



West Virginia Purchasing Division

2019 Washington Street, East
Charleston, WV 25305
Telephone: 304-558-2306
General Fax: 304-558-6026
Bid Fax: 304-558-3970

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.

Header @ 1

List View

General Information | Contact | Default Values | Discount | Document Information

Procurement Folder: 220813

Procurement Type: Central Purchase Order

Vendor ID: 000000210570

Legal Name: ALPHA TECHNOLOGIES INC

Alias/DBA:

Total Bid: \$47,448.59

Response Date: 10/11/2016

Response Time: 10:59

SO Doc Code: CRFQ

SO Dept: 0702

SO Doc ID: TAX1700000003

Published Date: 10/4/16

Close Date: 10/11/16

Close Time: 13:30

Status: Closed

Solicitation Description: Addendum 1 - Cisco Switches and Router or Equal

Total of Header Attachments: 1

Total of All Attachments: 1



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

**State of West Virginia
 Solicitation Response**

Proc Folder : 220813

Solicitation Description : Addendum 1 - Cisco Switches and Router or Equal

Proc Type : Central Purchase Order

Date issued	Solicitation Closes	Solicitation Response	Version
	2016-10-11 13:30:00	SR 0702 ESR10111600000001583	1

VENDOR
000000210570 ALPHA TECHNOLOGIES INC

Solicitation Number: CRFQ 0702 TAX1700000003

Total Bid : \$47,448.59

Response Date: 2016-10-11

Response Time: 10:59:41

Comments:

FOR INFORMATION CONTACT THE BUYER
 Michelle L Childers
 (304) 558-2063
 michelle.l.childers@wv.gov

Signature on File **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	Cisco 3850 Series 48 Port Switches or Equal w/warranty	5.00000	EA	\$5,353.880000	\$26,769.40

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description : Cisco 3850 Series 48 Port Switches or equal w/warranty

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	Cisco 3850 Series 24 Port Switches or Equal w/warranty	1.00000	EA	\$4,082.510000	\$4,082.51

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description : Cisco 3850 Series 24 Port Switches or equal w/warranty

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
3	Cisco 2960X 48 Port Switches or Equal w/warranty	2.00000	EA	\$2,225.620000	\$4,451.24

Comm Code	Manufacturer	Specification	Model #
43222501			

Extended Description : Cisco 2960X 48 Port Switches or equal w/warranty.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
4	Cisco ASA 5508-X Security Firewall or Equal w/warranty	1.00000	EA	\$3,316.320000	\$3,316.32

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description : Cisco ASA 5508-X Security Firewall or equal w/warranty.

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
5	Cisco 2951 Router or Equal w/warranty	1.00000	EA	\$8,829.120000	\$8,829.12

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description :	Cisco 2951 Router or equal w/warranty.
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Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

State of West Virginia
 Request for Quotation
 21 - Info Technology

Proc Folder: 220813

Doc Description: Addendum 1 - Cisco Switches and Router or Equal

Proc Type: Central Purchase Order

Date Issued	Solicitation Closes	Solicitation No	Version
2016-10-04	2016-10-11 13:30:00	CRFQ 0702 TAX1700000003	2

BID RECEIVING LOCATION

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

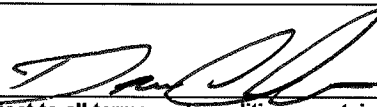
VENDOR

Vendor Name, Address and Telephone Number:

Alpha Technologies Inc.
 4003 Outlook Drive
 Hurricane, WV 25526
 304-721-8987

FOR INFORMATION CONTACT THE BUYER

Michelle L Childers
 (304) 558-2063
 michelle.l.childers@wv.gov

Signature X  FEIN # 55-0774279 DATE 10/10/2016

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

ADDITIONAL INFORMATION:

Addendum

Addendum No. 1 issued to publish and distribute the attached information to the vendor community.

The West Virginia Purchasing Division is soliciting bids on behalf of the West Virginia Tax Division to establish a contract for the one time purchase of network equipment.

INVOICE TO		SHIP TO	
OPERATIONS DIVISION TAX DIVISION OF PO BOX 11748		INFORMATION TECHNOLOGY DIVISION TAX DIVISION OF 1001 LEE STREET	
CHARLESTON	WV25339-1748	CHARLESTON	WV 25301
US		US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	Cisco 3850 Series 48 Port Switches or Equal w/warranty	5.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description :

Cisco 3850 Series 48 Port Switches or equal w/warranty

INVOICE TO		SHIP TO	
OPERATIONS DIVISION TAX DIVISION OF PO BOX 11748		INFORMATION TECHNOLOGY DIVISION TAX DIVISION OF 1001 LEE STREET	
CHARLESTON	WV25339-1748	CHARLESTON	WV 25301
US		US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	Cisco 3850 Series 24 Port Switches or Equal w/warranty	1.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description :

Cisco 3850 Series 24 Port Switches or equal w/warranty

INVOICE TO		SHIP TO	
OPERATIONS DIVISION TAX DIVISION OF PO BOX 11748		INFORMATION TECHNOLOGY DIVISION TAX DIVISION OF 1001 LEE STREET	
CHARLESTON	WV25339-1748	CHARLESTON	WV 25301
US		US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
3	Cisco 2960X 48 Port Switches or Equal w/warranty	2.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222501			

Extended Description :
Cisco 2960X 48 Port Switches or equal w/warranty.

