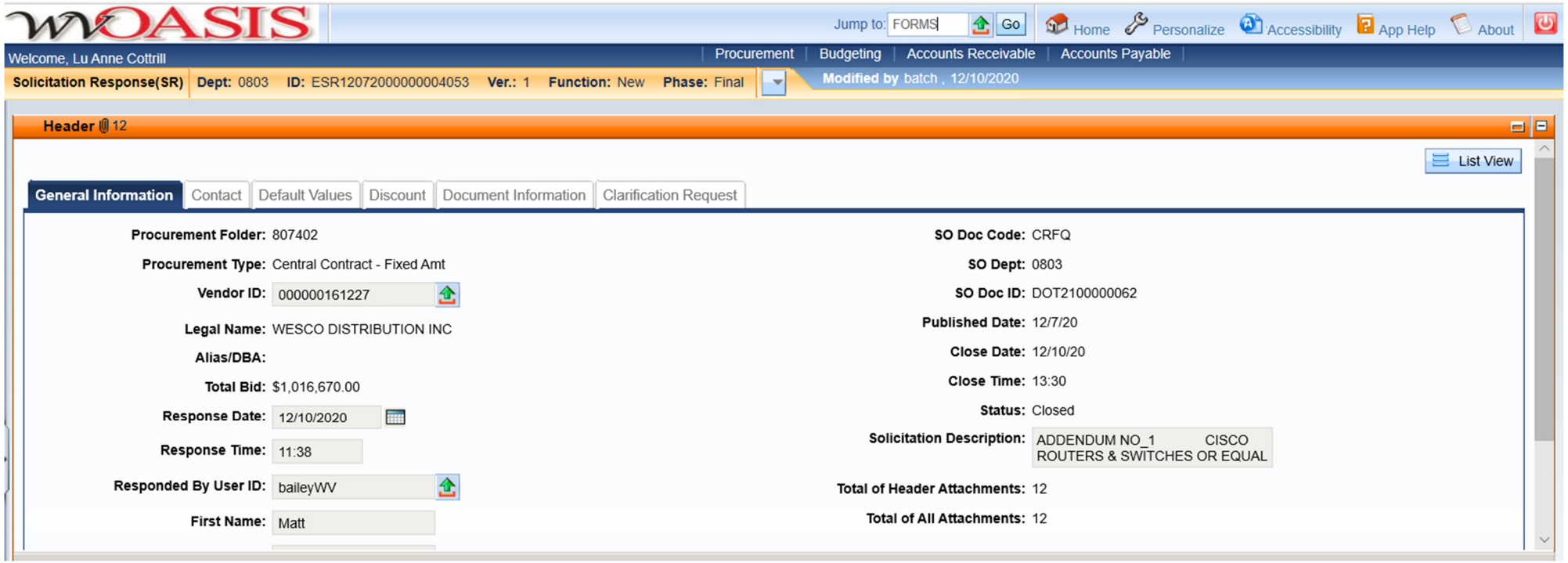
The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at ***wvOASIS.gov***. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at ***WVPurchasing.gov*** with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.


wvOASIS
Jump to: FORMS Go
Home
Personalize
Accessibility
App Help
About
Welcome, Lu Anne Cottrill
Procurement | Budgeting | Accounts Receivable | Accounts Payable
Solicitation Response(SR) Dept: 0803 ID: ESR12072000000004053 Ver.: 1 Function: New Phase: Final
Modified by batch , 12/10/2020
Header 12
List View
General Information
Contact
Default Values
Discount
Document Information
Clarification Request
Procurement Folder: 807402
Procurement Type: Central Contract - Fixed Amt
Vendor ID: 000000161227
Legal Name: WESCO DISTRIBUTION INC
Alias/DBA:
Total Bid: $1,016,670.00
Response Date: 12/10/2020
Response Time: 11:38
Responded By User ID: baileyWV
First Name: Matt
SO Doc Code: CRFQ
SO Dept: 0803
SO Doc ID: DOT2100000062
Published Date: 12/7/20
Close Date: 12/10/20
Close Time: 13:30
Status: Closed
Solicitation Description: ADDENDUM NO_1 CISCO ROUTERS & SWITCHES OR EQUAL
Total of Header Attachments: 12
Total of All Attachments: 12

Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Solicitation Response

Proc Folder:	807402
Solicitation Description:	ADDENDUM NO_1 CISCO ROUTERS & SWITCHES OR EQUAL
Proc Type:	Central Contract - Fixed Amt

Solicitation Closes	Solicitation Response	Version
2020-12-10 13:30	SR 0803 ESR12072000000004053	1

VENDOR

000000161227
WESCO DISTRIBUTION INC

Solicitation Number: CRFQ 0803 DOT2100000062

Total Bid: 1016670 **Response Date:** 2020-12-10 **Response Time:** 11:38:31

Comments:

FOR INFORMATION CONTACT THE BUYER
John W Estep
304-558-2566
john.w.estep@wv.gov

Vendor
Signature X **FEIN#** **DATE**

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 1	11.00000	EA	2790.000000	30690.00

Comm Code	Manufacturer	Specification	Model #
43222612			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 4321 Series Chassis Bundle with 1 year of Smart Net Coverage Cisco Part Number CON-SSSNT-ISR4321K. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout

Extended Description:

3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 1 Smart Net Coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 2	11.00000	EA	3160.000000	34760.00

Comm Code	Manufacturer	Specification	Model #
43222612			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 4321 Series Chassis Bundle with 2 years of Smart Net Coverage, Cisco Part Number CON-SSSNT-ISR4321K . Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout

Extended Description:

3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 2 Smart Net Coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
3	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 3	11.00000	EA	3530.000000	38830.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 4321 Series Chassis Bundle with 3 years of Smart Net Coverage, Cisco Part Number CON-SSSNT-ISR4321K. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout

Extended Description:

3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 3 Smart Net Coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
4	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 4	11.00000	EA	3900.000000	42900.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 4321 Series Chassis Bundle with 4 years of Smart Net Coverage, Cisco Part Number CON-SSSNT-ISR4321K . Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout

Extended Description:

3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 4 Smart Net Coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
5	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 1	7.00000	EA	4150.000000	29050.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 4331 Series Chassis Bundle with 1 year of Smart Net Coverage, Cisco Part Number CON-SSSNT-ISR4331K. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or Equal with Year 1 Smart Net Coverage.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
6	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 2	7.00000	EA	4640.000000	32480.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 4331 Series Chassis Bundle with 2 years of Smart Net Coverage, Cisco Part Number CON-SSSNT-ISR4331K. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or Equal with Year 2 Smart Net Coverage.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
7	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 3	7.00000	EA	5130.000000	35910.00

Comm Code	Manufacturer	Specification	Model #
43222612			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 4331 Series Chassis Bundle with 3 years of Smart Net Coverage, Cisco Part Number CON-SSSNT-ISR4331K. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or equal with Year 3 Smart Net coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
8	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 4	7.00000	EA	5620.000000	39340.00

Comm Code	Manufacturer	Specification	Model #
43222612			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 4331 Series Chassis Bundle with 4 years of Smart Net Coverage, Cisco Part Number CON-SSSNT-ISR4331K. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or equal with Year 4 Smart Net coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
9	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 1	60.00000	EA	1228.000000	73680.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 1101 4 Ports GE Ethernet WAN Router with 1 year of Smart Net Coverage, Cisco Part Number CON-SSSNT-CISR1K4P. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #206208 for pricing

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 1 Smart Net Coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
10	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 2	60.00000	EA	1316.000000	78960.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 1101 4 Ports GE Ethernet WAN Router with 2 years of Smart Net Coverage, Cisco Part Number CON-SSSNT-CISR1K4P. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #206208 for

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 2 Smart Net Coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
11	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 3	60.00000	EA	1404.000000	84240.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 1101 4 Ports GE Ethernet WAN Router with 3 years of Smart Net Coverage, Cisco Part Number CON-SSSNT-CISR1K4P. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #206208 for

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 3 Smart Net Coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
12	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 4	60.00000	EA	1492.000000	89520.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco ISR 1101 4 Ports GE Ethernet WAN Router with 4 years of Smart Net Coverage, Cisco Part Number CON-SSSNT-CISR1K4P. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #206208 for

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 4 Smart Net Coverage

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
13	3.1.4 Extreme Networks 12 Port Switch or Equal	95.00000	EA	1118.000000	106210.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Catalyst 2960L 16 port GigE with PoE Switch. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout. See attached "Cisco Catalyst 2960-L Series Switches" document for

Extended Description:

3.1.4 Extreme Networks 12 Port Switch or Equal

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
14	3.1.5 Extreme Networks 48 Port Switch or Equal	75.00000	EA	3400.000000	255000.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Catalyst 2960L 48 port GigE PoE+ Switch. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout. See attached "Cisco Catalyst 2960-L Series Switches" document for

Extended Description:

3.1.5 Extreme Networks 48 Port Switch or Equal

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
15	3.1.6 Extreme Networks 24 Port Switch or Equal	20.00000	EA	2255.000000	45100.00

Comm Code	Manufacturer	Specification	Model #
43222609			

Commodity Line Comments: The "Unit Price" for this "Line Number" includes (1) Cisco Catalyst 2960L 24 port GigE PoE+ Switch. Refer to "CRFQ DOT2100000062 Exhibit A Pricing Page" document attached as well as also attached WESCO Distribution, Inc. Quote #306208 for pricing breakout. See attached "Cisco Catalyst 2960-L Series Switches"

Extended Description:

3.1.6 Extreme Networks 24 Port Switch or Equal

Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Quote
Info Technology

Proc Folder: 807402			**Reason for Modification:**
Doc Description: ADDENDUM NO_1 CISCO ROUTERS & SWITCHES OR EQUAL			Vendor Questions and responses
Proc Type: Central Contract - Fixed Amt			
Date Issued	**Solicitation Closes**	**Solicitation No**	**Version**
2020-12-07	2020-12-10 13:30	CRFQ 0803 DOT2100000062	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code: 000000161227
Vendor Name : WESCO Distribution, Inc.
Address : 256
Street : Ragland Road
City : Beckley
State : West Virginia **Country :** United States **Zip :** 25801
Principal Contact : Matt Bailey, Senior Account Representative
Vendor Contact Phone: (304) 923-6352 **Extension:**

FOR INFORMATION CONTACT THE BUYER
John W Estep
304-558-2566
john.w.estep@wv.gov

Vendor Signature X Matt Bailey **FEIN#** 251723345 **DATE** 12/10/2020

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION
ADDENDUM NO.1 Addendum No.1 issued to publish and distribute the attached information to the Vendor Community REQUEST FOR QUOTATION: The West Virginia Department of Transportation (WVDOT) is soliciting bids to establish a contract for the one-time purchase of hardware, software, licensing and support equipment required for the WVDOT network infrastructure. Equipment will be located at WVDOT offices located throughout the state. This equipment is intended to provide data connectivity. Per the Bid Requirements, Specifications, Terms and Conditions attached to this Solicitation.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 1	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:
3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 1 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 2	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:
3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 2 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
3	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 3	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 3 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
4	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 4	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 4 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
5	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 1	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.2 CISCO ISR 4331 Series Chassis Bundle or Equal with Year 1 Smart Net Coverage.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
6	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 2	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.2 CISCO ISR 4331 Series Chassis Bundle or Equal with Year 2 Smart Net Coverage.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
7	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 3	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:
3.1.2 CISCO ISR 4331 Series Chassis Bundle or equal with Year 3 Smart Net coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
8	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 4	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:
3.1.2 CISCO ISR 4331 Series Chassis Bundle or equal with Year 4 Smart Net coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
9	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 1	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.3 Cisco ISR 1101 4 port router or equal with Year 1 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
10	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 2	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.3 Cisco ISR 1101 4 port router or equal with Year 2 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
11	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 3	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.3 Cisco ISR 1101 4 port router or equal with Year 3 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
12	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 4	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.3 Cisco ISR 1101 4 port router or equal with Year 4 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
13	3.1.4 Extreme Networks 12 Port Switch or Equal	95.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.4 Extreme Networks 12 Port Switch or Equal

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
14	3.1.5 Extreme Networks 48 Port Switch or Equal	75.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.5 Extreme Networks 48 Port Switch or Equal

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
15	3.1.6 Extreme Networks 24 Port Switch or Equal	20.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.6 Extreme Networks 24 Port Switch or Equal

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Tech Questions Due by 10:00am	2020-12-03

	Document Phase	Document Description	Page 10
DOT2100000062	Draft	ADDENDUM NO_1 CISCO ROUTERS & SWITCHES OR EQUAL	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

SOLICITATION NUMBER: CRFQ DOT2100000062
Addendum Number: 1

The purpose of this addendum is to modify the solicitation identified as CRFQ DOT21000000062 ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

[ ] Modify bid opening date and time

[ ] Modify specifications of product or service being sought

[X] Attachment of vendor questions and responses

[ ] Attachment of pre-bid sign-in sheet

[ ] Correction of error

[ ] Other-

Additional Documentation:

1. Bid Opening remains 12/10/20 at 1:30pm

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.

2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

Cisco Routers & Switches or Equal (63210039)
Addendum #1 CRFQ DOT21*62

Question #1
Could you please confirm what level of security firewall do you need on the router side?

The security firewall specifications on equipment that is bid must meet or exceed the specifications of the requested equipment in the RFQ.

Question #2
How much smartnet do you want? The excel sheet says 4 years. It comes in 1, 3, or 5 years. Can the bid be emailed or electronic back via the oasis website?

Please provide pricing for the 1, 3, and 5 years. Please contact the Purchasing Division regarding submission of the bid.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CRFQ DOT2100000062

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:
(Check the box next to each addendum received)

[X]	Addendum No. 1	[ ]	Addendum No. 6
[ ]	Addendum No. 2	[ ]	Addendum No. 7
[ ]	Addendum No. 3	[ ]	Addendum No. 8
[ ]	Addendum No. 4	[ ]	Addendum No. 9
[ ]	Addendum No. 5	[ ]	Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

WESCO Distribution, Inc.
Company

Authorized Signature

12/10/2020
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.

Cisco 1000 Series Integrated Services Routers

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Cisco® 1000 Series Integrated Services Routers (ISRs) with Cisco IOS® XE Software combine Internet access, comprehensive security, and wireless services (LTE Advanced 3.0 wireless WAN and 802.11ac wireless LAN) in a single, high-performance device. The routers are easy to deploy and manage, with separate data and control plane capabilities.

The Cisco 1000 Series ISRs are well suited for deployment as Customer Premises Equipment (CPE) in enterprise branch offices, in service provider managed environments as well as smaller form factor and M2M use cases.

Note: Not all 1000 series SKU variants are available in every region with different technologies (check on CCW pricelist for your region).

Figure 1.
Cisco 1000 Product Family Series

Figure 2.
Cisco 1100-8P ISR with LTE advanced, back and front view

Figure 3.
Cisco 1120 and 1160 with LTE pluggable and 802.11ac Wi-Fi options

Primary features and benefits

Table 1. Business benefits

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Business need	Features/description
Lightweight, compact size with low power consumption	• Can be deployed in many different environments where space, heat dissipation, and low power consumption are critical factors (Including Cisco Pluggable smaller form factor technology).
High performance to run concurrent services	• High performance allows customers to take advantage of broadband network speeds while running secure, concurrent data, voice, video, and wireless services. C1160 models will have better overall performance.
High availability and business continuity	• Redundant WAN connections for failover protection and load balancing. • Dynamic failover protocols such as Virtual Router Redundancy Protocol (VRRP; RFC 2338), Hot Standby Router Protocol (HSRP), and Multigroup HSRP (MHSRP).
Consistent, high application performance levels	• The router can run multiple services simultaneously with minimal performance degradation.
Risk mitigation with multilevel security	• Network perimeter security with integrated application inspection firewall. • Data privacy through high-speed IP Security (IPsec) Triple Data Encryption Standard (3DES), and Advanced Encryption Standard (AES) encryption. • High-performance VPNs: DMVPN, FlexVPN, GETVPN. • Encrypted Traffic Analytics (ETA) to identify malware communications in encrypted traffic using passive monitoring, extraction of relevant data elements, and supervised machine learning with cloud-based global visibility. • Cisco Umbrella™ is a cloud security platform that provides the first line of defense against threats on the internet wherever users go. • Security hardware acceleration. • Trustworthy systems with Field-Programmable Gate Array (FPGA) and hardware anchor.
Unified control of wired and wireless networks from a common console for streamlined operations	• Simplifies and centralizes configuration and management of wireless and wireline devices. Supports WLAN services without requiring a wireless LAN controller. • Supports Mobility Express for WLAN-enabled routers.
Remote configuration and management to keep local IT staff lean	• Supports separate console and USB ports. Can be configured to work with optional USB token. • Supports TR-069.
Performance • Throughput • Service reliability	• ISR 1000 can provide encrypted traffic performance greater than 350 Mbps. • A distributed multicore architecture with the dedicated control plane and service plane. • Remote installation of application-aware services that run identically to their counterparts in dedicated appliances (Future roadmap).
Lower WAN expenditures	• Cisco Software-Defined WAN (SD-WAN) support for optimized WAN connection. • Smaller form factor and Cisco Pluggable technology provide additional protection investment and flexibility.
Pay as you grow: IPsec performance upgrade model	• Router IPsec capacity can be increased with a remote performance-on-demand license upgrade (no hardware upgrade) for exceptional savings and CapEx budget management.
IT consolidation, space savings, and improved Total Cost of Ownership (TCO)	• Single converged branch platform integrates routing, switching, security, and performance management capabilities.
Business continuity and increased resiliency	• The entire 1000 Series supports Power over Ethernet (PoE) and PoE+ power to endpoints (Not available on C1101 and C1109 smaller form factor series).

Table 2. Support for Software-Defined WAN on ISR 1000

Cisco SD-WAN offers an entirely new way to manage and operate your WAN infrastructure. Cisco SDWAN is a cloud delivered architecture that offers secure, flexible and rich services with the following key benefits:

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Cisco SD-WAN	Cisco SD-WAN capability can be enabled on ISR 1000 platform
Better user experience	• The ability to deploy applications in minutes, on any platform, with a consistent user experience. Deliver predictable performance for applications residing in the data center or in the cloud.
Greater agility	• Faster, easier deployment and operation of your WAN, and get faster performance using less bandwidth. Add new revenue generating services in minutes not months.
Advanced threat protection	• Securely connect your users to applications in minutes and protect your data from the WAN edge to the cloud. Secure segmentation for critical assets and multi-layer, robust security that encrypts all data.

IOS XE SD-WAN software enables important steps towards Intent Based Networking for WAN, i.e.

- Centralized management and operational simplicity
- Secure connectivity on the hybrid WAN
- Optimized access to SaaS and Public Cloud
- Predictable Application Quality of Experience with policy-based automation

Platform architecture and capabilities

Table 3. Architectural highlights

Architectural feature	Benefits/description
Multicore processors	• High-performance multicore processors support high-speed WAN connections. The data plane uses a flow processor that delivers Application-Specific Integrated Circuit (ASIC)-like performance that does not degrade as services are added.
Embedded IPsec VPN hardware acceleration	• Increases scalability when combined with an optional Cisco IOS XE Software Security license, enables WAN link security and VPN services.
Integrated Gigabit Ethernet ports	• Provides up to 10 built-in 10/100/1000 Ethernet ports for WAN or LAN (1100-8P: 2 WAN and 8 LAN ports, 1100-4P: 2 WAN and 4 LAN ports, 1101-4P: 1WAN and 4 LAN ports, 1109-2P M2M: 1 WAN and 2 LAN ports, and 1109-4P M2M: 1 WAN and 4 LAN). • All 1100-8P and 1100-4P platforms model have one 10/100/1000 Ethernet port that can support Small Form-Factor Pluggable (SFP)-based connectivity in addition to RJ-45 connections, enabling fiber or copper connectivity. • Depending on the platform, PoE/PoE+ can be enabled on Gigabit Ethernet interfaces (4 PoE or 2 PoE+ ports on the 1100-8P and 2 PoE or 1 PoE+ ports on the 1100-4P), to provide power to external devices such as video endpoints and 802.11ac access points (Not available on C1101 and C1109 M2M smaller form factor models). • Smaller form factor 1101-4P and 1109-4P with Cisco WAN LTE Pluggable technology option. Additional WAN options such as Cisco 12:1 High Speed Serial Pluggable.
USB-based console access	• A type B micro USB console port supports management connectivity when traditional serial ports are not available. Traditional console port is also available on selected models.
Optional PoE upgrade	• An optional upgrade to enable PoE capabilities on the integrated ethernet switch modules is available. • PoE is not supported on 1101 and 1109.

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Architectural feature	Benefits/description
Flash memory support	• The 1000 Series ship with a fixed 4GB or 8GB flash memory depending on the models selected. • Type A USB 3.0 ports provide capabilities for convenient storage.
DRAM	• The 1000 Series comes with 4 GB or 8GB fixed DRAM depending on the models selected. The C1111, C1120, C1160 series have an option to include an 8 GB fixed DRAM for advanced SD-WAN security features.

Table 4. Network management solutions

Operational phase	Application	Description
Cloud management user interface	vManage	• vManage provides a single cloud-based console to manage your network and SD-WAN security for faster deployments with automated provisioning and app assurance.
Device staging and configuration	WebUI	• A GUI-based device-management tool for Cisco IOS and Cisco IOS XE Software-based access routers. This tool simplifies routing, firewall, VPN, unified communications, and WAN and LAN configuration through easy-to-use wizards.
Networkwide deployment, configuration, monitoring, and troubleshooting	Cisco Prime® Infrastructure	• Offers comprehensive lifecycle management of wired and wireless access, campus, and branch-office networks; rich visibility into enduser connectivity; and application performance assurance. • Provides wired lifecycle functions such as inventory, configuration, and image management; automated deployment; compliance reporting; integrated best practices; and reporting.
Context-aware security configuration and monitoring	Cisco Prime Security Manager	• Management tool for configuring and managing context-aware security. The application supports both single- and multidevice manager form factors. • Provides the ability to write and enforce granular context-aware security policies.
Digitalized applications to become inherently network-aware and Application Policy Infrastructure Controller Enterprise Module	Cisco Digital Network Architecture (Cisco DNA Center) with APIC-EM	• Cisco DNA centers around a network infrastructure that is not only fully programmable and open to third–party innovation, but can also fully and seamlessly integrates the cloud as an infrastructure component. • The Cisco DNA controller factilitatest simple, automated and programmatic deployment of network services. It brings the notion of user–and application–aware policies into the foreground of network operations. • With Cisco DNA, the network can provide continuous feedback to simplify and optimize network operations. • Automate network configuration and setup APIC-EM is a central part of Cisco Digital Network Architecture. It delivers software-defined networking to the enterprise branch, campus, and WAN.

Table 5. Embedded management capabilities

Feature	Description
Cisco IOS Embedded Event Manager (EEM)	• A distributed and customized approach to event detection and recovery. • Offers the ability to monitor events and take informational, corrective, or any desired EEM. • Action when the monitored events occur or when a threshold is reached.
Cisco IOS XE IP Service-Level Agreements (IP SLAs)	• Helps assure the performance of new business-critical IP applications as well as IP services that use data and voice in an IP network.

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Feature	Description
Simple Network Management Protocol (SNMP), Remote Monitoring (RMON), syslog, NetFlow, IP Flow Information Export (IPFix)	• Network monitoring and accounting tools. Enhanced 3G MIB with 4G MIB extension.
LTE network management and diagnostics	• In-band and out-of-band management using Telnet (Cisco IOS XE Software Command Line Interface [CLI]) and SNMP, including MIB II and other extensions. Industry-standard LTE diagnostics and monitoring tools (Qualcomm CDMA Air Interface Tester [CAIT] and Spirent Universal Diagnostic Monitor [UDM]).

Table 6. Software features and protocols

Feature	Description
Protocols	IPv4, IPv6, static routes, Routing Information Protocol Versions 1 and 2 (RIP and RIPv2), Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Border Gateway Protocol (BGP), BGP Router Reflector, Intermediate System-to-Intermediate System (IS-IS), Multicast Internet Group Management Protocol Version 3 (IGMPv3), Protocol Independent Multicast Sparse Mode (PIM SM), PIM Source-Specific Multicast (SSM), Resource Reservation Protocol (RSVP), Cisco Discovery Protocol, Encapsulated Remote Switched Port Analyzer (ERSPAN), Cisco IOS IP Service-Level Agreements (IPSLA), Call Home, Cisco IOS Embedded Event Manager (EEM), Internet Key Exchange (IKE), Access Control Lists (ACL), Ethernet Virtual Connections (EVC), Dynamic Host Configuration Protocol (DHCP), Frame Relay (FR), DNS, Locator ID Separation Protocol (LISP), Hot Standby Router Protocol (HSRP), RADIUS, Authentication, Authorization, and Accounting (AAA), Application Visibility and Control (AVC), Distance Vector Multicast Routing Protocol (DVMRP), IPv4-to-IPv6 Multicast, Multiprotocol Label Switching (MPLS), Layer 2 and Layer 3 VPN, IPsec, Layer 2 Tunneling Protocol Version 3 (L2TPv3), Bidirectional Forwarding Detection (BFD), IEEE 802.1ag, and IEEE 802.3ah.
Encapsulations	Generic Routing Encapsulation (GRE), Ethernet, 802.1q VLAN, Point-to-Point Protocol (PPP), Multilink Point-to-Point Protocol (MLPPP), Frame Relay, Multilink Frame Relay (MLFR) (FR.15 and FR.16), High-Level Data Link Control (HDLC), Serial (RS-232, RS-449, X.21, V.35, and EIA-530), and PPP over Ethernet (PPPoE).
Traffic management	Quality of Service (QoS), Class-Based Weighted Fair Queuing (CBWFQ), Weighted Random Early Detection (WRED), Hierarchical QoS, Policy-Based Routing (PBR), Performance Routing (PfR), and Network-Based Application Recognition (NBAR).
Cryptographic algorithms	Encryption: DES, 3DES, AES-128 or AES-256 (in CBC and GCM modes). Authentication: RSA (748/1024/2048 bit), ECDSA (256/384 bit); Integrity: MD5, SHA, SHA-256, SHA-384, SHA-512.

