For more information, refer to "Monitoring Traffic" on page 33.

Corrective Actions:

- Check the integrity of the physical E1/T1 line.
- If regenerators are used, check the integrity of the regenerators.
- Use loopbacks to help pinpoint the cause of the alarm condition. For information on using loopbacks, refer to "Using Loopbacks" on page 36.



Note: After clearing the condition causing the High BER/Major alarm, the module will continue to indicate an High BER/Major condition for approximately 11 seconds.

RAI/Yellow

Definition: Remote Alarm Indication. Local Rx line is down. There is a problem with the remote module. The alarm severity is Major.

Indication: The alarm is indicated when the ALM LED lights up or by using the **show controllers** command from the CLI. For more information, refer to "Monitoring Traffic" on page 33.

Corrective Action:

- Check your configuration (for example, framing) to verify that it matches the configuration of the remote end.

AIS/Blue

Definition: Alarm Indication Signal. Local Rx line is down. The administrator of the remote module cut your line. The alarm severity is Major.

Indication: The alarm is indicated when the ALM LED lights up or by using the **show controllers** command from the CLI. For more information, refer to "Monitoring Traffic" on page 33.

Corrective Actions:

- Call the administrator of the remote module.
- Wait for the signal to return.

Alarm Detection

Alarms can be identified on the X330WAN either using the LEDs on the front panel or using the CLI.

The X330WAN front panel LEDs can indicate two types of Local Alarms:

- If a LOS is sensed by a E1/T1 port, its SIG LED will be off and the ALM LED will be on.
- When all other alarms are sensed by a E1/T1 port, the ALM LED will light.

In addition, an Alarm condition will be indicated by a message on the CLI screen, for example, "Controller T1 1 changed state to down (LOS)".

More detailed information about alarms can be obtained using the **show controllers** CLI command.

Using Loopbacks

The X330WAN supports the following Loopback types:

- **Diag Loopback (E1/T1)** - The X330WAN CPU instructs the Line Framer to create a loop towards the CPU. A Blue Alarm (AIS) is sent on the line to the peer module.
- **Local Line Loopback (E1/T1)** - The X330WAN Line Framer creates a loop on the line towards the other peer module.
- **Local Payload Loopback (E1/T1)** - The X330WAN Line Framer creates a loop through itself and re-frames the signal on its way back from the peer module.
- **Remote Line Loopback (T1 only)** - The X330WAN sends the remote peer module a request to create a line loop. A Line Loopback signal is used to indicate the request.
- **Remote Payload Loopback (T1 only)** - The X330WAN sends the remote peer module a request to create a loop through its Line Framer. A Payload Loopback signal is used to indicate the request. The Remote Payload Loopback type is only available in ESF framing.

To instruct the X330WAN to perform a loopback, use the **loopback diag**, **loopback local**, and **loopback remote** command. For more information about these commands, see Chapter 7, "X330WAN CLI Commands."

Troubleshooting VoIP Transmission

To enable VoIP, the following must be configured on the devices at both ends of the connection:

- VoIP must be enabled on both ends.
- The RTP port range must be the same on both ends.
- The devices on both ends must be configured according to the running voice applications.

When the device on the other end is a non-Avaya device:

- Configure the non-Avaya device for the maximum amount of connections (255).
- Configure the port range of the Avaya device to: 49152 - 65535.
- Configure the "non-ietf" working mode using the command:
ip rtp non-tcp mode

Embedded Web Manager

The Embedded Web Manager for the X330WAN provides the following:

- Expansion module configuration.
- E1/T1 port configuration.
- Channel group management.
- Channel group wizard.

System Requirements

Minimum hardware and Operating System requirements are:

- One of the following operating systems:
 - Windows® 95
 - Windows 98 SP1
 - Windows 98 OSR (Second Edition)
 - Windows ME
 - Windows NT® Workstation or Server
 - Windows 2000 Professional or Server
- Pentium® II 400 Mhz-based computer with 256 Mb of RAM (512 Mb recommended)
- Minimum screen resolution of 1024 x 768 pixels
- Sun Microsystems Java™ plug-in version 1.3.1_02 (supplied)
- Microsoft® Internet Explorer® or Netscape Navigator/Communicator® (see table)

	Windows 95 or NT	Windows 98, ME or 2000
Internet Explorer	5.0 or higher	5.01 or higher
Netscape Navigator/ Communicator	4.7	4.73



Note for users of Netscape Navigator: The Java plug-in requires certain services from **Windows 95** which are not present if **Internet Explorer** is not installed. In order to add these services to the operating system, please install Internet Explorer version 3 or higher. You can then use either browser to manage the switch.

Running the Embedded Manager



Note: You should assign an IP address to the X330WAN before beginning this procedure.

- 1 Open your browser.
- 2 Enter the url of the switch in the format **http://aaa.bbb.ccc.ddd** where **aaa.bbb.ccc.ddd** is the IP address of the switch.



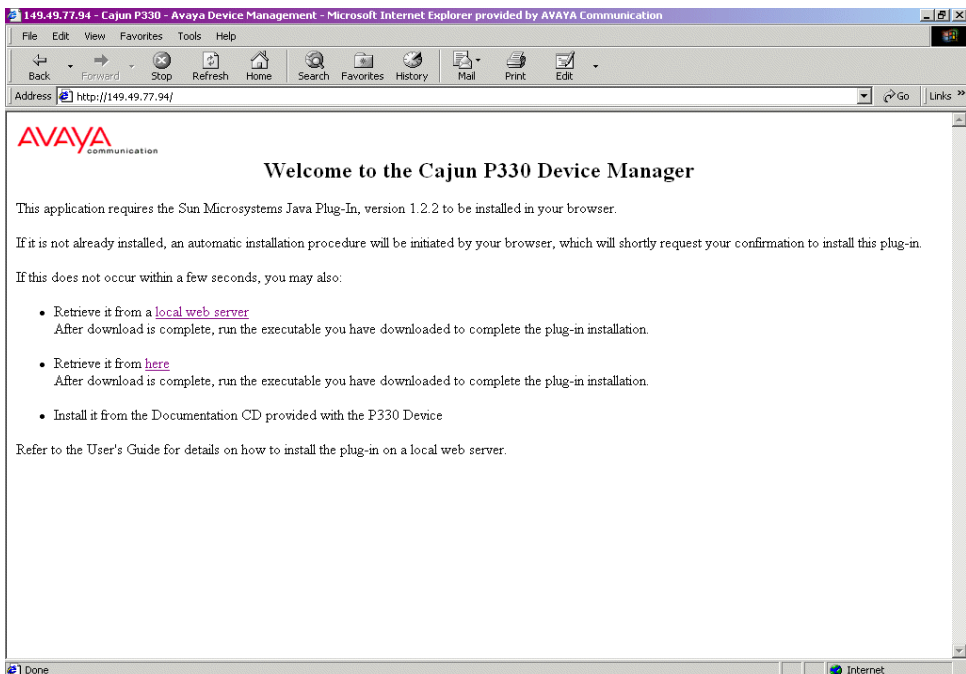
Note: The user name is “root”
The default password for read-write access is “root”.



Note: The Web management passwords are the same as those of the CLI. If you have created additional CLI user names or changed the default passwords then you can use those passwords for Web management as well.

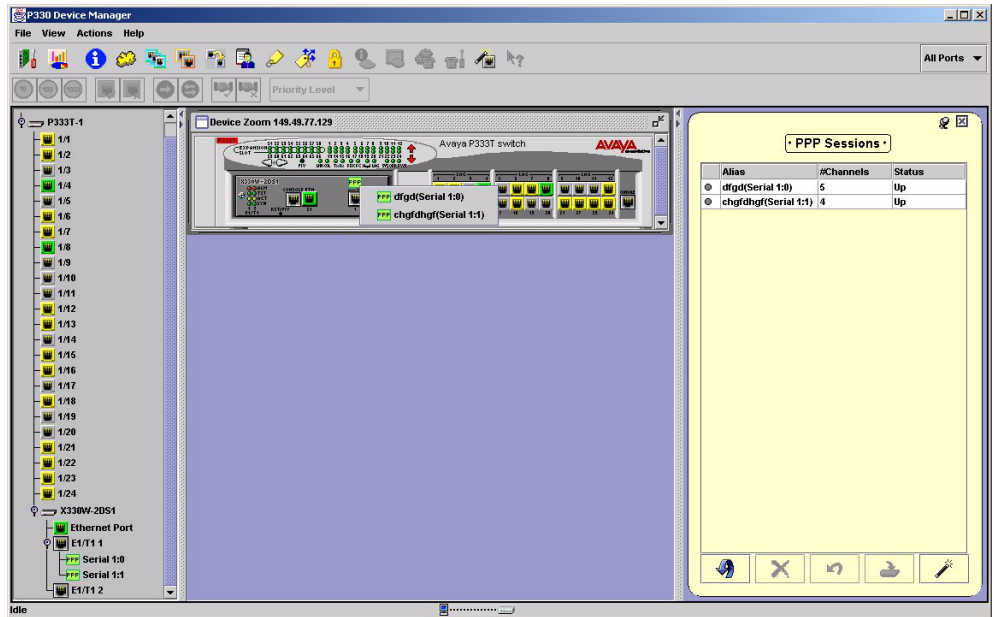
The welcome page is displayed:

Figure 6.1 The Welcome Page



- If you have the Java plug-in installed, the Web-based manager should open in a new window (see Figure 6.2).

Figure 6.2 Web-based Manager



- If you do **not** have the Java plug-in installed, follow the instructions on the Welcome page that offer a variety of options to install the plug-in (see Figure 6.1), or see *Installing the Java Plug-in* on page 42.

Installing the Java Plug-in

If the network manager has configured the system, the plug-in should be installed automatically.



Note: Ensure that Java or JavaScript is enabled on your Web browser. Please refer to your browser on-line help or documentation for further information.

If the plug-in is not installed automatically, then you have three options for installing it manually:

1 Installing from the Avaya P330 Documentation and Utilities CD

- 1 Close all unnecessary applications on your PC.
- 2 Insert the “Avaya P330 Documentation and Utilities” CD into the CD drive.
- 3 Click **Start** on the task bar.
- 4 Select Run.
- 5 Type **x:\emweb-aux-files\plug-in_1_3_1_02.exe** where **x** is the CD drive letter.
- 6 Follow the instructions on screen.

2 Install from the Avaya Site

Click link in the Welcome page.

3 Install from your Local Web Site

Click link in the Welcome page.



Note: This option is only available if the network manager has placed the files on the local Web server.

Installing the On-Line Help and Java Plug-In on your Web Site



Note: This procedure is optional.

Copying the help files and Java plug-in to a local Web server allows users to access the on-line help for the Embedded Manager and enables automatic installation of the Java plug-in the first time the users tries to manage the device.

- 1 Copy the `emweb-aux-files` directory from the “Avaya P330 Documentation and Utilities” CD to your local Web server. Please refer to your Web server documentation for full instructions.
- 2 Define the URL in the Avaya P330 using the following CLI command:
`set web aux-files-url //IP address/directory name`
where **`//IP address/directory name`** is the location of the directory from the previous step.

Documentation and Online Help

Refer to the Avaya P330 Documentation and Utilities CD.

Software Download

You can perform software download using the CLI or Avaya UpdateMaster.

X330WAN CLI Commands

This chapter provides a complete list of all WAN related CLI commands. Each command that appears on the list is accompanied by a detailed description, including the proper syntax. The list is presented in alphabetical order to help you locate commands easily.

Introduction: About CLI

The CLI is command-line driven and does not have any menus. To activate a configuration option, type the desired command at the prompt and press Enter.

To exit a context, type **exit**.

You can use all **show** commands in User mode.

To configure the X330WAN, you must either be in Supervisor mode, or enter the Configure context. Generic commands are performed from the Configure context.

If you are in Supervisor mode or have entered the Configure context, you can enter any of the following contexts:

- Controller
- Interface Console
- Interface Fast Ethernet
- Interface Fabric Fast Ethernet
- Interface Serial
- Interface Loopback
- Other contexts

Layer 1 (E1/T1) commands are performed from the Controller context, and Layer 2/Layer 3 (Fabric, PPP) commands are performed from the various Interface contexts.

For a list of all Controller commands, see General: Device Commands on page 47.

For a list of all Interface Fast Ethernet commands, see "interface FastEthernet on page 132".

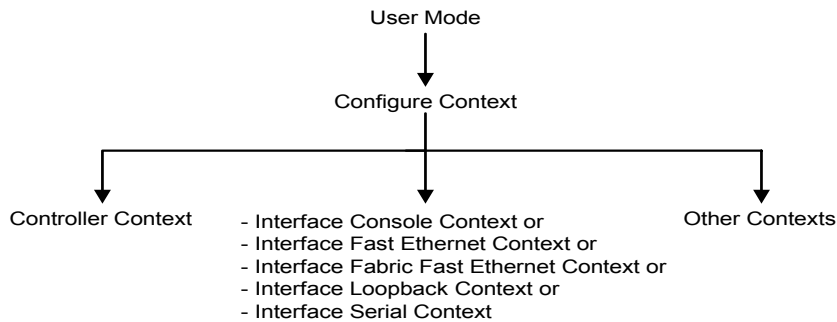
For a list of all Interface Fabric Fast Ethernet commands, see interface FabricFastEthernet on page 131.

For a list of all Interface Loopback commands, see async mode interactive (Console interface context) on page 120.

For a list of all Interface Serial commands, see interface Serial on page 133.

The following figure illustrates this introduction.

Figure 7.1 X330WAN CLI Contexts



X330WAN CLI Prompts

The following table displays examples of X330WAN-2DS1 CLI prompts.

Table 7.1 X330WAN-2DS1 CLI Prompts

Mode/Context	Prompt
User	X330WAN-2DS1-N>
Supervisor	X330WAN-2DS1-N(super) #
Configure	X330WAN-2DS1-N(configure) #
Controller	X330WAN-2DS1-N(config-controller:n) #
Interface Console	X330WAN-2DS1-N(config-if:CON) #
Interface Fast Ethernet	X330WAN-2DS1-N(config-if:FastEthernet1) #
Interface Fabric Fast Ethernet	X330WAN-2DS1-N(config-if:FabricFastEthernetn) #
Interface Loopback	X330WAN-2DS1-N(config-if:LoopbackZ) #
Interface Serial	X330WAN-2DS1-N(config-if:Serialn:x) #

N is the number of the device in a stack of WAN devices, n is the number of the WAN port ("1" or "2"), z is the interface number, and x is the number of the channel group.

General: Device Commands

This section contains a list of all general device CLI commands.

clear screen

The clear screen command clears the current terminal display.

The syntax for this command is:

```
clear screen
```

clear snmp trap

Use the `clear snmp trap` command to clear an entry from the SNMP trap receiver table.

The syntax for this command is:

```
clear snmp trap {<rcvr_addr>|all}
```

`rcvr_addr` IP address or IP alias of the trap receiver (the SNMP management station) to clear

`all` Keyword that specifies every entry in the SNMP trap receiver table

Output Example:

```
X330WAN-2DS1-1(super)# clear snmp trap 192.122.173.82  
SNMP trap receiver deleted.
```

clear timezone

Returns the timezone to its default, Coordinated Universal Time (UTC).