INVOICE TO		SHIP TO	
OPERATIONS DIVISION TAX DIVISION OF PO BOX 11748		INFORMATION TECHNOLOGY DIVISION TAX DIVISION OF 1001 LEE STREET	
CHARLESTON	WV25339-1748	CHARLESTON	WV 25301
US		US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
4	Cisco ASA 5508-X Security Firewall or Equal w/warranty	1.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222612			

Extended Description :
Cisco ASA 5508-X Security Firewall or equal w/warranty.

INVOICE TO		SHIP TO	
OPERATIONS DIVISION TAX DIVISION OF PO BOX 11748		INFORMATION TECHNOLOGY DIVISION TAX DIVISION OF 1001 LEE STREET	
CHARLESTON	WV25339-1748	CHARLESTON	WV 25301
US		US	

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
5	Cisco 2951 Router or Equal w/warranty	1.00000	EA		

Comm Code	Manufacturer	Specification	Model #
43222609			

Extended Description :

Cisco 2951 Router or equal w/warranty.

TAX1700000003	Document Phase Final	Document Description Addendum 1 - Cisco Switches and Router or Equal	Page 5 of 5
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ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

SOLICITATION NUMBER: CRFQ TAX1700000003

Addendum Number: 01

The purpose of this addendum is to modify the solicitation identified as ("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
- Attachment of vendor questions and responses
- Attachment of pre-bid sign-in sheet
- Correction of error
- Other

Description of Modification to Solicitation:

This addendum is issued to modify the solicitation per the attached documentation and the following:

1. To publish the vendor questions and agency answers.

No other changes.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

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.

ATTACHMENT A

Cisco Switches and Router or Equal
CRFQ TAX1700000003
Vendor Questions & Answers

Q1. Do you have the actual part numbers the end user is looking for? There are lots of variations of most of these items. If not, is there someone I can speak with on the technical details?

A1. The technical details are found in 3.1 Mandatory Contract Item Requirements.

Q2. Is Refurbished an option?

A2. Each piece of equipment must be new and factory sealed.

Q3. Are these access layer switches?

o If so, will these switches be layer 2 or layer 3?

o **LAN Lite**

▪ LAN Lite is the least-expensive and least-robust IOS version. It's considered entry-level, and is only bundled with. It only supports Layer 2 routing, with a bare minimum of VoIP enhancement and security services.

o **LAN Base**

▪ LAN Base is a good choice for small-to-medium sized businesses that want a robust and flexible network OS. As the name implies, it's largely aimed at networks installed in a single location with a single LAN, and lacks most features associated with maintaining a WAN or other distributed network. LAN Base is still heavily reliant on Layer 2+ static routing, with few options for dynamic packet routes. It does, however, offer much more robust VoIP options than LAN Lite, including ingress policing, AutoQoS, and DSCP mapping. Likewise, security options are significantly better than LAN Lite, with DHCP snooping, IPSG, Cisco Identity 4.0 and 802.1x port protections.

o **IP Base**

▪ IP Base has one big upgrade in its fully-featured Layer 3 dynamic packet routing, alongside support for Layer 2 static routes. You also get much more robust edge security, with full support for VLANs and encrypted VPN tunneling. TrustSec, SXP, and 802.1AE security systems are also included in the hardware. Likewise, VoIP is improved further, with AutoQoS systems optimizing voice/data transmission on a per-VLAN basis.

o **IP Services**

▪ Aimed almost exclusively at very large-scale operations managing vast networks between many offices. There are relatively few differences in features between IP Services and IP Base, with most of the differences

involving the size and scale of the systems involved. IP Services supports more locations, more users, etc, with scalability that's nearly unlimited. IP Services does come with much more comprehensive Layer 3 routing options, as this is one of the biggest challenges as a network continues to grow.

A3. The switches in 3.1.1 and 3.1.2 must be layer 3, the switches found in 3.1.3 must be layer 2.

Q4. For the 5508 are FirePower services or VPN capabilities needed for this device? If so, provide details?

A4. Refer to 3.1.4.1, VPN capability is not required.

Q5. For the 2951 please know that this model is no longer the preferred model for ISRs as the end of sale date is nearing. We can supply a quote for the 4K equivalent, but need to know how this device will be used so any and all details for this device have to be listed so we can quote it properly. This includes all circuits that will connect to the device and all applications that need to run this device.

A5. A newer version of the 2951 would be a better option due to the mandatory requirement of a 5 year warranty is required.

Q6. The router specifications in Section 3.1.5 indicate that a PVDM3-16 is to be included. The router specified has a PVDM3-32 installed by default. Considering this, does the additional PVDM3-16 still need to be included in the quote?

A6. An additional PVDM3-16 is not required. As long as the device has a PVDM3-16 or equal/greater that will suffice.