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Product specifications

Table 7. Cisco 1000 Series ISRs DSL and LTE SKUs

Model	WAN					Wi-Fi	LAN switch			Integrated Micro USB console	Pluggables
	GE	GE/SFP combo	ADSL2/VDSL2 + or G.FAST or G.SHDSL	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11 ac	GE	PoE or PoE+			
C1101-4P	1	NA	NA	NA	NA	NA	4	NA	NA	Yes	CAT4 LTE Dongle
C1109-2PLTEVZ	1	NA	NA	NA	NA	NA	2	NA	NA	Yes	Embedded builtin same CAT4 LTE technology as P-LTE-VZ
C1109-2PLTEUS	1	NA	NA	NA	NA	NA	2	NA	NA	Yes	Embedded builtin same CAT4 LTE technology as P-LTE-US
C1109-2PLTEGB	1	NA	NA	NA	NA	NA	2	NA	NA	Yes	Embedded builtin same CAT4 LTE technology as P-LTE-GB
C1109-4PLTE2P	1	NA	NA	Yes with Pluggable Technology	NA	NA	4	NA	NA	Yes	Yes (CAT4/CAT6), Dual Pluggables, Single P-1T Serial in Slot 0
C1111-8P (C1111X-8P with 8 GB memory and flash for SD-WAN Advanced Security support)	1	1	NA	NA	NA	NA	8	4	2	Yes	NA
C1111-4P	1	1	NA	NA	NA	NA	4	2	1	Yes	NA
C1112-8P	NA	1	1 G.FAST (Annex B)	NA	NA	NA	8	4	2	Yes	NA
C1113-8P	NA	1	1 G.FAST (Annex A)	NA	NA	NA	8	4	2	Yes	NA
C1113-8PM	NA	1	1 G.FAST (Annex M)	NA	NA	NA	8	4	2	Yes	NA

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Model	WAN					Wi-Fi	LAN switch			Integrated Micro USB console	Pluggables
	GE	GE/SFP combo	ADSL2/VDSL2 + or G.FAST or G.SHDSL	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11 ac	GE	PoE or PoE+			
C1116-4P	NA	1	1 VA-DSL (Annex B/J)	NA	NA	NA	4	2	1	Yes	NA
C1117-4P	NA	1	1 VA-DSL (Annex A)	NA	NA	NA	4	2	1	Yes	NA
C1117-4PM	NA	1	1 VA-DSL (Annex M)	NA	NA	NA	4	2	1	Yes	NA
C1101-4PLTEP	1	NA	NA	Yes with Pluggable Technology	NA	NA	4	NA	NA	Yes	Yes (CAT4/CAT6), or Single P-1T Serial
C1111-8PLTEEA	1	1	NA	1 EMEAR and North America	NA	NA	8	4	2	Yes	NA
C1111-8PLTELA	1	1	NA	1 LATAM and APAC	NA	NA	8	4	2	Yes	NA
C1111-4PLTEEA	1	1	NA	1 EMEAR and North America	NA	NA	4	2	1	Yes	NA
C1111-4PLTELA	1	1	NA	1 LATAM and APAC	NA	NA	4	2	1	Yes	NA
C1112-8PLTEEA	NA	1	1 G.FAST (Annex B)	1 EMEAR and North America	NA	NA	8	4	2	Yes	NA
C1113-8PLTEEA	NA	1	1 G.FAST (Annex A)	1 EMEAR and North America	NA	NA	8	4	2	Yes	NA
C1113-8PLTELA	NA	1	1 G.FAST (Annex A)	1 LATAM and APAC	NA	NA	8	4	2	Yes	NA
C1113-8PMLTEEA	NA	1	1 G.FAST (Annex M)	1 EMEAR and North America	NA	NA	8	4	2	Yes	NA
C1116-4PLTEEA	NA	1	1 ADSL2/VDSL2 + (Annex B/J)	1 EMEAR and North America	NA	NA	4	2	1	Yes	NA
C1117-4PLTEEA	NA	1	1 ADSL2/VDSL2 + (Annex A)	1 EMEAR and North America	NA	NA	4	2	1	Yes	NA
C1117-4PLTELA	NA	1	1 ADSL2/VDS	1 LATAM and APAC	NA	NA	4	2	1	Yes	NA

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Model	WAN					Wi-Fi	LAN switch			Integrated Micro USB console	Pluggables
	GE	GE/SFP combo	ADSL2/VDSL2 + or G.FAST or G.SHDSL	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11 ac	GE	PoE or PoE+			
			L2 + (Annex A)								
C1117-4PMLTEEA	NA	1	1 ADSL2/VDSL2 + (Annex M)	1 EMEAR and North America	NA	NA	4	2	1	Yes	NA
C1118-8P	NA	1	1 G.SHDSL	NA	NA	NA	8	4	2	Yes	NA
C1121-4P	1	1	NA	NA	NA	NA	4	2	1	Yes	CAT4 LTE Dongle
C1121-4PLTEP	1	1	NA	Yes with Pluggable Technology	Yes with Pluggable Technology	NA	4	2	1	Yes	Yes (All)
C1121-8P **(C1121X-8P with 8 GB memory and flash for SD-WAN Advanced Security support)**	1	1	NA	NA	NA	NA	8	4	2	Yes	CAT4 LTE Dongle
C1121-8PLTEP **(C1121X-8PLTEP with 8 GB memory and flash for SD-WAN Advanced Security support)**	1	1	NA	Yes with Pluggable Technology	Yes with Pluggable Technology	NA	8	4	2	Yes	Yes (All)
C1126-8PLTEP **(C1126X-8PLTEP with 8 GB memory and flash for SD-WAN Advanced Security support)**	NA	1	1 ADSL2/VDSL2 + (Annex B/J)	Yes with Pluggable Technology	Yes with Pluggable Technology	NA	8	4	2	Yes	Yes (All)
C1127-8PLTEP **(C1127X-8PLTEP with 8 GB memory and flash for SD-WAN Advanced Security support)**	NA	1	1 ADSL2/VDSL2 + (Annex A)	Yes with Pluggable Technology	Yes with Pluggable Technology	NA	8	4	2	Yes	Yes (All)
C1127-8PMLTEP **(C1127X-8PMLTEP with 8 GB memory and flash for SD-WAN Advanced Security support)**	NA	1	ADSL2/VDSL2 + (Annex M)	Yes with Pluggable Technology	Yes with Pluggable Technology	NA	8	4	2	Yes	Yes (All)

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Model	WAN					Wi-Fi	LAN switch			Integrated Micro USB console	Pluggables
	GE	GE/SFP combo	ADSL2/VDSL2 + or G.FAST or G.SHDSL	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11 ac	GE	PoE or PoE+			
C1128-8PLTEP	NA	1	G.SHDL	Yes with Pluggable Technology	Yes with Pluggable Technology	NA	8	4	2	Yes	Yes (All)
C1161-8P (C1161X-8P with 8 GB memory and flash for SD-WAN Advanced Security support)	1	1	NA	NA	NA	NA	8	4	2	Yes	CAT4 LTE Dongle
C1161-8PLTEP (C1161X-8PLTEP with 8 GB memory and flash for SD-WAN Advanced Security support)	1	1	NA	Yes with Pluggable Technology	Yes with Pluggable Technology	NA	8	4	2	Yes	Yes (All)

Table 8. Cisco 1000 Series ISRs DSL and Wi-Fi SKUs

Model	WAN					Wi-Fi	LAN switch			Integrated USB 3.0 console	Pluggable
	GE	GE/SFP combo	ADSL2/ VDSL2+	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11 ac	GE	PoE or PoE+			
C1109-4PLTE2PWZ***	1	NA	NA	Yes with Pluggable Technology	NA	2X2 MIMO	4	NA	NA	Yes	Yes (CAT4/CAT6), Dual Pluggables, Single P-1T Serial in Slot 0
C1111-8PWY*	1	1	NA	NA	NA	2X2 MIMO	8	4	2	Yes	NA
C1111-4PWX**	1	1	NA	NA	NA	2X2 MIMO	4	2	1	Yes	NA

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Model	WAN					Wi-Fi	LAN switch			Integrated USB 3.0 console	Pluggable
	GE	GE/SFP combo	ADSL2/ VDSL2+	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11 ac	GE	PoE or PoE+			
C1112-8PWE	NA	1	1 G.FAST (Annex B)	NA	NA	2X2 MIMO	8	4	2	Yes	NA
C1113-8PWA	NA	1	1 G.FAST (Annex A)	NA	NA	2X2 MIMO	8	4	2	Yes	NA
C1113-8PWB	NA	1	1 G.FAST (Annex A)	NA	NA	2X2 MIMO	8	4	2	Yes	NA
C1113-8PWE	NA	1	1 G.FAST (Annex A)	NA	NA	2X2 MIMO	8	4	2	Yes	NA
C1113-8PWZ	NA	1	1 G.FAST (Annex A)	NA	NA	2X2 MIMO	8	4	2	Yes	NA
C1113-8PMWE	NA	1	1 G.FAST (Annex M)	NA	NA	2X2 MIMO	8	4	2	Yes	NA
C1116-4PWE	NA	1	1 ADSL2/VDSL2+ (ISDN) Annex B/J	NA	NA	2X2 MIMO	4	2	1	Yes	NA
C1117-4PWE	NA	1	1 ADSL2/VDSL2+ (POTS) Annex A	NA	NA	2X2 MIMO	4	2	1	Yes	NA
C1117-4PWA	NA	1	1 ADSL2/VDSL2+ (POTS) Annex A	NA	NA	2X2 MIMO	4	2	1	Yes	NA

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Model	WAN					Wi-Fi	LAN switch			Integrated USB 3.0 console	Pluggable
	GE	GE/SFP combo	ADSL2/ VDSL2+	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11 ac	GE	PoE or PoE+			
C1117-4PWZ	NA	1	1 ADSL2/VDSL2+ (POTS) Annex A	NA	NA	2X2 MIMO	4	2	1	Yes	NA
C1117-4PMWE	NA	1	1 ADSL2/VDSL2+ (POTS) Annex M	NA	NA	2X2 MIMO	4	2	1	Yes	NA

* Wi-Fi domain WY; Y = A, B, E, F, H, N, Q, R, Z (S will be available with IOX XE 16.9 or later releases starting January, 2019)

** Wi-Fi domain WX; X = A, B, D, E, F, H, N, Q, R, Z

*** Wi-Fi domain WZ; Z = A, B, D, E, Q, R, Z

Cisco WLAN Country Compliance Lookup https://www.cisco.com/c/dam/assets/prod/wireless/wireless-compliance-tool/index.html.

Table 9. Cisco 1000 Series ISRs LTE, Wi-Fi, and DSL SKUs

Model	WAN					Wi-Fi	LAN switch			Integrated USB 3.0 console	Pluggable
	GE	GE/SFP combo	ADSL2/VDSL2+	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11ac	GE	PoE or PoE+			
C1111-8PLTEEAWX*	1	1	NA	1 EMEAR and North America	NA	2X2 MIMO	8	4	2	Yes	NA
C1111-8PLTELAWY**	1	1	NA	1 LATAM and APAC	NA	2X2 MIMO	8	4	2	Yes	NA
C1112-8PLTEEAWE	NA	1	1 G.FAST (Annex B)	1 EMEAR and North America	NA	2X2 MIMO	8	4	2	Yes	NA
C1113-8PLTEEAWA	NA	1	1 G.FAST (Annex A)	1 EMEAR and North America	NA	2X2 MIMO	8	4	2	Yes	NA
C1113-8PLTEEAWB	NA	1	1 G.FAST (Annex A)	1 EMEAR and North America	NA	2X2 MIMO	8	4	2	Yes	NA
C1113-8PLTEEAWE	NA	1	1 G.FAST (Annex	1 EMEAR and North Ameri	NA	2X2 MIMO	8	4	2	Yes	NA

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Model	WAN					Wi-Fi	LAN switch			Integrated USB 3.0 console	Pluggable
	GE	GE/SFP combo	ADSL2/VDSL2+	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11ac	GE	PoE or PoE+			
			A)	ca							
C1113-8PLTELAWZ	NA	1	1 G.FAST (Annex A)	1 LATAM and APAC	NA	2X2 MIMO	8	4	2	Yes	NA
C1116-4PLTEEAWE	NA	1	1 ADSL2/VDSL2+ (ISDN) Annex B/J	1 EMEAR and North America	NA	2X2 MIMO	4	2	1	Yes	NA
C1117-4PLTEEAWE	NA	1	1 ADSL2/VDSL2+ (POTS) Annex A	1 EMEAR and North America	NA	2X2 MIMO	4	2	1	Yes	NA
C1117-4PLTEEAWA	NA	1	1 ADSL2/VDSL2+ (POTS) Annex A	1 EMEAR and North America	NA	2X2 MIMO	4	2	1	Yes	NA
C1117-4PLTELAWZ	NA	1	1 ADSL2/VDSL2+ (POTS) Annex A	1 LATAM and APAC	NA	2X2 MIMO	4	2	1	Yes	NA
C1117-4PMLTEEAWE	NA	1	1 ADSL2/VDSL2+ (POTS) Annex M	1 EMEAR and North America	NA	2X2 MIMO	4	2	1	Yes	NA
C1101-4PLTEPWX***	1	NA	NA	Yes with Pluggable Technology	NA	2X2 MIMO	4	NA	NA	Yes	Yes (CAT4/CAT6), or Single P-1T Serial

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Model	WAN					Wi-Fi	LAN switch			Integrated USB 3.0 console	Pluggable
	GE	GE/SFP combo	ADSL2/VDSL2+	LTE Advanced (CAT6)	LTE Adv. Pro (CAT18)	802.11ac	GE	PoE or PoE+			
C1121-8PLTEPWX* **(C1121X-8PLTEPWY* with 8 GB memory and flash for SD-WAN Advanced Security support)**	1	1	NA	Yes with Pluggable Technology	Yes with Pluggable Technology	2X2 MIMO	8	4	2	Yes	Yes (All)

C1111-8PLTEEAWX*

* Wi-Fi domain WX; X = A, B, E, R

C1111-8PLTELAWY**

** Wi-Fi domain WY; Y = D, F, H, N, Q, Z (S, E and A will be available with IOX XE 16.9 or later releases starting January, 2019)

C1101-4PLTEPWX***

*** Wi-Fi domain WX; X = A, B, D, E, Z

C1121-8PLTEPWX*

* Wi-Fi domain WX; X = B, E, Z, Q

C1121X-8PLTEPWY**

** Wi-Fi domain WY; Y = A, E, B, Z

Cisco WLAN Country Compliance Lookup https://www.cisco.com/c/dam/assets/prod/wireless/wireless-compliance-tool/index.html.

System specifications

Table 10. LTE (3GPP Category 4) pluggable bands supported

Region or theater	Cisco LTE 2.5 for P-LTE-VZ	Cisco LTE 2.5 for P-LTE-US	Cisco LTE 2.5 for P-LTE-GB
Bands	LTE bands 4, 13. FDD LTE 700 MHz (band 13), 1700 MHz and 2100 MHz (band 4 AWS).	LTE bands 2, 4, 5, 12. FDD LTE 700 MHz (band 17), 700 MHz (band 12), 850 MHz (band 5 CLR), 1700 MHz and 2100 MHz (band 4 AWS).	LTE bands 1, 3, 7, 8, 20, 28. FDD LTE 700 MHz (band 28), 800 MHz (band 20), 900 MHz (band 8), 1800 MHz (band 3), 2100 MHz (band 1), and 2600 MHz (band 7).
Theoretical Category 4 download/upload speeds	150 Mbps/50 Mbps	150 Mbps/50 Mbps	150 Mbps/50 Mbps
United States	• Verizon	• ATT and T-Mobile	
Europe			•

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Table 11. USB based LTE Dongle (3GPP Category 4) bands supported

Region or theater	Cisco LTE 2.5 for D-LTE-GB	Cisco LTE 2.5 for D-LTE-AS	Cisco LTE 2.5 for D-LTE-NA
Bands	*LTE bands 1,3,7,8,20,28	*LTE bands 1,3,5,8,40,41	*LTE band 2,4,5,12,13,14,17
Theoretical Category 4 download/upload speeds	75 Mbps/50 Mbps	75 Mbps/50 Mbps	75 Mbps/50 Mbps
United States			•
Europe	•		
India		•	
China		•	
Indonesia		•	
Malaysia		•	
Philippines		•	
South Africa		•	

* Non-LTE Bands are not supported.

Table 12. LTE Advanced (3GPP Category 6) pluggable supported bands

Region or theater	Cisco LTE Advanced 3.0 LTEEA (Category 6)	Cisco LTE Advanced 3.0 LTELA (Category 6)
Bands	LTE bands 1-5, 7, 12, 13, 20, 25, 26, 29, 30, and 41. FDD LTE 700 MHz (band 12), 700 MHz (band 29), 800 MHz (band 20), 850 MHz (band 5 CLR), 850 MHz (band 26 Low), 900 MHz (band 8), 1800 MHz (band 3), 1900 MHz (band 2), 1900 MHz (PCS band 25), 1700 MHz and 2100 MHz (band 4 AWS), 2100 MHz (band 1), 2300 MHz (band 30), or 2600 MHz (band 7). TDD LTE 2500 MHz (band 41). **Carrier aggregation band combinations:** 1+8; 2+(2,5,12,13,29); 3+(7,20); 4+(4,5,12,13,29); 7+(7,20); 12+30, 5+30, and 41+41.	LTE bands 1, 3, 5, 7, 8, 18, 19, 21, 28, 38, 39, 40, and 41. FDD LTE 700 MHz (band 28), 850 MHz (band 5 CLR), 850 MHz (bands 18 and 19 Low), 900 MHz (band 8), 1500 MHz (band 21), 1800 MHz (band 3), 2100 MHz (band 1), or 2600 MHz (band 7). TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), or 2600 MHz (band 38). **Carrier aggregation band combinations:** 1+(8,18,19,21); 3+(5,7,19,28); 7+(5,7,28); 19+21, 38+38, 39+39,40+40, and 41+41.
Theoretical Category 6 download/upload speeds	300 Mbps/50 Mbps	300 Mbps/50 Mbps
United States	•	
Europe	•	
Canada	•	
Middle East with specific LTE bands/frequencies	•	

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Region or theater	Cisco LTE Advanced 3.0 LTEEA (Category 6)	Cisco LTE Advanced 3.0 LTELA (Category 6)
Australia and New Zealand		•
Japan		•
China		•
India		•
Southeast Asia		•
Latin America		• Dependent upon specific operators supporting the LTE bands listed above.
South Korea		•

Table 13. LTE Advanced Pro (3GPP Category 18) pluggable supported bands

Region or theater	Cisco LTE Advanced Pro Pluggable P-LTEAP18-GL
Bands	LTE bands 1-5, 7, 8, 12-14, 17, 18-20, 25, 26, 28-30, 32, 38-43, 46, 48, 66, and 71. FDD LTE 600 MHz (band 71), 700 MHz (bands 12, 13, 14, 17, 28, and 29), 800 MHz (band 20), 850 MHz (bands 5, 18, 19, and 26), 900 MHz (band 8), 1500 MHz (band 32), 1700 MHz (bands 4 and 66), 1800 MHz (band 3), 1900 MHz (bands 2 and 25), 2100 MHz (band 1), 2300 MHz (band 30), 2600 MHz (band 7). TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), 2600 MHz (band 38), 3500 MHz (bands 42 and 48), 3700 MHz (band 43), 5200 MHz (band 46).
Theoretical Category 6 download/upload speeds	1.2 Gbps/200 Mbps
United States	•
Europe	•
Canada	•
Australia and New Zealand	•
Japan	•

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Table 14. Cisco LTE specifications

Item	Specification
LTE modem form factor	• Embedded (included with the router) or LTE Pluggable Technology with LTEP PIDs. • Cisco LTE Advanced 3.0 LTEEA (CAT6) and Pluggable P-LTEA-EA SKU: FW-7455-LTE-VZ (Verizon) or FW-7455-LTE-AT (ATT) or FW-7455-LTE-ST (Sprint) or FW-7455-LTE-BE (Bell) or FW-7455-LTERO (Rogers) or FW-7455-LTE-TE (Telus) or FW-7455-LTE-GN (generic for T-Mobile, Europe, and Middle East) selection option. • Cisco LTE Advanced 3.0 LTELA (CAT6) and Pluggable P-LTEA-LA SKU: FW-7430-LTE-AU (Australia) or FW-7430-LTE-JN (Japan) or FW-7430-LTE-GN (generic) selection option. • Cisco LTE Advanced Pro (CAT18) pluggable P-LTEAP18-GL SKU: FW-LM960-LTE-VZ (Verizon), FW-LM960-LTE-ST (Sprint), FW-LM960-LTE-AT AT&T), FW-LM960-LTE-GN (Generic/Global) selection options.
Important LTE features	• Automatic switch failover between primary and backup link. • Multichannel-Interface-Processor (MIP) profile configuration. • Remotely initiated data callback using voice or Short Message Service (SMS). • Remote firmware upgrade over LTE. • SIM lock and unlock capabilities. • Dying gasp available on pluggable LTE modules.
Dual SIM support	• High reliability, and cellular multihoming support for dual micro (3FF) SIMs card socket; compliant with ISO-7816-2 (SIM mechanical), Auto SIM carrier capability with correct firmware selection (Fast SIM failover).
SMS and GPS	• GPS antenna: SMA connector (separate active GPS antenna with SMA option). • Send and receive SMS (maximum 160 characters). • Standalone GPS and Assisted GPS (AGPS); needs line of sight.
Modem information	**Modem form factor:** (M.2) EM7455 or (M.2) EM7430 series for Cisco LTE Advanced 3.0, WP7600 series for Cisco LTE 2.5, (mPCIe) LM960 series for Cisco LTE Advanced Pro.
Wireless technologies supported (performance and throughput)	**Cisco LTE Advanced 3.0 LTEEA and LTELA (Refer to above Table 11: LTE Advanced Bands Supported)** **Backward compatibility:** • UMTS and HSPA+. • DC-HSPA+ speed download with Category 24 (42 Mbps) and upload up to Category 8 (11.5 Mbps). LTELA supports DC-HSPA+ band 1, 5, 6, 8, 9, 19. LTEEA supports DC-HSPA+ band 1, 2, 3, 4, 5, 8. • TD-SCDMA 39 (LTELA China Mobile supports). **Cisco LTE 2.5 (Refer to Table 10: LTE Bands Supported) Backward compatibility:** • P-LTE-US: HSPA+ (Band 2, 4, 5). • P-LTE-GB: UMTS, HSPA+ (Band 1, 8), EDGE, GSM, GPRS (900/1800).
Included antenna	• Two multiband swivel-mount dipole antennas (LTE-ANTM-D for CAT6 and LTE-ANTM2-SMA-D for CAT18) are included with all Cisco LTE pluggables and 1000 Series routers. Two multiband swivel-mount dipole antennas (LTE-ANTM-SMA-D) are included with all Cisco LTE 2.5 Pluggables 1101 and 1109 Series routers. For –N antenna and cable installation guidance, view the Connected Grid Antennas Installation Guide.
Carrier support	• For a list of carriers that offer services on the Cisco 1000 Series LTE Advanced 3.0, please visit the Wireless Carrier Partners page.

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Table 15. Cisco USB Based Cat4 LTE specifications

Item	Specification
LTE modem form factor	• USB Based CAT4 LTE Dongle.
Important LTE features	• Automatic switch failover between primary WAN and backup LTE link and vice-versa. • Multiple profile configuration. • Remote firmware upgrade over LTE.
Single SIM support	• Single micro (3FF) SIMs card socket; compliant with ISO-7816-2 (SIM mechanical).
SMS and GPS	• Send and receive SMS (maximum 160 characters). • GPS: Not Supported.
Modem information	**Modem form factor:** WP7600 series for Cisco USB based CAT4 LTE Dongle.
Wireless technologies supported (performance and throughput)	Cisco LTE 2.5 (Refer to Table 10: LTE Bands Supported). 75Mbps (DL)/50Mbps (UL).
Included antenna	• Sub-Miniature version-A (SMA) Antenna is included with USB based CAT4 LTE Dongle. • For Dongle installation guidance, view the Hardware Installation Guide.

Table 16. Cisco 1000 Series ISRs system specifications

Feature	Specification	
Memory (default and maximum)	DRAM: 4 GB Only C1111X-8P,C1121X-8P,C1126X,C1127X,C1161X models have 8GB DRAM	Flash: 4 GB Only C1111X-8P,C1121X-8P,C1126X,C1127X,C1161X models have 8GB Flash
Console	• Micro USB console (Type A). • RJ45.	
Micro-USB port (reserved)	• Micro-USB port to support remote LTE diagnostics and monitoring tools (Qualcomm CAIT and Spirent UDM) (USB 3.0).	
WLAN interfaces	• Multiuser Multiple-Input Multiple-Output (MU-MIMO) allows transmission of data to multiple 802.11ac Wave 2–capable clients simultaneously to improve the client experience. Prior to MU-MIMO, 802.11n and • 802.11ac Wave 1 access points could transmit data to only one client at a time, typically referred to as Single-User MIMO (SU-MIMO). • 802.11ac Wave 2 with 2x2:2 MIMO technology uses two spatial streams when operating in SU-MIMO or MU-MIMO mode, offering 867-Mbps rates for more capacity and reliability than competing access points. • Flexible deployment through the Mobility Express solution is ideal for small to medium-sized deployments. Easy setup allows the 1000 Series (similar to 1815i) to be deployed on networks without a physical controller. • For more information, view the Cisco Aironet 1815i Access Point Data Sheet.	
Maximum clients	• Maximum number of associated wireless clients: 200 per Wi-Fi radio; in total 400 clients per access point. C1109-4PLTEP and C1109-4PLTEW models come with default dual W-ANTM2050D-RPSMA external antenna and all modem have default 8.8 AP autonomous or Mobility Express release. Option to select 8.8 CAPWAP WLC image.	

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Feature	Specification
Authentication and security	• AES for Wi-Fi Protected Access 2 (WPA2). • 802.1X, RADIUS AAA. • 802.11r and 802.11i.
802.11ac	• 2x2 SU-MIMO/MU-MIMO with two spatial streams. • Maximal Ratio Combining (MRC). • 20-, 40-, and 80-MHz channels. • PHY data rates up to 866.7 Mbps (80 MHz on 5 GHz). • Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Rx). • 802.11 Dynamic Frequency Selection (DFS). • Cyclic Shift Diversity (CSD) support.
Software	• Cisco IOS Software feature set: Universal Cisco IOS XE 16.6.1 Software image or later. C1112, C1113, and C1101 models support starting with IOS XE 16.8.1 Software image or later. C1118, C1111X-8P and C1109 models support with IOS XE 16.9.1 Software image or later. • Cisco IOS Software feature set: C1120 and C1160 models Universal Cisco IOS XE 16.11.1 Software image or later. • Cisco Unified Wireless Network Software with AireOS Wireless Controllers Release 8.5 (migration to 8.8 starting March, 2019 and 8.8 for 1101 and 1109 Models) MR1 or later.
DSL interfaces	**C1116 and C1117** • Dying gasp. • ITU G.993.2 (VDSL2) and supported profiles: 8a, 8b, 8c, 8d, 12a, 12b, and 17a. • VDSL2 Vectoring. • ADSL Annex A and Annex B ITU G. 992.1 (ADSL), G.992.3 (ADSL2), and G.992.5 (ADSL2+). • ADSL Annex M G.992.3 (ADSL2) and G.992.5 (ADSL2+). **C1112 and C1113** • G.FAST (spectrum up to 106MHz) Annex A, Annex B, Annex M and compatible with ADSL2/2+ and VDSL2. • ITU G.993.2 (VDSL2) and supported profiles: 8a, 8b, 8c, 8d, 12a, 12b, 17a, and 35b. • ITU G.9700/9701/997.2 G.FAST and supported profiles: 106a, and 106b. **C1118** • G.SHDSL.
Serial WAN interface and protocol	• Support for both synchronous and bisync modes. • Synchronous maximum speed of up to 8 Mbps. • Support for bisync modes. • Support for network clock synchronization. • EIA-232, EIA-449, EIA-530, EIA-530A, V.35, and X.21.