The syntax for this command is:

```
clear timezone
```

copy running-config startup-config

Use the `copy running-config startup-config` command to copy the device configuration from the current RAM Running Configuration to the Startup Configuration NVRAM.

The syntax for this command is:

```
copy running-config startup-config
```

copy running-config tftp

Use the `copy running-config tftp` command to copy the device configuration from the current RAM Running Configuration to the TFTP file.

The syntax for this command is:

```
copy running-config tftp <filename> <ip>
```

filename	The file name (full path)
ip	The IP address of the host

Examples:

```
X330WAN-2DS1-1(configure)# copy running-config tftp  
c:\p332\router1.cfg 192.168.49.10
```

copy startup-config tftp

Use the `copy startup-config tftp` command to copy the device configuration from the NVRAM Startup Configuration to the TFTP file.

The syntax for this command is:

```
copy startup-config tftp <filename> <ip>
```

filename	The file name (full path)
ip	The ip address of the host

Examples:

```
X330WAN-2DS1-1(configure)# copy startup-config tftp  
c:\p332\router1.cfg 192.168.49.10
```

copy tftp startup-config

Use the `copy tftp startup-config` command to copy the device configuration from the saved TFTP file to the Startup Configuration NVRAM.

The syntax for this command is:

```
copy tftp startup-config <filename> <ip>
```

filename	The file name (full path)
ip	The ip address of the host

Examples:

```
X330WAN-2DS1-1(configure)# copy tftp startup-config
c:\p332\router1.cfg 192.168.49.10
```

copy tftp EW_archive

Use the `copy tftp EW_archive` command to download the WAN Device Manager application into the device via TFTP. To use this command, you need to have an active TFTP server, and to create a file into which to download the data. If Avaya MultiService Network Manager is running, an additional TFTP server is not required.

The syntax for this command is:

```
copy tftp EW_archive <filename> <ip> <mod_num>
```

filename	Embedded Web Manager image file name (full path)
ip	The ip address of the TFTP server
mod_num	Target device number

Example:

```
X330WAN-2DS1-1(configure)# copy tftp EW_archive
c:\p330\p330web201 192.168.49.10 5
```

copy tftp SW_image

Use the `copy tftp SW_image` command to update the software image and the device manager applications of a designated device. To use this command, you need to have an active TFTP server, and to create a file into which to download the data. If Avaya MultiService Network Manager is running, an additional tftp server is not required.

The syntax for this command is:

```
copy tftp SW_image <sw-image-file> EW_archive <EmWeb_File>
<ip_address>
```

The syntax for this command for the X330WAN is:

```
copy tftp SW_image <sw-image-file> EW_archive <ew_archive-
file> <ip_address>
```

sw-image-file	Common name for the files that contain the Software Image and Embedded Web archive (full path).
---------------	---

EmWeb_File	Embedded Web Manager image file name (full path).
ew_archive-file	Embedded Web Manager archive file.
ip_address	The IP address of the TFTP server.

Example:

```
X330WAN-2DS1-1(super)# copy tftp SW_image c:\p330\p330web101
EW_archive c:\p330\p330web201 192.168.49.10
```

dir

Use the `dir` command to show the file types that have been downloaded to the device.

The syntax for this command is:

dir**Output Example:**

```
X330WAN-2DS1-1(super)# dir
M# file          ver num  file type    file location  file description
-- ----          -
1  startup-config N/A      Startup Conf Nv-Ram         Startup Config
1  running-config N/A      Running Conf Ram            Running Config
1  X330WAN-A      N/A      SW Component Flash Bank A   Software Image - Bank
A
1  X330WAN-B      3.9.5    SW RT Image  Flash Bank B   Software Image - Bank
B
1  P3WAN          N/A      SW Web Image Nv-Ram         EmWeb application
```

Output Fields:

Field	Description
M#	The device number
file	There are several files loaded into the device's memory: <ul style="list-style-type: none"> • module-config – file which contains the configuration settings made to this device • stack-config – file which contains the configuration settings made at the stack level (for example IP address of the stack) • EW_Archive – file which contains the Device Manager (Embedded Web) software

ver num	S/W Version number – relevant only for the Device Management S/W
file type	There are several file types: <ul style="list-style-type: none"> • Running Conf – the configuration currently in use and the startup configuration • SW Web Image – Device Manager S/W archive file
file location	Type of internal memory into which the file is loaded
file description	Description of the file



Note: If the N/A is displayed for the EW_Archive file, this means that the Device Manager S/W is not loaded correctly. Download the Device Manager S/W again.

erase startup-config

The `erase startup-config` command erases the startup configuration NVRAM.

The syntax for this command is:

erase startup-config

get time

Use the `get time` command to retrieve the time from the network.

The syntax for this command is:

get time

Output Example:

```
get time
Time is being acquired from server 0.0.0.0!
```

hostname

Use the `hostname` command to change the Command Line Interface (CLI) prompt. The current device number always appears at the end of the prompt.

The syntax for this command is:

hostname [<hostname_string>]

hostname_string **none** – displays current hostname
 string – the string to be used as the hostname
 (up to 20 characters).

no hostname

Use the `no hostname` command to return the CLI prompt to its default.

The syntax for this command is:

no hostname

nvramp initialize

Use the `nvramp initialize` command to reset the WAN parameters to the factory defaults.

The syntax for this command is:

nvramp initialize

Output Example:

```
X330WAN-2DS1-1(super)# nvramp initialize
This command will restore factory defaults, and can disconnect
your telnet session
*** Reset *** - do you want to continue (Y/N)?
Connection closed by foreign host.
host%
```

reset

Use the `reset` command to restart the system.

If you want to keep changes you made to the current running configuration use the `copy running-config startup-config` command first.



Note: You should perform a reset after downloading software to the device.

The syntax for this command is:

reset

Output Example:

```
X330WAN-2DS1-1(super)# reset
This command will reset the module and may disconnect your
telnet session.
*** Reset the device *** - do you want to continue (Y/N)? y
Connection closed by foreign host.
```

set boot bank

Use the `set boot bank` command to configure the software bank from which the device will boot at the next boot process.

The syntax for this command is:

```
set boot bank <value>
```

value {bank-a | bank-b}

Output Example:

```
X330WAN-2DS1-1(super)# set boot bank bank-a
Boot bank set to bank-a
```

set logout

The `set logout` command is used to set the number of minutes until the system automatically disconnects an idle session.

The syntax for this command is:

```
set logout [timeout]
```

timeout Number of minutes (0 to 999) until the system automatically disconnects an idle session. Setting the value to 0 disables the automatic disconnection of idle sessions (default is 15 minutes).

Output Example:

To set the number of minutes until the system disconnects an idle session automatically:

```
X330WAN-2DS1-1(super)# set logout 20
Sessions will be automatically logged out after 20 minutes of
idle time.
```

Output Example:

To disable the automatic disconnection of idle sessions:

```
X330WAN-2DS1-1(super)# set logout 0
Sessions will not be automatically logged out.
```

set snmp trap

Use the `set snmp trap` commands to add an entry into the SNMP trap receiver table and to enable or disable the different SNMP traps for a specific receiver. First add the `rcvr_addr` and then enable/disable the different traps for it.

The syntax for this command is:

```
set snmp trap <rcvr_addr>
set snmp trap <rcvr_addr> {enable|disable}
{all|vlan_violation|...}
```

<code>enable</code>	Activate SNMP traps
<code>disable</code>	Deactivate SNMP traps
<code>all</code>	(Optional) Specify all trap types
<code>vlan_violation</code>	(Optional) Specify the vlan violation trap from the TRAP-MIB.
<code>rcvr_addr</code>	IP address or IP alias of the system to receive SNMP traps

Output Example:

To enable SNMP `vlan_violation` traps to a specific manager:

```
X330WAN-2DS1-1(super)# set snmp trap 192.168.173.42 enable
vlan_violation
SNMP vlan_violation change traps enabled.
```

Output Example:

To enable all traps to a specific manager:

```
X330WAN-2DS1-1(super)# set snmp trap 192.168.173.42 enable all
All SNMP traps enabled.
```

Output Example:

To disable SNMP `vlan_violation` traps to a specific manager:

```
X330WAN-2DS1-1(super)# set snmp trap 192.168.173.42 disable
vlan_violation
SNMP vlan_violation traps disabled.
```

Output Example:

To add an entry in the SNMP trap receiver table with default:

```
X330WAN-2DS1-1(super)# set snmp trap 192.168.173.42
SNMP trap receiver added.
```

set snmp trap auth

Use the `set snmp trap auth` commands to enable/disable the sending of SNMP traps upon SNMP authentication failure.

The syntax for this command is:

```
set snmp trap {enable|disable} auth
```

Output Example:

```
X330WAN-2DS1-1(super)# set snmp trap enable auth
Authentication trap enabled
```

set system contact

Use the `set system contact` command to set mib2 system contact MIB variable.

The syntax for this command is:

```
set system contact [contact string]
```

`contact string` Contact person. The contact person field is cleared if this field is blank. A string of 2 words or more must be type in quotation marks – e.g. “Yigdal Naouri”.

Example:

```
set system contact "Gabby ext.545"
```

set system location

Use the `set system location` command to set the mib2 system location MIB variable.

The syntax for this command is:

```
set system location [location string]
```

location string Location name. The location name is cleared if this field is left blank. A string of 2 words or more must be type in quotation marks – e.g. “Operations Floor”.

Example:

```
set system location "Floor 5,Room 12"
```

set system name

Use the `set system name` command to set mib2 system name MIB variable.

The syntax for this command is:

```
set system name [name string]
```

name string System name. The system name is cleared if this field is left blank. A string of 2 words or more must be type in quotation marks – e.g. “Backbone Stack”.

Example:

```
set system name "Banking System"
```

set time client

The `set time client` command is used to enable or disable the periodic network time acquisition by the device from the network time server (SNTP or TIME protocol).

The syntax for this command is:

```
set time client {enable|disable}
```

set time protocol

Use the `set time protocol` command to set the protocol for use in the system as either SNTP protocol or TIME protocol.

The syntax for this command is:

```
set time protocol [sntp-protocol|time-protocol]
```

Output Example:

```
X330WAN-2DS1-1(super)# set time protocol sntp-protocol
The protocol has been set to SNTP protocol
```

Output Example:

```
X330WAN-2DS1-1(super)# set time protocol time-protocol
The protocol has been set to TIME protocol
```

set time server

The `set time server` command is used to set the TIME server address.

The syntax for this command is:

```
set time server <ip address>
```

ip address IP address of the TIME server.

set timezone

Use the `set timezone` command to assign a timezone name and set the time difference of your WAN relative to the Coordinated Universal Time (UTC/GMT). The minutes parameter can only be set to 30.

The syntax for this command is:

```
set timezone <zone name> <hours|hours:min>
```

zone name Three letter representation of the time zone.

Output Example:

```
set timezone GMT -3:30
Timezone set to 'GMT', offset from UTC is -3:30 hours
```



Note: If you wish to define a name which includes spaces, you must enclose the entire name in quotation marks, e.g. "new york".

show boot bank

Use the `show boot bank` command to display the software bank from which the

device will boot at the next boot process.

The syntax for this command is:

show boot bank

Output Example:

```
show boot bank
Boot bank set to bank-a
```

show copy status

Use the `show copy status` command to show the status of the local configuration copy operation.

The syntax for this command is:

show copy status

Output Example:

```
X330WAN-2DS1-1(super)# show copy status
Module #1
=====
Module           : 1
Source file      : startup-config
Destination file : running-config
Host            : -
Running state    : Idle
Failure display  : (null)
Last warning     : No warning
```

show dev log file

Use the `show dev log file` command to display the encrypted device's log file.

The syntax for this command is:

show dev log file

show erase status

Use the `show erase status` command to view the status of the erase Startup Configuration operation.

The syntax for this command is:

show erase status

show image version

Use the `show image version` command to display the software version of the image on both memory banks of the device.

The syntax for this command is:

show image version

Output Example:

```
X330WAN-2DS1-1(super)# show image version
```

Mod	Module-Type	Bank	Version
1	Avaya X330W-2DS1 WAN Router	A	N/A
1	Avaya X330W-2DS1 WAN Router	B	3.9.5

show module-identity

Use the `show module identity` command to display the device identity required for acquiring a license.

The syntax for this command is:

show module-identity

Output Example:

```
show module-identity
```

```
X330WAN-2DS1-1(super)# show module-identity
```

Mod	Module Identity
1	1234567

show running-config

Use the `show running-config` command to show the RAM based configuration currently running on the device.

The syntax for this command is:

show running-config

show snmp

Use the `show snmp` command to display SNMP information.

The syntax for this command is:

show snmp

Output Example:

```
X330WAN-2DS1-1(super)# show snmp
Authentication trap disabled
Community-Access      Community-String
-----
read-only              public
read-write             public
trap                   public
-----
1.1.1.1                duplicate_ip
                       ip_vlan_violation
                       etc...
```

show startup-config

Use the `show startup-config` command to show the NVRAM based configuration loaded automatically at startup.

The syntax for this command is:

show startup-config

show system

Use the `show system` command to display the up time, system name, location, and contact person.

The syntax for this command is:

show system

Output Example:

```
X330WAN-2DS1-1(super)# show system
Uptime d,h:m:s
-----
0,2:40:55

System Name              System Location          System Contact
```

P332_version-3.0.5

Alpha LAB

Ygdal Naouri

show tftp download software status

Use the `show tftp download software status` commands to display the status of the current TFTP Device Manager S/W (Embedded Web) download process into the device.

The syntax for this command is:

show tftp download software status

Output Example:

```
X330WAN-2DS1-1(super)# show tftp download software status
Module #1
=====
Module           : 1
Source file      : d:\p340sw\gt-ml\3.5.18\p340.web
Destination file : EW_Archive
Host             : 149.49.70.61
Running state    : Writing ...
Failure display  : (null)
Last warning     : No-warning
```

show tftp download/upload status

Use the `show tftp download status` and `show tftp upload status` commands to display the status of the current TFTP configuration file copy process into/from the device.

The syntax for this command is:

show tftp {download|upload} status

Output Example:

```
X330WAN-2DS1-1(super)# show tftp upload status
Module           : 1
Source file      : stack-config
Destination file : c:\conf.cfg
Host             : 149.49.36.200
Running state    : Executing
Failure display  : (null)
```

Last warning : No-warning

show time

Use the `show time` command to display the current device time.

The syntax for this command is:

show time

Output Example:

```
X330WAN-2DS1-1(super)# show time
10:32:34 27 JAN 2000 GMT
```

show time parameters

Use the `show time parameters` command to display the status and parameters.

The syntax for this command is:

show time parameters

```
X330WAN-2DS1-1(super)# show time parameters
Client status: Enabled
Current time : L:01:38:31 01 JAN 1970 GMT
Timezone set to 'GMT', offset from UTC is 0 hours
Time-Server : 0.0.0.0 (I.e. broadcast address)
Time acquired from Time-Server: 0.0.0.0
Time protocol set to : TIME protocol
```

show timezone

Use the `show timezone` command to display the current device timezone.