Q7. Sorry I'm just able to email this. But I need all the exact parts you want into your Cisco configuration due to all Cisco routers and switches are built to order.

A7. Refer to 3.1 Mandatory Contract Item Requirements, the vendor will be responsible for quoting the equipment necessary to meet the requirements.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: _____

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)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> 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 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.

Alpha Technologies Inc.

Company


Authorized Signature

10/10/2016

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.
Revised 6/8/2012

WV-10
Approved / Revised
12/16/15

State of West Virginia VENDOR PREFERENCE CERTIFICATE

Certification and application is hereby made for Preference in accordance with *West Virginia Code*, §5A-3-37. (Does not apply to construction contracts). *West Virginia Code*, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the *West Virginia Code*. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Vendor Preference, if applicable.

1. **Application is made for 2.5% vendor preference for the reason checked:**
Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or,**
 Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification;
 Bidder is a resident vendor partnership, association, or corporation with at least eighty percent of ownership interest of bidder held by another entity that meets the applicable four year residency requirement; **or,**
 Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; **or,**
2. **Application is made for 2.5% vendor preference for the reason checked:**
Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or,**
3. **Application is made for 2.5% vendor preference for the reason checked:**
Bidder is a nonresident vendor that employs a minimum of one hundred state residents, or a nonresident vendor which has an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia and employs a minimum of one hundred state residents, and for purposes of producing or distributing the commodities or completing the project which is the subject of the bidder's bid and continuously over the entire term of the project, on average at least seventy-five percent of the bidder's employees or the bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years and the vendor's bid; **or,**
4. **Application is made for 5% vendor preference for the reason checked:**
Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; **or,**
5. **Application is made for 3.5% vendor preference who is a veteran for the reason checked:**
Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; **or,**
6. **Application is made for 3.5% vendor preference who is a veteran for the reason checked:**
Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.
7. **Application is made for preference as a non-resident small, women- and minority-owned business, in accordance with *West Virginia Code* §5A-3-59 and *West Virginia Code of State Rules*.**
Bidder has been or expects to be approved prior to contract award by the Purchasing Division as a certified small, women- and minority-owned business.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) rescind the contract or purchase order; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: Alpha Technologies Inc.


Signed: 

Date: 10/10/2016


Title: Sales Executive

*Check any combination of preference consideration(s) indicated above, which you are entitled to receive.

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.


 _____ David Chambers Sales Executive
 (Name, Title)
 _____ David Chambers Sales Executive
 (Printed Name and Title)
 _____ 4003 Outlook Drive, Hurricane, WV 25526
 (Address)
 _____ Ph. 304-721-8987 Fax 304-201-2610
 (Phone Number) / (Fax Number)
 _____ dchambers@alpha-tech.us
 (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.

_____ Alpha Technologies Inc.
 (Company)

 _____ David Chambers, Sales Executive
 (Authorized Signature) (Representative Name, Title)

_____ David Chambers Sales Executive
 (Printed Name and Title of Authorized Representative)

_____ 10/10/2016
 (Date)

_____ Phone 304-721-8987 Fax 304-201-2610
 (Phone Number) (Fax Number)

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: 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 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: Alpha Technologies Inc.

Authorized Signature:  Date: 10/10/2016

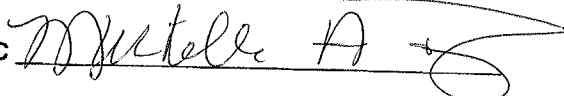
State of West Virginia

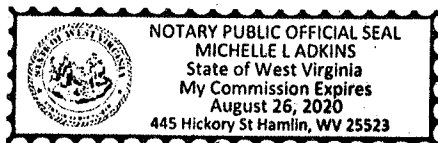
County of Putnam, to-wit:

Taken, subscribed, and sworn to before me this 10 day of October, 2016.

My Commission expires August 26th, 2020.

AFFIX SEAL HERE

NOTARY PUBLIC 
Purchasing Affidavit (Revised 08/01/2015)



INSTRUCTIONS TO VENDORS SUBMITTING BIDS

1. REVIEW DOCUMENTS THOROUGHLY: The attached documents contain a solicitation for bids. Please read these instructions and all documents attached in their entirety. These instructions provide critical information about requirements that if overlooked could lead to disqualification of a Vendor's bid. All bids must be submitted in accordance with the provisions contained in these instructions and the Solicitation. Failure to do so may result in disqualification of Vendor's bid.

2. MANDATORY TERMS: The Solicitation may contain mandatory provisions identified by the use of the words "must," "will," and "shall." Failure to comply with a mandatory term in the Solicitation will result in bid disqualification.

3. PREBID MEETING: The item identified below shall apply to this Solicitation.

A pre-bid meeting will not be held prior to bid opening

A **NON-MANDATORY PRE-BID** meeting will be held at the following place and time:

A **MANDATORY PRE-BID** meeting will be held at the following place and time:

All Vendors submitting a bid must attend the mandatory pre-bid meeting. Failure to attend the mandatory pre-bid meeting shall result in disqualification of the Vendor's bid. No one person attending the pre-bid meeting may represent more than one Vendor.