Cisco Smart Serial Cabling

Product Number	Cable Type	Length	Connector Type
CAB-SS-V35MT	V.35 DTE	10 ft (3m)	Male
CAB-SS-V35FC	V.35 DCE	10 ft (3m)	Female
CAB-SS-232MT	EIA/TIA-232 DTE	10 ft (3m)	Male
CAB-SS-232FC	EIA/TIA-232 DCE	10 ft (3m)	Female
CAB-SS-449MT	EIA/TIA-449 DTE	10 ft (3m)	Male
CAB-SS-449FC	EIA/TIA-449 DCE	10 ft (3m)	Female
CAB-SS-X21MT	X.21 DTE	10 ft (3m)	Male
CAB-SS-X21FC	X.21 DCE	10 ft (3m)	Female
CAB-SS-530MT	EIA/TIA-530 DTE	10 ft (3m)	Male
CAB-SS-530AMT	EIA/TIA-530A DTE	10 ft (3m)	Male

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Feature	Specification			
				Male
Inline PoE	• Optional internal adapter for inline PoE on 4 switch ports for IP phones or external wireless access points; 802.3af-compliant PoE or 802.3at-compliant PoE+.			
External power supply	**Product power specifications:** **C111X, C1120 and C1160 Models** • AC input voltage: Universal 100 to 240 VAC. • Frequency: 50 to 60 Hz. • Maximum output power: 66W (default). • Output voltages: 12 VDC. • Optional PoE and PoE+: ◦ Single 150W power supply required for Cisco 1100-8P series router ◦ Single 115W power supply required for Cisco 1100-4P series router • External output voltage: 48 VDC. **C1101-4PLTEPWX and C1109-4PLTE2PWX Models:** • AC input voltage: Universal 100 to 240 VAC. • Frequency: 50 to 60 Hz. • Maximum output power: 66W (default iTemp for C1109-4PLTE2PWX Models). • Output voltages: 12 VDC. **C1101-4P, C1101-4PLTEP,C1109-2PLTE, and C1109-4PLTE2P Models:** • AC input voltage: Universal 100 to 240 VAC. • Frequency: 50 to 60 Hz. • Maximum output power: 30W (default iTemp for Models). • Output voltages: 12 VDC.			
USB 3.0	• USB devices supported: ◦ USB eTokens and USB flash memory • Devices USB 3.0 supports to be connected externally. View the USB Device Support Data Sheet.			
LEDs	• WWAN (green/amber). • SIM status (green/amber). • Received signal strength indication (RSSI) bar (green). • 3G/LTE service (green/amber). • GPS (green/amber). • Speed and link for Gigabit Ethernet WAN port (green). • Speed and link for all Fast Ethernet LAN ports (green).			

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Feature	Specification
Physical dimensions (H x W x D)	**C111X Models** • 1.75 x 12.7 x 9.6 in. (44 x 323 x 244 mm) (includes rubber feet on LTE models). • 1.75 x 12.7 x 9.03 in. (42 x 323 x 230mm) (includes rubber feet on non-LTE models). **C1120 Models** • 1.65 x 12.7 x 8.9 in. (41.9 x 322 x 226 mm). **C1160 Models** • 1.65 x 10.8 x 7.85 in. (41.9 x 274 x 199 mm). **C1101-4PLTEP and C1101-4PLTEPWX Models** • 1.73 x 9.75 x 6.6 in. (43.9 x 247.6 x 167.6 mm) (includes rubber feet models). **C1101-4P Models** • 1.1 x 7.5 x 6.0 in. (27.9 x 190.5 x 152.4 mm) (includes rubber feet models). **C1109-2PLTE Models** • 1.27 x 8.4 x 6.0 in. (32.3 x 213.4 x 152.4mm) (includes rubber feet models). **C1109-4PLTE2P and C1109-4PLTE2PWX Models (ship default with dual W-ANTM2050DRPSMA Wi-Fi antennae)** • 1.71 x 11.16 x 9.8 in. (43.4 x 283.5 x 248.9 mm) (includes rubber feet models). **Pluggable** • .85 x 2.5 x 3.88 in. (21.6 x 63.5 x 98.5 mm). • USB Based CAT4 LTE Dongle 3.69 x 1.3 x 0.39 in. (93.73 x 32.99 x 10.00 mm).
Weight	**C111X Models** • 1.94 lb to 4.59 lb (1.94kg to 2.08 kg). • 4.50 lb (2.04 kg) with LTE Advanced. • 4.76 lb (2.16 kg) with Wave 2 802.11ac Dual Radio. • 4.89 lb (2.22 kg) with LTE Advanced plus Wave 2 802.11ac Dual Radio. **C1120 Models** • 3.43 lb (1.56Kg). base model with 4 ports. • 3.7 lb (1.68Kg). with 4 ports and pluggable LTE. • 4.62 lb (2.1Kg). with LTE and WiFi. • 4.53 lb (2.06Kg). with LTE and VDSL. • 3.7 lb (1.68Kg). with 4 ports and pluggable LTE. **C1160 Models** • 3.48 lb (1.58Kg). base model with 8 ports. • 3.74 lb (1.7Kg). with 8 ports and pluggable LTE. **C1101-4PLTEPWX Models** • 3.78 lb (1.71kg). **C1101-4PLTEP Models** • 3.34 lb (1.51kg). **C1101-4P Models** • 1.89 lb (.86kg). **C1109-2PLTE Models** • 2.25 lb (1.02kg). **C1109-4PLTE2PWX Models (Only C1109-4PLTE2PWX have external Wi-Fi antennae options)**

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Feature	Specification
	• 6.23 lb (2.83kg). **C1109-4PLTE2P Models** • 5.93 lb (2.69kg). **Pluggable** • CAT18 LM960XX.45 lb (.21kg) • CAT6 EM74XX.44 lb (.20kg). • CAT4 WP76XX.40 lb (.18kg). • USB Based CAT4 LTE Dongle WP76XX 0.068 lb (0.031kg).
Standard safety certifications	• UL 60950-1.and EN 60950-1. • CAN/CSA C22.2 No. 60950-1. • CB to IEC 60950-1, 2nd edition with all group differences and national deviations.
EMC emissions	• EN55022/CISPR22, CFR 47 Part 15, ICES003, VCCI-V-3, AS/NZS CISPR22, CNS13438, EN300-386, EN61000-3-2, EN61000-3-3, and EN61000-6-1.
EMC immunity	• EN55024/CISPR24, (EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11), and EN300-386.
Radio immunity	• EN301 489-1, EN 301 489-7, and EN301 489-24.
Cellular radio	• EN 301 908-1, EN 301 908-2, EN 301 511, 47 CFR Part 22, 47 CFR Part 24, and EN 301 908-13.
Environmental operating range	• Nonoperating temperature: -4° to 149°F (-20° to 65°C). • Nonoperating humidity: 5% to 95% relative humidity (noncondensing). • Nonoperating altitude: 0 to 15,000 ft (0 to 4570 m). • Operating temperature: 32° to 104°F (0° to 40°C). C1101 support 32° to 113°F (0° to 45°C). C1109-2PLTE support 32° to 122°F (0° to 50°C). C1109-4PLTE2P and C1109-4PLTE2PW models support -4° to 131°F (-20° to 55°C). • Operating humidity: 10% to 85% relative humidity (noncondensing). • Operating altitude: 0 to 10,000 ft (0 to 3000 m at 30°C). Operating altitude: 0 to 10,000 ft (0 to 3000 m at 35°C for C1109-2PLTE models). Operating altitude: 0 to 10,000 ft (0 to 3000 m at 40°C for C1109-4PLTE2P and C1109-4PLTE2PW models).

Cisco IOS Software licensing and packaging

Universal Cisco IOS XE Image

A single Cisco IOS XE Universal image encompassing all functions is delivered with the platform. Advanced features can be enabled simply by activating a software license on the Universal image. Technology packages and feature licenses, enabled through right-to-use licenses, simplify software delivery and decrease the operational costs of deploying new features.

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Four major technology licenses are available on the Cisco 1000 Series; these licenses can be activated through the Cisco software activation process identified at https://www.cisco.com/go/sa. The following licenses are available:

- IP Base: This technology package is available as the default.
- Application Experience (APP): This license includes data and application performance features.
- Security (SEC) or Security with No Payload Encryption (SEC-NPE): This license includes features for securing network infrastructure.
- IP Security (IPSEC): This license includes features that improve IP security performance multifold.

The Cisco SD-WAN subscriptions are aligned across three subscription licenses of **Cisco DNA Essentials, Cisco DNA Advantage and Cisco DNA Premier,** each expanding functionally. The **Cisco DNA Essentials** covers all types of connectivity and router life cycle management, support for Network and application visibility coupled with basic premise and transport security. The **Cisco DNA Advantage** provides for Advanced WAN topologies, Application aware policies supported by enhanced network security. The **Cisco DNA Premier** provides for Cloud connectivity with unlimited segmentation, Advanced Application optimization and Network Analytics, secured by advanced threat protection. There are separate SD-WAN promotional PIDs or using LIC-DNA-ADD option. For Cisco ONE, there is also C1-ISR-ADD option.

Cisco CVO is now supported on 1100-8P and 1100-4P models with SEC license.

For more information on Cisco SD-WAN please refer to: https://www.cisco.com/c/en/us/products/software/one-wan-subscription/index.html.

Table 17. Cisco 1000 Series licenses

Part number	Bundles	Features
SL-1100-8P-IPB **SL-1100-4P-IPB** **SL-1100-2P-IPB**	IP Base (default)	Routing protocols, ACL, NAT, QoS, BFD, VRF Lite, IP SLA Responder.
SL-1100-8P-APP(=) **SL-1100-4P-APP(=)** **SL-1100-2P-APP(=)**	Application Experience (APP)	IP Base + advanced networking protocols: L2TPv3, MPLS. Application Experience: PfRv3, NBAR2, AVC, IPSLA Initiator. Hybrid Cloud Connectivity: LISP, Virtual Private LAN Services (VPLS), Ethernet over MPLS.

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Part number	Bundles	Features
SL-1100-8P-SEC(=) SL-1100-8P-SECNPE(=) SL-1100-4P-SEC(=) SL-1100-4P-SECNPE(=) SL-1100-2P-SEC(=) SL-1100-2P-SECNPE(=)	Security (SEC)	IP Base + Advanced Security: Zone-based firewall, IPsec VPN, Dynamic Multipoint VPN (DMVPN), FlexVPN, GETVPN. Provides up to 50 Mbps IPsec performance. SEC license needed for CVO deployment option.
FL-VPERF-8P-200(=) FL-VPERF-4P-100(=)	IPSec Performance (VPERF)	IPsec Performance: Additional 100 Mbps for ISR 1100-4P and 200 Mbps for ISR 1100-8P. Not applicable on C1109-2PLTE models.
FL-1100-8P-HSEC(=) FL-1100-4P-HSEC(=) FL-1100-2P-HSEC(=)	IPSec HSEC	IPSEC HSEC License for Cisco ISR 1100 8P,ISR 1100 4P, and 1100 2P. Support with IOS XE 16.8.1 or later releases.
C1F1PISR1100S8PK9 C1F1PISR1100S4PK9	Cisco One S/W Bundle	APP, SEC, PRIME licenses (SL-1100-8P-IPB, C1-SL-11008P-APP, C1-SL-1100-8P-SEC or C1-SL-1100-8P-SECNPE, C1-PI-LFAS-ISR-K9, C1F1VISR1100S8P-01, C1-SL-1100-PAK) or (SL-1100-4P-IPB, C1-SL-1100-4P-APP, C1-SL1100-4P-SEC or C1-SL-1100-4P-SECNPE, C1-PI-LFASISR-K9, C1F1VISR1100S4P-01, C1-SL-1100-PAK). Cisco ONE selection option can also be order with separate SWSS PID under C1-ISR-ADD.

Table 18. Product part numbers and software images

Product part number	Description
Router software images	
SISR1100UK9-166(=) SISR1100NPEUK9-166(=) SISR1100UK9-168(=) SISR1100NPEUK9-168(=) SISR1100UK9-169(=) SISR1100NPEUK9-169(=) SISR1100UK9-1610(=) SISR11NPEUK9-1610(=) SISR1100UK9-1611(=) SISR11NPEUK9-1611(=)	Cisco 1100 ISR Universal Image and Non-Pay load Encryptions Image.

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Product part number	Description
SD-WAN image	
SISR1100UCMK9-169(=) SISR1100UCMK9-1610(=) SISR1100UCMK9-1611(=)	SD-WAN Image for ISR 1100 platforms. Some models with –DNA value, –SPM promotional PIDs or certain models with separate LIC-DNA-ADD (or L-LIC-DNA-ADD) option.
Access point software images	
AIR-AP1815-K9-ME-8-8-110-0.tar	Cisco 111X Models AP delivers industry-leading wireless performance with support for the latest Wi-Fi standard, IEEE's 802.11ac Wave 2 and Mobility Express.
DSL firmware options	
A2pvbF039t.d26d	Annex A and M.
B2pv6F039g1.d26d	Annex B and J.
A2pvfbH043j	G.FAST Annex A and M.
B2pvfbH043j	G.FAST Annex B.
Power over Ethernet options	
ISR-1100-POE2(=)	1100-4P with 115W PSU (2 PoE or 1 PoE+).
ISR-1100-POE4(=)	1100-8P with 150W PSU (4 PoE or 2 PoE+).
Rack mount kit and RJ Console Adapter	
ACS-1100-RM-19(=)	Rack-mount kit for all 111X Series ISRs.
ACS-1100-RM2-19(=)	Rack-mount kit for 112X and 116X Series ISRs.
CAB-CON-USBRJ45(=)	Micro USB to RJ45 Console Adapter (Only for 1101 and 1109 Models).
Pluggable	
P-LTEAP18-GL(=)	System and spare CAT18 LTE Advanced Pro Pluggable for North America, Europe and APJC.
P-LTEA-EA(=)	System and spare CAT6 LTE Advanced Pluggable for North American and Europe.
P-LTEA-LA(=)	System and spare CAT6 LTE Advanced Pluggable for APAC, ANZ, and LATAM.
P-LTE-VZ(=)	System and spare CAT4 LTE Pluggable for Verizon. Single SIM slot. Spare need antenna selection option.
P-LTE-US(=)	System and spare CAT4 LTE Pluggable for ATT and T-Mobile. Spare need antenna selection option.
P-LTE-GB(=)	System and spare CAT4 LTE Pluggable for Europe. Spare need antenna selection option.
D-LTE-GB(=)	System and spare USB Based CAT4 LTE Pluggable for EMEAR.

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Product part number	Description
D-LTE-AS(=)	System and spare USB Based CAT4 LTE Pluggable for India, China, Hong Kong, Indonesia, Malaysia, Philippines, South Africa.
D-LTE-NA(=)	System and spare USB Based CAT4 LTE Pluggable for North America.
D-MHLD(=)	System and spare Magnetic Holder for USB based CAT4 LTE Dongle.
P-1T(=)	System and spare Cisco 12:1 High Speed serial WAN interface (sync and bisync).
P-BLANK(=)	System and spare blank Pluggable.

Small Form-Factor Pluggable	ISR 1100 8P	ISR 1100 4P	Description
GLC-EX-SMD	Yes	Yes	1000BASE-EX SFP transceiver module, SMF, 1310nm, DOM.
GLC-LH-SM	Yes	Yes	GE SFP, LC connector LX/LH transceiver.
GLC-LH-SMD	Yes	Yes	GE SFP, LC connector LX/LH transceiver; with DOM.
GLC-SX-MM	Yes	Yes	GE SFP, LC connector SX transceiver.
GLC-SX-MMD	Yes	Yes	GE SFP, LC connector SX transceiver; with DOM.
GLC-ZX-SM	Yes	Yes	1000BASE-ZX SFP.
GLC-ZX-SMD	Yes	Yes	1000BASE-ZX SFP; with DOM.
GLC-FE-100FX	Yes	Yes	100BASE-FX SFP for FE port.
GLC-FE-100LX	Yes	Yes	100BASE-LX SFP for FE port.
GLC-FE-100ZX	Yes	Yes	100BASE-ZX SFP (80km).
GLC-FE-100EX	Yes	Yes	100BASE-EX SFP (40km).
GLC-FE-100BX-D	Yes	Yes	100BASE-BX10-D SFP.
GLC-FE-100BX-U	Yes	Yes	100BASE-BX10-U SFP.
GLC-GE-100FX	Yes	Yes	100FX SFP on GE ports.
GLC-BX80-D-I	Yes	Yes	1000BASE-BX80 SFP, 1570NM.
GLC-BX80-U-I	Yes	Yes	1000BASE-BX80 SFP, 1490NM.
GLC-BX40-D-I	Yes	Yes	1000BASE-BX40 SFP, 1550NM.
GLC-BX40-U-I	Yes	Yes	1000BASE-BX40 SFP, 1310NM.
GLC-BX-D	Yes	Yes	1000BASE-BX SFP, 1490NM.
GLC-BX-U	Yes	Yes	1000BASE-BX SFP, 1310NM.

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Small Form-Factor Pluggable	ISR 1100 8P	ISR 1100 4P	Description
GLC-TE	Yes	Yes	10/100/1000BASE-T.
GLC-T	Yes	Yes	10/100/1000BASE-T.
SFP-GE-S	Yes	Yes	1000BASE-SX SFP transceiver module for MMF, 850-nm wavelength, extended operating temperature range and DOM support, dual LC/PC connector.
SFP-GE-T	Yes	Yes	10/100/1000BASE-T SFP (NEBS 3 ESD).
CWDM-SFP-1470	Yes	Yes	CWDM 1470 NM SFP Gigabit Ethernet and 1G/2G FC.
CWDM-SFP-1490	Yes	Yes	CWDM 1490 NM SFP Gigabit Ethernet and 1G/2G FC.
CWDM-SFP-1510	Yes	Yes	CWDM 1510 NM SFP Gigabit Ethernet and 1G/2G FC.
CWDM-SFP-1530	Yes	Yes	CWDM 1530 NM SFP Gigabit Ethernet and 1G/2G FC.
CWDM-SFP-1550	Yes	Yes	CWDM 1550 NM SFP Gigabit Ethernet and 1G/2G FC.
CWDM-SFP-1570	Yes	Yes	CWDM 1570 NM SFP Gigabit Ethernet and 1G/2G FC.
CWDM-SFP-1590	Yes	Yes	CWDM 1590 NM SFP Gigabit Ethernet and 1G/2G FC.
CWDM-SFP-1610	Yes	Yes	CWDM 1610 NM SFP Gigabit Ethernet and 1G/2G FC.
DWDM-SFP-3033	Yes	Yes	DWDM SFP 1530.33 nm SFP (100 GHz ITU grid).
DWDM-SFP-3112	Yes	Yes	DWDM SFP 1531.12 nm SFP (100 GHz ITU grid).
DWDM-SFP-3190	Yes	Yes	DWDM SFP 1531.90 nm SFP (100 GHz ITU grid).
DWDM-SFP-3268	Yes	Yes	DWDM SFP 1532.68 nm SFP (100 GHz ITU grid).
DWDM-SFP-3425	Yes	Yes	DWDM SFP 1534.25 nm SFP (100 GHz ITU grid).
DWDM-SFP-3504	Yes	Yes	DWDM SFP 1535.04 nm SFP (100 GHz ITU grid).
DWDM-SFP-3582	Yes	Yes	DWDM SFP 1535.82 nm SFP (100 GHz ITU grid).
DWDM-SFP-3661	Yes	Yes	DWDM SFP 1536.61 nm SFP (100 GHz ITU grid).
DWDM-SFP-3819	Yes	Yes	DWDM SFP 1538.19 nm SFP (100 GHz ITU grid).
DWDM-SFP-3898	Yes	Yes	DWDM SFP 1538.98 nm SFP (100 GHz ITU grid).
DWDM-SFP-3977	Yes	Yes	DWDM SFP 1539.77 nm SFP (100 GHz ITU grid).
DWDM-SFP-4056	Yes	Yes	DWDM SFP 1540.56 nm SFP (100 GHz ITU grid).
DWDM-SFP-4214	Yes	Yes	DWDM SFP 1542.14 nm SFP (100 GHz ITU grid).
DWDM-SFP-4294	Yes	Yes	DWDM SFP 1542.94 nm SFP (100 GHz ITU grid).
DWDM-SFP-4373	Yes	Yes	DWDM SFP 1543.73 nm SFP (100 GHz ITU grid).

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Small Form-Factor Pluggable	ISR 1100 8P	ISR 1100 4P	Description
DWDM-SFP-4453	Yes	Yes	DWDM SFP 1544.53 nm SFP (100 GHz ITU grid).
DWDM-SFP-4612	Yes	Yes	DWDM SFP 1546.12 nm SFP (100 GHz ITU grid).
DWDM-SFP-4692	Yes	Yes	DWDM SFP 1546.92 nm SFP (100 GHz ITU grid).
DWDM-SFP-4772	Yes	Yes	DWDM SFP 1547.72 nm SFP (100 GHz ITU grid).
DWDM-SFP-4851	Yes	Yes	DWDM SFP 1548.51 nm SFP (100 GHz ITU grid).
DWDM-SFP-5012	Yes	Yes	DWDM SFP 1550.12 nm SFP (100 GHz ITU grid).
DWDM-SFP-5092	Yes	Yes	DWDM SFP 1550.92 nm SFP (100 GHz ITU grid).
DWDM-SFP-5172	Yes	Yes	DWDM SFP 1551.72 nm SFP (100 GHz ITU grid).
DWDM-SFP-5252	Yes	Yes	DWDM SFP 1552.52 nm SFP (100 GHz ITU grid).
DWDM-SFP-5413	Yes	Yes	DWDM SFP 1554.13 nm SFP (100 GHz ITU grid).
DWDM-SFP-5494	Yes	Yes	DWDM SFP 1554.94 nm SFP (100 GHz ITU grid).
DWDM-SFP-5575	Yes	Yes	DWDM SFP 1555.75 nm SFP (100 GHz ITU grid).
DWDM-SFP-5655	Yes	Yes	DWDM SFP 1556.55 nm SFP (100 GHz ITU grid).
DWDM-SFP-5817	Yes	Yes	DWDM SFP 1558.17 nm SFP (100 GHz ITU grid).
DWDM-SFP-5898	Yes	Yes	DWDM SFP 1558.98 nm SFP (100 GHz ITU grid).
DWDM-SFP-5979	Yes	Yes	DWDM SFP 1559.79 nm SFP (100 GHz ITU grid).
DWDM-SFP-6061	Yes	Yes	DWDM SFP 1560.61 nm SFP (100 GHz ITU grid).

For more information

For more information about the Cisco 1000 Series ISRs, visit: https://www.cisco.com/go/ISR1000 or contact your local Cisco account representative.

To learn more about Cisco SD-WAN Security, visit: https://www.cisco.com/c/en/us/solutions/enterprise-networks/sd-wan/sd-wan-security.html.

For additional information and details about Cisco IOS Software licensing and packaging on the Cisco 1000 Series, please visit:

https://www.cisco.com/c/en/us/support/routers/1110-integrated-services-router/model.html#LicensingInformation.

For the Cisco 1000 Series ISR Hardware and Software Installation Guide, Go to:

https://www.cisco.com/c/en/us/support/routers/1110-integrated-services-router/model.html#InstallandUpgradeGuides.

https://www.cisco.com/c/en/us/support/routers/1110-integrated-services-router/model.html#ConfigurationGuides.

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Cisco and partner services

Services from Cisco and our certified partners can help you reduce the cost and complexity of branch office deployments. Cisco Smart Net Total Care™ technical support for the Cisco 1000 Series ISRs is available on a one-time or annual contract basis. Support options range from help-desk assistance to proactive, onsite consultation.

For more information, visit https://www.cisco.com/go/services.

Ordering information

To place an order, visit the Cisco Ordering Home Page. To download software, visit the Cisco Software Center.

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Information about Cisco's environmental sustainability policies and initiatives for our products, solutions, operations, and extended operations or supply chain is provided in the "Environment Sustainability" section of Cisco's Corporate Social Responsibility (CSR) Report.

Reference links to information about key environmental sustainability topics (mentioned in the "Environment Sustainability" section of the CSR Report) are provided in the following table:

Sustainability topic	Reference
Information on product material content laws and regulations	Materials
Information on electronic waste laws and regulations, including products, batteries, and packaging	WEEE compliance

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Document History

New or revised topic	Described in	Date
Added support for CAT18 Pluggable and USB LTE Dongle	Table 11, 13, 14, 15, 16 and 18	September 24, 2019
Add support for additional SFPs	Table 16	August 2, 2019
Add support for P-1T high speed serial pluggable module and update some corrections	Updated throughout document	April 18, 2019
Add support for C1109-4PLTE2P models, LIC-DNA-ADD option, SDWAN promotional PIDs, and C1-ISR-ADD option	Updated throughout document	January 11, 2019
Add support for new platforms, add available date	C1118-8P, C1111X-8P, C1109-2PLTEXX	October 05, 2018

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Cisco 4000 Family Integrated Services Router

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Cisco® 4000 Family Integrated Services Routers (ISRs) form an Software Defined WAN platform that delivers the performance, security, and convergence capabilities that today's branch offices need.

Product Overview

The Cisco 4000 Family Integrated Services Router (ISR) revolutionizes WAN communications in the enterprise branch. With new levels of built-in intelligent network capabilities and convergence, it specifically addresses the growing need for application-aware networking in distributed enterprise sites. These locations tend to have lean IT resources. But they often also have a growing need for direct communication with both private data centers and public clouds across diverse links, including Multiprotocol Label Switching (MPLS) VPNs and the Internet.