The syntax for this command is:

show timezone

Output Example:

```
X330WAN-2DS1-1(super)# show timezone
Timezone set to 'GMT', offset from UTC is 0 hours
```

sync time

Use the `sync time` command to synchronize the time.

The syntax for this command is:

sync time

Output Example:

```
X330WAN-2DS1-1(super)# sync time
Time has been distributed.
```

tech

Use the `tech` command to enter tech mode. This command is reserved for service personnel use only.

terminal length

Use the `terminal length` command to set the length of the terminal display in characters.

The syntax for this command is:

terminal length [<screen-length>]

screen-length	none - Displays the current length.
	number - Set the new screen length.

Example:

```
X330WAN-2DS1-1(super)# terminal length 24
```

terminal width

Use the `terminal width` command to set the width of the terminal display in characters.

The syntax for this command is:

terminal width [<character>]

character	none - Displays the current width.
	number - Set the new screen width.

Example:

```
X330WAN-2DS1-1(super)# terminal width 6
```

Layer 3 CLI Commands

This section contains a list of all Layer 3 related CLI commands.

arp

Use the `arp` command to add a permanent entry to the Address Resolution Protocol (ARP) cache. The `no` form of this command removes an entry, either a static entry or a dynamically learned entry.

The syntax for this command is:

```
[no] arp <ip-address> <mac-address>
```

<code>ip-address</code>	IP address, in dotted decimal format, of the station
<code>mac-address</code>	MAC address of the local data link

Examples:

To add a permanent entry for station 192.168.7.8 to the ARP cache:

```
Router(configure)# arp 192.168.7.8 00:40:0d:8c:2a:01
```

To remove an entry to the ARP cache for the station 192.168.13.76:

```
Router(configure)# no arp 192.168.13.76
```

arp timeout

Use the `arp timeout` command to configure the amount of time that an entry remains in the ARP cache. To restore the default value, 14400, use the `no` form of this command.

The syntax for this command is:

```
arp timeout <seconds>
```

The syntax for the `no` form of this command is:

```
no arp timeout
```

<code>seconds</code>	The amount of time, in seconds, that an entry remains in the arp cache. Max value is 604800
----------------------	--

Examples:

To set the `arp timeout` to one hour:

```
X330WAN-2DS1-1(configure)# arp timeout 3600
```

To restore the default `arp timeout`:

```
Router-N(configure)# no arp timeout
```

clear arp-cache

Use the `clear arp-cache` command to delete all dynamic entries from the ARP cache and the IP route cache.

The syntax for this command is:

```
clear arp-cache [<vlan>|<ip addr> [<mask>]]
```

vlan	VLAN string (up to 16 characters) or VLAN ID number
ip addr	IP address
mask	IP mask

Examples:

<code>clear arp-cache</code>	Flush all ARP entries.
<code>clear arp-cache marketing_vlan</code>	Flush ARP entries for a VLAN.
<code>clear arp-cache 30</code>	Flush ARP entries for a VLAN ID.
<code>clear arp-cache 192.168.0.0 255.255.0.0</code>	Flush range of ARP entries belonging to one subnet.

clear ip route

Use the `clear ip route` command to delete all the dynamic routing entries from the Routing Table.

The syntax for this command is:

```
clear ip route * | <ip-addr> [<ip-mask>]
```

ip-addr	IP address
ip-mask	IP mask address

Examples:

<code>clear ip route *</code>	Clears all the routing table.
<code>clear ip route 192.168.49.1 255.255.255.0</code>	Clears a range of entries.

default-metric (Interface context)

Use the `default-metric` command to set the interface RIP route metric value. The `no` form of this command restores the default value (**1**).

The syntax for this command is:

```
[no] default-metric <number>
```

number The interface route metric value. The range is 1 to 15.

Example:

```
X330WAN-2DS1-1(configure:interface)# default-metric 10
```

default-metric (Router-OSPF context)

Use the `default-metric` command to set the default metric of redistributed routes. The `no` form of this command restores the default. The default metric is **20**.

The syntax for this command is:

```
[no] default-metric <default metric>
```

default metric An integer. The range is 1 to 65535.

Example:

```
X330WAN-2DS1-1(configure router:ospf)# default-metric 50
```

default-metric (Router-RIP Mode)

Use the `default-metric` command to set the default metric of redistributed routes. The `no` form of this command restores the default. The default metric is **1**.

The syntax for this command is:

```
[no] default-metric <default metric>
```

default metric The interface RIP route metric value. The range is 1 to 16.

Example:

```
X330WAN-2DS1-1(configure router:rip)# default-metric 5
```

distribution-list (Router-RIP Mode)

Use the `distribution-list` command to filter incoming/outgoing networks in route updates. The `no` form of this command deactivates the filter.

The syntax for this command is:

```
[no] distribution-list <access-list-number> <type>
```



```
[<interface>|<protocol>]
```

access-list-number	An integer. The range is 1 to 99.
type	[in out]
interface-type	The interface type, a string.
interface-number	The interface number.
protocol	[static ospf] Protocol is only relevant for outgoing (out) list entries.

Examples:

```
X330WAN-2DS1-1(configure router:rip)# distribution-list 10 in
"FabricFastEthernet 1"
```

```
X330WAN-2DS1-1(configure router:rip)# distribution-list 20 out
"Serial 1:1"
```

```
X330WAN-2DS1-1(configure router:rip)# distribution-list 40 out
ospf
```

ip address

Use the `ip address` command to assign an IP address and mask to an interface. The `no` form of the command deletes an IP interface.

The syntax for this command is:

```
[no] ip address <ip-address> <mask> [<admin-state>]
```

ip address	The IP address assigned to the interface
mask	Mask for the associated IP subnet
admin-state	The administration status – either Up or Down (default is Up). This parameter is not applicable for the Console interface of the X330WAN.

Example:

To assign the IP address 192.168.22.33 with mask 255.255.255.0 to the interface "marketing":

```
X330WAN-2DS1-1(configure)# ip address 192.168.22.33
```

```
X330WAN-2DS1-1(configure)# ip address 255.255.255.0
```

ip admin-state (Interface context)

Use the `ip admin-state` command to set the administrative state of an IP interface. The default state is **up**.

The syntax for this command is:

```
ip admin-state <up/down>
```

up/down	Administrative state of the interface. The choices are up (active) or down (inactive).
---------	--

ip bootp-dhcp network (Interface context)

Use the `ip bootp-dhcp network` command to select the network from which the bootp/dhcp server shall allocate an address. This command is required only when there are multiple interfaces over the Fabric. The `no` form of this command restores to the default.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip bootp-dhcp network <ip net>
```

ip net	The IP subnet
--------	---------------

Example:

To select the network 192.168.169.0 as the network from which an address shall be allocated for bootp/dhcp requests:

```
X330WAN-2DS1-1(configure)# ip bootp-dhcp network 192.168.169.0
```

ip bootp-dhcp relay

Use the `ip bootp-dhcp relay` command to enable relaying of bootp and dhcp requests to the bootp/dhcp server. The `no` form of this command disables bootp/dhcp relay. The default state is: **disabled**.

The syntax for this command is:

```
[no] ip bootp-dhcp relay
```

Examples:

To enable relaying of BOOTP and DHCP requests:

```
X330WAN-2DS1-1(configure)# ip bootp-dhcp relay
```

To disable relaying of bootp and dhcp requests:

```
X330WAN-2DS1-1(configure)# no ip bootp-dhcp relay
```

ip bootp-dhcp server (Interface context)

Use the `ip bootp-dhcp server` command to add a bootp/dhcp server to handle bootp/dhcp requests received by this interface. The `no` form of this command removes the server. A maximum of two servers can be added to a single interface. Using the X330WAN, the `no` form of this command remove a bootp server.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip bootp-dhcp server <ip-address>
```

ip-address

The IP address of the server

Example:

To add station 192.168.37.46 as a bootp/dhcp server to handle bootp/dhcp requests arriving at the interface “marketing”:

```
X330WAN-2DS1-1(configure)# ip bootp-dhcp server 192.168.37.46
```

ip broadcast-address (Interface Context)

Use the `ip broadcast-address` command to update the interface broadcast address. The Broadcast address must be filled in with 0s or 1s, for example, 10.255.255.255 or 10.0.0.0.



Note: This command is executed from the Serial, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

ip broadcast-address <bc addr>

bc addr The broadcast IP address

Example:

```
ip broadcast-address 192.168.255.255
```

ip default-gateway

Use the `ip default-gateway` command to define a default gateway (router). The `no` form of this command removes the default gateway.

The syntax for this command for the P332G-ML/P332GT-ML/P333R/P333R-LB is:

[no] ip default-gateway <ip-address> [<cost>] [<preference>]

The syntax for this command for the X330WAN is:

[no] ip default-gateway {<ip-address> | <interface-type>
<interface-number>} [<cost>] [<preference>] [permanent]

ip-address	The IP address of the router.
cost	The path cost. The default is 1.
interface-type	The interface type.
interface-number	The interface name.
preference	Preference, either High or Low. The default is Low.
permanent	The route will not be disabled if the interface is down.

Example:

To define the router at address 192.168.37.1 as the default gateway:

```
Router-N(configure)# ip default-gateway 192.168.37.1
```

Example:

```
X330WAN-2DS1-1(super)# ip default-gateway 132.55.4.45 4 high
X330WAN-2DS1-1(super)# ip default-gateway Serial 1:1 permanent
X330WAN-2DS1-1(super)# no ip default-gateway
```

ip directed-broadcast (Interface context)

Use the `ip directed-broadcast` command to enable net-directed broadcast forwarding. The `no` form of this command disables net-directed broadcasts on an interface.



Note: This command is executed from the Serial, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip directed-broadcast
```

ip icmp-errors

Use the `ip icmp-errors` command to set ICMP error messages ON. The `no` form of this command to set ICMP error messages OFF.

The syntax for this command is:

```
[no] ip icmp-errors
```

ip max-arp-entries

Use the `ip max-arp-entries` command to specify the maximum number of ARP cache entries allowed in the ARP cache. The `no` form of this command restores to the default value of 4096. This command takes effect only after start-up.

The syntax for this command is:

```
[no] ip max-arp-entries <value>
```

value The space available for the IP address table. When you decrease the number of entries, it may cause the table to be relearned more frequently. If you do not enter a value, then the current ARP Cache size is shown. The range of accepted values is 128 to 16384.

Examples:

To set the maximum number of ARP cache entries to 8000:

```
X330WAN-2DS1-1(configure)# ip max-arp-entries 8000
```

To restore the maximum number of ARP cache entries to its default:

```
X330WAN-2DS1-1(configure)# no ip max-arp-entries
```

ip max-route-entries

This command exists for compatibility with P550. There is no limitation on the size of the routing table, except for the amount of available memory. Use the `no` form of this command to set the maximum number of route entries in the routing table to its default value.

The syntax for this command is:

```
[no] ip max-route-entries <value>
```

value number of entries. The range of accepted values is 100 to 20000.

ip netbios-rebroadcast (Interface context)

Use the `ip netbios-rebroadcast` command to set NETBIOS rebroadcasts mode on an interface. The `no` form of this command disables NETBIOS rebroadcasts on an interface.



Note: This command is executed from the Serial, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip netbios-rebroadcast [<direction>]
```

The possible values of `direction` is:

both	Netbios packets received on the interface rebroadcasted to other interfaces and netbios packets received on other interfaces are rebroadcasted into this interface. If no parameter is provided in the command, the "both" option is applied as the default.
disable	Netbios packets are not rebroadcasted into or out of this interface.

Example:

To enable rebroadcasting of netbios packets received by and sent from the interface "marketing":

```
X330WAN-2DS1-1(configure)# ip netbios-rebroadcast both
```

```
X330WAN-2DS1-1(configure)# ip netbios-rebroadcast
```

ip netmask-format

Use the `ip netmask-format` command to specify the format of netmasks in the **show** command output. The `no` form of this command restores to the default, which is a dotted decimal format.

The syntax for this command is:

```
[no] ip netmask-format <mask-format>
```

The possible mask formats are:

bitcount	Addresses are followed by a slash and the total number of bits in the netmask, for example, 17.
decimal	The network masks are in dotted decimal notation. For example, 255.255.255.0.
hexadecimal	The network masks are in hexadecimal format as indicated by the leading 0X. For example, 0FFFFFFF00.

Example:

To display netmasks in bitcount format:

```
X330WAN-2DS1-1(configuration)# ip netmask-format bitcount
```

ip ospf authentication-key (Interface context)

Use the `ip ospf authentication-key` command to configure the interface authentication password. The `no` form of this command removes the OSPF password.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip ospf authentication-key <key>
```

key	A string (up to 8 characters)
-----	-------------------------------

Example:

```
config-if:ip ospf authentication-key my_pass
```

ip ospf cost (Interface context)

Use the `ip ospf cost` command to configure interface metric. The `no` form of this command sets the cost to its default. The default is **1**.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip ospf cost <cost>
```

cost An integer in the range 1 to 65535.

Example:

```
ip ospf cost 10
```

ip ospf dead-interval (Interface context)

Use the `ip ospf dead-interval` command to configure the interval before declaring the neighbor as dead. The `no` form of this command sets the dead-interval to its default. The default is **40**.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip ospf dead-interval <seconds>
```

seconds An integer in the range 1 to 65535.

Example:

```
ip ospf dead-interval 15
```

ip ospf hello-interval (Interface Mode)

Use the `ip ospf hello-interval` command to specify the time interval between hello's the router sends. The `no` form of this command sets the hello-interval to its default. The default is **10**.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip ospf hello-interval <seconds>
```

seconds An integer in the range 1 to 65535.

Example:

```
ip ospf hello-interval 5
```

ip ospf priority (Interface Mode)

Use the `ip ospf priority` command to configure interface priority used in DR election. The `no` form of this command sets the OSPF priority to its default. The default is 1.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip ospf priority <priority>
```

priority An integer in the range 1 to 255.

Example:

```
priority 17
```

ip ospf router-id

Use the `ip ospf router-id` command to configure router identity. The `no` form of this command returns the router identity to its default (lowest IP interface that exists).

The syntax for this command is:

```
[no] ip ospf router-id <router id>
```

router id	IP address
-----------	------------

Example:

```
X330WAN-2DS1-1(configure)# ip ospf router-id 192.168.49.1
```

ip proxy-arp (Interface context)

Use the `ip proxy-arp` command to enable proxy ARP on an interface. The `no` form of this command disables proxy ARP on an interface.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip proxy-arp
```

Example:

To disable proxy ARP on interface marketing:

```
X330WAN-2DS1-1(configure)# no ip proxy-arp
```

ip redirect (Interface context)

Use the `ip redirect` command to enable the sending of redirect messages on the interface. The `no` form of this command disables the redirect messages. By default, sending of redirect messages on the interface is enabled.



Note: This command is executed from the Serial, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip redirects
```

Examples:

```
X330WAN-2DS1-1(configure)# ip redirect
```

```
X330WAN-2DS1-1(super-if:FastEthernet1)# ip redirects
```

ip rip authentication key (Interface context)

Use the `ip rip authentication key` command to set the authentication string used on the interface. The `no` form of this command clears the password.

Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip rip authentication key <password>
```

`password` The authentication string for the interface. Up to 16 characters are allowed.