An attendance sheet provided at the pre-bid meeting shall serve as the official document verifying attendance. The State will not accept any other form of proof or documentation to verify attendance. Any person attending the pre-bid meeting on behalf of a Vendor must list on the attendance sheet his or her name and the name of the Vendor he or she is representing.

Additionally, the person attending the pre-bid meeting should include the Vendor's E-Mail address, phone number, and Fax number on the attendance sheet. It is the Vendor's responsibility to locate the attendance sheet and provide the required information. Failure to complete the attendance sheet as required may result in disqualification of Vendor's bid.

All Vendors should arrive prior to the starting time for the pre-bid. Vendors who arrive after the starting time but prior to the end of the pre-bid will be permitted to sign in, but are charged with knowing all matters discussed at the pre-bid.

Questions submitted at least five business days prior to a scheduled pre-bid will be discussed at the pre-bid meeting if possible. Any discussions or answers to questions at the pre-bid meeting are preliminary in nature and are non-binding. Official and binding answers to questions will be published in a written addendum to the Solicitation prior to bid opening.

4. VENDOR QUESTION DEADLINE: Vendors may submit questions relating to this Solicitation to the Purchasing Division. Questions must be submitted in writing. All questions must be submitted on or before the date listed below and to the address listed below in order to be considered. A written response will be published in a Solicitation addendum if a response is possible and appropriate. Non-written discussions, conversations, or questions and answers regarding this Solicitation are preliminary in nature and are nonbinding.

Submitted e-mails should have solicitation number in the subject line.

Question Submission Deadline: September 27, 2016 at 9:00 AM EST.

Submit Questions to: Michelle Childers
 2019 Washington Street, East
 Charleston, WV 25305
 Fax: (304) 558-4115 (Vendors should not use this fax number for bid submission)
 Email: Michelle.L.Childers@wv.gov

5. VERBAL COMMUNICATION: Any verbal communication between the Vendor and any State personnel is not binding, including verbal communication at the mandatory pre-bid conference. Only information issued in writing and added to the Solicitation by an official written addendum by the Purchasing Division is binding.

6. BID SUBMISSION: All bids must be submitted electronically through wvOASIS or signed and delivered by the Vendor to the Purchasing Division at the address listed below on or before the date and time of the bid opening. Any bid received by the Purchasing Division staff is considered to be in the possession of the Purchasing Division and will not be returned for any reason. The Purchasing Division will not accept bids, modification of bids, or addendum acknowledgment forms via e-mail. Acceptable delivery methods include electronic submission via wvOASIS, hand delivery, delivery by courier, or facsimile.

The bid delivery address is:
 Department of Administration, Purchasing Division
 2019 Washington Street East
 Charleston, WV 25305-0130

A bid that is not submitted electronically through wvOASIS should contain the information listed below on the face of the envelope or the bid may be rejected by the Purchasing Division.:

SEALED BID:
 BUYER:
 SOLICITATION NO.:
 BID OPENING DATE:
 BID OPENING TIME:
 FAX NUMBER:

The Purchasing Division may prohibit the submission of bids electronically through wvOASIS at its sole discretion. Such a prohibition will be contained and communicated in the wvOASIS system resulting in the Vendor's inability to submit bids through wvOASIS. Submission of a response to an Expression or Interest or Request for Proposal is not permitted in wvOASIS.

For Request For Proposal ("RFP") Responses Only: In the event that Vendor is responding to a request for proposal, the Vendor shall submit one original technical and one original cost proposal plus N/A convenience copies of each to the Purchasing Division at the address shown above. Additionally, the Vendor should identify the bid type as either a technical or cost proposal on the face of each bid envelope submitted in response to a request for proposal as follows:

BID TYPE: (This only applies to CRFP)

- Technical
 Cost

7. BID OPENING: Bids submitted in response to this Solicitation will be opened at the location identified below on the date and time listed below. Delivery of a bid after the bid opening date and time will result in bid disqualification. For purposes of this Solicitation, a bid is considered delivered when confirmation of delivery is provided by wvOASIS (in the case of electronic submission) or when the bid is time stamped by the official Purchasing Division time clock (in the case of hand delivery).

Bid Opening Date and Time: October 11, 2016 at 1:30 PM EST.

Bid Opening Location: Department of Administration, Purchasing Division
 2019 Washington Street East
 Charleston, WV 25305-0130