The Cisco 4000 Family contains the following platforms: the 4461, 4451, 4431, 4351, 4331, 4321 and 4221 ISRs.

Figure 1.
Cisco 4000 Series Integrated Services Routers

Features and Benefits

Cisco 4000 Family ISRs provide you with Cisco® Software Defined WAN (SDWAN) software features and a converged branch infrastructure. Along with superior throughput, these capabilities form the building blocks of next-generation branch-office WAN solutions.

Cisco Software Defined WAN

Cisco SDWAN is a set of intelligent software services that allow you to reliably and securely connect users, devices, and branch office locations across a diverse set of WAN transport links. SDWAN-enabled routers like the ISR 4000 dynamically route traffic across the "best" link based on up-to-the-minute application and network conditions for great application experiences. You get tight control over application performance, bandwidth usage, data privacy, and availability of your WAN links - control that you need as your branches conduct greater volumes of mission-critical business.

Cisco Converged Branch Infrastructure

The Cisco 4000 Series ISRs consolidate many must-have IT functions, including network, compute, and storage resources. The high-performance, integrated routers run multiple concurrent services, including encryption, traffic management, and WAN optimization, without slowing your data throughput. And you can activate new services on demand through a simple licensing change.

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Cisco Intent Based Networking and Digital Network Architecture (Cisco DNA)

The last few years has seen a rapid transformation and adoption of digital technologies. This puts pressure on the on the Network teams supporting this changing infrastructure - especially when provisioning, managing, monitoring and troubleshooting these diverse devices. Additionally innovations such as Software Defined WAN (SDWAN), Network Function Virtualization (NFV), Open APIs and Cloud Management show great promise in transforming Organizations IT networks. This transformation raises further questions and challenges for the IT teams.

The Cisco Digital Network Architecture (Cisco DNA) is an open, extensible, software-driven architecture that provides for faster innovation, helping to generate deeper insights, and deliver exceptional experiences across many different applications. Cisco DNA relies on intent-based networking, a revolutionary approach in networking that helps organizations automate, simplify, and secure the network.

The intent-based Cisco DNA network is:

- Informed by Context: Interprets every byte of data that flows across it, resulting in better security, more customized experiences, and faster operations.
- Powered by Intent: Translates your intent into the right network configuration, making it possible to manage and provision multiple devices and things in minutes.
- Driven by Intuition: Continually learns from the massive amounts of data flowing through it and turns that data into actionable insight. Helps you solve issues before they become problems and learn from every incident.

Cisco DNA Center provides a centralized management dashboard across your entire network — the branch, campus, data center, and cloud. Rather than relying on box-by-box management, you can design, provision, and set policy end-to-end from the single Cisco DNA Center interface. This allows you to respond to organizational needs faster and to simplify day-to-day operations. Cisco DNA Analytics and Assurance and Cisco Network Data Platform (NDP) help you get the most from your network by continuously collecting and putting insights into action. Cisco DNA is open, extensible, and programmable at every layer. It integrates Cisco and third-party technology, open APIs, and a developer platform, to support a rich ecosystem of network-enabled applications.

Table 1 breaks out many of the features and benefits of the Cisco 4000 Family that create a Software Define WAN (SDWAN) and a converged branch infrastructure.

Table 1. Cisco 4000 Family ISR General Feature Highlights

Business Requirement(s)	Feature/Solution
Performance • Throughput • Service reliability	• Concurrent software services at speeds up to 2 Gbps. Backplane architecture supports high-bandwidth module-to-module communication at speeds up to 10 Gbps. • A distributed multicore architecture with the industry's first internal services plane. • Remote installation of application-aware services, which run identically to their counterparts in dedicated appliances.
Lower WAN expenditures	• Embedded SDWAN solution for creating lower-cost, business-class Internet connections.
Pay-as-you-grow • Performance upgrade model • Investment protection • CapEx budget management	• Router capacity can be increased with a remote performance-on-demand license upgrade (no hardware upgrade) for exceptional savings.
Superior and secure user application experiences	• ISR-AX "Application Experience" software bundle with advanced routing and network monitoring services. • Dynamic Multipoint VPN (DMVPN), zone-based firewalls, Intrusion Prevention (Snort & Umbrella Branch) and Content Management using Cisco Cloud Web security & OpenDNS protecting data,

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Business Requirement(s)	Feature/Solution
	providing authentication credentials, and transmissions not backhauled through the data center. • Secure boot feature performs hardware-based authentication of the bootloader software to prevent malicious or unintended software from booting on the system. • Code signing verifies digital signatures of executables prior to loading to prevent execution of altered or corrupted code. • Hardware authentication protects against hardware counterfeiting by using an on-board tamper-proof silicon, including field replaceable modules. If authentication fails, the module is not allowed to boot.
IT consolidation, space savings, and improved Total Cost of Ownership (TCO)	• Single converged branch platform integrates routing, switching, virtual server, storage, security, unified communications, WAN optimization, and performance management tools.
Business continuity and increased resiliency	• ISR 4400 Series models (4461, 4451, and 4431 ISRs) support dual integrated power supplies for backup. The entire ISR 4000 Family supports optional power supply capable of delivering additional PoE power to endpoints. • Modular network interfaces with diverse connection options for load-balancing and network resiliency. • Modular interfaces with online removal and insertion (OIR) for module upgrades without network disruption. • Cisco Unified Survivable Remote Site Telephony (SRST), which serves as a resiliency complement to Cisco Hosted Collaboration Solution (HCS), a Cisco cloud-based UC service. • Support for multiple, diverse access links: T1/E1, T3/E3, Serial, xDSL, Gigabit and Ten-Gigabit Ethernet.
Lower telephony costs with VoIP and rich media experiences	• High-performance analog/digital gateway, allowing VoIP over less expensive Session Initiation Protocol (SIP) trunks. • Integrated IP PBX (Cisco Unified Communications Express) and Session Border Controller (Cisco Unified Border Element, or CUBE).
Easier manageability and support	• Single, universal software image for all features and performance-on-demand licensing flexibility. • No additional services and support needed for compute and storage. • Supported by Cisco and third-party management tools, with programmability and automation.

Platform Architecture

Table 2 lists the primary hardware architectural features and benefits of the Cisco 4000 Family. The routers run modular Cisco IOS XE Software, widely deployed in the world's most demanding networks. The software's comprehensive portfolio of services spans multiple technology areas, including security, WAN optimization, app and network Quality of Service (QoS), and embedded management.

Table 2. Architectural Highlights

Architectural Features	Benefits/Description
Multicore processors	• High-performance multicore processors support high-speed WAN connections. The data plane uses an emulated Flow Processor (FP) that delivers Application-Specific Integrated Circuit (ASIC)-like performance that does not degrade as services are added.
Embedded IP Security (IPsec) VPN hardware acceleration	• Increases scalability. When combined with an optional Cisco IOS XE Software Security license, enables WAN link security and VPN services.

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Architectural Features	Benefits/Description
Integrated Gigabit Ethernet ports	• The Cisco 4000 Family provides up to four built-in 10/100/1000 Ethernet ports for WAN or LAN. • Based on the platform, some of the 10/100/1000 Ethernet ports can support Small Form-Factor Pluggable (SFP)-based connectivity in addition to RJ-45 connections, enabling fiber or copper connectivity. • Optionally, depending on the platform, up to 30W PoE+ can be enabled on two of the built-in front panel Gigabit Ethernet interfaces to provide power to external devices such as fourth-generation (4G) LTE routers. • An additional dedicated Gigabit Ethernet port is provided for device management[1].
USB-based console access	• A mini type-B USB console port[1] supports management connectivity when traditional serial ports are not available. • Traditional console and auxiliary ports are also available[2].
Optional integrated power supply for distribution of PoE	• An optional upgrade to the internal power supply provides inline power (802.3af-compliant PoE or 802.3at-compliant PoE+) to optional integrated switch modules. • Redundant PoE conversion modules provide an additional layer of fault tolerance.
Optional integrated Redundant Power Supply (RPS)	• For the ISR 4400 Series, power redundancy is available by installing an optional integrated RPS for decreasing network downtime and protecting the network from power failures. • Optional PoE boost mode increases total PoE capacity to up to 1000W.
Cisco Enhanced Services Module (SM-X)	• Each service-module slot offers high data-throughput capability of up to 10 Gbps toward the system and up to 1 Gbps to other module slots. • Support for both single- and double-wide service modules provides flexibility in deployment options. • An SM-X slot can be converted into a Network Interface Module (NIM) slot using an optional carrier card. • Service modules support Online Insertion and Removal (OIR), avoiding network disruption when installing new or replacement modules[1].
Cisco Network Interface Modules (NIMs)[3]	• Up to three integrated NIM slots on the Cisco 4000 Family allow for flexible configurations. • Each NIM slot offers options of up to two 2Gbps connections. One towards the route processor and one for direct module to module communication. The ISR 4221 has only one 1Gbps connection to the Route Processor • NIMs support OIR. • Special NIMs add support Solid-State Drives (SSDs) and Hard Disk Drives (HDDs)[1].
Cisco Integrated Services Card (ISC) slot on motherboard	• Integrated Services Card natively supports the new Cisco High-Density Packet Voice Digital Signal Processor Modules (PVDM4s), providing greater-density rich-media voice. • Each Integrated Services Card slot connects to the system architecture through an up-to 2-Gbps link. • Future modules can be hosted on the Integrated Services Card slot, improving system functions.
Flash memory support	• A single flash memory slot is available to support high-speed storage densities, upgradable to up to 32 GB. The ISR4221 ships with a fixed 8GB Flash • Two USB type A 2.0 ports provide capabilities for convenient storage[1].

[1] Not supported on ISR4221

[2] ISR4221 supports shared Console & Auxiliary ports

[3] Unified Communications (UC) and UC based NIM's are not supported

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Architectural Features	Benefits/Description
DRAM	• For the ISR 4400 Series, the default control-plane memory is 4 GB, upgradable to 16 GB to provide additional scalability for control-plane features. The default data-plane memory is 2 GB. • For the ISR 4300 Series, the default memory is 4 GB, upgradable to 16 GB (only 8GB for 4321) to provide additional scalability. • The ISR 4200 Series comes with 4GB Fixed DRAM

Managing your Cisco ISR 4000 Family ISRs

The Cisco network management applications listed at the top of Table 3 are standalone products that can be purchased or downloaded to manage your Cisco network devices. The applications are built specifically for the different operational phases; select those that best fit your needs. Those management capabilities listed under the "Cisco IOS Software XE Embedded Management" heading are directly integrated into the routers' software operating system.

Table 3. Cisco DNA Center

Operational Phase	Application	Description
Device staging and configuration	WebUI	• A GUI-based device-management tool for Cisco IOS and Cisco IOS XE Software-based access routers. This tool simplifies routing, firewall, VPN, unified communications, and WAN and LAN configuration through easy-to-use wizards.
Network-wide deployment, configuration, monitoring, and troubleshooting	Cisco Prime™ Infrastructure	• Offers comprehensive lifecycle management of wired and wireless access, campus, and branch-office networks, rich visibility into end-user connectivity, and application performance assurance. • Provides wired lifecycle functions such as inventory, configuration, and image management; automated deployment; compliance reporting; integrated best practices; and reporting.
Staging, deployment, and changes to configuration and image files	Cisco Configuration Engine	• A secure network management product that provides zero-touch image and configuration distribution through centralized, template-based management.
Context-aware security configuration and monitoring	Cisco Prime Security Manager	• Management tool for configuring and managing context-aware security. The application supports both single- and multi-device manager form factors. • Provides the ability to write and enforce the granular context-aware security policies.
Cisco Wide Area Application Service (WAAS) management	Cisco WAAS Central Manager	• The management tool for the WAAS[4] (WAN optimization and application acceleration) integrated service. It provides a centralized mechanism for configuring WAAS features, reporting, and monitoring.

Cisco IOS XE Software Embedded Management Capabilities	
Feature	**Description**
Cisco IOS Embedded Event Manager (EEM)	• A distributed and customized approach to event detection and recovery. • Offers the ability to monitor events and take informational, corrective, or any desired EEM action when the monitored events occur or when a threshold is reached.
Cisco IOS XE IP Service-Level Agreements (IP SLAs)	• Helps assure the performance of new business-critical IP applications as well as IP services that use data and voice in an IP network.
SNMP, Remote Monitoring (RMON), syslog, NetFlow, IP Flow Information Export (IPFix)	• Network monitoring and accounting tools.

[4] It is suggested to use AppNav with an External WAAS device for the ISR4221

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Product Specifications

Table 4 lists the general product specifications for the Cisco 4000 Family routers.

Table 4. Specifications of Cisco 4000 Family Integrated Services Routers

Technical Specifications	Cisco 4461	Cisco 4451	Cisco 4431	Cisco 4351	Cisco 4331	Cisco 4321	Cisco 4221
Aggregate Throughput (Default)	1.5Gbps	1 Gbps	500 Mbps	200 Mbps	100 Mbps	50 Mbps	35Mbps
Aggregate Throughput (Performance License)	3Gbps	2 Gbps	1 Gbps	400 Mbps	300 Mbps	100 Mbps	75 Mbps
Aggregate CEF Only[5] Throughput (Boost License)	Over 7Gbps	Over 4Gbps	Over 4Gbps	Over 2Gbps	Over 2Gbps	1.5Gbps	1.2Gbps
Total onboard WAN or LAN 10/100/1000 ports	4	4	4	3	3	2	2
Total onboard WAN or LAN 10Gbps ports	2	-	-	-	-	-	-
RJ-45-based ports	4	4	4	3	2	2	2
SFP-based ports	4	4	4	3	2	1	1

[5] Using onboard Gigabit Ethernet Interfaces

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Technical Specifications	Cisco 4461	Cisco 4451	Cisco 4431	Cisco 4351	Cisco 4331	Cisco 4321	Cisco 4221
Enhanced service-module slots	3	2	0	2	1	0	0
Doublewide service-module slots	2	1 (assumes no singlewide SM-X modules installed)	0	1 (assumes no singlewide SM-X modules installed)	0	0	0
NIM slots	3	3	3	3	2	2	2
OIR (all I/O modules)	Yes	Yes	Yes	Yes	Yes	Yes	No
Onboard ISC slot	1	1	1	1	1	1	No
Default memory double-data-rate 3 (DDR3) error-correction-code (ECC) DRAM (Combined control/services/data planes)	NA	NA	NA	4 GB	4 GB	4 GB	4GB
Maximum memory DDR3 ECC DRAM (Combined control/services/data planes)	NA	NA	NA	16 GB	16 GB	8 GB	4GB
Default memory DDR3 ECC DRAM (data plane)	4 GB	2 GB	2 GB	NA	NA	NA	NA
Maximum memory DDR3 ECC DRAM (data plane)	4 GB	2 GB	2 GB	NA	NA	NA	NA
Default memory DDR3 ECC DRAM (control/services plane)	8 GB	4 GB	4 GB	NA	NA	NA	NA

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Technical Specifications	Cisco 4461	Cisco 4451	Cisco 4431	Cisco 4351	Cisco 4331	Cisco 4321	Cisco 4221
Maximum memory DDR3 ECC DRAM (control/services plane)	32 GB	16 GB	16 GB	NA	NA	NA	NA
Default flash memory	8 GB	8 GB	8 GB	4 GB	4 GB	4 GB	8GB
Maximum flash memory	32 GB	32 GB	32 GB	16 GB	16 GB	8 GB	8GB
External USB 2.0 slots (type A)	2	2	2	2	1	1	1
USB console port -type B mini (up to 115.2 kbps)	1	1	1	1	1	1	0
Serial console port - RJ45 (up to 115.2 kbps)	1	1	1	1	1	1	1 (combo CON/AUX port)
Serial auxiliary port - RJ45 (up to 115.2 kbps)	1	1	1	1	1	1	1 (combo CON/AUX port)
Power-supply options	Internal: AC, DC and PoE	Internal: AC, DC and PoE	Internal: AC, DC, and PoE	Internal: AC, DC and PoE	Internal: AC,DC and PoE	External: AC and PoE	External AC only
Redundant power supply	Internal: AC, DC and PoE	Internal: AC, DC and PoE	Internal: AC, DC, and PoE	N/A	N/A	N/A	NA
Power Specifications							
AC input voltage	100 to 240 VAC autoranging	100 to 240 VAC autoranging	100 to 240 VAC autoranging	100 to 240 VAC autoranging	100 to 240 VAC autoranging	100 to 240 VAC autoranging	100 to 240 VAC autoranging
DC Input Voltage Input Voltage Input Current	48 – 60V 12A Max	48 – 60V 12A Max	48 – 60V 12A Max	NA NA	24 – 60V 14 - 5A	NA NA	NA NA
AC input frequency	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
AC input current range, AC power supply (maximum)	7.1 to 3.0A	7.1 to 3.0A	3 to 1.3A	7.1 to 3.0A	3 to 1.3A	1.5 to 0.6A	1.5 to 0.6A
AC input surge current	60 A peak and less than 5 Arms per half cycle	<50 A	60 A peak and less than 5 Arms per half cycle	60 A peak and less than 12 Arms per half cycle	60 A peak and less than 5 Arms per half cycle	90 A peak and less than 3 Arms per half cycle	90 A peak and less than 3 Arms per half cycle
Typical power (no		158	65	48	42	36	24

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Technical Specifications	Cisco 4461	Cisco 4451	Cisco 4431	Cisco 4351	Cisco 4331	Cisco 4321	Cisco 4221
modules) (watts)							
Maximum power with AC power supply (watts)	1000W (no PoE)	450 (no PoE)	250 (no PoE)	430	250	125	90
Maximum power with DC power supply (watts)	437 (no PoE)	437 (no PoE)	437 (no PoE)	437 (no PoE)	250 (no PoE)		
Maximum power with PoE power supply (platform only) (watts)	1000 with PoE redundant 1450 with PoE boost no redundancy	1000 with PoE redundant 1450 with PoE boost no redundancy	500 with PoE redundant 1000 with PoE boost no redundancy	990	530	260	NA (No PoE Support)
Maximum endpoint PoE power available from PoE power supply (watts)	500 W with optional redundancy	500 W with optional redundancy	250 W with optional redundancy	500	250	120	NA (No PoE Support)
Maximum endpoint PoE power capacity with PoE boost (watts)	950 W no redundancy	950 W no redundancy	500 W no redundancy	N/A	N/A	N/A	NA (No PoE Support)
Sizes and Weights							
Dimensions (H x W x D)	3.5 x 17.25 x 18.5 in 88.9 x 438.15 x 469.9 mm)	3.5 x 17.25 x 18.5 in (88.9 x 438.15 x 469.9 mm)	1.73 x 17.25 x 19.97 in (43.9 x 438.15 x 507.2 mm)	3.5 x 17.25 x 18.5 in (88.9 x 438.15 x 469.9 mm)	1.75 x 17.25 x 17.25 in (44.45 x 438.15 x 438.15 mm)	1.75 x 14.55 x 11.60 in (44.55 x 369.57 x 294.64 mm)	1.72 x 12.7 x 10" (43.7 x 322.6 x 254 mm)

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Technical Specifications	Cisco 4461	Cisco 4451	Cisco 4431	Cisco 4351	Cisco 4331	Cisco 4321	Cisco 4221
External Power Supply Dimensions (H x W x D)	N/A	N/A	N/A	N/A	N/A	2.95 x 1.18 x 6.10 in (75 x 30 x 155 mm)	37 x 73 x 152 mm (Phihong mfg PN: AA90U-120A-R) 36.5 x 67 x 155 mm (Delta mfg PN: ADP90GRBA)
Shipping Box Dimensions (H x W x D)	9.75 x 22.25 x 26 in (24.76 x 56.51 x 66.04 mm)	9.75 x 22.25 x 26 in (24.76 x 56.51 x 66.04 mm)	7.88 x 22.25 x 28.75 in (200.2 x 565.1 x 730.25 mm)	9.75 x 22.25 x 26 in (24.76 x 56.51 x 66.04 mm)	7.125 x 22.75 x 22.5 in (180.98 x 577.85 x 571.5 mm)	7.0 x 21.5 x 16.125 in (177.8 x 546.1 x 409.6 mm)	4.13 x 18.25 x 12.94" (104.9 x 463.6 x 328.7 mm)
Rack height	3 Rack Units (3RU)	2 Rack Units (2RU)	1 Rack Units (1RU)	2 Rack Units (2RU)	1 Rack Unit (1RU)	1 Rack Unit (1RU)	1 Rack Unit (1RU)
Rack-mount 19in. (48.3 cm) EIA	Included	Included	Included	Included	Included	Included	Optional
Rack-mount 23in. (58.4 cm) EIA	Optional	Optional	Optional	Optional	Optional	N/A	NA
Wall-mount	No	No	Yes	No	Yes	Mounting holes under chassis	Yes
Weight with 1, 450-WAC power supply (no modules)		28.8 lb (13.1 kg)	N/A	28.8 lb (13.1 kg)	N/A	N/A	NA
Weight with 1 1,000-WAC power supply+ 1 PoE power module (no other modules)		30.6 lb (13.9 kg)	N/A	29.0 lb (13.2 kg)	N/A	N/A	NA
Weight with AC PS (no modules)		N/A	18.5 lb (8.4 kg)	N/A	13.5 lb (6.2 kg)	7.7 lb (3.5 kg) + 1.2 lb (0.66 kg) external PS	7.1 lb (3.22kg)
Weight with DC PS (no modules)		28.8lb (13.1kg)	28.8lb (13.1kg)	28.8lb (13.1kg)	13.5 lb (6.2 kg)		
Weight with AC PS with POE (no modules)		N/A	18.6 lb (8.4 kg)	N/A	14.1 lb (6.4 kg)	N/A	NA
Typical weight (fully loaded with modules)		42.7 lb (19.4 kg)	22.4 lb (10.2 kg)	37.7 lb (17.1 kg)	16.1 lb (7.3 kg)	9.14 lb (4.2 kg) + 1.2 lb (0.66 kg) external PS	8.11 lb (3.68kg)
Packaging		6.4 lb (2.9 kg)	5.9 lb (2.7 kg)	6.4 lb (2.9 kg)	4.6 lb (2.1 kg)	2.2 lb (1 kg)	1.28 lb (0.58kg)

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Technical Specifications	Cisco 4461	Cisco 4451	Cisco 4431	Cisco 4351	Cisco 4331	Cisco 4321	Cisco 4221
Weight							
Airflow	I/O side to bezel side	I/O side to bezel side	I/O side to bezel side	I/O side to bezel side	I/O side to bezel side	Right I/O side to Left I/O side	I/O side to bezel side
MTBF (Hours)	480770	480770	512970	566310	587250	593270	593270
Environmental Specifications							
Operating Conditions							
Temperature	32 to 104°F (0 to 40°C)	32 to 104°F (0 to 40°C)	32 to 104°F (0 to 40°C)	32 to 104°F (0 to 40°C)	32 to 104°F (0 to 40°C)	32 to 104°F (0 to 40°C)	32 to 104°F (0 to 40°C)
Altitude (China)	0 – 6,560 ft. (0 – 2,000 m)	0 – 6,560 ft. (0 – 2,000 m)	0 – 6,560 ft. (0 – 2,000 m)	0 – 6,560 ft. (0 – 2,000 m)	0 – 6,560 ft. (0 – 2,000 m)	0 – 6,560 ft. (0 – 2,000 m)	0 – 6,560 ft. (0 – 2,000 m)
Altitude (Rest of the world)	0 – 10,000 ft. (0 – 3,050 m)	0 – 10,000 ft. (0 – 3,050 m)	0 – 10,000 ft. (0 – 3,050 m)	0 – 10,000 ft. (0 – 3,050 m)	0 – 10,000 ft. (0 – 3,050 m)	0 – 10,000 ft. (0 – 3,050 m)	0 – 10,000 ft. (0 – 3,050 m)
Short Term Temperature upto 6560ft per NEBS GR-63-CORE	NA	NA	NA	NA	32° to 131° (0° to 55° C) (for ISR4331-DC version)	NA	NA
Relative humidity	5% to 85%	5% to 85%	5% to 85%	5% to 85%	5% to 85%	5% to 85%	5% to 85%
Short-term humidity	5% to 90%, not to exceed 0.024 kg water/kg of dry air	5% to 90%, not to exceed 0.024 kg water/kg of dry air	5% to 90%, not to exceed 0.024 kg water/kg of dry air	5% to 90%, not to exceed 0.024 kg water/kg of dry air	5% to 90%, not to exceed 0.024 kg water/kg of dry air	5% to 90%, not to exceed 0.024 kg water/kg of dry air	5% to 90%, not to exceed 0.024 kg water/kg of dry air
Acoustics: Sound pressure (Typical/ maximum)	50.6/73.1 dBA	50.6/73.1 dBA	54.3/79.1 dBA	50.6/73.1 dBA	52.8/74.8 dBA	24.2/51.9 dBA	28.5/53 dBA

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Technical Specifications	Cisco 4461	Cisco 4451	Cisco 4431	Cisco 4351	Cisco 4331	Cisco 4321	Cisco 4221
Acoustics: Sound power (Typical/ maximum)	58.2/78.8 dBA	58.2/78.8 dBA	57.2/80.8 dBA	58.2/78.8 dBA	61.2/81.6 dBA	31.9/59.9 dBA	41 / 68 dBA
Nonoperating Conditions							
Temperature	-40 to 158°F (-40 to 70°C)	-40 to 158°F (-40 to 70°C)	-40 to 158°F (-40 to 70°C)	-40 to 158°F (-40 to 70°C)	-40 to 158°F (-40 to 70°C)	-40 to 158°F (-40 to 70°C)	-40 to 158°F (-40 to 70°C)
Relative humidity	5% to 95%	5% to 95%	5% to 95%	5% to 95%	5% to 95%	5% to 95%	5% to 95%
Altitude	15,584 ft (4750m)	15,584 ft (4750m)	15,584 ft (4750m)	15,584 ft (4750m)	15,584 ft (4750m)	15,584 ft (4750m)	15,584 ft (4750m)
Regulatory and Compliance							
Safety	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1	UL 60950-1 CAN/CSA C22.2 No. 60950-1 EN 60950-1 AS/NZS 60950-1 IEC 60950-1
EMC	47 CFR, Part 15 ICES-003 Class A EN55032 Class A CISPR32 Class A AS/NZS CISPR 32 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 KN22, KN24	47 CFR, Part 15 ICES-003 Class A EN55032 Class A CISPR32 Class A AS/NZS CISPR 32 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 KN22, KN24	47 CFR, Part 15 ICES-003 Class A EN55032 Class A CISPR32 Class A AS/NZS CISPR 32 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 KN22, KN24	47 CFR, Part 15 ICES-003 Class A EN55032 Class A CISPR32 Class A AS/NZS CISPR 32 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 KN22, KN24	47 CFR, Part 15 ICES-003 Class A EN55032 Class A CISPR32 Class A AS/NZS CISPR 32 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 KN22, KN24 EN 50121-1 EN61000-6-4 EN 50121-4	ICES-003 Class A EN55032 Class A CISPR32 Class A AS/NZS CISPR 32 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 KN22, KN24	ICES-003 Class A EN55032 Class A CISPR32 Class A AS/NZS CISPR 32 Class A VCCI V-3 CNS 13438 EN 300-386 EN 61000 (Immunity) EN 55024, CISPR 24 KN22, KN24
Telecom	T1 IC CS-03:2004	T1 IC CS-03:2004 TIA-968-	TIA-968-B CS-03 ANSI T1.101	TIA-968-B CS-03 ANSI T1.101	TIA-968-B CS-03 ANSI T1.101	TIA-968-B CS-03 ANSI T1.101	TIA-968-B CS-03 ANSI T1.101