Example:

```
X330WAN-2DS1-1(configure)# ip rip authentication key hush-hush
```

ip rip authentication mode (Interface context)

Use the `ip rip authentication mode` command to specify the type of authentication used in RIP Version 2 packets. The `no` form of this command restores the default value of none.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip rip authentication mode [simple|none]
```

`simple | none` The authentication type used in RIP Version 2 packets:

- simple - clear text authentication.
- none - no authentication.

Example:

To specify simple authentication to be used in RIP Version 2 packets on the interface "marketing".

```
X330WAN-2DS1-1(configure)# ip rip authentication mode simple
```

ip rip default-route-mode (Interface context)

Use the `ip rip default-route-mode` command to enable learning of the default route received by the RIP protocol. The default state is `talk-listen`. Using the X330WAN, the `no` form of the command disables listening to default routes.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

[no] ip rip default-route-mode <mode>

The possible default route modes on an interface are:

talk-listen	Set RIP to send and receive default route updates on the interface.
talk-only	Set RIP to send but not receive default route updates on the interface.

Example:

```
X330WAN-2DS1-1(configure)# ip rip default-route-mode talk-only
```

ip rip poison-reverse (Interface Context)

Use the `ip rip poison-reverse` command to enable split-horizon with poison-reverse on an interface. The `no` form of this command disables the poison-reverse mechanism.

The split-horizon technique prevents information about routes from exiting the router interface through which the information was received. This prevents routing loops.

Poison reverse updates explicitly indicate that a network or subnet is unreachable rather than implying they are not reachable. Poison reverse updates are sent to defeat large routing loops.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

[no] ip rip poison-reverse

ip rip rip-version (Interface context)

Use the `ip rip rip-version` command to specify the RIP version running on the interface basis.



Note: This command is executed from the Serial, Loopback, Fast Ethernet, and Fabric Fast Ethernet interfaces.

The syntax for this command is:

ip rip rip-version [1|2]

The possible versions of the RIP packets received and sent on an interface are:

[1] RIP Version 1 packets

[2] RIP Version 2 packets.

Example:

To specify that RIP version 2 should be running on the basis of the interface “marketing”:

```
X330WAN-2DS1-1(super-if:Serial:1:1)# ip rip rip version 2
```

ip rip send-receive (Interface context)

Use the `ip rip send-receive` command to set the RIP Send and Receive mode on an interface. The default state is **talk-listen**.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

[no] ip rip send-receive-mode <mode>[<default route metric>]

where the `no` form of this command sets the RIP to `talk` (send report).

mode talk-listen - Set RIP to receive and transmit updates on the interface.

talkdefault-listen - Set RIP to receive updates on the interface and send only a default route.

`listen-only` - Set RIP to only receive updates on the interface and not transmit them (for Avaya P332G-ML/P332GT-ML devices only).

`default route metric` Integer value

Example:

To set the RIP Send and Receive mode on the interface “marketing” to be listen-only:

```
X330WAN-2DS1-1(super-if:Serial:1:1)# ip rip send-receive talk-listen
```

ip rip split-horizon (Interface Context)

Use the `ip rip split-horizon` command to enable split-horizon mechanism. The `no` form of this command disables the split-horizon. By default split-horizon is enabled.

The split-horizon technique prevents information about routes from exiting the router interface through which the information was received. This prevents routing loops.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

[no] ip rip split-horizon

Example:

```
X330WAN-2DS1-1(super-if:Serial:1:1)# no ip rip split-horizon
```

ip route

Use the `ip route` command to establish a static route. The `no` form of this command removes a static route.

The syntax for this command is:

```
[no] ip route <ip addr> <mask> {{<next-hop> [<next-hop>
[<next-hop>]] | <interface-type> <interface-number>} [<cost>]
[<preference>] [permanent] | Null0}
```

<code>ip-address</code>	The IP address of the network.
<code>mask</code>	Mask of the static route.
<code>next-hop</code>	The next hop address in the network.
<code>cost</code>	The path cost. The default is 1.
<code>preference</code>	Preference, either High or Low. Default is Low.
<code>Null0</code>	Creates a static discard route.
<code>interface-type</code>	The interface type.
<code>interface-number</code>	The interface number.
<code>permanent</code>	The route will not be disabled if the interface is down.

Examples:

```
X330WAN-2DS1-1(configure)# ip route 132.55.0.0 255.255.0.0
132.55.4.45 3 high
X330WAN-2DS1-1(configure)# no ip route 134.66.0.0 255.255.0.0
X330WAN-2DS1-1(configure)# ip route 135.0.0.0 255.0.0.0 Serial
1:1 permanent
X330WAN-2DS1-1(configure)# ip route 134.66.0.0 255.255.0.0
Null0
```

ip routing

Use the `ip routing` command to enable IP routing. The `no` form of this command disables the IP routing process in the device. By default, IP routing is enabled.

The syntax for this command is:

```
[no] ip routing
```

ip routing-mode (Interface Context) ???

Use the `ip routing-mode` command to set the IP routing mode of the interface. In RT-MGMT mode, the interface functions as a routing interface. In RT_PRIMARY_MGMT mode, the interface function as both a routing interface and the primary management interface. The IP address used in Avaya MultiService Network Manager is the primary management interface IP address. Only one interface can be in RT_PRIMARY_MGMT mode. By default, the first IP address defined is used as the primary.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
ip routing-mode <mode>
```

mode RT_MGMT or RT_PRIMARY_MGMT mode

The syntax for this command for the X330WAN is:

```
ip routing-mode <rt_primary_mgmt>
```

Example:

```
X330WAN-2DS1-1(configure)# ip routing-mode RT_PRIMARY_MGMT
```

ip vrrp (Interface Context)

Use the `ip vrrp` command to create a virtual router on the interface. Use the `no` form of this command to delete a virtual router.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip vrrp <vr-id>
```

vr-id Virtual Router ID (1-255)

Example:

```
X330WAN-2DS1-1(configure)# ip vrrp 1
```

(ip vrrp) address

Use the `address` option to assign an IP address to the virtual router. Use the `no` form of this command to remove an IP address from a virtual router.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip vrrp <vr-id> address <ip-address>
```

vr-id Virtual Router ID (1-255)

ip-address The IP address to be assigned to the virtual router

Example:

To assign address 10.0.1.2 to virtual router 1:

```
X330WAN-2DS1-1(configure)# ip vrrp 1 address 10.0.1.2
```

(ip vrrp) auth-key

Use the `ip vrrp auth-key` command to set the virtual router simple password authentication for the virtual router ID. Use the `no` form of this command to disable simple password authentication for the virtual router instance.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip vrrp <vr-id> auth-key <key-string>
```

vr-id Virtual Router ID (1-255)

key-string Simple password string

```
ip vrrp 1 primary 192.168.66.23
```

(ip vrrp) override addr owner

Use the `ip vrrp override addr owner` command to accept packets addressed to the IP address(es) associated with the virtual router, such as ICMP, SNMP, and TELNET (if it is not the IP address owner). Use the `no` form of this command to discard these packets.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip vrrp <vr-id> override addr owner
```

vr-id Virtual Router ID (1-255)

Example:

```
X330WAN-2DS1-1(configure)# ip vrrp 1 override addr owner
```

(ip vrrp) preempt

Use the `ip vrrp preempt` command to configure the router to preempt a lower priority master for the virtual router ID. Use the `no` form of this command to disable preemption for the virtual router instance. By default, preemption is enabled.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

[no] ip vrrp <vr-id> preempt

vr-id Virtual Router ID (1-255)

Example:

```
X330WAN-2DS1-1(configure)# ip vrrp 1 preempt
```

(ip vrrp) primary

Use the `ip vrrp primary` command to set the primary address that shall be used as the source address of VRRP packets for the virtual router ID. Use the `no` form of this command to return to the default primary address for the virtual router instance. By default, the primary address is selected automatically by the device.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

[no] ip vrrp <vr-id> primary <ip-address>

vr-id Virtual Router ID (1-255)

ip-address Primary IP address of the virtual router. This address should be one of the router addresses on the Fabric.

Example:

```
ip vrrp 1 primary 192.168.66.23
```

(ip vrrp) priority

Use the `priority` option to set the virtual router priority value used when selecting a master router. Use the `no` form of this command to restore the default value.



Note: This command is executed from the Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

```
[no] ip vrrp <vr-id> priority <pri-value>
```

vr-id	Virtual Router ID (1-255)
pri-value	The priority value (1-254)

Example:

To set the priority value for virtual router 1 to 10:

```
X330WAN-2DS1-1(configure)# ip vrrp 1 priority 10
```

(ip vrrp) timer

Use the `ip vrrp timer` command to set the virtual router advertisement timer value (in seconds) for the virtual router ID. Use the `no` form of this command to restore the default value.

The syntax for this command is:

```
[no] ip vrrp <vr-id> timer <value>
```

vr-id	Virtual Router ID (1-255)
value	The advertisement transmit time (seconds). The range is from 1 to 255.

Example:

To set the virtual router advertisement timer value for virtual router 3 to 2:

```
X330WAN-2DS1-1(configure)# ip vrrp 3 timer 2
```

network (Router-OSPF context)

Use the `network` command to enable OSPF in this network. The `no` form of this command disables the OSPF in this network. The default is **disabled**.

The syntax for this command is:

```
network <net addr> [<wildcard-mask> [area <area id>]]
```

net addr	IP address
wildcard-mask	Wildcard mask address
area id	Area ID. This parameter exists for compatibility with the P550.

Examples:

```
X330WAN-2DS1-1(configure router:ospf)# network 192.168.0.0
X330WAN-2DS1-1(configure router:ospf)# network 192.168.0.0
0.0.255.255 area 0.0.0.0
```

network (Router-RIP Context)

Use the `network` command to specify a list of networks on which the RIP is running. The `no` form of this command removes an entry.

The syntax for this command is:

```
[no] network <ip-address> [<wildcard-mask>]
```

<code>ip addr</code>	The IP address of the network of directly connected networks
<code>wildcard-mask</code>	Wildcard mask address. Exists for compatibility with P550.

Example:

To specify that RIP will be used on all interfaces connected to the network 192.168.37.0:

```
X330WAN-2DS1-1(configure router:rip)# network 192.168.37.0
```

ping

Use the `ping` command to check host reachability and network connectivity.

The syntax for this command is:

```
ping <host> [<interval> [<size>[timeout[source address]]]]
```

<code>host</code>	IP address of the target system.
<code>interval</code>	An integer, the number of seconds between successive ping messages. The default is 1 second.
<code>size</code>	An integer, the size of the packet sent during a ping operation. The default is 50 bytes.
<code>timeout</code>	Timeout in seconds (1-10).
<code>source address</code>	IP address.

Example:

```
X330WAN-2DS1-1(configure)# ping 149.49.50.13 5 8
```

Output Example:

```
X330WAN-2DS1-1(configure)# ping 149.49.54.1
Reply from 149.49.54.1: bytes=32 time=17ms TTL=64
Reply from 149.49.54.1: bytes=32 time=1ms TTL=64
Reply from 149.49.54.1: bytes=32 time=17ms TTL=64
Ping statistics for 149.49.54.1:
    Packets: sent = 3, Received = 3, Lost = 0 (0% loss)
Approximate round trip times in milli-seconds:
    Minimum = 1, Maximum = 17, Average = 9
```

redistribute (Router-OSPF context)

Use the `redistribute` command to redistribute routing information from other protocols into OSPF. The `no` form of this command disables redistribution by OSPF.

The syntax for this command is:

```
[no] redistribute <protocol>
```

```
protocol                [static | connected | rip]
```

Example:

```
X330WAN-2DS1-1(configure router:ospf)# redistribute static
```

redistribute (Router-RIP context)

Use the `redistribute` command to redistribute routing information from other protocols into RIP. The `no` form of this command disables redistribution by RIP. The default is **disabled**.

The syntax for this command is:

```
[no] redistribute <protocol>
```

```
protocol                Either Static or OSPF
```

Example:

```
X330WAN-2DS1-1(configure router:rip)# redistribute ospf
```

router ospf

Use the `router ospf` command to enable OSPF protocol on the system and to enter the Router Configuration context. The `no` form of this command disables it globally. The default is **disabled**.

The syntax for this command is:

[no] router ospf

router rip

Use the `router rip` command to enable the Routing Information Protocol (RIP) and to enter the Router Configuration context. The `no` form of this command disables RIP. The default state is **disabled**.

The syntax for this command is:

[no] router rip

Example:

To enable the RIP protocol:

```
X330WAN-2DS1-1(configure)# router rip
```

```
X330WAN-2DS1-1(configure)# router: rip #
```

router vrrp

Use the `router vrrp` command to enable VRRP routing globally. Use the `no` form of this command to disable VRRP routing.



Note: You cannot activate both VRRP and SRRP protocols at the same time.

The syntax for this command is:

[no] router vrrp

show ip arp

Use the `show ip arp` command to display the Address Resolution Protocol (ARP) cache.

The syntax for this command is:

show ip arp [<interface> | <IP interface> | <ip addr> [<ip mask>] | static]

interface

String up to 32 characters

IP interface	String up to 32 characters
ip-addr	The IP address of the station(s)
ip-mask	The IP mask of the routes
static	Display static IP ARP information

Examples:

<code>show ip arp</code>	Displays all ARP mapping.
<code>show ip arp marketing</code>	Displays an interface ARP mapping.
<code>show ip arp 192.168.49.1</code>	Displays one host ARP mapping.
<code>show ip arp 192.168.49.1 255.255.255.0</code>	Displays a range of ARP mapping.
<code>show ip arp marketing_vlan</code>	Displays Fabric ARP mapping.
<code>show ip arp static</code>	Displays static ARP mapping.



Note: If you wish to define a name which includes spaces, you must enclose the entire name in quotation marks, e.g. "new york".

show ip icmp

Use the `show ip icmp` command to display the status (enabled/disabled) of ICMP error messages.

The syntax for this command is:

show ip icmp

show ip interface

Use the `show ip interface` command to display information for an IP interface.

The syntax for this command for the X330WAN is:

```
show ip interface [<interface-name>|<IP interface>|<ip-address>]
```

interface-name	The name of the interface whose information you want to display
ip-address	The IP address of the interface whose information you want to display
IP interface	A string (up to 32 characters).



Note: If you wish to define a name which includes spaces, you must enclose the entire name in quotation marks, e.g. "new york".

Example:

To display all IP interfaces:

```
X330WAN-2DS1-1(configure)# show ip interface
```

Example:

To display all IP interfaces on one interface:

```
X330WAN-2DS1-1(configure)# show ip interface "FastEthernet 1"
```

Example:

To display specific IP interface information:

```
X330WAN-2DS1-1(configure)# show ip interface "FastEthernet 1.0"
```

Example:

To display the IP's interface:

```
X330WAN-2DS1-1(configure)# show ip interface 192.168.49.1
```

Output Example:

```
X330WAN-2DS1-1(super)# show ip interface
Showing 2 Interfaces
Serial 1:1 is down
```

```
Internet address is 2.2.2.2      , subnet mask is 255.255.255.0
Advertised IPCP address
Broadcast address is 2.2.2.255
Directed broadcast forwarding is disabled
Proxy ARP is disabled
Primary management IP interface
```

```
FastEthernet 1 is up
Internet address is 149.49.75.71  , subnet mask is 255.255.255.0
Broadcast address is 149.49.75.255
Directed broadcast forwarding is disabled
Proxy ARP is disabled
```

show ip ospf

Use the `show ip ospf` command to display general information about OSPF routing.