- 8. ADDENDUM ACKNOWLEDGEMENT:** Changes or revisions to this Solicitation will be made by an official written addendum issued by the Purchasing Division. Vendor should acknowledge receipt of all addenda issued with this Solicitation by completing an Addendum Acknowledgment Form, 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.
- 9. BID FORMATTING:** Vendor should type or electronically enter the information onto its bid to prevent errors in the evaluation. Failure to type or electronically enter the information may result in bid disqualification.
- 10. ALTERNATES:** Any model, brand, or specification listed in this Solicitation establishes the acceptable level of quality only and is not intended to reflect a preference for, or in any way favor, a particular brand or vendor. Vendors may bid alternates to a listed model or brand provided that the alternate is at least equal to the model or brand and complies with the required specifications. The equality of any alternate being bid shall be determined by the State at its sole discretion. Any Vendor bidding an alternate model or brand should clearly identify the alternate items in its bid and should include manufacturer's specifications, industry literature, and/or any other relevant documentation demonstrating the equality of the alternate items. Failure to provide information for alternate items may be grounds for rejection of a Vendor's bid.
- 11. EXCEPTIONS AND CLARIFICATIONS:** The Solicitation contains the specifications that shall form the basis of a contractual agreement. Vendor shall clearly mark any exceptions, clarifications, or other proposed modifications in its bid. Exceptions to, clarifications of, or modifications of a requirement or term and condition of the Solicitation may result in bid disqualification.
- 12. COMMUNICATION LIMITATIONS:** In accordance with West Virginia Code of State Rules §148-1-6.6, communication with the State of West Virginia or any of its employees regarding this Solicitation during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited without prior Purchasing Division approval. Purchasing Division approval for such communication is implied for all agency delegated and exempt purchases.
- 13. REGISTRATION:** Prior to Contract award, the apparent successful Vendor must be properly registered with the West Virginia Purchasing Division and must have paid the \$125 fee, if applicable.
- 14. UNIT PRICE:** Unit prices shall prevail in cases of a discrepancy in the Vendor's bid.
- 15. PREFERENCE:** Vendor Preference may only be granted upon written request and only in accordance with the West Virginia Code § 5A-3-37 and the West Virginia Code of State Rules. A Vendor Preference Certificate form has been attached hereto to allow Vendor to apply for the preference. Vendor's failure to submit the Vendor Preference Certificate form with its bid will result in denial of Vendor Preference. Vendor Preference does not apply to construction projects.

16. SMALL, WOMEN-OWNED, OR MINORITY-OWNED BUSINESSES: For any solicitations publicly advertised for bid, in accordance with West Virginia Code §5A-3-37(a)(7) and W. Va. CSR § 148-22-9, any non-resident vendor certified as a small, women-owned, or minority-owned business under W. Va. CSR § 148-22-9 shall be provided the same preference made available to any resident vendor. Any non-resident small, women-owned, or minority-owned business must identify itself as such in writing, must submit that writing to the Purchasing Division with its bid, and must be properly certified under W. Va. CSR § 148-22-9 prior to contract award to receive the preferences made available to resident vendors. Preference for a non-resident small, women-owned, or minority owned business shall be applied in accordance with W. Va. CSR § 148-22-9.

17. WAIVER OF MINOR IRREGULARITIES: The Director reserves the right to waive minor irregularities in bids or specifications in accordance with West Virginia Code of State Rules § 148-1-4.6.

18. ELECTRONIC FILE ACCESS RESTRICTIONS: Vendor must ensure that its submission in wvOASIS can be accessed by the Purchasing Division staff immediately upon bid opening. The Purchasing Division will consider any file that cannot be immediately opened and/or viewed at the time of the bid opening (such as, encrypted files, password protected files, or incompatible files) to be blank or incomplete as context requires, and are therefore unacceptable. A vendor will not be permitted to unencrypt files, remove password protections, or resubmit documents after bid opening if those documents are required with the bid.

19. NON-RESPONSIBLE: The Purchasing Division Director reserves the right to reject the bid of any vendor as Non-Responsible in accordance with W. Va. Code of State Rules § 148-1-5.3, when the Director determines that the vendor submitting the bid does not have the capability to fully perform, or lacks the integrity and reliability to assure good-faith performance.”

20. ACCEPTANCE/REJECTION: The State may accept or reject any bid in whole, or in part in accordance with W. Va. Code of State Rules § 148-1-4.5. and § 148-1-6.4.b.”

21. 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.

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: 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 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. 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 _____ months in total. Automatic renewal of this Contract is prohibited. Notwithstanding the foregoing, Purchasing Division approval is not required on agency delegated or exempt purchases. Attorney General approval may be required for vendor terms and conditions.

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, the vendor agrees that maintenance, monitoring, or warranty services will be provided for one year thereafter with an additional _____ successive one year renewal periods or multiple renewal periods of less than one year provided that the multiple renewal periods do not exceed _____ months in total. Automatic renewal of this Contract is prohibited.

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 a 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 _____. The performance bond must be received by the Purchasing Division prior to Contract award. On construction contracts, the performance bond must be 100% of the Contract value.

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.

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.

INSURANCE: The apparent successful Vendor shall furnish proof of the following insurance prior to Contract award and shall list the state as a certificate holder:

Commercial General Liability Insurance: In the amount of _____ or more.

Builders Risk Insurance: In an amount equal to 100% of the amount of the Contract.

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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 above.

LICENSE(S) / CERTIFICATIONS / PERMITS: In addition to anything required under the Section entitled Licensing, of the General Terms and Conditions, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits prior to Contract award, in a form acceptable to the Purchasing Division.

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

8. 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.