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Technical Specifications	Cisco 4461	Cisco 4451	Cisco 4431	Cisco 4351	Cisco 4331	Cisco 4321	Cisco 4221
	TIA-968-B:2009 HKTA 2028:2010 HKTA 2017:2010 HKTA 2015: 2006 G.703:2001 ID0002:2007 IS6100:2004 DSPR Gray Book:2000 DSPR Technical Condition: 2004 E1 AS/ACIF S016: 2001 AS/ACIF S038: 2001 G.703:2001 TBR 4:1995 TBR 12:1993 TBR 13:1996 RRA 2009-38 (RRL 2005-96) IDA TS DLCN:2011 IDA TS ISDN PRA:2005 IS6100: 2004 PTC 220:2008 Ethernet IEEE 802.3 ANSA X3.263	B:2009 HKTA 2028:2010 HKTA 2017:2010 HKTA 2015: 2006 G.703:2001 ID0002:2007 IS6100:2004 DSPR Gray Book:2000 DSPR Technical Condition: 2004 E1 AS/ACIF S016: 2001 AS/ACIF S038: 2001 G.703:2001 TBR 4:1995 TBR 12:1993 TBR 13:1996 RRA 2009-38 (RRL 2005-96) IDA TS DLCN:2011 IDA TS ISDN PRA:2005 IS6100: 2004 PTC 220:2008 Ethernet IEEE 802.3 ANSA X3.263	ITU-T G.823, G.824 IEEE 802.3 RTTE Directive Homologation requirements vary by country and interface type. For specific country information, refer to the online approvals data base at: https://www.ciscofax.com/.	ITU-T G.823, G.824 IEEE 802.3 RTTE Directive Homologation requirements vary by country and interface type. For specific country information, refer to the online approvals data base at: https://www.ciscofax.com/.	ITU-T G.823, G.824 IEEE 802.3 RTTE Directive Homologation requirements vary by country and interface type. For specific country information, refer to the online approvals data base at: https://www.ciscofax.com/.	ITU-T G.823, G.824 IEEE 802.3 RTTE Directive Homologation requirements vary by country and interface type. For specific country information, refer to the online approvals data base at: https://www.ciscofax.com/.	ITU-T G.823, G.824 IEEE 802.3 RTTE Directive Homologation requirements vary by country and interface type. For specific country information, refer to the online approvals data base at: https://www.ciscofax.com/.
Cisco IOS XE Software							
Protocols	IPv4, IPv6, static routes, Routing Information Protocol Versions 1 and 2 (RIP and RIPv2), Open Shortest Path First (OSPF), Enhanced IGRP (EIGRP), Border Gateway Protocol (BGP), BGP Router Reflector, Intermediate System-to-Intermediate System (IS-IS), Multicast Internet Group Management Protocol Version 3 (IGMPv3), Protocol Independent						

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Technical Specifications	Cisco 4461	Cisco 4451	Cisco 4431	Cisco 4351	Cisco 4331	Cisco 4321	Cisco 4221
	Multicast sparse mode (PIM SM), PIM Source Specific Multicast (SSM), RSVP, CDP, ERSPAN, IPSLA, Call Home, EEM, IKE, ACL, EVC, DHCP, FR, DNS, LISP, OTV[6], HSRP, RADIUS, AAA, AVC, Distance Vector Multicast Routing Protocol (DVMRP), IPv4-to-IPv6 Multicast, MPLS, Layer 2 and Layer 3 VPN, IP sec, Layer 2 Tunneling Protocol Version 3 (L2TPv3), Bidirectional Forwarding Detection (BFD), IEEE802.1ag, and IEEE802.3ah						
Encapsulations	Generic routing encapsulation (GRE), Ethernet, 802.1q VLAN, Point-to-Point Protocol (PPP), Multilink Point-to-Point Protocol (MLPPP), Frame Relay, Multilink Frame Relay (MLFR) (FR.15 and FR.16), High-Level Data Link Control (HDLC), Serial (RS-232, RS-449, X.21, V.35, and EIA-530), and PPP over Ethernet (PPPoE)						
Traffic management	QoS, Class-Based Weighted Fair Queuing (CBWFQ), Weighted Random Early Detection (WRED), Hierarchical QoS, Policy-Based Routing (PBR), Performance Routing, and NBAR.						
Cryptographic Algorithms	Encryption: DES, 3DES, AES-128 or AES-256 (in CBC and GCM modes); Authentication: RSA (748/1024/2048 bit), ECDSA (256/384 bit); Integrity: MD5, SHA, SHA-256, SHA-384, SHA-512						

Services plane: Enabling the Branch-in-a-Box

All Cisco ISR 4000 routers contain processing cores built-in as standard to allow full-featured services to run on-board. This includes the full-featured Cisco WAAS engine that provides application acceleration and highly responsive virtual desktop experience. The technology is known as Cisco Service Containers and it uses a standard hypervisor to allow x64 based applications to run.

The 4000 series routers can be fitted with Solid State Drives (SSD) and server cards for local storage and computing capability. The Cisco UCS-E server cards are available with 8-core Intel Xeon processors with up to 48GB of high speed DDR3 memory and three drives built in offering RAID 0, 1 and 5. This immense amount of compute power can eliminate the need for any dedicated servers at branch sites. UCS-E cards can be configured and managed using VMware vCenter and pooled with Data Center compute resources.

[6] Supported only on the 4451 for Bandwidths <100Mbps

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Software Subscription through Cisco DNA Licensing

The ISR4000 series supports software based subscription using Cisco DNA based licensing. Three Cisco DNA based software subscription licenses are available for the WAN portfolio: Cisco DNA Essentials, Cisco DNA Advantage and Cisco ONE Advantage allowing customers to have a single unified solution that spans across the ISR4000 series routers and its ASR1000 and ISR1000 counterparts

The license tiers are structured to support the growth in business needs enabling the customer to move from basic functionality using the Cisco DNA Essentials to full-functionality with the Cisco DNA Advantage and expanding that to include WAN Optimization and Analytics on the Cisco ONE Advantage. This provides complete flexibility to move the same license across end-points based on growing network and security requirements, growth in bandwidth based on user and application growth at the sites as also the ability to change the management of the platform from on-prem to cloud or vice-versa.

Cisco DNA Licenses are supported for all ISR4000 platforms using the Cisco DNA Center, the controller and analytics platform at the heart of Cisco's intent-based network. For more information on the Cisco DNA Center and supported platforms, please refer to https://www.cisco.com/c/en/us/products/cloud-systems-management/dna-center/index.html

Enterprise NFV on ISR4000

Built to reduce costs without compromising vital network services, the UCS E-Series router-integrated branch blade servers provide support for a Virtualization-ready and Application-centric platform that can be seamlessly integrated on the ISR4000 platform. Customers can now install virtualized applications on the ISR4000 routers through the Cisco® Enterprise NFV Infrastructure Software (NFVIS) – a virtualization infrastructure that integrates full VM lifecycle management, monitoring, device programmability, and service chaining in a single, installable package. For more information on Enterprise NFV and NFVIS, please refer to the link at https://www.cisco.com/c/en/us/solutions/enterprise-networks/enterprise-network-functions-virtualization-nfv/index.html#~stickynav=2

Support for DC Power

ISR4000 platforms support both DC and AC Power Supplies as options. Specifically, the ISR 4331 has two separate product SKU's – the ISR4331/K9 and the ISR4331-DC/K9 which support AC and DC Power respectively, The ISR4400 can independently support an AC or a DC Power supply on the same chassis. While the 4300 supports between 24V and 60Vdc, the 4400 supports between 48V and 60Vdc. The 4331 provides for upto 250W of power rating while the 4400 provides upto 437W. It is important to note that when DC Power supplies are installed on the router, PoE based modules may not be used.

More details about the DC Power supplies and its capabilities can be found at the below url https://www.cisco.com/c/en/us/td/docs/routers/access/4400/hardware/installation/guide4400-4300/C4400_isr/FRUs_Modules.html#49534

Product Performance and Scalability

The Cisco 4000 Family is built on a multicore CPU architecture. It runs modular Cisco IOS XE Software, which allows the platform to use to full advantage a distributed multicore architecture. The architecture of the Cisco 4000 separates control- and data-plane operations and integrates an industry-first services plane. This design delivers full-featured integrated services up to Layer 7 at high performance with the ability to deliver application-aware network services while maintaining a stable platform and a high level of performance during periods of heavy network traffic.

The ISR 4000 consists of 3 series of Routers – the ISR 4400 series, the 4300 series and ISR 4200 series whose performance levels maybe represented by the chart below

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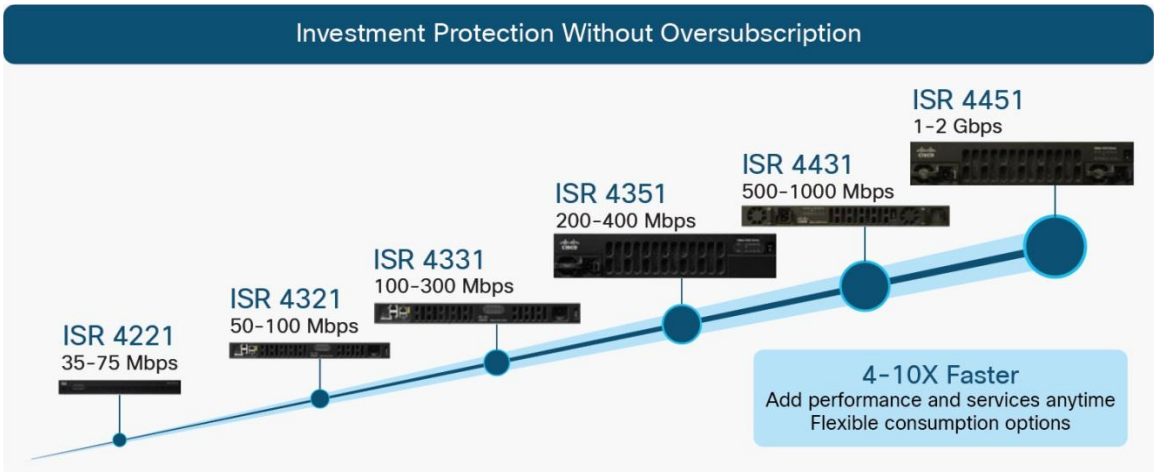

Common for the new 4000 Family is that all platforms come with fixed maximum performance levels. One fixed base performance level is delivered as factory default with an optional performance-on-demand license to increase the base forwarding throughput. This scenario enables deployment in high-speed WAN environments through performance-on-demand licensing to double or, for one of the platforms, triple the router capacity without any hardware upgrades.

All 4000 platforms have their fixed performance levels set well within actual capacity, with the result that performance does not necessarily degrade when a service is added to the configuration. This setup provides a deterministic performance, eliminating a network administrator's guesswork when planning for new services.

For a more detailed document on ISR 4000 Series Performance and Platform Scalability, please refer to the Performance Whitepaper at https://www.cisco.com/c/en/us/products/collateral/routers/4000-series-integrated-services-routers-isr/white-paper-c11-734550.html

ISR 4000 Boost License

In addition to the Performance License, customers may now order a Booster (or Boost) License that allows the router to perform between five or more times than that of the throughput with Performance License. In contrast to the deterministic performance described above, in the Booster mode, the router does not provide the deterministic level of performance as provided when operating with the default license or with the Performance license.

The Boost License provides a license tier above the Performance License allowing customers to completely remove the ISR4000's performance limiters. This will make the ISR 4000 platforms perform at entirely new performance levels, allowing for 4+ Gbps of IP Routing (CEF) performance on the 4400 series ISRs. For deployments using encryption, IPSec throughput with AES 256 increases to 250Mbps on the lowest platform up to 10Gbps on the ISR4461.

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ISR 4000 Interfaces and Modules Support

The Cisco 4000 Series Integrated Services Routers (ISRs) are modular routers with LAN and WAN connectivity. The routers provide for Network Interface Module (NIM) slots and Enhanced service module (SM-X) slots offering a rich set of Modules, such as LAN, WAN and Wireless Interfaces plus a range of Compute engines for embedded services

For the complete list of supported modules on the ISR4000 Series refer to the Interfaces and Modules sheet at https://www.cisco.com/c/en/us/products/routers/4000-series-integrated-services-routers-isr/relevant-interfaces-and-modules.html.

Software defined WAN with the ISR4000 Series

The ISR 4000 series is optimized for the Software Defined WAN (SD-WAN). For enterprises this means that business critical applications run faster, with more reliability and reduced Operational Expenditure (OpEx). The SDWAN achieves this by making all branches and Data Centers have the ability to monitor, control, move and report on streams of application data such as specific web (HTTP) traffic for example. The ISR 4000 series has deep packet inspection capability and can accurately identify and control thousands of different applications including custom in-house enterprise applications.

The entire SD-WAN implementation on the ISR4000 is maybe implemented by managing the end device either from the Cloud or On-Premise through ascending levels of throughput based licenses. All licenses that support SD-WAN, whether On-Premise or on Cloud are all enabled using Subscription Licenses. These subscription licenses enable all customers to seamlessly transition between On-Premise and Cloud management as needed. The license tiers are structured to support the growth in business needs through simple subscriptions that help simplify the journey to intent-based networking for the WAN.

The SDWAN subscriptions are aligned across three subscription licenses of **Cisco DNA Essentials**, **DNA Advantage and Cisco DNA Premier,** each expanding functionally**.** The **Cisco DNA Essentials** covers all types of connectivity & router life cycle management, support for Network & application visibility coupled with basic premise and transport security. The **Cisco DNA Advantage** provides for Advanced WAN topologies, Application aware policies supported by enhanced network security. The **Cisco DNA Premier** provides for Cloud connectivity with unlimited segmentation, Advanced Application optimization & Network Analytics, secured by advanced threat protection

For more information on Cisco SDWAN please refer to https://www.cisco.com/c/en/us/products/software/one-wan-subscription/index.html

The benefits are immense;

1. Business-critical applications no longer have to contend each other or with traffic that should be served on best effort basis.
2. The Enterprise network becomes more reliable because multiple paths can be used.
3. Costs are greatly reduced because dual MPLS links can be replaced with a mix of MPLS and Internet.
4. The time to bring up new remote sites is dramatically reduced because the SD-WAN supports rapidly deployed DSL and 3G/4G LTE connections as easily as MPLS.
5. Security is assured across these connections using a zero-touch secure VPN technology used by governments and finance organizations worldwide.

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From a platform perspective, the ISR 4000 series has

1. Separated control and data planes for Denial of Service (DoS) attack prevention and Intrusion Prevention System (IPS) and firewall capability built-in.
2. SaaS applications can have content locally cached. The caching is automatic and peers directly with Akamai technology to obtain intelligence.
3. Application performance speed is greatly increased using in-built application acceleration technology that can locally cache at a byte-level.

Cisco Security Solutions for the ISR4000 Series

Cisco WAN MACsec,

Cisco routers support a wide-range of ever enhancing security features on the ISR4000 routers. Cisco WAN MACsec is supported on the ISR4000 series routers using the NIM-2GE-CU-SFP module. WAN MACsec provides a line-rate network encryption solution over Layer 2 Ethernet transport services and can be leveraged outside campus networks, whether it be over Metro Ethernet transport or Data Center Interconnect (DCI) links. MACsec also secures WAN connections that are leveraging Ethernet as the link-layer media. For more information refer to the whitepaper at https://www.cisco.com/c/dam/en/us/td/docs/solutions/CVD/Aug2016/WP-WAN-MACsecDep-Aug2016.pdf

Cisco Encrypted Threat Analytics

The rapid rise in encrypted traffic is changing the threat landscape. As more businesses become digital, a significant number of services and applications are using encryption as the primary method of securing information. Encrypted Threat Analytics (ETA) is a functionality that allows customers to do cryptographic assessments and identify malware communications in encrypted traffic through passive monitoring. Using information about events that occur inside of a flow or intraflow telemetry to identify malware communication in encrypted traffic means Encrypted Traffic Analytics can maintain the integrity of the encrypted flow without the need for bulk decryption. For more information and platform support refer to https://www.cisco.com/c/dam/en/us/solutions/collateral/enterprise-networks/enterprise-network-security/nb-09-encrytd-traf-anlytcs-wp-cte-en.pdf

Cisco Snort IPS and Cisco Umbrella Branch

Cisco® Snort® IPS for Cisco 4000 Series Integrated Services Routers (ISRs) offers a lightweight threat defense solution that uses industry-recognized Snort open-source Intrusion Prevention System (IPS) technology. It is perfect for customers who are looking for a cost-effective solution that provides one box for both advanced routing capabilities and integrated threat defense security to help comply with regulatory requirements.

Cisco Umbrella Branch is a cloud-delivered security service for the Cisco Integrated Services Router (ISR). It provides the first layer of defense against threats at branch offices. And it offers the simplest, fastest way to protect every device on your branch network. You gain visibility and enforcement at the DNS layer, so you can block requests to malicious domains and IPs before a connection is ever made.

When enabling MACsec, you will need to procure the Security and HSEC licenses to stay within the limits of federal export control regulations. When customers wish to enable ETA, the Security (SEC) license needs to be enabled. Enabling Snort needs a Security (SEC) license and a signature subscription license. Enabling Cisco Umbrella Branch needs an Umbrella Branch license and a subscription license.

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Reducing Operational Costs using Cisco ISR

Support for Data Modelling

Enterprises and Service Providers (SP's) wish to drive down the operational cost (opex) of their networks and increase the agility and speed with which they deliver new services furthered by investments in Software Defined Networking (SDN) and Network Function Virtualization (NFV). Cisco routers provide support for Netconf and YANG data-modelling with increasing model coverage in successive releases

Software Maintenance Upgrades (SMU)

The ISR4000 routers now support Software Maintenance Upgrades (SMU)[7]. The Software Maintenance Upgrade (SMU) is a package that can be installed on a system to provide a patch fix or security resolution to a released image. An SMU package is provided on a per release and per component basis and is specific to the platform. An SMU is an independent and self-sufficient package and it does not have any prerequisites or dependencies. Please refer to https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/config-mgmt/configuration/xe-16-6/config-mgmt-xe-16-6-book/cm-smu.html for additional details

Network Plug and Play

Network Plug and Play helps automate the onboarding of new devices on your network by applying configuration settings without manual intervention. With the ease of a centrally managed controller, it reduces the time a new device takes to join your network and become functional. For more information on Plug and Play (PnP), please refer to https://www.cisco.com/c/en/us/td/docs/solutions/Enterprise/Plug-and-Play/release/notes/pnp-connect-release-notes.html

Cisco IOS Software Licensing and Packaging

Universal IOS XE and XE-SDWAN Image

A single Cisco IOS XE Universal image encompassing all functions is delivered with the platform. Advanced features can be enabled by simply activating a software license on the Universal image. Technology packages and feature licenses, enabled through right-to-use licenses, simplify software delivery and decrease the operational costs of deploying new features.

Beginning IOS version 16.9.1, SDWAN support is provided for IOS image on the ISR4000 series router. The SDWAN features are provisioned through a separate image, the XE-SDWAN image. While the Universal IOS-XE image provides for routing features, the XE-SDWAN image provides support for OnPrem or Cloud based Software Defined WAN solutions. Unified Communications for XE-SDWAN will be supported in upcoming releases

When ordering an ISR router, a customer may choose either of IOS-XE or XE-SDWAN image. With IOS-XE image, customers may opt for subscription based licensing or for perpetual licensing. With XE-SDWAN image, customers may order only subscription licensing. Refer to Cisco DNA Ordering Guide at https://www.cisco.com/c/dam/en/us/products/collateral/cloud-systems-management/dna-center/nb-09-dna-1-x-ordering-guide-cte-en-latest.pdf.

[7] Supported from IOS-XE16.6.1 for all ISR4000 and ASR1000 series routers

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Four major technology licenses are available on the Cisco 4000 Family and use the IOS-XE image; these licenses can be activated through the Cisco software activation process identified at https://www.cisco.com/go/sa. The following licenses are available:

- IP Base: This technology package is available as default.
- Application Experience (APPX): This license includes data and application performance features.
- Unified Communications (UC)[8]: This license includes voice features.
- Security (SEC) or Security with No Payload Encryption (SEC-NPE): This license includes features for securing network infrastructure.

The Cisco 4000 Series has a performance-on-demand license to increase the base forwarding throughput with no hardware changes. Also present is the High Security (HSEC) license, which removes the curtailment enforced by the U.S. government export restrictions on the encrypted tunnel count and encrypted throughput. The HSECK9 license is a separately required license for a feature to have full crypto functionality. Without the HSECK9 license, only 1000 secure tunnels and 250[9] Mbps of crypto bandwidth would be available.

For additional information and details about Cisco IOS Software licensing and packaging on the Cisco 4000 Family, please visit https://www.cisco.com/c/en/us/td/docs/routers/access/4400/software/configuration/guide/isr4400swcfg.pdf.

IOS-XE provides support for both perpetual and subscription licensing. Subscription Licensing with support for Cisco DNA Center is offered using the 3-Licenses of Cisco DNA Essentials, Cisco DNA Advantage and Cisco DNA Premier in-line with similar licenses that provide support on the XE-SDWAN side. Please refer to Cisco DNA Ordering Gide at: https://www.cisco.com/c/dam/en/us/products/collateral/cloud-systems-management/dna-center/nb-09-dna-1-x-ordering-guide-cte-en-latest.pdf.

Software Defined Networks maybe provisioned through three major licenses on the Cisco 4000 Family; these licenses can be activated through the Cisco software activation process identified at https://www.cisco.com/go/sa using the Cisco DNA Center or through the vManage management portal. The XE-SDWAN image provides for its own licensing schema through the Cisco DNA Licensing

The following licenses are available:

- **Cisco DNA Essentials** covers all types of connectivity & router life cycle management, support for Network & application visibility coupled with basic premise and transport security
- **Cisco DNA Advantage** provides for Advanced WAN topologies, Application aware policies supported by enhanced network security
- The **Cisco DNA Premier** provides for Cloud connectivity with unlimited segmentation, Advanced Application optimization & Network Analytics, secured by advanced threat protection

For more information please refer to https://www.cisco.com/c/dam/en/us/products/collateral/software/dna-software-routing-subscription.pdf

[8] Unified Communications is not supported by ISR4221

[9] The change to 250Mbps was achieved in the IOS-XE version 16.8.1 pursuant to revised Federal regulations

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Smart Software Licensing Support for IOS-XE

IOS-XE supports Smart Licensing beginning with image version 16.6.1 and Device Led Conversion with image version 16.9.1. Smart Software licensing is a simplified license management system that delivers visibility into customer license ownership and consumption. Licenses are managed through a central Cisco Smart License cloud portal (CSSM). The cloud portal maintains an account of what the customer has bought and what they are using, thus alerting the customer if they go out of compliance. Customers can determine what licenses they own and how they are being used. Customers benefit from being able to pool available licenses thus providing for a more straightforward license usage across like-platforms, thus decreasing operational costs.

While customers can purchase existing SKU's, they must mandatorily create a Smart Account when implementing Smart Licensing. One or more Virtual Accounts maybe created under the Smart Account to enable the organization to logically segregate the purchased licenses. Device Led Conversion (DLC) allows the customer to convert all existing PAK and RTU licenses on the router into a Smart License. For more information, refer to the link at https://www.cisco.com/c/en/us/products/software/smart-accounts/software-licensing.html.

Cisco ISR 4000 Bundles

Cisco ISR 4000 is available is several attractive bundles. The AX bundles integrate Cisco Wide Area Application Services (WAAS), Security (SEC), and Data (DATA) licenses into a single bundle that is simple to order, configure, and deploy. For customers who are also interested in voice along with all of these features, AXV presents an attractive option. See Table 6 for details.

Table 5. Cisco ISR 4000 Feature Bundles

Bundles	Features
Application Experience with Voice (AXV)	AX + Voice
Voice with Security (VSEC)	Voice + Security
Application Experience (AX)	IP Base + Security + advanced networking protocols: L2TPv3, BFD, MPLS, VRF, VXLAN[10] (Bandwidth <100Mbps) Application Experience: PfRv3, WAAS with AppNav, NBAR2, AVC, IP SLA Hybrid Cloud Connectivity: LISP, OTV (for Bandwidth <100Mbps), VPLS, EoMPLS Intelligent Web Caching: Akamai Connect
Voice (V)	IP Base + Unified Communications: CME, SRST, CUBE
Security (SEC)	IP Base + Advanced Security: Zone Based Firewall, IPSec VPN, EZVPN, DMVPN, FlexVPN

Note: ISR4221/K9 does not support UC (Voice), hence no V, VSEC, AXV bundles for ISR4221/K9

More information on ISR AX bundles is available at https://www.cisco.com/go/ax.

A pay-as-you-grow licensing model lets you increase the performance level for the platforms from the base level to a higher level. So you can purchase at an attractive entry-level price point and increase the performance level as your business demand grows. Table 7 describes the performance licenses.