The syntax for this command is:

```
show ip ospf
```

Output Example:

```
X330WAN-2DS1-1(super router:ospf)# show ip ospf
Routing Process OSPF with ID 149.49.75.71
Number of areas in this router is 1
Area 0.0.0.0
Number of Interfaces in this area 0
SPF algorithm executed 1 times
SPF hold time is 3 sec
```

show ip ospf database

Use the `show ip ospf database` command to display lists of information related to the OSPF database for a specific router.

The syntax for this command is:

```
show ip ospf database
```

```
[{asbr-summary|router|network|network-summary|external}]
```

<code>asbr-summary</code>	Displays information only about the autonomous system boundary router summary LSAs. Optional.
---------------------------	---

external	Displays information only about the external LSAs. Optional.
network	Displays information only about the network LSAs. Optional.
network-summary	Displays information only about the network LSAs summary. Optional.
router	Displays information only about the router LSAs. Optional.

Output Example:

```
X330WAN-2DS1-1(super router:ospf)# sho ip ospf database
Showing 1 rows
   Area          Type          LSA ID          Router ID        Sequence Age  Cksm
-----
0.0.0.0         RTR    149.49.75.71    149.49.75.71    80000001 567  139b
```

show ip ospf interface

Use the `show ip ospf interface` command to display the OSPF-related interface information.

The syntax for this command is:

```
show ip ospf interface [<interface-name>]
```

interface-name A string, the OSPF interface name



Note: If you wish to define a name which includes spaces, you must enclose the entire name in quotation marks, e.g. "new york".

Output Example:

```
X330WAN-2DS1-1(super router: ospf)# show ip ospf interface
There are no OSPF interfaces
```

show ip ospf neighbor

Use the `show ip ospf neighbor` command to display OSPF-neighbor information on a per-interface basis.

The syntax for this command is:

```
show ip ospf neighbor  
[<interface-name>] [<neighbor-id>]
```

interface-name	A string, the OSPF interface name
neighbor-id	Neighbor ID, an IP address.



Note: If you wish to define a name which includes spaces, you must enclose the entire name in quotation marks, e.g. "new york".

Output Example:

```
X330WAN-2DS1-1(super router:ospf)# show ip ospf neighbor  
There are no ospf neighbors
```

show ip protocols

Use the `ip protocols` command to display parameters and statistics of the IP routing protocol process.

The syntax for this command is:

```
show ip protocols [<protocol>]
```

protocol	RIP OSPF
----------	------------

Examples:

<code>show ip protocols</code>	Displays all running protocols details.
<code>show ip protocols RIP</code>	Displays RIP details.

Output Example:

```

Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 0 seconds
  Invalid after 180 seconds, flushed after 300
  Redistributing: rip
  Default version control: rip version 1
    Interface                Version  Key
  Routing for Networks:
  Routing Information Sources:
    Gateway                   Last Update

```

Note: entire name in quotation marks, e.g. "new york".

show ip reverse-arp

Use the `show ip reverse-arp` command to display the IP address of a host, based on a known MAC address.

The syntax for this command is:

```
show ip reverse-arp <mac addr> [<match len>]
```

mac addr	MAC address
match len	The number of bytes in the address to match

Examples:

```

show ip reverse-arp 00:40:0d:67:53:04 List IP's that match the MAC
show ip reverse-arp 00:40:0d:00:00:00 3 List IP's that match a vendor MAC.

```

Output Example:

```

X330WAN-2DS1-1(super)# sh ip reverse-arp 00:10:a4:98:97:e0
Showing 1 rows

```

Address	MAC Address	I/F	Type	TTL
149.49.70.68	00:10:a4:98:97:e0	e-70	Dynamic	14355

show ip route

Use the `show ip route` command to display information about the IP routing table.

The syntax for this command is:

```
show ip route [<ip-address>[<ip-mask>]
```

`ip-address` The IP address of the routes

`ip-mask` The IP mask of the routes

Examples:

```
show ip route                                              Display all routes
show ip route 137.32.50.13                              Display a single route
show ip route 137.44.50.13 255.255.255.0             Display range of routes
```

show ip route best-match

Use the `show ip route best-match` command to display a routing table for a destination address.

The syntax for this command is:

```
show ip route best-match <dst addr>
```

`dst addr` IP address

Output Example:

```
X330WAN-2DS1-1(super)# sh ip route best-match 199.93.0.0
```

```
Searching for: 199.93.0.0
```

```
Showing 1 rows
```

Network	Mask	Interface	Next-Hop	Cost	TTL	Source
199.93.0.0	255.255.0.0	e-135new	135.64.76.1		1 n/a	STAT-HI

show ip route static

Use the `show ip route static` command to display the static routes.

The syntax for this command is:

show ip route static [<ip addr> [<mask>]]

ip-address The IP address of the routes

mask The ip mask of the routes

Examples:

```
show ip route static                      Display all static routes
show ip route static 137.32.50.13        Display a single static route
show ip route static 137.44.50.13 255.255.255.0    Display range of static routes
```

Output Example:

```
Router-1 (super)# show ip route static
X330WAN-2DS1-1(super router:ospf)# show ip route static
Showing 1 rows
   Network      Mask      Interface      Next-Hop      Cost Pref Perm Active
-----
   0.0.0.0      0         FastEth 1       149.49.75.1   1   low No   Yes
```

show ip route summary

Use the show ip route summary command to display the number of routes known to the device.

The syntax for this command is:

show ip route summary

Output Example:

```
X330WAN-2DS1-1(super router:ospf)# show ip route summary
X330WAN-2DS1-1(super)# show ip route summary
   Route Source      Networks      Subnets
-----
Local                0              1
Static               0              1
Total                0              2
```

Use the show ip vrrp command to display VRRP information.

The syntax for this command is:

```
show ip vrrp [<vlan> [router-id <vr-id>]][detail]
```

vlan	Filter by Fabric.
router-id	Filter by virtual router ID (1-255).
vr-id	The virtual router ID.
detail	Provide detailed information.

Output Example:

```
X330WAN-2DS1-1(configure)# show ip vrrp
VRRP is globally enabled
VLAN  VRID  IP Address      Pri   Timer    State    Since
-----
  1     1    192.168.66.23  255   1        MASTER   00:00:00
  1     2    192.168.66.24  100   1        BACKUP   00:00:00
```

show ip vrrp detail

Use the `show ip vrrp detail` command to display full VRRP-related information

The syntax for this command is:

```
show ip vrrp detail
```

detail	Show full detail information
--------	------------------------------

Output Example:

```
X330WAN-2DS1-1(configure)# show ip vrrp detail
VRRP is globally enabled
Virtual Router on VLAN: 1
  Router-id: 1
  State: MASTER
  Priority: 255
  Advertisement Interval: 1
  Last State Change: 00:00:00
  Override Address Ownership Rule: No
  Authentication Type: None
  Authentication Key: ""
  Master IP Address 192.168.66.23
  Has 1 IP addresses
```



```

IP addresses:
  192.168.66.23
Primary IP Address:          192.168.66.23
Primary IP Address was chosen by default
Preemption Mode:           enabled
# of times Master:         2
# of received Advertisements: 0
# of transmitted Advertisements: 20
# of received Advertisements with Security Violations: 0
Virtual Router on VLAN:    1
Router-id:                 2
State:                     BACKUP
Priority:                   100
Advertisement Interval:    1
Last State Change:        00:00:00
Override Address Ownership Rule: No
Authentication Type:      None
Authentication Key:       ""
Master IP Address         0.0.0.0
Has 1 IP addresses
IP addresses:
  192.168.66.24
Primary IP Address:        192.168.66.23
Primary IP Address was chosen by default
Preemption Mode:          enabled
# of times Master:         1
# of received Advertisements: 0
# of transmitted Advertisements: 13
# of received Advertisements with Security Violations: 0

```

timers basic (Router-RIP context)

Use the `timers basic` command to set RIP timers. The `no` form of this command to set the RIP timers to their default.

The syntax for this command is:

```
[no] timers basic <update> <invalid>
```

<code>update</code>	RIP update timer, in seconds.
<code>invalid</code>	RIP invalid route timer, in seconds.

Example:

```
X330WAN-2DS1-1(configure router:rip)# timers basic 30 180
```

timers spf (Router-OSPF context)

Use the `timers spf` command to configure the delay between runs of OSPF's SPF calculation. Use the `no` form of this command to restore the default (3 seconds).

The syntax for this command is:

```
[no] timers spf <spf-holdtime>
```

<code>spf-holdtime</code>	The time in seconds of the delay between runs of OSPF's SPF calculation. The range of acceptable values is 1 to 3600.
---------------------------	---

Example:

```
X330WAN-2DS1-1(super)# timers spf 5
```

traceroute

Use the `traceroute` command as a trace route utility.

The syntax for this command is:

```
traceroute <host>
```

<code>host</code>	IP address
-------------------	------------

Example:

```
X330WAN-2DS1-1(super)# traceroute 192.168.50.13
```

Policy CLI Commands

This section contains a list of all Policy related CLI commands.

ip access-default-action

Use the `ip access-default-action` command to set the default action for a specific policy list.

The syntax for this command is:

```
ip access-default-action <policy-list-number> <default-action>
```

policy-list-number	An integer (100..199), or for the X330WAN (100..149) where 0 is the default list.
default-action	default-action-deny default-action-permit

Example:

```
X330WAN-2DS1-1 ip access-default-action 101 default-action-deny
```

ip access-group

Use the `ip access-group` command to activate a specific policy list and direction. To suspend the policy list, use the `no` version of this command.



Note: This command can only be executed from inside the interface context, such as: the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces of the X330WAN.

The syntax for this command is:

```
[no] ip access-group <policy-list-number> <direction>
```

policy-list-number	An integer (100..149) where 0 is the default list.
direction	in out

Example:

```
X330WAN-2DS1-1(config-if:FastEthernet1)# ip access-group 110
```

out

ip access-list

Use the `ip access-list` command to create a specific policy rule. This command defines a policy rule. The access list contains several of these rules. Each rule pertains to the source IP address, the destination IP address, the protocol, the protocol ports (tcp/udp if relevant), and to the ACK bit (in TCP protocol). To delete a specific rule, use the `no` form of this command.

The syntax for this command for the X330WAN is:

```
[no] ip access-list <policy-list-number> <access-list-index>
    <action> <protocol> {<source-ip>
    <source-wildcard> | any | host
    <source-ip>} [<operator> <port> [<port>]]
    {<destination-ip> <destination-
    wildcard> | any | host
    <destination-ip>} [<operator> <port>
    [<port>]] [established] [precedence]
```

access-list-number	An integer (100..149)
policy-list-number	An integer (100..149)
access-list-index	An integer (1...9999)
command	permit deny deny-and-notify fwd0-7
action	permit deny deny-and-notify fwd0-7 composite op name
protocol	ip tcp udp integer (1..255)
source-ip	IP network
source-wildcard	IP network wildcard
operator	eq lt gt range
port	An integer (1..65535)
destination-ip	IP network
destination-wildcard	IP network wildcard
precedence	mandatory optional

Example:

```
Router-N>ip access-list 101 23 deny ip any 1.2.0.0 0.0.255.255
X330WAN-2DS1-1(super)# ip access-list 101 23 deny ip any
10.10.0.0 0.0.255.255
X330WAN-2DS1-1(super)# ip access-list 101 24 fwd3 udp any host
10.1.1.1 range 20 23 optional
X330WAN-2DS1-1(super)# ip access-list 101 25 permit tcp any
any eq 23 established
```

ip access-list-cookie

Use the `ip access-list-cookie` command to set the list cookie for a specific policy list.

The syntax for this command for the X330WAN is:

```
ip access-list-cookie <list-id> <cookie>
```

policy-list-number	An integer (100..199)
list-id	An integer (100..149) where 0 is the default list.
cookie	An integer

Example:

```
X330WAN-2DS1-1(super)# ip access-list-cookie 101 12345
```

ip access-list-copy

Use the `ip access-list-copy` command to copy a configured source policy list to a destination policy list.

The syntax for this command is:

```
ip access-list-copy <source-list> <destination-list>
```

source-list	An integer (100..199), or for the X330WAN (100..149) where 0 is the default list.
destination-list	An integer (100..199), or for the X330WAN (100..149).

Example:

```
X330WAN-2DS1-1(super)# ip access-list-copy 100 101
```

ip access-list-dscp operation

Use the `ip access-list-dscp operation` command to set a DSCP to action.



Note: This command is only supported by the P333R-LB device and X330WAN module.

The syntax for this command is:

```
ip access-list-dscp operation <policy-list-number> <dscp>
<action>
```

policy-list-number	An integer (100..199), or for the X330WAN (100..149), where 0 is the default list.
dscp	Range of DSCP
action	Action name

Example:

```
X330WAN-2DS1-1(super)# ip access-list-dscp operation 101 9-16
fwd3
```

ip access-list-dscp name

Use the `ip access-list-dscp name` command to set a DSCP name.



Note: This command is only supported by the P333R-LB device and X330WAN module.

The syntax for this command is:

```
ip access-list-dscp name <policy-list-number> <dscp> <name>
```

policy-list-number	An integer (100..199), or for the X330WAN (100..149), where 0 is the default list.
dscp	DSCP entry (0-63)
name	Entry name

Example:

```
X330WAN-2DS1-1(super)# ip access-list-dscp name 101 16
"special"
```

ip access-list-dscp precedence

Use the `ip access-list-dsc precedence` command to set a DSCP precedence.



Note: This command is only supported by the P333R-LB device and X330WAN module.

The syntax for this command is:

```
ip access-list-dscp precedence <policy-list-number> <dscp>
<precedence>
```

policy-list-number	An integer (100..199), or for the X330WAN (100..149), where 0 is the default list.
dscp	DSCP entry (0-63)
precedence	mandatory optional

Example:

```
X330WAN-2DS1-1(super)# ip access-list-dscp precedence 101 16
mandatory
```

ip access-list-dscp trust

Use the `ip access-list-dscp trust` command to set a DSCP trust.



Note: This command is only supported by the P333R-LB device and X330WAN module.

The syntax for this command is:

```
ip access-list-dscp trust <policy-list-number> {untrusted |
```

```
trust-cos | trust-dscp | trust-cos-dscp}
```

policy-list-number	An integer (100..199), or for the X330WAN (100..149) where 0 is the default list.
--------------------	---

Example:

```
X330WAN-2DS1-1(super)# ip access-list-dscp trust 101 trust-dscp
```

ip access-list-name

Use the `ip access-list-name` command to set a name for a policy list.

The syntax for this command is:

```
ip access-list-name <policy-list-number> <name>
```

policy-list-number	An integer (100..199), or for the X330WAN (100..149) where 0 is the default list.
--------------------	---

name	List name
------	-----------

Example:

```
X330WAN-2DS1-1(super)# ip access-list-name 101 morning
```



Note: If you wish to define a name which includes spaces, you must enclose the entire name in quotation marks, e.g. "new york".

ip access-list-owner

Use the `ip access-list-owner` command to set the owner for a specific policy list.