9. LITIGATION BOND: The Director reserves the right to require any Vendor that files a protest of an award to submit a litigation bond in the amount equal to one percent of the lowest bid submitted or \$5,000, whichever is greater. The entire amount of the bond shall be forfeited if the hearing officer determines that the protest was filed for frivolous or improper purpose, including but not limited to, the purpose of harassing, causing unnecessary delay, or needless expense for the Agency. All litigation bonds shall be made payable to the Purchasing Division. In lieu of a bond, the protester may submit a cashier's check or certified check payable to the Purchasing Division. Cashier's or certified checks will be deposited with and held by the State Treasurer's office. If it is determined that the protest has not been filed for frivolous or improper purpose, the bond or deposit shall be returned in its entirety.

10. LIQUIDATED DAMAGES: Vendor shall pay liquidated damages in the amount of

for _____

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.

11. 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.

12. 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.

13. PAYMENT: 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.

14. PURCHASING CARD ACCEPTANCE: The State of West Virginia currently utilizes a Purchasing Card program, administered under contract by a banking institution, to process payment for goods and services. The Vendor must accept the State of West Virginia's Purchasing Card for payment of all orders under this Contract unless the box below is checked.

Vendor is not required to accept the State of West Virginia's Purchasing Card as payment for all goods and services.

15. 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.

16. 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.

17. 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.

18. 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.

- 19. TIME:** Time is of the essence with regard to all matters of time and performance in this Contract.
- 20. 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.
- 21. COMPLIANCE:** 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.
- 22. 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.
- 23. 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.
- 24. 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.
- 25. 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.
- 26. 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. Notwithstanding the foregoing, Purchasing Division approval may or may not be required on certain agency delegated or exempt purchases.

27. 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.

28. 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.

29. BANKRUPTCY: In the event the Vendor files for bankruptcy protection, the State of West Virginia may deem this Contract null and void, and terminate this Contract without notice.

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. 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.

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, all Vendors are required to sign, notarize, and submit the Purchasing Affidavit stating that neither the Vendor nor a related party owe a debt to the State in excess of \$1,000. The affidavit must be submitted prior to award, but should be submitted with the Vendor's bid. A copy of the Purchasing Affidavit is included herewith.

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"). 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. If the Vendor does not wish to extend the prices, terms, and conditions of its bid and subsequent contract to the Other Government Entities, the Vendor must clearly indicate such refusal in its bid. 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.

REQUEST FOR QUOTATION
Network Equipment

SPECIFICATIONS

1. **PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of the West Virginia Tax Division to establish a contract for the one time purchase of network equipment.
2. **DEFINITIONS:** The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.
 - 2.1 **“Contract Item”** means network equipment as more fully described by these specifications.
 - 2.2 **“Pricing Page”** means the pages, contained in wvOASIS or attached as Exhibit A, upon which Vendor should list its proposed price for the Contract Items.
 - 2.3 **“Solicitation”** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.
 - 2.4 **“FIPS”** means Federal Information Processing Standard.
 - 2.5 **“RJ-45”** means a 8-pin/8-position plug or jack is commonly used to connect computers onto Ethernet-based local area networks
 - 2.6 **“Mini USB”** means a version of Universal Serial Bus, which is an industry standard developed in the mid 1990’s that defines the cables, connectors and communication protocols used in a bus connection, communication, and power supply between computers and electronic devices.
 - 2.7 **“Cryptographic modules”** means any combination of hardware, firmware or software that implements cryptographic functions such as encryption, decryption, digital signatures, authentication techniques and random number generation.
 - 2.8 **“PoE”** means Power over Ethernet which describes any of several standardized or ad-hoc systems which pass electrical power along with data on twisted pair Ethernet cabling.
 - 2.9 **“Layer 3 Switch”** means a specialized hardware device used in network routing. Layer 3 switches technically share much in common with traditional routers. Both can support the same routing protocols. Both inspect incoming packets and make dynamic routing decisions based on the source and destination addresses inside.

REQUEST FOR QUOTATION
Network Equipment

- 2.10 “GB” means a measure of computer data storage capacity that is roughly equivalent to 1 billion bytes.
- 2.11 “SFP+” stands for small form-factor pluggable transceiver.
- 2.12 “SWITCH” is a computer networking device that connects devices together on a computer network, by using packet switching to receive, process and forward data to the destination device.
- 2.13 “VLAN” stands for virtual LAN, which is any broadcast domain that is partitioned and isolated in a computer network at the data link layer. LAN is an abbreviation of local area network.

3. GENERAL REQUIREMENTS:

- 3.1 **Mandatory Contract Item Requirements:** Contract Item must meet or exceed the mandatory requirements listed below.