[10] Supported only on the ISR4451

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Table 6. Cisco ISR 4000 Performance Licenses

Platform	Performance-on-Demand License	Features
ISR4461	FL-4460-PERF-K9	Increases the performance from base performance 1.5 Gbps to 3 Gbps
ISR4451	FL-44-PERF-K9	Increases the performance from base performance 1 Gbps to 2 Gbps
ISR4431	FL-44-PERF-K9	Increases the performance from base performance 500 Mbps to 1 Gbps
ISR4351	FL-4350-PERF-K9	Increases the performance from base performance 200 Mbps to 400 Mbps
ISR4331	FL-4330-PERF-K9	Increases the performance from base performance 100 Mbps to 300 Mbps
ISR4321	FL-4320-PERF-K9	Increases the performance from base performance 50 Mbps to 100 Mbps
ISR4221	FL-4220-PERF-K9	Increases the performance from base performance 35 Mbps to 75 Mbps

Table 7. Cisco ISR 4000 Booster (boost) Performance Licenses

Part number	Description
FL-4220-BOOST-K9 (=)	Booster Performance License for 4220 Series Router
FL-4320-BOOST-K9 (=)	Booster Performance License for 4320 Series Router
FL-4330-BOOST-K9 (=)	Booster Performance License for 4330 Series Router
FL-4350-BOOST-K9 (=)	Booster Performance License for 4350 Series Router
FL-4430-BOOST-K9 (=)	Booster Performance License for 4430 Series Router
FL-44-BOOST-K9 (=)	Booster Performance License for 4450 Series Router
FL-4460-BOOST-K9 (=)	Booster Performance License for 4460 Series Router

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Ordering Information

The Cisco ISR 4000 Family is orderable and shipping. To place an order, refer to Table 8 below and visit the Cisco Ordering Home Page.

Table 8. Cisco ISR 4000 Series Ordering Information

Product Name	Product Description
ISR4461/K9	Cisco ISR 4461 with 4 onboard GE, 3 NIM slots, 1 ISC slot, 3 SM slots, 8 GB Flash Memory default, 2 GB DRAM default (data plane), 4 GB DRAM default (control plane)
ISR4451-X/K9	ISR 4451 with 4 onboard GE, 3 NIM slots, 1 ISC slot, 2 SM slots, 8 GB Flash Memory default, 2 GB DRAM default (data plane), 4 GB DRAM default (control plane)
ISR4431/K9	ISR 4431 with 4 onboard GE, 3 NIM slots, 1 ISC slot, 8GB Flash Memory default, 2 GB DRAM default (data plane), 4 GB DRAM default (control plane)
ISR4351/K9	ISR 4351 with 3 onboard GE, 3 NIM slots, 1 ISC slot, 2 SM slots, 4 GB Flash Memory default, 4 GB DRAM default
ISR4331/K9	ISR 4331 with 3 onboard GE, 2 NIM slots, 1 ISC slot, 1 SM slots, 4 GB Flash Memory default, 4 GB DRAM default
ISR4321/K9	ISR 4321 with 2 onboard GE, 2 NIM slots, 1 ISC slot, 4 GB Flash Memory default, 4 GB DRAM default
ISR4221/K9	ISR 4221 with 2 onboard GE, 2 NIM slots, 1 ISC slot, 8 GB Flash Memory default, 4 GB DRAM default

For additional product numbers, including the Cisco 4000 Family bundle offerings, please contact your local Cisco account representative. To place an order, visit the Cisco Ordering Home Page. To download software, visit the Cisco Software Center.

Integrated Services Router Migration Options

The Cisco ISR 4000 Family is included in the standard Cisco Technology Migration Program (TMP). Refer to https://www.cisco.com/go/tmp and contact your local Cisco account representative for program details.

Warranty Information

The Cisco ISR 4000 Series Integrated Services Routers have a 90-day limited liability warranty.

Cisco and Partner Services for the Branch Office

Services from Cisco and our certified partners help you transform the branch-office experience and accelerate business innovation and growth. We have the expertise to create a clear, replicable, optimized branch-office footprint across technologies. Planning and design services align technology with your business goals and can increase deployment efficiency. Technical services help you improve operational efficiency, save money, and mitigate risk. Optimization services help you continuously improve performance and succeed with new technologies. For more information, please visit https://www.cisco.com/go/services.

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Cisco SMARTnet® technical support for the Cisco ISR 4000 Family is available on a one-time or annual contract basis. Support options range from help-desk assistance to proactive, onsite consultation. All support contracts include:

- Major Cisco IOS Software updates for protocol, security, bandwidth, and feature improvements
- Full access rights to Cisco.com technical libraries for technical assistance, electronic commerce, and product information
- Access 24 hours a day to the industry's largest dedicated technical support staff

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For More Information

For more information about the Cisco ISR 4000 Family, visit https://www.cisco.com/go/ISR4K or contact your local Cisco account representative.

Document History

New or revised topic	Described In	Date
Change 4461 from 2RU to 3RU	Sizing Section	December 4, 2018
Added 4461 and SD-WAN		November 13, 2018
Added support for Cisco SD-WAN with IOS XE SD-WAN, 16.9.1 software release. Added Encrypted Traffic Analytics as well as Boost Performance Licensing support information.	Ordering Information	August 8, 2018
Added new ISR 4000 Series model, the ISR 4221. Updated all related modules, memory, licenses and bundles support related to the ISR 4221.	Features and Benefits	August 23, 2017

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The bridge to possible

Data Sheet

Cisco Catalyst 2960-L Series Switches

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Product Overview

Cisco® Catalyst® 2960-L Series Switches are fixed and smart-managed Gigabit Ethernet switches that provide enterprise-class access switching for branch offices, out-of-the-wiring-closet applications, and critical Internet of Things (IoT) deployments, as well as small and medium-sized businesses. They operate on Cisco IOS® Software and support simple device management and network management via Command Line Interface (CLI) as well as an on-box web interface.

Catalyst 2960-L Smart Managed Switches are secure, reliable, enterprise grade switches built for small office deployments. These switches can be configured and managed via an on-box web interface allowing customers a quick and reliable way to get a small branch or office network up and running within minutes. These switches also feature limited CLI support for troubleshooting and monitoring.

The Cisco Catalyst 2960-L Series and 2960-L Smart Managed Switches are fully managed switches that offer advanced Layer 2 features as well as Power over Ethernet Plus (PoE+) power. These switches deliver enhanced network security, network reliability, and operational efficiency.

Product Highlights

Cisco Catalyst 2960-L Switches feature:

- 8, 16, 24, or 48 Gigabit Ethernet data or PoE+ ports with line-rate forwarding
- 2 or 4 fixed 1 Gigabit Ethernet Small Form-Factor Pluggable (SFP) uplinks or 4 fixed 10 Gigabit Ethernet SFP+ uplinks
- Perpetual PoE+ support with a power budget of up to 370W
- Enhanced version of Cisco IOS LAN Lite software
- CLI and/or intuitive Web-UI manageability options
- Device management support with:
  - Over-the-air access via Bluetooth, Simple Network Management Protocol (SNMP), RJ-45 or USB console access
  - Network management with Cisco Prime®, Cisco Network Plug and Play, and Cisco DNA Center
- Security with 802.1X support for connected devices, Switched Port Analyzer (SPAN), and Bridge Protocol Data Unit (BPDU) Guard
- Fanless operation with operating temperature up to 45°C
- Compact design with a depth of less than 11.5 inches
- Reliability with higher Mean Time Between Failures (MTBF) and an Enhanced Limited Lifetime Warranty (E-LLW)

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Switch Models and Configurations

Cisco Catalyst 2960-L Switches include a single fixed power supply. Table 1 shows configuration information.

Table 1. Cisco Catalyst 2960-L Switches Configurations

Product ID*	10/100/1000 Ethernet ports	Uplink interfaces	Available PoE power	Fanless	Dimensions (H x D x W)	Weight
WS-C2960L-8TS-LL/ WS-C2960L-SM-8TS	8	2 SFP	–	Y	1.73 x 8.45 x 10.56 in. (4.4 x 21.5 x 26.8 cm)	3.33 lb (1.51kg)
WS-C2960L-8PS-LL/ WS-C2960L-SM-8PS	8	2 SFP	67W	Y	1.73 x 9.45 x 10.56 in. (4.4 x 24 x 26.8 cm)	4.50 lb (2.04kg)
WS-C2960L-16TS-LL/ WS-C2960L-SM-16TS	16	2 SFP	–	Y	1.73 x 8.45 x 10.56 in. (4.4 x 21.5 x 26.8 cm)	3.41 lb (1.55kg)
WS-C2960L-16PS-LL/ WS-C2960L-SM-16PS	16	2 SFP	120W	Y	1.73 x 9.45 x 10.56 in. (4.4 x 24 x 26.8 cm)	4.65 lb (2.11kg)
WS-C2960L-24TS-LL/ WS-C2960L-SM-24TS	24	4 SFP	–	Y	1.73 x 9.45 x 17.5 in. (4.4 x 24 x 44.5 cm)	6.04 lb (2.74kg)
WS-C2960L-24PS-LL/ WS-C2960L-SM-24PS	24	4 SFP	195W	Y	1.73 x 10.45 x 17.5 in. (4.4 x 26.5 x 44.5 cm)	7.41 lb (3.36kg)
WS-C2960L-48TS-LL/ WS-C2960L-SM-48TS	48	4 SFP	–	Y	1.73 x 9.45 x 17.5 in. (4.4 x 24 x 44.5 cm)	6.57 lb (2.98kg)
WS-C2960L-48PS-LL/ WS-C2960L-SM-48PS	48	4 SFP	370W	N	1.73 x 11.5 x 17.5 in. (4.4 x 29.2 x 44.5 cm)	10.08 lb (4.57kg)
WS-C2960L-24TQ-LL/ WS-C2960L-SM-24TQ	24	4 SFP+	–	Y	1.73 x 9.45 x 17.5 in (4.4 x 24 x 44.5 cm)	6.06 lb (2.75kg)
WS-C2960L-24PQ-LL/ WS-C2960L-SM-24PQ	24	4 SFP+	195W	Y	1.73 x 10.45 x 17.5 in (4.4 x 26.5 x 44.5 cm)	7.39 lb (3.35kg)
WS-C2960L-48TQ-LL/ WS-C2960L-SM-48TQ	48	4 SFP+	–	Y	1.73 x 9.45 x 17.5 in (4.4 x 24 x 44.5 cm)	6.68 lb (3.03kg)
WS-C2960L-48PQ-LL/ WS-C2960L-SM-48PQ	48	4 SFP+	370W	N	1.73 x 11.5 x 17.5 in (4.4 x 29.2 x 44.5 cm)	9.81 lb (4.54kg)

*Please refer to local price lists for full product SKUs.

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Software

All Cisco Catalyst 2960-L Series Switches support an enhanced version of Cisco IOS LAN Lite software image. For more information about the software features supported on the Cisco Catalyst 2960-L Series, please refer to the Cisco Feature Navigator: https://tools.cisco.com/ITDIT/CFN/jsp/index.jsp.

Switch Management

Cisco Catalyst 2960-L Switches support the following on-device management features:

- **Web UI** via Cisco Configuration Professional. Configuration Professional provides a user interface for day-zero provisioning, which enables easy onboarding of the switch. Configuration Professional also has an intuitive dashboard for configuring, monitoring, and troubleshooting the switch (Figure 1). For more information, about Cisco Configuration Professional, please refer to https://www.cisco.com/c/en/us/products/cloud-systems-management/configuration-professional-catalyst/index.html.

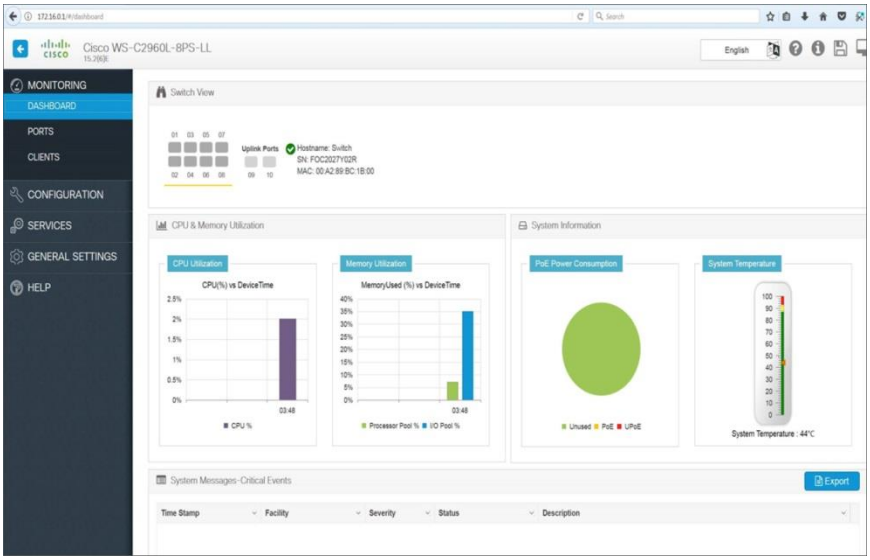

Figure 1.
Cisco Configuration Professional web UI for the Cisco Catalyst 2960-L Switches

- **Bluetooth** for over-the-air access. The switches support an external Bluetooth dongle that plugs into the USB port on the switch and allows a Bluetooth-based RF connection with external laptops and tablets (Figure 2). Laptops and tablets can access the switch CLI using a Telnet or Secure Shell (SSH) client over Bluetooth. The GUI can be accessed over Bluetooth with a browser.

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Figure 2.
Over-the-air switch access using Bluetooth

Network Management

The Cisco Catalyst 2960-L Series Switches offer a superior CLI for detailed configuration and administration. The switches are also supported by the full range of Cisco network management solutions.

- **Cisco DNA Center** on the Cisco Catalyst 2960-L Series Switches provides a simple web user interface to enterprise network customers for day-zero plug and play, switch discovery and management, topology visualization, and software image management. For details on Cisco DNA Center features, please refer to dnac.cisco.com.
- **Cisco Prime Infrastructure** provides comprehensive network lifecycle management, including an extensive library of easy-to-use features to automate the initial and day-to-day management of your Cisco network. Cisco Prime technology integrates hardware and software platform expertise and operational experience into a powerful set of workflow-driven configuration, monitoring, troubleshooting, reporting, and administrative tools. For detailed information about Cisco Prime, visit cisco.com/go/prime.
- **Cisco Network Plug and Play** is supported using the Cisco Application Policy Infrastructure Enterprise Module (APIC-EM) and Cisco DNA Center on Cisco Catalyst 2960-L Series Switches. This provides a simple, secure, unified, and integrated offering for enterprise network customers to ease new branch or campus device rollouts or for provisioning updates to an existing network with a near zero-touch deployment experience. For detailed information about APIC-EM-based Plug-and-Play capabilities, please refer to Cisco Network Plug and Play. Licenses have to be purchased for using the Cisco Prime Infrastructure, Cisco Network Plug and Play, or Cisco DNA Center network management solution.

Intelligent PoE+

Cisco Catalyst 2960-L Switches support both IEEE 802.3af PoE and IEEE 802.3at PoE+ (up to 30W per port) to deliver a lower total cost of ownership for deployments that incorporate Cisco IP phones, Cisco Aironet® wireless access points, or other standards-compliant PoE and PoE+ end devices. PoE removes the need to supply wall power to PoE-enabled devices and eliminates the cost of adding electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments.

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The Cisco Catalyst 2960-L Switches PoE power allocation is dynamic, and power mapping scales up to a maximum of 370W of PoE+ power. Intelligent power management allows flexible power allocation across all ports. With Perpetual PoE, the PoE+ power is maintained during a switch reload. This is important for critical endpoints such as medical devices and for IoT endpoints such as PoE-powered lights, so that there is no disruption during a switch reboot.

Network Security

Cisco Catalyst 2960-L Switches provide a range of security features to limit access to the network and mitigate threats, including:

- **Comprehensive 802.1X** features to control access to the network, including flexible authentication, 802.1X monitor mode, and RADIUS change of authorization.
- **802.1x support with Network Edge Access Topology (NEAT)** extends identity authentication to areas outside the wiring closet (such as conference rooms).
- **IEEE 802.1x User Distribution** enables you to load-balance users with the same group name across multiple different VLANs.
- **Disable per-VLAN MAC learning** manages the available MAC address table space by controlling which interface or VLANs learn MAC addresses.
- **Multidomain authentication** to allow an IP phone and a PC to authenticate on the same switch port while being placed on appropriate voice and data VLANs.
- **AAA command authorization** in plug-and-play (PnP) to enable seemless PnP provisioning.
- **Access control lists (ACLS)** for IPv6 and IPv4 security and Quality-of-Service (QoS) ACL elements (ACEs).
- **Port-based ACLs** for Layer 2 interfaces to allow security policies to be applied on individual switch ports.
- **SSH, Kerberos, and SNMPv3** to provide network security by encrypting administrator traffic during Telnet and SNMP sessions. SSH, Kerberos, and the cryptographic version of SNMPv3 require a special cryptographic software image because of U.S. export restrictions.
- **SPAN,** with bidirectional data support, to allow Cisco Intrusion Detection System (IDS) to take action when an intruder is detected.
- **TACACS+ and RADIUS authentication** to facilitate centralized control of the switch and restrict unauthorized users from altering the configuration.
- **MAC address notification** to notify administrators about users added to or removed from the network.
- **MAC authentication bypass and Webauth with downloadable ACLs** allows per-user ACLs to be downloaded from the Cisco Access Control Server (ACS) as policy enforcement after authentication using MAB or Web authentication in addition to IEEE 802.1X.
- **Web Authentication redirection** enables networks to redirect guest users to the URL that they had originally requested.
- **Multilevel security on console access** to prevent unauthorized users from altering the switch configuration.

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- **BPDU guard** to shut down spanning-tree PortFast-enabled interfaces when BPDUs are received to avoid accidental topology loops.
- **IP Source Guard** restricts IP traffic on nonrouted, Layer 2 interfaces by filtering traffic based on the DHCP snooping binding database or manually configuring IP source bindings.
- **SSHv2** allows use of digital certificates for authentication between user and server.
- **Spanning-Tree Root Guard (STRG)** to prevent edge devices that are not in the network administrator's control from becoming Spanning Tree Protocol (STP) root nodes.
- **Internet Group Management Protocol (IGMP) filtering** to provide multicast authentication by filtering out nonsubscribers and to limit the number of concurrent multicast streams available per port.
- **Dynamic VLAN assignment** through implementation of VLAN Membership Policy Server client capability to provide flexibility in assigning ports to VLANs. Dynamic VLAN facilitates the fast assignment of IP addresses.

Redundancy and Resiliency

Cisco Catalyst 2960-L Switches offer a number of redundancy and resiliency features to prevent outages and help ensure that the network remains available:

- **IEEE 802.1s/w Rapid Spanning Tree Protocol (RSTP) and Multiple Spanning Tree Protocol (MSTP)** provide rapid spanning-tree convergence independent of spanning-tree timers and also offer the benefits of Layer 2 load balancing and distributed processing.
- **Per-VLAN Rapid Spanning Tree (PVRST+)** allows rapid spanning-tree reconvergence on a per-VLAN spanning-tree basis, without requiring the implementation of spanning-tree instances.
- **Switch-port autorecovery (error disable)** automatically attempts to reactivate a link that is disabled because of a network error.
- **Link State Tracking** binds the link state of multiple interfaces. The server NIC adapters form a group to provide redundancy in the network. When the link is lost on the primary interface, network connectivity is transparently changed to the secondary interface.

Enhanced QoS

Cisco Catalyst 2960-L Switches offer intelligent traffic management that keeps everything flowing smoothly. Flexible mechanisms for marking, classifying, and scheduling deliver superior performance for data, voice, and video traffic, all at wire speed. Primary QoS features include:

- Up to **eight egress queues** and two thresholds per port, supporting egress bandwidth control, shaping, and priority queuing so that high-priority packets are serviced ahead of other traffic.
- **Ingress policing** allows the analysis of IP service levels for IP applications and services using active traffic monitoring - generating traffic in a continuous, reliable, and predictable manner—for measuring network performance. The number of ingress policers available per port is 64.
- **QoS through Differentiated Services Code Point** (DSCP) **mapping and filtering**.
- **QoS through Traffic Classification**
- **Trust Boundary** to configure device-based trust.
- **Auto-QoS** simplifies the deployment of QoS features.

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- **Shaped Round Robin** (SRR) scheduling and **Weighted Tail Drop** (WTD) congestion avoidance.
- **802.1p Class of Service** (CoS) classification, with marking and reclassification.

  For more information on features supported on the intuitive Web-UI for Cisco Catalyst 2960-L Switches, refer to the Cisco Catalayst 2960-L Smart Managed Switches Configuration Guide.

Energy Management

Cisco Catalyst 2960-L Switches offer a range of industry-leading features for energy efficiency and management:

- **IEEE 802.3az Energy Efficient Ethernet** (EEE) enables ports to dynamically sense idle periods between traffic bursts and quickly switch the interfaces into a low-power idle mode, reducing power consumption.
- **Cisco EnergyWise**® policies can be used to control the power consumed by PoE-powered endpoints, desktop and data center IT equipment, and a wide range of building infrastructure. Cisco EnergyWise technology is included on all Cisco Catalyst 2960-L Series Switches. For more information about Cisco EnergyWise technology, visit cisco.com/go/energywise.
- **Cisco Catalyst SmartOperations** is a comprehensive set of capabilities that simplify LAN planning, deployment, monitoring, and troubleshooting. Deploying SmartOperations tools reduces the time and effort required to operate the network and lowers TCO.
- **Loop detection** is a new method to detect network loops in the absence of STP.
- **Cisco AutoConfig** services determine the level of network access provided to an endpoint based on the type of the endpoint device. This feature also permits hard binding between the end device and the interface.
- **Cisco Smart Install** services enable minimal-touch deployment by providing automated Cisco IOS Software image installation and configuration when new switches are connected to the network. This enables network administrators to remotely manage Cisco IOS Software image installs and upgrades.
- **Cisco Auto SmartPorts** services enable automatic configuration of switch ports as devices connect to the switch with settings optimized for the device type, resulting in zero-touch port-policy provisioning.
- **Cisco Smart Troubleshooting** is an extensive array of diagnostic commands and system health checks in the switch, including Smart Call Home. The Cisco Generic Online Diagnostics (GOLD) and online diagnostics on switches in live networks help predict and detect failures more quickly.

For more information about Cisco Catalyst SmartOperations, visit cisco.com/go/SmartOperations.

Operational Simplicity

- **Cisco AutoSecure** provides a single-line CLI to enable baseline security features (port security, Dynamic Host Configuration Protocol [DHCP] snooping, Dynamic Address Resolution Protocol [ARP] Inspection). This feature simplifies security configurations with a single touch.
- **DHCP** auto configuration of multiple switches through a boot server eases switch deployment.
- **Auto negotiation** on all ports automatically selects half- or full-duplex transmission mode to optimize bandwidth.

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- **Dynamic Trunking Protocol (DTP)** facilitates dynamic trunk configuration across all switch ports.
- **Port Aggregation Protocol (PAgP)** automates the creation of Cisco Fast EtherChannel groups or Gigabit EtherChannel groups to link to another switch, router, or server.
- **Link Aggregation Control Protocol (LACP)** allows the creation of Ethernet channeling with devices that conform to IEEE 802.3ad. This feature is similar to Cisco EtherChannel technology and PAgP.
- **Automatic media-dependent interface crossover (MDIX)** automatically adjusts transmit and receive pairs if an incorrect cable type (crossover or straight-through) is installed.
- **Unidirectional Link Detection Protocol (UDLD)** and Aggressive UDLD allow unidirectional links caused by incorrect fiber-optic wiring or port faults to be detected and disabled on fiber-optic interfaces.
- **Local Proxy ARP** works in conjunction with Private VLAN Edge to minimize broadcasts and maximize available bandwidth.
- **VLAN1 minimization** allows VLAN1 to be disabled on any individual VLAN trunk.
- **IGMP** snooping for IPv4 and IPv6 and Multicast Listener Discovery (MLD) v1 and v2 snooping provide fast client joins and leaves of multicast streams and limit bandwidth-intensive video traffic to only the requesters.
- **Per-port broadcast, multicast, and unicast storm control** prevents faulty end stations from degrading overall system performance.
- **Voice VLAN** simplifies telephony installations by keeping voice traffic on a separate VLAN for easier administration and troubleshooting.
- **Cisco VLAN Trunking Protocol (VTP)** supports dynamic VLANs and dynamic trunk configuration across all switches.
- For enhanced traffic management, monitoring, and analysis, the embedded **Remote Monitoring (RMON)** software agent supports four RMON groups (history, statistics, alarms, and events).
- **Layer 2 trace route** eases troubleshooting by identifying the physical path that a packet takes from source to destination.
- **Trivial File Transfer Protocol (TFTP)** reduces the cost of administering software upgrades by downloading from a centralized location.
- **Network Time Protocol (NTP)** provides an accurate and consistent timestamp to all intranet switches.

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Specifications

Product specifications (Table 2) apply to both PoE and non-PoE models.

Table 2. Specifications

*Routes, ACEs, and multicast group scale listed below are available starting with Cisco IOS Software Release 15.2(6)E. See the release notes for more information.

	8 port	16 port	24 port (1/10G uplinks)	48 port (1/10G uplinks)
Console ports				
RJ45 Ethernet	1	1	1	1
USB mini-B	1	1	1	1
USB-A port for storage and Bluetooth console	1	1	1	1
Memory and processor				
CPU	ARMv7 800 MHz	ARMv7 800 MHz	ARMv7 800 MHz	ARMv7 800 MHz
DRAM	512 MB	512 MB	512 MB	512 MB
Flash memory	256 MB	256 MB	256 MB	256 MB
Performance				
Forwarding bandwidth	10 Gbps	18 Gbps	1G: 28 Gbps 10G: 64 Gbps	1G: 52 Gbps 10G: 88Gpbs
Switching bandwidth	20 Gbps	36 Gbps	1G: 56 Gbps 10G: 128 Gbps	1G: 104 Gbps 10G: 176 Gbps
Unicast MAC addresses	16000	16000	16000	16000
IPv4 unicast direct routes	512	512	512	512
IPv4 unicast indirect routes	256	256	256	256
IPv6 unicast direct routes	414	414	414	414
IPv6 unicast indirect routes	128	128	128	128
IPv4 multicast routes and IGMP groups	1024	1024	1024	1024
IPv6 multicast groups	1024	1024	1024	1024
IPv4/MAC security ACEs	384	384	384	384
IPv6 security ACEs	256	256	256	256
Maximum active VLANs	256	256	256	256

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	8 port	16 port	24 port (1/10G uplinks)	48 port (1/10G uplinks)
VLAN IDs available	4094	4094	4094	4094
Maximum STP instances	64	64	64	64
Maximum SPAN sessions	4	4	4	4
Jumbo Ethernet frame	10,240 bytes	10,240 bytes	10,240 bytes	10,240 bytes
MTBF in hours (data)	2,448,133	2,416,689	2,412,947	1,370,769
MTBF in hours (PoE)	315,044	313,496	909,838	437,970
Environment				
Operating temperature				
Up to 5,000 ft (1500 m)	23ºF to 113ºF (–5ºC to 45ºC)	23ºF to 113ºF (–5ºC to 45ºC)	23ºF to 113ºF (–5ºC to 45ºC)	23ºF to 113ºF (–5ºC to 45ºC)
	WS-C2960L-16PS-LL has maximum operating temperature of 40° C (up to 5,000 ft) and 35° C (up to 10,000 ft).			
Up to 10,000 ft (3000 m)	23ºF to 104ºF (–5ºC to 40ºC)	23ºF to 104ºF (–5ºC to 40ºC)	23ºF to 104ºF (–5ºC to 40ºC)	23ºF to 104ºF (–5ºC to 40ºC)
Operating altitude	10,000 ft (3000 m)	10,000 ft (3000 m)	10,000 ft (3000 m)	10,000 ft (3000 m)
Operating relative humidity	5% to 90% at 40ºC	5% to 90% at 40ºC	5% to 90% at 40ºC	5% to 90% at 40ºC
Storage temperature	–13º to 158ºF (–25º to 70ºC)	–13º to 158ºF (–25º to 70ºC)	–13º to 158ºF (–25º to 70ºC)	–13º to 158ºF (–25º to 70ºC)
Storage altitude	15,000 ft (4500 m)	15,000 ft (4500 m)	15,000 ft (4500 m)	15,000 ft (4500 m)
Storage relative humidity	5% to 95% at 65ºC	5% to 95% at 65ºC	5% to 95% at 65ºC	5% to 95% at 65ºC
Storage altitude	**Note:** Minimum ambient temperature for cold start is 0° C (32° F).			