The syntax for this command is:

```
ip access-list-owner <policy-list-number> <owner>
```

policy-list-number	An integer (100..199), or for the X330WAN (100..149) where 0 is the default list.
--------------------	---

owner	List owner
-------	------------

Example:

```
X330WAN-2DS1-1(super)# ip access-list-owner 101 admin
```

ip composite-op access

Use the `ip composite-op access` command to set the access value of a policy operation.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
ip composite-op access <policy-list-number> <composite-operation-index> <access>
```

policy-list-number	An integer (100..149), where 0 is the default list
composite-operation-index	Index of operation in the table.
access	forward deny

Example:

```
X330WAN-2DS1-1(configure)# ip composite-op access 101 17
forward
```

ip composite-op dscp

Use the `ip composite-op dscp` command to set the DSCP value of a policy operation.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
ip composite-op dscp <policy-list-number> <composite-op-index> <dscp value>
```

policy-list-number	An integer (100..149), where 0 is the default list.
composite-op-index	Index of operation in the table.

dscp value	DSCP entry, an integer (0-63), where 64 - no change).
------------	---

Example:

```
X330WAN-2DS1-1(configure)# ip composite-op dscp 101 17 52
```

ip composite-op name

Use the `ip composite-op name` command to set the name of a policy operation.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
ip composite-op name <policy-list-number> <composite-op-index>  
<OpName>
```

policy-list-number	An integer (100..149), where 0 is the default list.
--------------------	---

composite-op-index	Index of operation in the table.
--------------------	----------------------------------

OpName	The name you are giving the policy operation.
--------	---

Example:

```
X330WAN-2DS1-1(configure)# ip composite-op name 101 17 gold-account
```

ip composite-op notify

Use the `ip composite-op notify` command to set the trap mode of a composite operation in a policy list.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
ip composite-op notify <policy-list-number> <composite-operation-index> <notify>
```

policy-list-number	An integer (100..149), where 0 is the default list.
composite-operation-index	Index of operation in the table.
notify	send-trap no-trap

Example:

```
X330WAN-2DS1-1(configure)# ip composite-op notify 101 17 send-trap
```

ip composite-op priority

Use the `ip composite-op priority` command to set the Layer 2 priority of a policy operation.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
ip composite-op priority <list-number> <composite-op-index> <priority>
```

policy-list-number	An integer (100..149), where 0 is the default list.
composite-operation-index	Index of operation in the table.
priority	fwd0-7 no-change

Example:

```
X330WAN-2DS1-1(configure)# ip composite-op priority 101 17 fwd1
```

Example:

```
X330WAN-2DS1-1(configure)# ip composite-op name 101 17 gold-account
```

ip distribution access-default-action

Use the `ip distribution access-default-action` command to set the default action for a specific policy list.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
ip distribution access-default-action <list-number> <default-action>
```

policy-list-number	An integer (1..99)
default-action	default-action-deny default-action-permit

Example:

```
X330WAN-2DS1-1(configure)# ip distribution access-default-action 1 default-action-deny
```

ip distribution access-list

Use the `ip distribution access-list` command to create a distribution policy statement.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
ip distribution access-list <policy-list-number>  
<access-list-index> <action>  
{<dest-ip> [<dest-wildcard>] | any}
```

policy-list-number	An integer (1..99)
access-list-index	An integer
action	permit deny
dest-ip	IP network address
dest-wildcard	IP network wildcard address

Examples:

```
X330WAN-2DS1-1(configure)# ip distribution access-list 1 23
deny 10.10.0.0 0.0.255.255
X330WAN-2DS1-1(configure)# ip distribution access-list 2 24
permit 10.1.1.1
X330WAN-2DS1-1(configure)# ip distribution access-list 20 4
permit any
```

ip distribution access-list-cookie

Use the `ip distribution access-list-cookie` command to set the cookie list.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

ip distribution access-list-cookie <list-id> <cookie>

list-id	An integer (1..99)
cookie	An integer

Example:

```
X330WAN-2DS1-1(configure)# ip distribution access-list-cookie
4 12345
```

ip distribution access-list-copy

Use the `ip distribution access-list-copy` command to copy the distribution access-list.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

ip distribution access-list-copy <source-list> <destination-list>

source-list	An integer (1..99)
-------------	--------------------

destination-list An integer (1..99)

Example:

```
X330WAN-2DS1-1(configure)# ip distribution access-list-copy 1
3
```

ip distribution access-list-name

Use the `ip distribution access-list-name` command to set the distribution list name.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
ip distribution access-list-name <distribution-list-number>
<name>
```

distribution-list-number An integer (1..99)

name List name



Note: If you wish to define a name which includes spaces, you must enclose the entire name in quotation marks, e.g. "new york".

Example:

```
X330WAN-2DS1-1(configure)# ip distribution access-list-name 5
"evening"
```

ip distribution access-list-owner

Use the `ip distribution access-list-owner` command to set the policy list owner.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

ip distribution access-list-owner <policy-list-number> <owner>

policy-list-number	An integer (1..99)
owner	List owner



Note: If you wish to define a name which includes spaces, you must enclose the entire name in quotation marks, e.g. "new york".

Example:

```
X330WAN-2DS1-1(configure)# ip distribution access-list-owner
78 "admin"
```

ip simulate

Use the `ip simulate` command to check the policy for a simulated packet. The command contains the addressed list number, and the packet parameters.



Note: This command can only be executed from inside the interface context, such as: the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces of the X330WAN.

The syntax for this command is:

ip simulate <policy-list-number> <direction> [<priority>]
 [<dscp-value>]<source> <destination> [<protocol> [<source
 port> <destination port> [<established>]]]

policy-list-number	An integer (100..199) where 0 is the default list.
direction	in out
priority	fwd0 fwd1 .. fwd7
dscp value	dscp0 dscp1 .. dscp63
source	Source IP address
destination	Destination IP address
protocol	ip tcp udp integer (1..255)

source port	An integer (1..65535)
destination port	An integer (1..65535)
established	Value of TCP established bit

Example:

```
X330WAN-2DS1-1(config-if:FastEthernet1)# ip simulate 100 in
192.67.85.12 193.76.54.25
```

no ip composite-op

Use the `no ip composite-op` command to delete a composite operation from a policy list.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
no ip composite-op monitor <policy-list-number> <composite-
operation-index>
```

policy-list-number	An integer (100..149), where 0 is the default list.
composite-operation-index	Index of operation in the table to be deleted. Indices 0 - 12 can not be deleted.

Example:

```
X330WAN-2DS1-1(configure)# no ip composite-op 101 15
```

no ip distribution access-list

Use the `no ip distribution access-list` command to delete a distribution list statement.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
no ip distribution access-list <access-list-number>
```

[<access-list-index>

access-list-number	An integer (1..99)
access-list-index	An integer

Examples:

```
X330WAN-2DS1-1(configure)# no ip distribution access-list 1
X330WAN-2DS1-1(configure)# no ip distribution access-list 2 25
```



Note: If a list index is not given the `no ip distribution access-list`, all rules will be deleted.

set qos policy-source

Use the `set qos policy-source` command to set the policy source. The default policy source is `policy-server`.



Note: Before configuring the IP access list, you must change the policy source mode to `local`.

The syntax for this command is:

```
set qos policy-source <source>
```

source	local policy-server
--------	-----------------------

Example:

```
X330WAN-2DS1-1(configure)# set qos policy-source local
```

show ip access-group

Use the `show ip access-group` command to display information about the configured active access groups.

The syntax for this command for the X330WAN is:

```
show ip access-group <interface name> [<directions>]
```

interface name	string (e.g."FastEthernet 0")
direction	in out

Output Example:

```
X330WAN-2DS1-1(configure)# show ip access-group "FastEthernet 1" in
```

Note: This command is available out of context only.

show ip access-list-dscp

Use the `show ip access-list-dscp` command to display the DSCP table of a given policy list.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
show ip access-list dscp <policy-list-number> [<dscp>]
```

policy-list-number	The policy list number (integer from 100 to 199). Entering 0 displays the default list.
dscp	DSCP entry (integer from 0 to 63).

Example:

```
X330WAN-2DS1-1(configure)# show ip access-list-dscp 101 63
```

show ip access-lists

Use the `show ip access-lists` command to see all the current policy lists.

The syntax for this command is:

show ip access-lists [<policy-list-number>]

policy-list-number The policy list number (integer from 100 to 199 where 0 is the default list).

Output Example:

```
X330WAN-2DS1-1(configure)# show ip access-lists

ip access-list 100 10 deny-and-notify tcp
  192.168.55.0            0.0.0.255            range 5000 6000
  any range 7000 8000
ip access-list 100 30 deny udp
  any
  any
  optional
ip access-list 100 35 deny ip
  any
  any
ip access-list 100 55 fwd7 tcp
  host 192.168.3.4            eq    33333
  host 10.6.7.8
default action for list 100 is permit
```

show ip access-lists details

Use the `show ip access-lists details` command to view complete data of a policy list (including DSCP and composite operation tables).



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

show ip access-lists details [<policy-list-number>]

policy-list-number The policy list number (integer from 100 to 199).
Entering 0 displays the default list.

Example:

```
X330WAN-2DS1-1(configure)# show ip access-list details 101
```

show ip access-list-summary

Use the `show ip access-list-summary` command to display the policy list summary.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
show ip access-list-summary
```

show ip active-access-groups

Use the `show ip active-access-groups` command to display all activated lists on all interfaces.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
show ip active-access-groups
```

show ip composite-op

Use the `show ip composite-op` command to show a composite operation of a policy list.



Note: This command is only supported by the X330WAN module.

The syntax for this command is:

```
show ip composite-op [<policy-list-number>] [<composite-  
operation-index>
```

policy-list-number	The policy list number (integer from 100 to 199). Entering 0 displays the default list.
--------------------	--

composite-operation-
index Index of the operation in the table.

Example:

```
X330WAN-2DS1-1(configure)# show ip composite-op 101 11
```

validate-group

Use the `validate-group` command to verify that all the rules in a priority list are valid.



Note: This command can only be executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces of the X330WAN.

The syntax for this command is:

```
validate-group <policy-list-number> <direction> [quiet]
```

policy-list-number	An integer (100..149) where 0 is the default list.
direction	in out
quiet	Error messages not displayed.

Example:

```
X330WAN-2DS1-1(config-if:Serial1:1)# validate-group 101 in
```

WAN CLI Commands

This section contains a list of all WAN related CLI commands.

async mode interactive (Console interface context)

Use the `async mode interactive` command to enter Modem mode every time the proprietary modem cable is plugged into the Console port.

The syntax for this command is:

async mode interactive

async mode terminal (Console interface context)

Use the `async mode terminal` command to disable interactive mode on the Console, disabling the use of PPP and entering Terminal mode.

The syntax for this command is:

async mode terminal

async reset-modem (FastEthernet interface context)

Use the `async reset-modem` command to reset the connected modem.

The syntax for this command is:

async reset-modem

autoneg

Use the `autoneg` command to set the port speed and duplex to auto negotiation mode. Use the `no` form of this command to disable auto negotiation mode.

The syntax for this command is:

[no] autoneg

bandwidth (Interface context)

Use the `bandwidth` command to set the bandwidth informational parameter. Use the `no` form of this command to set the bandwidth informational parameter to the default.



Note: This command is executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

[no] bandwidth [<kilobits size>]

kilobits size An integer (1-10000000)

Example:

```
X330WAN-2DS1-1 (super-if:FabricFastEthernet1:1) # bandwidth 100
```

cablelength long (Controller Context)

Use the `cablelength long` command to configure transmit and receive levels for a cable length (line build-out) longer than 655 feet for a T1 trunk with a CSU interface. Use the `no` form of this command to restore the `cablelength long` parameters to their default (Tx=0db level, Rx=gain26).



Note: This command can only be performed if the controller is set to T1.

The syntax for this command is:

[no] cablelength long {gain26|gain36} {-15db|-22.5db|-7.5db|0db}

<code>long</code>	Configures parameters using gain/attenuation.
<code>gain26</code>	Sets the receive sensitivity to 26 dB if you can configure the hardware's receive sensitivity. This is the default value. However, it is recommended to enter <code>gain26</code> so that the CLI entry matches the actual value.
<code>gain36</code>	Sets the receive sensitivity to 36 dB if you can configure the hardware's receive sensitivity.
<code>-15db</code>	Sets the transmit attenuation to 15 dB.
<code>-22.5db</code>	Sets the transmit attenuation to 22.5 dB.
<code>-7.5db</code>	Sets the transmit attenuation to 7.5 dB.
<code>0db</code>	Sets the transmit attenuation to 0 dB. This is the default value.



Note: If you cannot configure the hardware's receive sensitivity, the receive sensitivity is fixed at 36 dB and is unaffected if you enter `gain26` or `gain36`.

Example:

The following example changes the CLI receive sensitivity to match the actual receive sensitivity of the hardware and adds 15 dB of attenuation to the transmit signal:

```
X330WAN-2DS1-1(config-controller:1)# cablelength long  
gain36 -15db
```

Example:

```
no cablelength
```

cablelength short (Controller Context)

Use the `cablelength short` command to configure transmit attenuation for a cable length (line build-out) of 655 feet or shorter for a T1 trunk with a DSX-1 interface. Use the `no` form of this command to restore the default value.



Note: This command can only be performed if the controller is set to T1.

The syntax for this command is:

```
cablelength short {133ft|266ft|399ft|533ft|655ft}
```

<code>short</code>	Configures parameters using the loop length.
<code>133</code>	Cable length of 0 to 133 feet. This is the default value.
<code>266</code>	Cable length of 134 to 266 feet.
<code>399</code>	Cable length of 267 to 399 feet.
<code>533</code>	Cable length of 400 to 533 feet.
<code>655</code>	Cable length of 534 to 655 feet.



Note: The transmit attenuation value is best obtained by experimentation. If the signal received by the far-end equipment is too strong, reduce the transmit level by entering additional attenuation.

Example:

The following example sets the transmit attenuation to the appropriate levels for a cable between 134 and 266 feet long:

```
X330WAN-2DS1-1(config-controller:1)# cablelength short 266ft
```

channel-group (Controller context)

Use the `channel group` command to create a channel-group (also referred to as "ds0 bundle"). A channel group can be the underlying interface for a PPP session. This command creates a logical interface, which is identified by a port number, a colon, and a channel group number. For example, channel-group 8 on E1 port 2 would be referred to as "2:8" in all places where a channel-group is needed as a parameter.

The syntax for this command is:

```
channel-group <channel-num> timeslots <timeslot-list> speed {56  
| 64}
```

Note: The Speed option can be performed only when the controller is set to T1.

channel-num	ID number to identify the channel group. The valid range is from 0 to 23 for T1 lines and from 0 to 30 for E1 lines.
timeslot-list	Timeslots (DS0s) to include in this channel group. The valid timeslots are: <ul style="list-style-type: none"> • 1 to 24 for T1 • 1 to 31 for E1 Values can be either separated by a "," (to indicate a list) or a "-" (to indicate a range)
speed	Acceptable values are 56 or 64.



Note: If the user has an active ppp session over this channel-group, a warning is issued.



Note: If a user issues this command with an existing channel-num, it is assumed that the timeslot-list is a list of timeslots that should replace the current list of timeslots already defined for that channel-group.



Note: Channel groups, voice groups, and TDM groups all use group numbers. All group numbers configured for channel groups, voice groups, and TDM groups must be unique. For example, you cannot use the same group number for a channel group and a TDM group.

Examples:

```
X330WAN-2DS1-1(config-controller:1)# channel-group 10  
timeslots 10-24
```

```
X330WAN-2DS1-1(config-controller:1)# channel-group 2  
timeslots 5-6,8,20-24
```

clear fragment

Use the `clear fragment` command to clear the fragment database and restore its defaults.



Note: No fragmentation will be done of packets in transit through the router.

The syntax for this command is:

clear fragment

clock source (Controller Context)

Use the `clock source` command to configure the clock source for an E1/ T1 controller. Use the `no` form of this command to return the value to the default.

The syntax for this command is:

```
[no] clock source {line|internal}
```

line	The controller recovers the external clock from the line and provides the recovered clock to the internal (system) clock generator. This is the default value.
internal	The controller synchronizes itself to the internal (system) clock.



Note: Only one E1/T1 controller at a time can recover the network clock and distribute it to the internal clock generator.

Examples:

```
X330WAN-2DS1-1(config-controller:1)# clock source internal
X330WAN-2DS1-1(config-controller:1)# no clock source
```

controller

Use the `controller` command to enter the specified controller's mode.



Note: You cannot configure one controller as E1 and the other as T1.

The syntax for this command is:

```
controller { e1 | t1 } <port>
```

e1	This is an E1 port.
t1	This is a T1 port.
port	The number of the port that is being configured.

Example:

```
X330WAN-2DS1-1(configure)# controller E1 2
```

description (Controller context)

Use the `description` command to set the description of the E1/T1 interface. This description appears both in the `ifAlias` and the `circuitIdentifier MIB` values for that interface. Use the `no` form of this command to remove the

controller's description.



Note: This command can also be executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

[no] description <desc>

desc A string describing the E1/T1 interface. The string may contain blanks and is up to 255 characters long.

Examples:

```
X330WAN-2DS1-1(config-controller:1)# description "E1 controller"
```

```
X330WAN-2DS1-1(config-controller:1)# no description
```

description (Interface context)

Use the `description` command to set the description of the interface. Use the `no` form of this command to remove the interface's description.



Note: This command can also be executed from the Serial, Loopback, Fast Ethernet and Fabric Fast Ethernet interfaces.

The syntax for this command is:

[no] description <desc>

desc A string describing the interface.

Examples:

```
X330WAN-2DS1-1(config-if:FastEthernet1)# description vlan5
```

ds-mode

Use the `ds-mode` command to set the controller's mode.



Note: After setting the controller's mode, this command will:

1. Perform the `copy running-config startup-config` command.
2. Erase startup-config.
3. Reset the device.

The syntax for this command is:

ds-mode [e1|t1]

- | | |
|----|--|
| e1 | Sets the device in E1 mode. All controllers are set to operate as E1. |
| t1 | Sets the device in T1 mode. All controllers are set to operate as T1. This is the default. |

Output Example:

```
X330WAN-2DS1-1(configure)# ds-mode e1
Your startup-config file will be erased!
Your telnet session will be disconnected.
This operation may take a few minutes
The WAN module will reset, in order to make the required
change.
Do you want to continue (Y/N)?
```



Note: If this command is entered when the correct mode is selected (for example, entering `ds1-mode e1` when the device is already in E1 mode) no errors are generated.

duplex (FastEthernet interface context)

Use the `duplex` command to control the duplex setting for the interface.

The syntax for this command is:

duplex {full|half}

- | | |
|------|-------------|
| full | Full duplex |
| half | Half duplex |

Example:

```
X330WAN-2DS1-1(config-if:FastEthernet1)# duplex full
```

encapsulation ppp (Serial interface context)

Use the `encapsulation ppp` command to set the encapsulation of the Serial interface to a Router PPP interface. Use the `no` form of this command to close the encapsulation of the Serial interface from a Router PPP interface.

The syntax for this command is:

```
[no] encapsulation ppp
```

Example:

```
X330WAN-2DS1-1(config-if:Serial1:1)# encapsulation ppp
```

fragment chain

Use the `fragment chain` command to set the maximum number of fragments that can comprise a single IP packet destined to the router. Use the `no` form of this command to set the fragment chain to the default value (64).



Note: No fragmentation will be done of packets in transit through the router.

The syntax for this command is:

```
[no] fragment chain <chain-limit>
```

chain-limit	The maximum number of fragments that can comprise a single IP packet (2-2048). The default is 64.
-------------	---

Example:

```
X330WAN-2DS1-1(configure)# fragment chain 30
```

fdl

Use the `fdl` command to define an fdl type. Fdl is used to define a remote loopback for the module or in order to receive the far-end counters.

To disable the fdl, use the `no` command.

**Note:**

1. This command can only be performed if the controller is set to T1.
2. Use this command only when framing esf is defined.

The syntax for this command is:

```
[no] fdl <fdl-mode>
```

```
fdl-mode      ansi | att | both
```

Example:

```
X330WAN-2DS1-1(configure)# fdl ansi
```

fragment size

Use the `fragment size` command to set the maximum number of fragmented IP packets, destined to the router, to reassemble at any given time. Use the `no` form of this command to set the fragment size to the default value (100).



Note: No fragmentation will be done of packets in transit through the router.

The syntax for this command is:

```
[no] fragment size <database-limit>
```

```
database-limit  The maximum number of packets undergoing re-assembly at  
any given time. The default is 100.
```

Example:

```
X330WAN-2DS1-1(configure)# fragment size 150
```

fragment timeout

Use the `fragment timeout` command to set the maximum number of seconds to reassemble a fragmented IP packet destined to the router. Use the `no` form of this command to set the fragment timeout to the default value (10).



Note: No fragmentation will be done of packets in transit through the router.

The syntax for this command is:

[no] fragment timeout <timeout>

timeout An integer (5-120). The maximum number of seconds to re-assemble an IP packet. The default is 10.

Example:

```
X330WAN-2DS1-1(configure)# fragment timeout 30
```

framing (Controller context)

Use the `framing` command to select the frame type for the E1 or T1 data line. Use the `no` form of this command to set the controller's framing type to the default value.

The syntax for this command is:

For T1 lines:

[no] framing {sf|esf}

For E1 lines:

[no] framing {crc4|no-crc4}

sf Selects Super frame framing (dsx1D4). This is the default value for T1 lines.

esf Selects Extended super frame framing (dsx1ESF).

crc4 Selects CRC4 framing. (dsx1E1-CRC-MF). This is the default value for E1 lines.

no-crc4 Selects no-CRC4 framing (dsx1E1-MF).



Note: Use this command in configurations where the router or access server is intended to communicate with E1 or T1 fractional data line. The service provider determines which framing type (`sf`, `esf`, or `crc4`) is required for your E1/T1 circuit.

Example:

The following example selects extended super frame as the T1 frame type:

```
X330WAN-2DS1-1(config-controller:1)# framing esf
```


Example:

```
X330WAN-2DS1-1(config-controller:1)# no framing
```

interface Console

Use the `interface Console` command to enter Console interface (Interface Console context) to PPP configure mode. For LAN interfaces, use this command to create the interface. Use the `no` form of this command to set the default Console parameters.

The syntax for this command is:

```
[no] interface Console
```

Example:

```
X330WAN-2DS1-1(configure)# interface Console
```

interface FabricFastEthernet

Use the `interface FabricFastEthernet` command to create and/or enter Interface Fabric Fast Ethernet configuration mode (context). For LAN interfaces, use this command to create the interface. Use the `no` form of this command to delete a Fabric Fast Ethernet interface or an IP interface.

The syntax for this command is:

```
[no] interface FabricFastEthernet  
[port[:vlan[.ip-interface]]]
```

<code>port</code>	An integer with a value of 1.
<code>vlan</code>	The 802.1q Fabric number. An integer between integer 1 and 3071.
<code>ip-interface</code>	The IP interface number within this interface (as a number of IP interfaces might be bound to an L3 interface). An integer between 0 and 1024.

Example:

To enter Interface Fabric Fast Ethernet context for port 1, vlan 1, with an IP-interface of 1:

```
interface FabricFastEthernet 1:1.1
```

Examples:

```
X330WAN-2DS1-1(configure)# interface FabricFastEthernet 1
```

```
X330WAN-2DS1-1(configure)# interface FabricFastEthernet 1:1
X330WAN-2DS1-1(configure)# no interface FabricFastEthernet 1.1
```

interface FastEthernet

Use the `interface FastEthernet` command to create and/or enter Interface Fast Ethernet configuration mode (context). For LAN interfaces, use this command to create the interface. Use the `no` form of this command to delete an IP interface.

The syntax for this command is:

```
[no] interface FastEthernet [interface number[.ip-interface]]
```

interface number	An integer with a value of 1.
ip-interface	The IP interface number within this interface (as a number of IP interfaces might be bound to an L3 interface). An integer between 0 and 1024.

Examples:

```
X330WAN-2DS1-1(configure)# interface FastEthernet 1
X330WAN-2DS1-1(configure)# interface FastEthernet 1.1
X330WAN-2DS1-1(configure)# no interface FastEthernet 1.1
```

interface Loopback

Use the `interface Loopback` command to create and/or enter interface Loopback configuration mode (context). Use the `no` form of this command to delete a Loopback interface or an IP interface.

The syntax for this command is:

```
[no] interface Loopback [<interface number>[.ip-interface]]
```

interface number	An integer between 0 and 99.
ip-interface	The IP interface number within this interface (as a number of IP interfaces might be bound to an L3 interface). An integer between 0 and 1024.

Examples:

```
X330WAN-2DS1-1(configure)# interface Loopback 1
```

```
X330WAN-2DS1-1(configure)# interface Loopback 1.0
X330WAN-2DS1-1(configure)# no interface Loopback 1.0
```

interface Serial

Use the `interface Serial` command to create and/or enter Interface Serial configuration mode (context). For LAN interfaces, use this command to create the interface. Use the `no` form of this command to delete an IP interface.

The syntax for this command is:

```
[no] interface Serial [port:channel-group[.ip-interface]]
```

port	The controller number (port number) for this serial port. For the X330W-2DS1, this value is either 1 or 2.
channel-group	An integer. For E1, between 0 and 30; for T1, between 0 and 23.
ip-interface	The IP interface number within this interface (as a number of IP interfaces might be bound to an L3 interface). An integer between 0 and 1024.

Example:

To enter Interface Serial mode port 1, channel-group 4 in ip-interface 1:

```
X330WAN-2DS1-1(configure)# interface Serial 1:4.1
```

Example:

```
X330WAN-2DS1-1(configure)# no interface Serial 1:4.1
```

keepalive (Serial interface context)

Use the `keepalive` command to enable keepalive. Use the `no` form of this command to disable keepalive.

The syntax for this command is:

```
[no] keepalive [<Seconds>]
```

Seconds	An integer (0-32767). Entering <code>keepalive</code> without a parameter will return the keepalive to its default of 10 seconds. Entering <code>keepalive 0</code> will disable keepalive.
---------	---

linecode (Controller context)

Use the `linecode` command to select the line-code type for an E1 or T1 line. Use

the `no` form of the command to restore the default line-code type of transmission.

The syntax for this command is:

For T1 lines:

linecode {ami | b8zs}

For E1 lines:

linecode {ami | hdb3}

ami	Alternate Mark Inversion line-code type. Valid for both T1 and E1 controllers.
b8zs	B8ZS line-code type. Valid for T1 controller only. This is the default value for T1 lines.
hdb3	High-Density Bipolar 3 line-code type. Valid for E1 controller only. This is the default value for E1 lines.



Note: Use this command in configurations where the router or access server must communicate with E1 or T1 fractional data lines. The T1 service provider determines which line-code type, `ami` or `b8zs`, is required for your T1 circuit. The E1 service provider determines which line-code type, `ami` or `hdb3`, is required for your E1 circuit.

Example:

The following example specifies B8ZS as the line-code type for a T1 line:

```
X330WAN-2DS1-1(config-controller:1)# linecode b8zs
```

Example:

```
X330WAN-2DS1-1(config-controller:1)# no linecode
```

loopback diag (Controller Context only)

Use the `loopback diag` command to put the T1 or E1 line into loopback mode.



Note: Regarding the use of loopbacks during line setup and maintenance, only one type of loopback can be defined at any given time.



Note: Use this command during line set up and maintenance.

The syntax for this command is:

loopback diag

loopback local(Controller context)

Use the `loopback local` command to put the T1 or E1 line into loopback mode.



Note: Regarding the use of loopbacks during line setup and maintenance, only one type of loopback can be defined at any given time.



Note: Use this command during line set up and maintenance.

The syntax for this command is:

loopback local {line|payload}

line	The controller loops the external line signal back toward the network without reframing the DS1 signal.
payload	The controller loops the external line signal back toward the network and reframes the DS1 signal.

Example:

```
X330WAN-2DS1-1(config-controller:1)#loopback local line
```

loopback remote (Controller context)

Use the `loopback remote` command to ask the far end to put itself into loopback mode.



Note:

1. This command can only be performed if the controller is set to T1.
 2. Use this command during line set up and maintenance.
-

loopback remote {line|payload}

line The controller loops the external line signal back toward the network without reframing the DS1 signal.

payload The controller loops the external line signal back toward the network and reframes the DS1 signal. (This option is available in the framing esf mode and only when fdl is defined.)

Example:

```
X330WAN-2DS1-1(config-controller:1)#loopback remote line
```

mtu (Serial interface context)

Use the **mtu** command to set the interface Maximum Transmission Unit (MTU). Use the **no** form of this command to restore interface MTU to the default value (1500).

The syntax for this command is:

[no] mtu <size in bytes>

size in bytes Range from 64-1500

Example:

```
X330WAN-2DS1-1(config-if:Serial1:1)# mtu 1000
```

no channel group (Controller context)

Use the **no channel group** command to delete a channel group.

The syntax for this command is:

no channel-group <channel-num>

channel-num ID number to identify the channel group. The valid range is from 0 to 23 for T1 lines and from 0 to 30 for E1 lines.

Example:

```
X330WAN-2DS1-1(config-controller:1)# no channel-group 2
```

no loopback (Controller context)

Use the **no loopback** command to disable the loopback mode.

The syntax for this command is:

no loopback

ppp authentication (Console interface context)

Use the `ppp authentication` command to set if and what type of password should be sent for authentication.

The syntax for this command is:

ppp authentication {pap|chap|none}

pap	Password Authentic Protocol. Unencrypted password sent for authentication.
chap	Challenge Handshake Authentication Protocol. Encrypted password sent for authentication.
none	No password sent.

Example:

To select the chap authentication protocol:

```
X330WAN-2DS1-1(config-if:CON)# ppp authentication chap
```

ppp timeout ncp (Serial interface context)

Use the `ppp timeout ncp` command to set the maximum time, in seconds, that the PPP should allow for negotiation of a network layer protocol. Use the `no` form of this command to disable the maximum time that the PPP should allow for negotiation.

The syntax for this command is:

[no] ppp timeout ncp <Seconds>

Seconds	The maximum time, in seconds, PPP should allow for negotiation of a network layer protocol. If no network protocol is negotiated within the given time, the connection is terminated. An integer from 1 to 65535.
---------	---

Example:

```
X330WAN-2DS1-1(config-if:Serial1:1)# ppp timeout ncp 10
```

ppp timeout retry (Serial interface context)

Use the `ppp timeout retry` command to set the maximum time, in seconds, to wait for a response during PPP negotiation. Use the `no` form of this command to restore the maximum time to wait for a response during PPP negotiation to the default value (2 seconds).

The syntax for this command is:

```
[no] ppp timeout retry <Seconds>
```

Seconds	The maximum time, in seconds, to wait for a response during PPP negotiation. An integer from 1 to 255.
---------	--

Example:

```
X330WAN-2DS1-1(config-if:Serial1:1)# ppp timeout retry 10
```

queue-limit (Serial interface context)

Use the `queue-limit` command to set the packet size of the various queues.

The syntax for this command is:

```
[no] queue-limit <queue id> <size>
```

queue id	The queue priority ID (1 - highest, 4 - lowest).
size	The size, in packets, of the queue. The total amount of packets in all queues cannot exceed 500.

Example:

```
X330WAN-2DS1-1(config-if:Serial1:1)# queue-limit 1 200
```

remote (Controller context)

Use the `remote` command to reset the far-end counters.

**Note:**

1. This command can only be performed if the controller is set to T1.
 2. This command is used only when the `fdl at&t` option is defined.
-

The syntax for this command is:

```
remote <fdl-request-type>
```

fdl-request-type	Reset Performance Monitoring Counters Reset Errorred ESF Data
------------------	---

Example:

```
X330WAN-2DS1-1(super)# remote Reset-errorred-ESF-data
```

show controllers

Use the `show controllers` command to display the status of the controller.

The syntax for this command is:

```
show controllers [<port>]
```

port	The port number.
------	------------------

Example:

```
X330WAN-2DS1-1(configure)# show controllers
```

Output Example:

```
E1 1 is up.
    No alarms detected.
    Framing is CRC4, Line Code is HDB3, Clock Source is
    Line.
    channel-group 1 timeslots 1-31
    Data in current interval (778 seconds elapsed):
      0 Line Code Violations, 0 Path Code Violations
      0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0
      Degraded Mins
      0 Errorred Secs, 0 Bursty Err Secs, 0 Severely Err
      Secs, 0 Unavail Secs
    Total Data (last 92 15 minute intervals):
      19958 Line Code Violations, 38 Path Code Violations
      0 Slip Secs, 5 Fr Loss Secs, 6 Line Err Secs, 0
      Degraded Mins
```

```
        6 Errored Secs, 1 Bursty Err Secs, 5 Severely Err
        Secs, 0 Unavail Secs
E1 2 is administratively down.
```

Output Example:

```
T1 1 is down.
```

```
  Cablelength is long gain26 0db.
  Transmitter is sending remote alarm.
  Receiver has loss of signal.
  Framing is SF, Line Code is AMI, Clock Source is Line.
  channel-group 1 timeslots 1-6
  Data in current interval (347 seconds elapsed):
    0 Line Code Violations, 0 Path Code Violations
    0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0
    Degraded Mins
    0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err
    Secs, 0 Unavail Secs
  Total Data (last 24 hours):
    0 Line Code Violations, 0 Path Code Violations
    0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0
    Degraded Mins
    0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err
    Secs, 0 Unavail Secs
```



Note: When this command is used with the `port` parameter, information about all statistics intervals is displayed.

The following are the `show controllers` command output fields:

Field	Description
T1 1 is down	Displays that the T1 controller 1 is not operating. The controller's state can be: up, down, or administratively down. Loopback conditions are shown either as being locally looped or remotely looped.
Cablelength	Displays the current line buildout. Relevant for T1 lines only.
Remote alarm	Any alarms detected by the controller are displayed. The possible alarms are: <ul style="list-style-type: none"> • Transmitter is sending remote alarm. • Transmitter is sending alarm indication signal (AIS). • Receiver has loss of signal. • Receiver is getting AIS. • Receiver has loss of frame. • Receiver has remote alarm. • Receiver has no alarms. • Receiver has major alarm.
Framing	Shows the current framing type. The default framing type for E1 is CRC4. The default framing type for T1 is SF.
Line Code	Displays the current line code. The default line code for E1 is HDB3. The default line code for T1 is AMI.
Clock Source	Displays the current clock source. The possible clock sources are either Line or Internal.
Channel Group	Displays the channel group number and timeslots.
Data in current interval (347 seconds elapsed)	Displays the current accumulation period (from 1-900 seconds), which rolls into a 24 hour accumulation every 15 minutes. The oldest 15 minute period falls off the back of the 24 hour accumulation buffer.
Line Code Violations	Displays either no line code violations, the occurrence of a Bipolar Violation, or the occurrence of an Excessive Zeros error event.

Path Code Violations	<p>Displays one of the following:</p> <ul style="list-style-type: none">• No path code violations.• A frame synchronization bit error in the SF (for T1) and no- CRC4 (for E1) frame types.• A CRC4 error in the ESF (for T1) and CRC4 (for E1) frame types.
Slip Secs	<p>Displays if there is a replication or deletion of the payload bits of a domestic trunk interface (DS1) frame. A slip might happen when there is a difference between the timing of a synchronous receiving terminal and the received signal.</p>
Fr Loss Secs	<p>Displays the number of seconds an Out of Frame (OOF) error is detected.</p>
Line Err Secs	<p>Displays the number of seconds one or more Line Code Violations are detected.</p>
Degraded Mins	<p>Displays the number of minutes where the estimated error rate is between 1E-6 and 1E-3.</p>
Errored Secs	<p>In ESF (T1) and CRC4 (E1) links, displays the number of seconds one of the following is detected:</p> <ul style="list-style-type: none">• One or more path code violations.• One or more Out of Frame defects.• One of more Controlled Slip events.• An AIS defect. <p>In SF (T1) and no-CRC4 (E1) links, displays the presence of bipolar violations.</p>
Bursty Err Secs	<p>Displays the number of seconds with:</p> <ul style="list-style-type: none">• Path Coding Violation errors (between 1 -320).• No Severely Errored Frame defects.• No detected incoming AIS defects. <p>The number of controlled slips are not displayed.</p>

Severly Err Secs	<p>For ESF (T1) signals, displays the number of seconds one of the following is detected:</p> <ul style="list-style-type: none"> • 320 or more Path Code Violation Errors. • One or more Out of Frame defects. • An AIS defect. <p>For SF (T1) signals, displays the number of seconds one of the following is detected:</p> <ul style="list-style-type: none"> • 1544 Line Code Violations. • A count of one second intervals with Framing Errors. • An Out of Frame defect. <p>For CRC (E1) signals, displays the number of seconds one of the following is detected:</p> <ul style="list-style-type: none"> • 832 or more Path Code Violation errors. • One or more Out of Frame defects. <p>For no-CRC (E1) signals, displays the number of seconds with 2048 or more Line Code Violations.</p>
Unavail Secs	<p>Displays the total number of seconds on the interface, calculated by counting the number of seconds that the interface is unavailable.</p>

show controllers remote

Use the `show controllers remote` command to display far end performance data through an fdl message.



Note: This command is used when the `fdl at&t` option is defined.

The syntax for this command is:

```
show controllers remote <port> <fdl-request-type>
```

port	Number of the port.
fdl-request-type	<p>Request types include:</p> <ul style="list-style-type: none"> • 1h-data • Enhanced-CI-configuration • Enhanced-1h • Errored-ESF-data

Example:

```
X330WAN-2DS1-1(super)# show controllers remote 1 1h-data
```

show fragment

Use the `show fragment` command to display information regarding fragmented IP packets that are destined to the router.



Note: No fragmentation will be done of packets in transit through the router.

This command displays the following information:

- Size - Maximum number of packets set by the size option.
- Chain - Maximum number of fragments for a single packet set by the chain option.
- Timeout - Maximum number of seconds set by the timeout option.
- Queue - Number of packets currently awaiting reassembly.
- Assemble - Number of packets successfully reassembled.
- Fail - Number of packets which failed to be reassembled.
- Overflow - Number of packets which overflowed the fragment database.

The syntax for this command is:

show fragment

Example:

```
X330WAN-2DS1-1(configure)# show fragment
Max number of concurrently reassembled packets is 100
Max number of fragments per packet is 64
Fragment timeout is 10 sec
Number of packets waiting to be reassembled is 0
Number of successfully reassembled packets is 11954
Number of packets which failed to be reassembled is 0
Number of packets which overflowed the database is 0
```

show interfaces

Use the `show interfaces` command to display information on all interfaces in the X330WAN, starting at the first Layer 2 interface. If the type is specified, only interfaces of that type are shown. If no type is specified, all interfaces are shown.

The syntax for this command is:

show interfaces [<type>] [<identifier>]

- | | |
|------------|---|
| type | The type of this interface. Select one of the following:
FastEthernet Serial FabricFastEthernet Loopback Console |
| identifier | <ul style="list-style-type: none"> • For a FastEthernet interface - An integer (1) • For a Serial interface - <port>:<channel-group>
 <port> - Either 1 or 2
 <channel-group> - For E1, an integer, 0-30
 For T1, an integer, 0-23 • For a FabricFastEthernet interface - 1[:<vlan>]
 <vlan> - An integer, 1-3071 • For a Loopback interface - An integer, 0-99 |

Examples:

```
X330WAN-2DS1-1(super)# show interfaces
```

```
FabricFastEthernet 1:1 is up, line protocol is up
  Physical address is 00.40.0d.bf.3b.01,
  MTU 1500 bytes, Bandwidth 100000 Kbit,
  Encapsulation ARPA,
  0 packets input, Received 0 broadcasts,
  33175 input errors,
  0 packets output,
  0 output errors
```

```
FastEthernet 1 is up, line protocol is up
  Physical address is 00.40.0d.bf.3b.fe,
  Internet address is 149.49.75.71 , mask is 255.255.255.0
  MTU 1500 bytes, Bandwidth 100000 Kbit,
  Encapsulation ARPA,
  Full-duplex, 100Mb, 100BaseTX/FX
  ARP type: ARPA, ARP Timeout 04:00:00
  680031 packets input, Received 661406 broadcasts,
  17 input errors,
  5569 packets output,
  0 output errors
```

```
FabricFastEthernet 1 is up, line protocol is up
  MTU 0 bytes, Bandwidth 100000 Kbit,
  Encapsulation ARPA,
  0 packets input, Received 0 broadcasts,
  0 input errors,
```

```
0 packets output,  
0 output errors  
  
Serial 1:1 is down, line protocol is down  
Internet address is 2.2.2.2 , mask is 255.255.255.0 (advertised IPCP)  
MTU 1500 bytes, Bandwidth 256 Kbit,  
Encapsulation PPP,  
LCP REQsent  
IPCP Starting  
0 packets input, Received 0 broadcasts,  
0 input errors,  
3872 packets output,  
0 output errors  
  
Console asynchronous mode is terminal  
Terminal baud rate is 9600
```

show ip distribution access-lists

Use the `show ip distribution access-lists` command to display the content of all current distribution lists or of a specific list.

The syntax for this command is:

```
show ip distribution access-lists [<distribution-list-number>]
```

`distribution list number` The distribution list number. An integer from 1 to 99.

Example:

To display the content of distribution list number 1:

```
X330WAN-2DS1-1(configure)# show ip distribution access-lists 1
```

Example:

To display the content of all current distribution lists:

```
X330WAN-2DS1-1(configure)# show ip distribution access-lists
```

show line console

Use the `show line console` command to display the console interface.

The syntax for this command is:

```
show line console
```


Output Example:

```
X330WAN-2DS1-1(configure)# show line console
Console
  ppp state disable
  Asynchronic mode terminal
  Baud rate is 38400
  Timeout is 0
  ppp authentication none
```

show logout

Use the `show logout` command to display the CLI logout.

The syntax for this command is:

show logout

Output Example:

```
X330WAN-2DS1-1(configure)# show logout
CLI timeout is 15 minutes
```

show queueing

Use the `show queueing` command to display the priority queue size, in packets.

The syntax for this command is:

show queueing [<interface type> <identifier>]

- | | |
|----------------|---|
| interface type | The type of this interface. Select one of the following:
FastEthernet Serial FabricFastEthernet |
| identifier | <ul style="list-style-type: none"> • For a FastEthernet interface - An integer (1) • For a Serial interface - <port>:<channel-group>
 <port> - Either 1 or 2
 <channel-group> - For E1, an integer, 0-30
 For T1, an integer, 0-23 • For a FabricFastEthernet interface - An integer (1) |

Examples:

```
X330WAN-2DS1-1(super)# show queueing
```

Interface Name	Voip mode	Queue 1 (High)	Queue 2	Queue 3	Queue 4 (Low)
Serial 1:1	OFF	64	64	64	64

shutdown (Controller context)

This command shuts down the E1/T1 link. This has the effect of administratively bringing the line down. In effect, it sends a 'blue alarm' on the line. Use the `no` form of this command to reconnect the E1/T1 link.

The syntax for this command is:

```
[no] shutdown
```

shutdown (Interface context)

Use the `shutdown` command to shutdown the selected interface. Use the `no` form of this command to activate the selected interface.



Note: This command is executed from the Serial, Loopback, Fast Ethernet, and Console interfaces.

The syntax for this command is:

```
[no] shutdown
```



Note: The `no shutdown` option is not available in the Console interface.

speed (Console context)

Use the `speed` command to set the PPP baud rate to be used by asynchronous PPP ports.



Note:

1. This command is executed from the Console interface.
 2. The peer baud-rate must be set to the same value.
-

The syntax for this command is:

speed {9600|19200|38400}

9600	Sets a speed of 9600 bits per second.
19200	Sets a speed of 19200 bits per second.
38400	Sets a speed of 38400 bits per second.

Example:

```
X330WAN-2DS1-1(config-if:CON)# speed 9600
```

speed (FastEthernet interface context)

Use the `speed` command to control the speed setting for the interface.



Note: This command is executed from the Fast Ethernet interface.

The syntax for this command is:

speed {10MB|100MB}

10MB	Sets a speed of 10 Mbps.
100MB	Sets a speed of 100 Mbps.

Example:

```
X330WAN-2DS1-1(config-if:FastEthernet1)# speed 100MB
```

timeout absolute (Console interface context)

Use the `timeout absolute` command to set the number of minutes until the system automatically disconnects an idle PPP incoming session.

The syntax for this command is:

timeout absolute <time>

time	Number of minutes (0-999) where 0 means no timeout should occur at all.
------	---

voip-queue (Serial interface context)

Use the `voip-queue` command to select custom queueing and queue sizes for VoIP traffic. Use the `no` form of this command to restore the default priority queues size to the default.

The syntax for this command is:

[no] voip-queue

How to Contact Us

To contact Avaya's technical support, please call:

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Dial 1-800-237-0016, press 0, then press 73300.

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