- 3.1.1 **5 Cisco Catalyst 3850 Series Switches (WS-C3850-48F) or Equal**

- 3.1.1.1 Each switch must have 48 10/100/1000 Ethernet ports
- 3.1.1.2 Each switch must have Cryptographic modules that have been tested and validated under the Cryptographic Module Validation Program as meeting requirements for FIPS PUB 140-1 and FIPS PUB 140-2. (<http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401vend.htm>)
- 3.1.1.3 Each switch must have at least two SFP+ uplinks
- 3.1.1.4 Each switch must be PoE and have at least 800Watt of available PoE Power
- 3.1.1.5 Each switch must be Layer 3
- 3.1.1.6 Each switch must include a rack mounting kit
- 3.1.1.7 Each switch must be brand new and factory sealed

REQUEST FOR QUOTATION
Network Equipment

- 3.1.1.8** Each switch must have a 5 year warranty which includes a 8 hours per day x 5 days a week next business day response time, technical support, and hardware coverage.
- 3.1.2 1 Cisco Catalyst 3850 Series Switches (WS-C3850-24T) or equal**
- 3.1.2.1** Each switch must have at least 24 10/100/1000 ports
- 3.1.2.2** Each switch must have cryptographic modules that have been tested and validated under the Cryptographic Module Validation Program as meeting requirements for FIPS PUB 140-1 and FIPS PUB 140-2 (<http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401vend.htm>)
- 3.1.2.3** Each switch must have at least two SFP+ uplinks
- 3.1.2.4** Each switch must be Layer 3
- 3.1.2.5** Each switch must include a rack mounting kit
- 3.1.2.6** Each switch must be brand new and factory sealed
- 3.1.2.7** Each switch must have a 5 year warranty which includes a next business day response time, technical support, and hardware coverage.
- 3.1.3 2 Cisco 2960-X Series Switches (WS-C2960X-48FPD-L)**
- 3.1.3.1** Each switch must have 48 10/100/1000 ports
- 3.1.3.2** Each switch must have cryptographic modules that have been tested and validated under the Cryptographic Module Validation Program as meeting requirements for FIPS PUB 140-1 and FIPS PUB 140-2

REQUEST FOR QUOTATION
Network Equipment

(<http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401vend.htm>)

- 3.1.3.3 Each switch must have at least two SFP+ uplinks
 - 3.1.3.4 Each switch must be capable of stacking with the Agency's existing Cisco 2960-S switches
 - 3.1.3.5 Each switch must include a rack mounting kit
 - 3.1.3.6 Each switch must be brand new and factory sealed
 - 3.1.3.7 Each switch must have a 5 year warranty which includes a 8 hours per day x 5 days a week next business day response time, technical support, and hardware coverage
- 3.1.4 1 Cisco ASA 5508-X Security Appliance (ASA5508-K9) or Equal**
- 3.1.4.1 The device must provide firewall functionality, advanced threat protection, and advanced breach detection and remediation.
 - 3.1.4.2 The device must have cryptographic modules that have been tested and validated under the Cryptographic Module Validation Program as meeting requirements for FIPS PUB 140-1 and FIPS Pub 140-2
(<http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401vend.htm>)
 - 3.1.4.3 The device must have at least 8GB of memory
 - 3.1.4.4 The device must be able to support at least 50 VLANs
 - 3.1.4.5 The device must have at least 1 RJ-45 and 1 Mini USB serial ports
 - 3.1.4.6 The device must have a rack mounting kit included

REQUEST FOR QUOTATION
Network Equipment

3.1.4.7 The device must be brand new and factory sealed

3.1.4.8 The device must have a 5 year warranty which includes a 8 hours per day x 5 days a week next business day response time, technical support, and hardware coverage

3.1.5 1 Cisco 2951 Router (C2951-CME-SRST/K9) or equal

3.1.5.1 The router must have a Cisco IP Unified Communications Voice/Fax Module voice interface installed (VIC2-2FXO) or equal.

3.1.5.2 The router must have a Cisco 16-Channel High-Density Voice and Video Digital Signal Process installed (PVDM3-16) or equal.

3.1.5.3 The router must have cryptographic modules that have been tested and validated under the Cryptographic Module Validation Program as meeting requirements for FIPS PUB 140-1 and FIPS PUB140-2
(<http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401vend.htm>)

3.1.5.4 The router must have a rack mounting kit included

3.1.5.5 The router must be brand new and factory sealed

3.1.5.6 The router must have a 5 year warranty which includes a 8 hours per day x 5 days a week next business day response time, technical support, and hardware coverage

4. CONTRACT AWARD:

4.1 **Contract Award:** The Contract is intended to provide Agencies with a purchase price for the Contract Items. The Contract shall be awarded to the Vendor that provides the Contract Items meeting the required specifications for the lowest overall TOTAL BID AMOUNT as shown on the Pricing Pages.

REQUEST FOR QUOTATION
Network Equipment

- 4.1.1 Vendor should include with their bid a copy of any Software Terms and Conditions or licenses that the State of West Virginia or the Agency will have to agree or accept as a part of this solicitation. **This information will be required before Purchase Order is issued.**
- 4.1.2 Vendor should include a copy of Maintenance Terms and Conditions or Licenses that the State of West Virginia or the Agency will be required to agree or accept as a part of this solicitation. **This information will be required before the Purchase Order is issued.**
- 4.2 **Pricing Page:** Vendor should complete the Pricing Page by providing the unit price multiplied per quantity to get the extended price. Vendor should complete the Pricing Page in full as failure to complete the Pricing Page in its entirety may result in Vendor's bid being disqualified.

Vendor should electronically enter the information into the Pricing Pages through wvOASIS, if available, or as an electronic document. In most cases, the Vendor can request an electronic copy of the Pricing Pages for bid purposes by sending an email request to the following address: Michelle.Childers@wv.gov.