Electrical	**Data**	**PoE**	**Data**	**PoE**	**Data**	**PoE**	**Data**	**PoE**
Voltage (auto ranging)	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in	110 to 220V AC in
Frequency	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Current	0.13A to 0.22A	0.22A to 0.27A	0.16A to 0.26A	0.24A to 0.28A	0.20A to 0.33A	0.21A to 0.26A	0.29A to 0.48A	0.37A to 0.64A
Power rating (maximum consumption)	0.04 kVA	0.11 kVA	0.05 kVA	0.19 kVA	0.06 kVA	0.24 kVA	0.09 kVA	0.48 kVA

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	8 port		16 port		24 port (1/10G uplinks)		48 port (1/10G uplinks)	
Power consumption (watts)								
0% traffic	13.0	19.9	14.9	21.9	1G: 16.5	1G: 17.52	1G: 24.36	1G: 27.24
					10G: 17.04	10G: 16.68	10G: 25.8	10G: 27
10% traffic	14.8	22.0	19.3	27.1	1G: 23.04	1G: 24	1G: 33	1G: 39.24
					10G: 22.92	10G: 23.16	10G: 38.04	10G: 39.12
100% traffic	14.9	22.0	19.3	27.1	1G: 23.64	1G: 24	1G: 33.6	1G: 40.32
					10G: 23.64	10G: 23.76	10G: 39.36	10G: 40.56
Weighted average	14.2	21.3	17.8	25.4	1G: 21.06	1G: 21.84	1G: 30.32	1G: 35.6
					10G: 21.2	10G: 21.2	10G: 34.4	10G: 35.56
	Note: The wattage rating on the power supply does not represent actual power draw. It indicates the maximum power draw possible by the power supply. This rating can be used for facility capacity planning. For PoE switches, cooling requirements are smaller than total power draw because a significant portion of the load is dissipated in the endpoints.							
Acoustic noise (48-port PoE only)								
Sound pressure	LpA (typical)				35 dB			
	LpAD (maximum)				39 dB			
Sound power	LwA (typical)				4.8 B			
	LwAD (maximum)				5.2 B			
	Note: Bystander positions operating mode at 77°F (25°C) ambient.							
Safety and compliance								
Safety	UL 60950-1 Second Edition, CAN/CSA-C22.2 No. 60950-1 Second Edition, EN 60950-1 Second Edition, IEC 60950-1 Second Edition, AS/NZS 60950-1							
EMC: emissions	47CFR Part 15 (CFR 47) Class A, AS/NZS CISPR22 Class A, CISPR22 Class A, EN55022 Class A, ICES003 Class A, VCCI Class A, EN61000-3-2, EN61000-3-3, KN22 Class A, CNS13438 Class A							
EMC: immunity	EN55024 (including EN 61000-4-5), CISPR24, EN300386, KN24							
Environmental	Reduction of Hazardous Substances (RoHS) including Directive 2011/65/EU							
Telco	Common Language Equipment Identifier (CLEI) code							
U.S. government certifications	USGv6 and IPv6 Ready Logo							

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	8 port	16 port	24 port (1/10G uplinks)	48 port (1/10G uplinks)
Connectors and interfaces				
Ethernet interfaces	10BASE-T ports: RJ-45 connectors, 2-pair Category 3, 4, or 5 Unshielded Twisted Pair (UTP) cabling			
	100BASE-TX ports: RJ-45 connectors, 2-pair Category 5 UTP cabling			
	1000BASE-T ports: RJ-45 connectors, 4-pair Category 5 UTP cabling			
	1000BASE-T SFP-based ports: RJ-45 connectors, 4-pair Category 5 UTP cabling			
Indicator LEDs	Per-port status: link integrity, disabled, activity, speed, and full duplex			
	System status: system, PoE, and link speed			
Console cables	CAB-CONSOLE-RJ45 Console cable 6 ft. with RJ-45			
	CAB-CONSOLE-USB Console cable 6 ft. with USB Type A and mini-B connectors			
Power	Use the supplied AC power cord to connect the AC power connector to an AC power outlet			
Management				
	BRIDGE-MIB CISCO-CABLE-DIAG-MIB CISCO-CDP-MIB CISCO-CLUSTER-MIB CISCO-CONFIG-COPY-MIB CISCO-CONFIG-MAN-MIB CISCO-DHCP-SNOOPING-MIB CISCO-ENTITY-VENDORTYPE-OID-MIB CISCO-ENVMON-MIB CISCO-ERR-DISABLE-MIB CISCO-FLASH-MIB CISCO-FTP-CLIENT-MIB CISCO-IGMP-FILTER-MIB CISCO-IMAGE-MIB CISCO-IP-STAT-MIB CISCO-LAG-MIB CISCO-MAC-NOTIFICATION-MIB CISCO-MEMORY-POOL-MIB CISCO-PAGP-MIB CISCO-POE-EXTENSIONS-MIB	CISCO-PORT-QOS-MIB CISCO-PORT-SECURITY-MIB CISCO-PORT-STORM-CONTROL-MIB CISCO-PRODUCTS-MIB CISCO-PROCESS-MIB CISCO-RTTMON-MIB CISCO-SMI-MIB CISCO-STP-EXTENSIONS-MIB CISCO-SYSLOG-MIB CISCO-TC-MIB CICSO-TCP-MIB CISCO-UDLDP-MIB CISCO-VLAN-IFTABLE CISCO-VLAN-MEMBERSHIP-MIB CISCO-VTP-MIB ENTITY-MIB ETHERLIKE-MIB IEEE8021-PAE-MIB IEEE8023-LAG-MIB	IF-MIB INET-ADDRESS-MIB OLD-CISCO-CHASSIS-MIB OLD-CISCO-FLASH-MIB OLD-CISCO-INTERFACES-MIB OLD-CISCO-IP-MIB OLD-CISCO-SYS-MIB OLD-CISCO-TCP-MIB OLD-CISCO-TS-MIB RFC1213-MIB RMON-MIB RMON2-MIB SNMP-FRAMEWORK-MIB SNMP-MPD-MIB SNMP-NOTIFICATION-MIB SNMP-TARGET-MIB SNMPv2-MIB TCP-MIB UDP-MIB	
	For an updated list of supported MIBs, refer to the MIB Locator at cisco.com/go/mibs.			

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	8 port	16 port	24 port (1/10G uplinks)	48 port (1/10G uplinks)
Standards				
	IEEE 802.1D Spanning Tree Protocol IEEE 802.1p CoS Prioritization IEEE 802.1Q VLAN IEEE 802.1s IEEE 802.1w IEEE 802.1X IEEE 802.1ab (LLDP) Bluetooth Ver 4.0	IEEE 802.3ad IEEE 802.3af and IEEE 802.3at IEEE 802.3ah (100BASE-X single/multimode fiber only) IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX	IEEE 802.3ab 1000BASE-T IEEE 802.3z 1000BASE-X RMON I and II standards SNMP v1, v2c, and v3 IEEE 802.3az IEEE 802.3ae 10 Gigabit Ethernet IEEE 802.1ax	
RFC compliance				
	RFC 768 - UDP RFC 783 - TFTP RFC 791 - IP RFC 792 - ICMP RFC 793 - TCP RFC 826 - ARP RFC 854 - Telnet RFC 951 - Bootstrap Protocol (BOOTP) RFC 959 - FTP RFC 1112 - IP Multicast and IGMP RFC 1157 - SNMP v1 RFC 1166 - IP Addresses	RFC 1256 - Internet Control Message Protocol (ICMP) Router Discovery RFC 1305 - NTP RFC 1492 - TACACS+ RFC 1493 - Bridge MIB RFC 1542 - BOOTP extensions RFC 1901 - SNMP v2C RFC 1902-1907 - SNMP v2 RFC 1981 - Maximum Transmission Unit (MTU) Path Discovery IPv6 FRC 2068 - HTTP RFC 2131 - DHCP RFC 2138 - RADIUS RFC 2233 - IF MIB v3		

Warranty

Cisco Catalyst 2960-L Switches come with an Enhanced Limited Lifetime Warranty (E-LLW). The E-LLW provides the same terms as the Cisco standard limited lifetime warranty but adds next-business-day delivery of replacement hardware, where available, and 90 days of 8x5 Cisco Technical Assistance Center (TAC) support. Your formal warranty statement, including the warranty applicable to Cisco software, appears in the Cisco information packet that accompanies your Cisco product. We encourage you to review carefully the warranty statement shipped with your specific product before use.

Cisco reserves the right to refund the purchase price as its exclusive warranty remedy. For more information about warranty terms, visit https://www.cisco.com/go/warranty and see Table 3. Warranty terms.

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Cisco enhanced limited lifetime hardware warranty	
Device covered	Applies to all Cisco Catalyst 2960-L Series Switches and 2960-L Smart Managed Switches.
Warranty duration	As long as the original end user continues to own or use the product.
End-of-life policy	In the event of discontinuance of product manufacture, Cisco warranty support is limited to 5 years from the announcement of discontinuance.
Hardware replacement	Cisco or its service center will use commercially reasonable efforts to ship a Cisco Catalyst 2960-L replacement part for next-business-day delivery, where available. Otherwise, a replacement will be shipped within 10 working days after the receipt of the RMA request. Actual delivery times might vary depending on customer location.
Effective date	Hardware warranty commences from the date of shipment to customer (and in case of resale by a Cisco reseller, not more than 90 days after original shipment by Cisco).
TAC support	Cisco will provide during customer's local business hours, 8 hours per day, 5 days per week basic configuration, diagnosis, and troubleshooting of device-level problems for up to 90 days from the date of shipment of the originally purchased Cisco Catalyst 2960-L product. This support does not include solution or network-level support beyond the specific device under consideration.
Cisco.com access	Warranty allows guest access only to Cisco.com.

Licensing

Cisco Catalyst 2960-L Series Switches support term-based Cisco DNA Essentials licenses (Cisco DNA Essential). Table 4 lists the features supported in Cisco DNA Essentials. Table 5 gives ordering information for Cisco DNA Essentials with the 2960-L Series.

Ordering and managing licenses with smart accounts: Creating smart accounts by using the Cisco Smart Software Manager (SSM) enables you to order devices and licensing packages and also to manage your software licenses from a centralized website. You can set up Cisco SSM to receive daily email alerts and to be notified of expiring add-on licenses that you want to renew. When the license term expires, you can either renew the add-on license to continue using it or deactivate the add-on license and then reload the switch to continue operating with the base license capabilities.

Table 3. Features supported in Cisco DNA Essentials for Cisco Catalyst 2960-L Series Switches

Category	Features
Day-zero network bring-up automation	Cisco Network Plug-and-Play application
Cisco DNA Center	Discovery, inventory, topology, software image management
Network monitoring	Device 360

Software Policy

Customers with enhanced version of Cisco IOS LAN Lite software feature sets are provided with maintenance updates and bug fixes designed to maintain the compliance of the software with published specifications, release notes, and industry standards as long as the original end user continues to own or use the product or up to 1 year from the end-of-sale date for this product, whichever occurs earlier.

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This policy supersedes any previous warranty or software statement and is subject to change without notice.

Technical Support and Services

Table 4 describes available technical services.

Table 4. Technical services available for Cisco Catalyst 2960-L Switches

Technical services
Cisco Smart Net Total Care™ Service • Around-the-clock, global access to the Cisco TAC • Unrestricted access to the extensive Cisco.com knowledge base and tools • Next-business-day, 8x5x4, 24x7x4, or 24x7x2 advance hardware replacement and onsite parts replacement and installation available[1] • Ongoing operating system software updates within the licensed feature set[2] • Proactive diagnostics and real-time alerts on Smart Call Home–enabled devices
Cisco Smart Foundation Service • Next-business-day advance hardware replacement as available • Access to SMB TAC during business hours (access levels vary by region) • Access to Cisco.com SMB knowledge base • Online technical resources through Smart Foundation Portal • Operating system software bug fixes and patches
Cisco Smart Care Service • Network-level coverage for the needs of small and medium-sized businesses • Proactive health checks and periodic assessments of Cisco network foundation, voice, and security technologies • Technical support for eligible Cisco hardware and software through Smart Net Total Care portal • Cisco operating system and application software updates and upgrades[2] • Next-business-day advance hardware replacement as available, 24x7x4 option available[1]
Cisco SP Base Service • Around-the-clock, global access to the Cisco TAC • Registered access to Cisco.com • Next-business-day, 8x5x4, 24x7x4, and 24x7x2 advance hardware replacement; return to factory option available1 • Ongoing operating system software updates[2]
Cisco Focused Technical Support Services Three levels of premium, high-touch services are available: • Cisco High-Touch Operations Management Service • Cisco High-Touch Technical Support Service • Cisco High-Touch Engineering Service Valid Cisco Smart Net Total Care or SP Base contracts are required on all network equipment.

[1] Advance hardware replacement is available in various service-level combinations. For example, 8x5xNBD indicates that shipment is initiated during the standard 8-hour business day, 5 days a week (the generally accepted business days within the relevant region), with Next-Business-Day (NBD) delivery. Where NBD is not available, same-day shipping is provided. Restrictions apply; for details, review the appropriate service descriptions.

[2] Cisco operating system updates include the following: maintenance releases, minor updates, and major updates within the licensed feature set.

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Accessories

Table 5 describes the available accessories.

Table 5. Cisco Catalyst 2960-L Switches accessories

Part numbers	Description	Compatibility
CAB-CONSOLE-RJ45	Console Cable 6 Feet with RJ-45	All models
CAB-CONSOLE-USB	Console Cable 6 Feet with USB Type A and mini-B Connectors	All models
PWR-CLP	Power Cable Restraining Clip	All models
RCKMNT-1RU-2KX	1RU Rack Mount Kit for 2960-X, 2960-XR, and 2960-L	24-port and 48-port models only
RCKMNT-REC-2KX	Recessed 1RU rack mount for 2960X, 2960-XR, and 2960-L	24-port and 48-port models only
CMPCT-MGNT-TRAY	Magnetic Mounting Tray for 3560-CX, 2960-CX, and 2960-L Compact Switches	8-port and 16-port models only
CMPCT-CBLE-GRD	Cable Guard for 3560-CX, 2960-CX, and 2960-L Compact Switches	8-port and 16-port models only
CMPCT-DIN-MNT	DIN Rail Mount for 3560-CX, 2960-CX, and 2960-L Compact Switches	8-port and 16-port models only

Ordering Information

Table 6 lists ordering information for the Cisco Catalyst 2960-L Switches. To place an order, visit the Cisco Ordering homepage at https://www.cisco.com/en/US/ordering/or13/or8/order_customer_help_how_to_order_listing.html.

Table 6. Cisco Catalyst 2960-L Series Switches ordering information

Product number	Description
Cisco Catalyst 2960-L Switches with 2x 1G SFP uplinks	
WS-C2960L-8TS-LL	8 port 10/100/1000 Ethernet ports, 2 x 1G SFP
WS-C2960L-8PS-LL	8 port 10/100/1000 Ethernet PoE+ ports, 2 x 1G SFP
WS-C2960L-16TS-LL	16 port 10/100/1000 Ethernet ports, 2 x 1G SFP
WS-C2960L-16PS-LL	16 port 10/100/1000 Ethernet PoE+ ports, 2 x 1G SFP
Cisco Catalyst 2960-L Switches with 4x 1G SFP Uplinks	
WS-C2960L-24TS-LL	24 port 10/100/1000 Ethernet ports, 4 x 1G SFP
WS-C2960L-24PS-LL	24 port 10/100/1000 Ethernet PoE+ ports, 4 x 1G SFP

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Product number	Description
WS-C2960L-48TS-LL	48 port 10/100/1000 Ethernet ports, 4 x 1G SFP
WS-C2960L-48PS-LL	48 port 10/100/1000 Ethernet PoE+ ports, 4 x 1G SFP
Cisco Catalyst 2960-L Switches with 4x 10G SFP+ Uplinks	
WS-C2960L-24TQ-LL	24 port 10/100/1000 Ethernet ports, 4 x 10G SFP+
WS-C2960L-24PQ-LL	24 port 10/100/1000 Ethernet PoE+ ports, 4 x 10G SFP+
WS-C2960L-48TQ-LL	48 port 10/100/1000 Ethernet ports, 4 x 10G SFP+
WS-C2960L-48PQ-LL	48 port 10/100/1000 Ethernet PoE+ ports, 4 x 10G SFP+

Table 7. Cisco Catalyst 2960-L Smart Managed Switches ordering information

Product number	Description
Cisco Catalyst 2960-L Smart Managed Switches with 2x 1G SFP uplinks	
WS-C2960L-SM-8TS	8 port 10/100/1000 Ethernet ports, 2 x 1G SFP
WS-C2960L-SM-8PS	8 port 10/100/1000 Ethernet PoE+ ports, 2 x 1G SFP
WS-C2960L-SM-16TS	16 port 10/100/1000 Ethernet ports, 2 x 1G SFP
WS-C2960L-SM-16PS	16 port 10/100/1000 Ethernet PoE+ ports, 2 x 1G SFP
Cisco Catalyst 2960-L Smart Managed Switches with 4x 1G SFP Uplinks	
WS-C2960L-SM-24TS	24 port 10/100/1000 Ethernet ports, 4 x 1G SFP
WS-C2960L-SM-24PS	24 port 10/100/1000 Ethernet PoE+ ports, 4 x 1G SFP
WS-C2960L-SM-48TS	48 port 10/100/1000 Ethernet ports, 4 x 1G SFP
WS-C2960L-SM-48PS	48 port 10/100/1000 Ethernet PoE+ ports, 4 x 1G SFP
Cisco Catalyst 2960-L Smart Managed Switches with 4x 10G SFP+ Uplinks	
WS-C2960L-SM-24TQ	24 port 10/100/1000 Ethernet ports, 4 x 10G SFP+
WS-C2960L-SM-24PQ	24 port 10/100/1000 Ethernet PoE+ ports, 4 x 10G SFP+
WS-C2960L-SM-48TQ	48 port 10/100/1000 Ethernet ports, 4 x 10G SFP+
WS-C2960L-SM-48PQ	48 port 10/100/1000 Ethernet PoE+ ports, 4 x 10G SFP+

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Table 8. Product IDs for Cisco DNA Essentials licenses on the Cisco Catalyst 2960-L Series

Ports	Product ID	Description
8	C2960L-DNA-E-8=	C2960L Cisco DNA Essentials, 8-port term licenses
	C2960L-DNA-E-8-3Y	C2960L Cisco DNA Essentials, 8-port, 3-year term licenses
	C2960L-DNA-E-8-5Y	C2960L Cisco DNA Essentials, 8-port, 5-year term licenses
	C2960L-DNA-E-8-7Y	C2960L Cisco DNA Essentials, 8-port, 7-year term licenses
16	C2960L-DNA-E-16=	C2960L Cisco DNA Essentials, 16-port term licenses
	C2960L-DNA-E-16-3Y	C2960L Cisco DNA Essentials, 16-port, 3-year term licenses
	C2960L-DNA-E-16-5Y	C2960L Cisco DNA Essentials, 16-port, 5-year term licenses
	C2960L-DNA-E-16-7Y	C2960L Cisco DNA Essentials, 16-port, 7-year term licenses
24	C2960L-DNA-E-24=	C2960L Cisco DNA Essentials, 24-port term licenses
	C2960L-DNA-E-24-3Y	C2960L Cisco DNA Essentials, 24-port, 3-year term licenses
	C2960L-DNA-E-24-5Y	C2960L Cisco DNA Essentials, 24-port, 5-year term licenses
	C2960L-DNA-E-24-7Y	C2960L Cisco DNA Essentials, 24-port, 7-year term licenses
48	C2960L-DNA-E-48=	C2960L Cisco DNA Essentials, 48-port term licenses
	C2960L-DNA-E-48-3Y	C2960L Cisco DNA Essentials, 48-port, 3-year term licenses
	C2960L-DNA-E-48-5Y	C2960L Cisco DNA Essentials, 48-port, 5-year term licenses
	C2960L-DNA-E-48-7Y	C2960X Cisco DNA Essentials, 48-port, 7-year term licenses

Optics Compatibility Information

The Cisco Catalyst 2960-L Switches supports a wide range of optics. Because the list of supported optics is updated on a regular basis, consult the tables available here for compatibility information: Optics Compatibility.

Contact Cisco

For more information about Cisco products, contact:

Phone: +1 800 553-NETS (6387).

Worldwide Product Support.

Company website: cisco.com.

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EXHIBIT A - PRICING PAGE

TOTAL EQUIPMENT PRICE								
LOCATION - BUILDING 5, ROOM A-920 CHARLESTON, WV 25305								
Item Number	**Quantity**	**Description**	**Unit Price**	**Smart Net Year (1)**	**Smart Net Year (2)**	**Smart Net Year (3)**	**Smart Net Year (4)**	**TOTAL**
3.1.1	11	Cisco ISR 4321 Series Chassis Bundle item number ISR4321/K9 (Cisco ISR 4321 (2GE, 2NIM, 4G FLASH, 4G DRAM, IPB)) Router or equal with (4) years Smart Net or equal	$2,420.00	$370.00	$370.00	$370.00	$370.00	$42,900.00
3.1.2	7	Cisco ISR 4331 Series Chassis Bundle item number ISR4331/K9 (Cisco ISR 4331 (3GE, 2NIM, 1SM, 4G FLASH, 4G DRAM, IPB)) Router or equalwith (4) Years Smart Net or equal	$3,660.00	$490.00	$490.00	$490.00	$490.00	$39,340.00
3.1.3	60	Cisco ISR 1101 4 Ports GE Ethernet WAN Router, item number C1101-4P or equal. with (4) years Smart Net or equal	$1,140.00	$88.00	$88.00	$88.00	$88.00	$89,520.00
3.1.4	95	Extreme Networks 12 Port POE Switch, part number X440-G2 X440-G212p-10GE4 or equal	$1,118.00					$106,210.00
3.1.5	75	Extreme Networks 48 Port POE Switch, part number X440-G2 X440-G248p-10GE4 or equal.	$3,400.00					$255,000.00
3.1.6	20	Extreme Networks 24 Port POE Switch, part number X440-G2 X440-G2-24p-10GE4 or equal.	$2,255.00					$45,100.00
Total								$578,070.00

GENERAL TERMS AND CONDITIONS:

1. CONTRACTUAL AGREEMENT: Issuance of a Award Document signed by the Purchasing Division Director, or his designee, and approved as to form by the Attorney General's office constitutes acceptance of this Contract made by and between the State of West Virginia and the Vendor. Vendor's signature on its bid signifies Vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.

2. DEFINITIONS: As used in this Solicitation/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this Solicitation/Contract.

2.1. "Agency" or **"Agencies"** means the agency, board, commission, or other entity of the State of West Virginia that is identified on the first page of the Solicitation or any other public entity seeking to procure goods or services under this Contract.

2.2. "Bid" or **"Proposal"** means the vendors submitted response to this solicitation.

2.3. "Contract" means the binding agreement that is entered into between the State and the Vendor to provide the goods or services requested in the Solicitation.

2.4. "Director" means the Director of the West Virginia Department of Administration, Purchasing Division.

2.5. "Purchasing Division" means the West Virginia Department of Administration, Purchasing Division.

2.6. "Award Document" means the document signed by the Agency and the Purchasing Division, and approved as to form by the Attorney General, that identifies the Vendor as the contract holder.

2.7. "Solicitation" means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.

2.8. "State" means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.

2.9. "Vendor" or **"Vendors"** means any entity submitting a bid in response to the Solicitation, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

3. CONTRACT TERM; RENEWAL; EXTENSION: The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:

☐ **Term Contract**

Initial Contract Term: Initial Contract Term: This Contract becomes effective on _____ and extends for a period of _____year(s).

Renewal Term: This Contract may be renewed upon the mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any request for renewal should be delivered to the Agency and then submitted to the Purchasing Division thirty (30) days prior to the expiration date of the initial contract term or appropriate renewal term. A Contract renewal shall be in accordance with the terms and conditions of the original contract. Unless otherwise specified below, renewal of this Contract is limited to _____ successive one (1) year periods or multiple renewal periods of less than one year, provided that the multiple renewal periods do not exceed the total number of months available in all renewal years combined. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

> ☐ **Alternate Renewal Term** – This contract may be renewed for _____ successive _____ year periods or shorter periods provided that they do not exceed the total number of months contained in all available renewals. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

Delivery Order Limitations: In the event that this contract permits delivery orders, a delivery order may only be issued during the time this Contract is in effect. Any delivery order issued within one year of the expiration of this Contract shall be effective for one year from the date the delivery order is issued. No delivery order may be extended beyond one year after this Contract has expired.

☐ **Fixed Period Contract:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and must be completed within _____days.

☐ **Fixed Period Contract with Renewals:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and part of the Contract more fully described in the attached specifications must be completed within _____ days. Upon completion of the work covered by the preceding sentence, the vendor agrees that maintenance, monitoring, or warranty services will be provided for _____ year(s) thereafter.

☑ **One Time Purchase:** The term of this Contract shall run from the issuance of the Award Document until all of the goods contracted for have been delivered, but in no event will this Contract extend for more than one fiscal year.

☐ **Other:** See attached.

4. NOTICE TO PROCEED: Vendor shall begin performance of this Contract immediately upon receiving notice to proceed unless otherwise instructed by the Agency. Unless otherwise specified, the fully executed Award Document will be considered notice to proceed.

5. QUANTITIES: The quantities required under this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below.

☐ **Open End Contract:** Quantities listed in this Solicitation are approximations only, based on estimates supplied by the Agency. It is understood and agreed that the Contract shall cover the quantities actually ordered for delivery during the term of the Contract, whether more or less than the quantities shown.

☐ **Service:** The scope of the service to be provided will be more clearly defined in the specifications included herewith.

☐ **Combined Service and Goods:** The scope of the service and deliverable goods to be provided will be more clearly defined in the specifications included herewith.

☑ **One Time Purchase:** This Contract is for the purchase of a set quantity of goods that are identified in the specifications included herewith. Once those items have been delivered, no additional goods may be procured under this Contract without an appropriate change order approved by the Vendor, Agency, Purchasing Division, and Attorney General's office.

6. EMERGENCY PURCHASES: The Purchasing Division Director may authorize the Agency to purchase goods or services in the open market that Vendor would otherwise provide under this Contract if those goods or services are for immediate or expedited delivery in an emergency. Emergencies shall include, but are not limited to, delays in transportation or an unanticipated increase in the volume of work. An emergency purchase in the open market, approved by the Purchasing Division Director, shall not constitute of breach of this Contract and shall not entitle the Vendor to any form of compensation or damages. This provision does not excuse the State from fulfilling its obligations under a One Time Purchase contract.

7. REQUIRED DOCUMENTS: All of the items checked below must be provided to the Purchasing Division by the Vendor as specified below.

☐ **BID BOND (Construction Only):** Pursuant to the requirements contained in W. Va. Code § 5-22-1(c), All Vendors submitting a bid on a construction project shall furnish a valid bid bond in the amount of five percent (5%) of the total amount of the bid protecting the State of West Virginia. The bid bond must be submitted with the bid.

☐ **PERFORMANCE BOND:** The apparent successful Vendor shall provide a performance bond in the amount of 100% of the contract. The performance bond must be received by the Purchasing Division prior to Contract award.

☐ **LABOR/MATERIAL PAYMENT BOND:** The apparent successful Vendor shall provide a labor/material payment bond in the amount of 100% of the Contract value. The labor/material payment bond must be delivered to the Purchasing Division prior to Contract award.

In lieu of the Bid Bond, Performance Bond, and Labor/Material Payment Bond, the Vendor may provide certified checks, cashier's checks, or irrevocable letters of credit. Any certified check, cashier's check, or irrevocable letter of credit provided in lieu of a bond must be of the same amount and delivered on the same schedule as the bond it replaces. A letter of credit submitted in lieu of a performance and labor/material payment bond will only be allowed for projects under $100,000. Personal or business checks are not acceptable. Notwithstanding the foregoing, West Virginia Code § 5-22-1 (d) mandates that a vendor provide a performance and labor/material payment bond for construction projects. Accordingly, substitutions for the performance and labor/material payment bonds for construction projects is not permitted.

☐ **MAINTENANCE BOND:** The apparent successful Vendor shall provide a two (2) year maintenance bond covering the roofing system. The maintenance bond must be issued and delivered to the Purchasing Division prior to Contract award.

☐ **LICENSE(S) / CERTIFICATIONS / PERMITS:** In addition to anything required under the Section of the General Terms and Conditions entitled Licensing, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits upon request and in a form acceptable to the State. The request may be prior to or after contract award at the State's sole discretion.

☐

☐

☐

☐

The apparent successful Vendor shall also furnish proof of any additional licenses or certifications contained in the specifications regardless of whether or not that requirement is listed above.

8. INSURANCE: The apparent successful Vendor shall furnish proof of the insurance identified by a checkmark below and must include the State as an additional insured on each policy prior to Contract award. The insurance coverages identified below must be maintained throughout the life of this contract. Thirty (30) days prior to the expiration of the insurance policies, Vendor shall provide the Agency with proof that the insurance mandated herein has been continued. Vendor must also provide Agency with immediate notice of any changes in its insurance policies, including but not limited to, policy cancelation, policy reduction, or change in insurers. The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether or not that insurance requirement is listed in this section.

Vendor must maintain:

☑ **Commercial General Liability Insurance** in at least an amount of: 1,000,000.00 per occurrence.

☐ **Automobile Liability Insurance** in at least an amount of: _____ per occurrence.

☐ **Professional/Malpractice/Errors and Omission Insurance** in at least an amount of: _____ per occurrence. Notwithstanding the forgoing, Vendor's are not required to list the State as an additional insured for this type of policy.

☐ **Commercial Crime and Third Party Fidelity Insurance** in an amount of: _____ per occurrence.

☐ **Cyber Liability Insurance** in an amount of: _____ per occurrence.

☐ **Builders Risk Insurance** in an amount equal to 100% of the amount of the Contract.

☐ **Pollution Insurance** in an amount of: _____ per occurrence.

☐ **Aircraft Liability** in an amount of: _____ per occurrence.

☑ **** State of West Virginia must be listed as additional insured on insurance certificate ****

☑ **** Certificate Holder Should Read as follows ****
State of WV
1900 Kanawha Blvd. E., Bldg. 5
Charleston, WV 25305

☐

☐

Notwithstanding anything contained in this section to the contrary, the Director of the Purchasing Division reserves the right to waive the requirement that the State be named as an additional insured on one or more of the Vendor's insurance policies if the Director finds that doing so is in the State's best interest.

9. WORKERS' COMPENSATION INSURANCE: The apparent successful Vendor shall comply with laws relating to workers compensation, shall maintain workers' compensation insurance when required, and shall furnish proof of workers' compensation insurance upon request.

10. [Reserved]

11. LIQUIDATED DAMAGES: This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other available remedy. Vendor shall pay liquidated damages in the amount specified below or as described in the specifications:

☐ _____ for _____

☐ Liquidated Damages Contained in the Specifications

12. ACCEPTANCE: Vendor's signature on its bid, or on the certification and signature page, constitutes an offer to the State that cannot be unilaterally withdrawn, signifies that the product or service proposed by vendor meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise indicated, and signifies acceptance of the terms and conditions contained in the Solicitation unless otherwise indicated.

13. PRICING: The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this Solicitation/Contract by the State. A Vendor's inclusion of price adjustment provisions in its bid, without an express authorization from the State in the Solicitation to do so, may result in bid disqualification. Notwithstanding the foregoing, Vendor must extend any publicly advertised sale price to the State and invoice at the lower of the contract price or the publicly advertised sale price.

14. PAYMENT IN ARREARS: Payment in advance is prohibited under this Contract. Payment may only be made after the delivery and acceptance of goods or services. The Vendor shall submit invoices, in arrears.

15. PAYMENT METHODS: Vendor must accept payment by electronic funds transfer and P-Card. (The State of West Virginia's Purchasing Card program, administered under contract by a banking institution, processes payment for goods and services through state designated credit cards.)

16. TAXES: The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

17. ADDITIONAL FEES: Vendor is not permitted to charge additional fees or assess additional charges that were not either expressly provided for in the solicitation published by the State of West Virginia or included in the unit price or lump sum bid amount that Vendor is required by the solicitation to provide. Including such fees or charges as notes to the solicitation may result in rejection of vendor's bid. Requesting such fees or charges be paid after the contract has been awarded may result in cancellation of the contract.

18. FUNDING: This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available.

19. CANCELLATION: The Purchasing Division Director reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract. The Purchasing Division Director may also cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-5.2.b.

20. TIME: Time is of the essence with regard to all matters of time and performance in this Contract.

21. APPLICABLE LAW: This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution, West Virginia Code or West Virginia Code of State Rules is void and of no effect.

22. COMPLIANCE WITH LAWS: Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendor acknowledges that it has reviewed, understands, and will comply with all applicable laws, regulations, and ordinances.

> **SUBCONTRACTOR COMPLIANCE:** Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to comply with all applicable laws, regulations, and ordinances. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

23. ARBITRATION: Any references made to arbitration contained in this Contract, Vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.

24. MODIFICATIONS: This writing is the parties' final expression of intent. Notwithstanding anything contained in this Contract to the contrary no modification of this Contract shall be binding without mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any change to existing contracts that adds work or changes contract cost, and were not included in the original contract, must be approved by the Purchasing Division and the Attorney General's Office (as to form) prior to the implementation of the change or commencement of work affected by the change.

25. WAIVER: The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.

26. SUBSEQUENT FORMS: The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by Vendor to the Agency or Purchasing Division such as price lists, order forms, invoices, sales agreements, or maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of Vendor's forms does not constitute acceptance of the terms and conditions contained thereon.

27. ASSIGNMENT: Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the Vendor without the express written consent of the Agency, the Purchasing Division, the Attorney General's office (as to form only), and any other government agency or office that may be required to approve such assignments.

28. WARRANTY: The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.

29. STATE EMPLOYEES: State employees are not permitted to utilize this Contract for personal use and the Vendor is prohibited from permitting or facilitating the same.

30. PRIVACY, SECURITY, AND CONFIDENTIALITY: The Vendor agrees that it will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the Agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the Agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in http://www.state.wv.us/admin/purchase/privacy/default.html.

31. YOUR SUBMISSION IS A PUBLIC DOCUMENT: Vendor's entire response to the Solicitation and the resulting Contract are public documents. As public documents, they will be disclosed to the public following the bid/proposal opening or award of the contract, as required by the competitive bidding laws of West Virginia Code §§ 5A-3-1 et seq., 5-22-1 et seq., and 5G-1-1 et seq. and the Freedom of Information Act West Virginia Code §§ 29B-1-1 et seq.

DO NOT SUBMIT MATERIAL YOU CONSIDER TO BE CONFIDENTIAL, A TRADE SECRET, OR OTHERWISE NOT SUBJECT TO PUBLIC DISCLOSURE.

Submission of any bid, proposal, or other document to the Purchasing Division constitutes your explicit consent to the subsequent public disclosure of the bid, proposal, or document. The Purchasing Division will disclose any document labeled "confidential," "proprietary," "trade secret," "private," or labeled with any other claim against public disclosure of the documents, to include any "trade secrets" as defined by West Virginia Code § 47-22-1 et seq. All submissions are subject to public disclosure without notice.

32. LICENSING: In accordance with West Virginia Code of State Rules § 148-1-6.1.e, Vendor must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agency or political subdivision. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Upon request, the Vendor must provide all necessary releases to obtain information to enable the Purchasing Division Director or the Agency to verify that the Vendor is licensed and in good standing with the above entities.

SUBCONTRACTOR COMPLIANCE: Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to be licensed, in good standing, and up-to-date on all state and local obligations as described in this section. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

33. ANTITRUST: In submitting a bid to, signing a contract with, or accepting a Award Document from any agency of the State of West Virginia, the Vendor agrees to convey, sell, assign, or transfer to the State of West Virginia all rights, title, and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to Vendor.

34. VENDOR CERTIFICATIONS: By signing its bid or entering into this Contract, Vendor certifies (1) that its bid or offer was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid or offer for the same material, supplies, equipment or services; (2) that its bid or offer is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this Solicitation in its entirety; understands the requirements, terms and conditions, and other information contained herein.

Vendor's signature on its bid or offer also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency. The individual signing this bid or offer on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid or offer or any documents related thereto on Vendor's behalf; that he or she is authorized to bind the Vendor in a contractual relationship; and that, to the best of his or her knowledge, the Vendor has properly registered with any State agency that may require registration.

35. VENDOR RELATIONSHIP: The relationship of the Vendor to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The Vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this Solicitation and resulting contract. Neither the Vendor, nor any employees or subcontractors of the Vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, etc. and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing.

Vendor shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

36. INDEMNIFICATION: The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

37. PURCHASING AFFIDAVIT: In accordance with West Virginia Code §§ 5A-3-10a and 5-22-1(i), the State is prohibited from awarding a contract to any bidder that owes a debt to the State or a political subdivision of the State, Vendors are required to sign, notarize, and submit the Purchasing Affidavit to the Purchasing Division affirming under oath that it is not in default on any monetary obligation owed to the state or a political subdivision of the state.

38. ADDITIONAL AGENCY AND LOCAL GOVERNMENT USE: This Contract may be utilized by other agencies, spending units, and political subdivisions of the State of West Virginia; county, municipal, and other local government bodies; and school districts ("Other Government Entities"), provided that both the Other Government Entity and the Vendor agree. Any extension of this Contract to the aforementioned Other Government Entities must be on the same prices, terms, and conditions as those offered and agreed to in this Contract, provided that such extension is in compliance with the applicable laws, rules, and ordinances of the Other Government Entity. A refusal to extend this Contract to the Other Government Entities shall not impact or influence the award of this Contract in any manner.

39. CONFLICT OF INTEREST: Vendor, its officers or members or employees, shall not presently have or acquire an interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder. Vendor shall periodically inquire of its officers, members and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Agency.

40. REPORTS: Vendor shall provide the Agency and/or the Purchasing Division with the following reports identified by a checked box below:

☐ Such reports as the Agency and/or the Purchasing Division may request. Requested reports may include, but are not limited to, quantities purchased, agencies utilizing the contract, total contract expenditures by agency, etc.

☐ Quarterly reports detailing the total quantity of purchases in units and dollars, along with a listing of purchases by agency. Quarterly reports should be delivered to the Purchasing Division via email at purchasing.requisitions@wv.gov.

41. BACKGROUND CHECK: In accordance with W. Va. Code § 15-2D-3, the Director of the Division of Protective Services shall require any service provider whose employees are regularly employed on the grounds or in the buildings of the Capitol complex or who have access to sensitive or critical information to submit to a fingerprint-based state and federal background inquiry through the state repository. The service provider is responsible for any costs associated with the fingerprint-based state and federal background inquiry.

After the contract for such services has been approved, but before any such employees are permitted to be on the grounds or in the buildings of the Capitol complex or have access to sensitive or critical information, the service provider shall submit a list of all persons who will be physically present and working at the Capitol complex to the Director of the Division of Protective Services for purposes of verifying compliance with this provision. The State reserves the right to prohibit a service provider's employees from accessing sensitive or critical information or to be present at the Capitol complex based upon results addressed from a criminal background check.

Service providers should contact the West Virginia Division of Protective Services by phone at (304) 558-9911 for more information.

42. PREFERENCE FOR USE OF DOMESTIC STEEL PRODUCTS: Except when authorized by the Director of the Purchasing Division pursuant to W. Va. Code § 5A-3-56, no contractor may use or supply steel products for a State Contract Project other than those steel products made in the United States. A contractor who uses steel products in violation of this section may be subject to civil penalties pursuant to W. Va. Code § 5A-3-56. As used in this section:

a. "State Contract Project" means any erection or construction of, or any addition to, alteration of or other improvement to any building or structure, including, but not limited to, roads or highways, or the installation of any heating or cooling or ventilating plants or other equipment, or the supply of and materials for such projects, pursuant to a contract with the State of West Virginia for which bids were solicited on or after June 6, 2001.

b. "Steel Products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed, or processed by a combination of two or more or such operations, from steel made by the open heath, basic oxygen, electric furnace, Bessemer or other steel making process. The Purchasing Division Director may, in writing, authorize the use of foreign steel products if:

c. The cost for each contract item used does not exceed one tenth of one percent (.1%) of the total contract cost or two thousand five hundred dollars ($2,500.00), whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project; or

d. The Director of the Purchasing Division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

43. PREFERENCE FOR USE OF DOMESTIC ALUMINUM, GLASS, AND STEEL: In Accordance with W. Va. Code § 5-19-1 et seq., and W. Va. CSR § 148-10-1 et seq., for every contract or subcontract, subject to the limitations contained herein, for the construction, reconstruction, alteration, repair, improvement or maintenance of public works or for the purchase of any item of machinery or equipment to be used at sites of public works, only domestic aluminum, glass or steel products shall be supplied unless the spending officer determines, in writing, after the receipt of offers or bids, (1) that the cost of domestic aluminum, glass or steel products is unreasonable or inconsistent with the public interest of the State of West Virginia, (2) that domestic aluminum, glass or steel products are not produced in sufficient quantities to meet the contract requirements, or (3) the available domestic aluminum, glass, or steel do not meet the contract specifications. This provision only applies to public works contracts awarded in an amount more than fifty thousand dollars ($50,000) or public works contracts that require more than ten thousand pounds of steel products.

The cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than twenty percent (20%) of the bid or offered price for foreign made aluminum, glass, or steel products. If the domestic aluminum, glass or steel products to be supplied or produced in a

"substantial labor surplus area", as defined by the United States Department of Labor, the cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than thirty percent (30%) of the bid or offered price for foreign made aluminum, glass, or steel products. This preference shall be applied to an item of machinery or equipment, as indicated above, when the item is a single unit of equipment or machinery manufactured primarily of aluminum, glass or steel, is part of a public works contract and has the sole purpose or of being a permanent part of a single public works project. This provision does not apply to equipment or machinery purchased by a spending unit for use by that spending unit and not as part of a single public works project.

All bids and offers including domestic aluminum, glass or steel products that exceed bid or offer prices including foreign aluminum, glass or steel products after application of the preferences provided in this provision may be reduced to a price equal to or lower than the lowest bid or offer price for foreign aluminum, glass or steel products plus the applicable preference. If the reduced bid or offer prices are made in writing and supersede the prior bid or offer prices, all bids or offers, including the reduced bid or offer prices, will be reevaluated in accordance with this rule.

44. INTERESTED PARTY SUPPLEMENTAL DISCLOSURE: W. Va. Code § 6D-1-2 requires that for contracts with an actual or estimated value of at least $1 million, the vendor must submit to the Agency a supplemental disclosure of interested parties reflecting any new or differing interested parties to the contract, which were not included in the original pre-award interested party disclosure, within 30 days following the completion or termination of the contract. A copy of that form is included with this solicitation or can be obtained from the WV Ethics Commission. This requirement does not apply to publicly traded companies listed on a national or international stock exchange. A more detailed definition of interested parties can be obtained from the form referenced above.

45. PROHIBITION AGAINST USED OR REFURBISHED: Unless expressly permitted in the solicitation published by the State, Vendor must provide new, unused commodities, and is prohibited from supplying used or refurbished commodities, in fulfilling its responsibilities under this Contract.

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

Matt Bailey, Senior Account Representative
(Name, Title)
Matt Bailey, Senior Account Representative
(Printed Name and Title)
256 Ragland Road, Beckley, WV, 24801
(Address)
(304) 252-8633
(Phone Number) / (Fax Number)
MatBailey@wesco.com
(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

WESCO Distribution, Inc.
(Company)

Matt Bailey, Senior Account Representative
(Authorized Signature) (Representative Name, Title)

Matt Bailey, Senior Account Representative
(Printed Name and Title of Authorized Representative)

12/10/2020
(Date)

(304) 252-8633 (304) 252-6327
(Phone Number) (Fax Number)

West Virginia Ethics Commission

Disclosure of Interested Parties to Contracts

(Required by *W. Va. Code* § 6D-1-2)

Name of Contracting Business Entity: WESCO Distribution **Address:** 256 Ragland Rd Beckley, WV 25801

Name of Authorized Agent: Matt Bailey **Address:** 256 Ragland Rd, Beckley, WV

Contract Number: _____ **Contract Description:** _____

Governmental agency awarding contract: _____

☐ **Check here if this is a Supplemental Disclosure**

List the Names of Interested Parties to the contract which are known or reasonably anticipated by the contracting business entity for each category below *(attach additional pages if necessary)*:

1. **Subcontractors or other entities performing work or service under the Contract**
   ☐ Check here if none, otherwise list entity/individual names below.

2. **Any person or entity who owns 25% or more of contracting entity (not applicable to publicly traded entities)**
   ☐ Check here if none, otherwise list entity/individual names below.

3. **Any person or entity that facilitated, or negotiated the terms of, the applicable contract (excluding legal services related to the negotiation or drafting of the applicable contract)**
   ☐ Check here if none, otherwise list entity/individual names below.

Signature: Matt Bailey Date Signed: 12-10-2020

Notary Verification

State of West Virginia, County of Wyoming:

I, Debra K Beavers, the authorized agent of the contracting business entity listed above, being duly sworn, acknowledge that the Disclosure herein is being made under oath and under the penalty of perjury.

Taken, sworn to and subscribed before me this 10th day of December, 2020.

Debra K Beavers
Notary Public's Signature

To be completed by State Agency:

Date Received by State Agency: _____

Date submitted to Ethics Commission: _____

Governmental agency submitting Disclosure: _____

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
DEBRA K. BEAVERS
Summit Community Bank
515 Appalachian Highway
Pineville, WV 24874
My Commission Expires March 08, 2021

Revised June 2018

Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Quote
Info Technology

Proc Folder: 807402			**Reason for Modification:**
Doc Description: CISCO ROUTERS & SWITCHES OR EQUAL (63210039)			
Proc Type: Central Contract - Fixed Amt			
Date Issued	**Solicitation Closes**	**Solicitation No**	**Version**
2020-11-23	2020-12-10 13:30	CRFQ 0803 DOT2100000062	1

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code: 000000161227
Vendor Name : WESCO Distribution, Inc.
Address : 256
Street : Ragland Road
City : Beckley
State : West Virginia **Country :** United States **Zip :** 25801
Principal Contact : Matt Bailey, Senior Account Representative
Vendor Contact Phone: (304) 923-6352 **Extension:** N/A

FOR INFORMATION CONTACT THE BUYER
John W Estep
304-558-2566
john.w.estep@wv.gov

Vendor Signature X **FEIN#** 251723345 **DATE** 12/10/2020

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION
REQUEST FOR QUOTATION: The West Virginia Department of Transportation (WVDOT) is soliciting bids to establish a contract for the one-time purchase of hardware, software, licensing and support equipment required for the WVDOT network infrastructure. Equipment will be located at WVDOT offices located throughout the state. This equipment is intended to provide data connectivity. Per the Bid Requirements, Specifications, Terms and Conditions attached to this Solicitation.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 1	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:
3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 1 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 2	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:
3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 2 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
3	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 3	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 3 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
4	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 4	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 4 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
5	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 1	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or Equal with Year 1 Smart Net Coverage.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
6	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 2	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or Equal with Year 2 Smart Net Coverage.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
7	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 3	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or equal with Year 3 Smart Net coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
8	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 4	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or equal with Year 4 Smart Net coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
9	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 1	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 1 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
10	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 2	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 2 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
11	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 3	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 3 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
12	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 4	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 4 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
13	3.1.4 Extreme Networks 12 Port Switch or Equal	95.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.4 Extreme Networks 12 Port Switch or Equal

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
14	3.1.5 Extreme Networks 48 Port Switch or Equal	75.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.5 Extreme Networks 48 Port Switch or Equal

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
15	3.1.6 Extreme Networks 24 Port Switch or Equal	20.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.6 Extreme Networks 24 Port Switch or Equal

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Tech Questions Due by 10:00am	2020-12-03

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Centralized Request for Quote
Info Technology

Proc Folder:	807402	**Reason for Modification:**
Doc Description:	ADDENDUM NO_1 CISCO ROUTERS & SWITCHES OR EQUAL	Vendor Questions and responses
Proc Type:	Central Contract - Fixed Amt	

Date Issued	Solicitation Closes	Solicitation No	Version
2020-12-07	2020-12-10 13:30	CRFQ 0803 DOT2100000062	2

BID RECEIVING LOCATION

BID CLERK
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON ST E
CHARLESTON WV 25305
US

VENDOR

Vendor Customer Code: 000000161227
Vendor Name : WESCO Distribution, Inc.
Address : 256
Street : Ragland Road
City : Beckley
State : West Virginia **Country :** United States **Zip :** 25801
Principal Contact : Matt Bailey, Senior Account Representative
Vendor Contact Phone: (304) 923-6352 **Extension:** N/A

FOR INFORMATION CONTACT THE BUYER
John W Estep
304-558-2566
john.w.estep@wv.gov

Vendor Signature X **FEIN#** 251723345 **DATE** 12/10/2020

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION
ADDENDUM NO.1 Addendum No.1 issued to publish and distribute the attached information to the Vendor Community REQUEST FOR QUOTATION: The West Virginia Department of Transportation (WVDOT) is soliciting bids to establish a contract for the one-time purchase of hardware, software, licensing and support equipment required for the WVDOT network infrastructure. Equipment will be located at WVDOT offices located throughout the state. This equipment is intended to provide data connectivity. Per the Bid Requirements, Specifications, Terms and Conditions attached to this Solicitation.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 1	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:
3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 1 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 2	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:
3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 2 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
3	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 3	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 3 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
4	3.1.1 Cisco ISR 4321 Series Chassis Bundle or Equal-Year 4	11.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.1 CISCO ISR 4321 Series Chassis Bundle or equal with Year 4 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
5	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 1	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or Equal with Year 1 Smart Net Coverage.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
6	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 2	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or Equal with Year 2 Smart Net Coverage.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
7	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 3	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or equal with Year 3 Smart Net coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
8	3.1.2 Cisco ISR 4331 Series Chassis Bundle or Equal-Year 4	7.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description:

3.1.2 CISCO ISR 4331 Series Chassis Bundle or equal with Year 4 Smart Net coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
9	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 1	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 1 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
10	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 2	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 2 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
11	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 3	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 3 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
12	3.1.3 Cisco ISR 1101 Series Port Router or Equal-Year 4	60.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.3 Cisco ISR 1101 4 port router or equal with Year 4 Smart Net Coverage

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
13	3.1.4 Extreme Networks 12 Port Switch or Equal	95.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.4 Extreme Networks 12 Port Switch or Equal

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
14	3.1.5 Extreme Networks 48 Port Switch or Equal	75.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:
3.1.5 Extreme Networks 48 Port Switch or Equal

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US	DIVISION OF HIGHWAYS INFORMATION SERVICE DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM 920 CHARLESTON WV 25305-0430 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
15	3.1.6 Extreme Networks 24 Port Switch or Equal	20.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description:

3.1.6 Extreme Networks 24 Port Switch or Equal

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Tech Questions Due by 10:00am	2020-12-03

	Document Phase	Document Description	Page 10
DOT2100000062	Final	ADDENDUM NO_1 CISCO ROUTERS & SWITCHES OR EQUAL	

ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (*W. Va. Code* §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: WESCO Distribution, Inc.

Authorized Signature: Matthew Basley Date: 12-10-2020

State of West Virginia

County of Wyoming, to-wit:

Taken, subscribed, and sworn to before me this 10th day of December, 2020

My Commission expires March 6, 2021, 20__

AFFIX SEAL HERE

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
DEBRA K. BEAVERS
Summit Community Bank
515 Appalachian Highway
Pineville, WV 24874
My Commission Expires March 06, 2021

NOTARY PUBLIC Debra K Beavers