Vendor's who wish to respond to a Centralized Request for Quotation (CRFQ) online may submit information through the State's wvOASIS Vendor Self Service (VSS). Vendors should download the Exhibit "A": Pricing Page that is attached separately to the CRFQ and published to the VSS.

Vendors must complete this form with their prices information and include it as an attachment to their online response.

If unable to respond online Vendor must submit the Exhibit "A" Proposal Pricing Pages with your bid prior to the scheduled bid opening date.

If submitting an "or Equal" per the Vendor's submitted Exhibit "A" Pricing Page Vendor must note this on their submitted bid response. Vendor may upon request, be required to provide samples of submitted or Equals product. Vendor should provide any product brochures with their submitted bid response. This information may be required before award of contract.

5. PAYMENT:

REQUEST FOR QUOTATION
Network Equipment

- 5.1 **Payment:** Vendor shall accept payment in accordance with the payment procedures of the State of West Virginia.

6. DELIVERY AND RETURN:

- 6.1 **Shipment and Delivery:** Vendor shall ship the Contract Items immediately after being awarded this Contract and receiving a purchase order. Vendor shall deliver the Contract Items within ten (10) calendar days after receiving a purchase order. Contract Items must be delivered to Agency at 1001 Lee Street East, Charleston, WV 25301
- 6.2 **Late Delivery:** The Agency placing the order under this Contract must be notified in writing if the shipment of the Contract Items will be delayed for any reason. Any delay in delivery that could cause harm to an Agency will be grounds for cancellation of the Contract, and/or obtaining the Contract Items from a third party.
- 6.3 **Delivery Payment/Risk of Loss:** Vendor shall deliver the Contract Items F.O.B. destination to the Agency's location.
- 6.4 **Return of Unacceptable Items:** If the Agency deems the Contract Items to be unacceptable, the Contract Items shall be returned to Vendor at Vendor's expense and with no restocking charge. Vendor shall either make arrangements for the return within five (5) days of being notified that items are unacceptable, or permit the Agency to arrange for the return and reimburse Agency for delivery expenses. If the original packaging cannot be utilized for the return, Vendor will supply the Agency with appropriate return packaging upon request. All returns of unacceptable items shall be F.O.B. the Agency's location. The returned product shall either be replaced, or the Agency shall receive a full credit or refund for the purchase price, at the Agency's discretion.
- 6.5 **Return Due to Agency Error:** Items ordered in error by the Agency will be returned for credit within 30 days of receipt, F.O.B. Vendor's location. Vendor shall not charge a restocking fee if returned products are in a resalable condition. Items shall be deemed to be in a resalable condition if they are unused and in the original packaging. Any restocking fee for items not in a resalable condition shall be the lower of the Vendor's customary restocking fee or 5% of the total invoiced value of the returned items.

7 VENDOR DEFAULT:

- 7.1 The following shall be considered a vendor default under this Contract.

REQUEST FOR QUOTATION
Network Equipment

- 7.1.1 Failure to provide Contract Items in accordance with the requirements contained herein.
 - 7.1.2 Failure to comply with other specifications and requirements contained herein.
 - 7.1.3 Failure to comply with any laws, rules, and ordinances applicable to the Contract Services provided under this Contract.
 - 7.1.4 Failure to remedy deficient performance upon request.
- 7.2 The following remedies shall be available to Agency upon default.
- 7.2.1 Immediate cancellation of the Contract.
 - 7.2.2 Immediate cancellation of one or more release orders issued under this Contract.
 - 7.2.3 Any other remedies available in law or equity.

Exhibit A - Pricing Page
Network Equipment

Item #	Item Description	Unit of Measure	Unit Price	Qty	Extended Price
3.1.1	Cisco Catalyst 3850 Switches (WS-C-3850-48F) or Equal	Each	5353. ⁸⁰	5	26769. ⁴⁰
3.1.2	Cisco Catalyst 3850 Series Switches (WS-C3850-24T) or Equal	Each	4082. ⁵¹	1	4082. ⁵¹
3.1.3	Cisco 2960 X Series Switches (WS-C2960X-48FPD-L) or Equal	Each	2225. ⁶²	2	4451. ²⁴
3.1.4	Cisco ASA 5508-X Security Appliance (ASA 5508-K9) or Equal	Each	3316. ³²	1	3316. ³²
3.1.5	Cisco 2951 Router (C2951-CME-SRST/K9) or Equal	Each	8829. ¹²	1	8829. ¹²
				Total Bid Amount	47,448.⁵⁹

Main: 3042017485

Email: dchambers@alpha-tech.us

Web: www.alpha-tech.us

We have prepared a quote for you

TAX1700000003 Brocade

Quote #007272

Version 1

Alpha Technologies

Main: 3042017485

Email: dchambers@alpha-tech.us

Web: www.alpha-tech.us

Prepared For:

WV State Tax Department
 George Mitchell
 1206 Quarrier St
 Charleston, WV 25301
 george.c.mitchell@wv.gov

Prepared By



David Chambers
 Phone: 3047218987
 Email: dchambers@alpha-tech.us

Quote ID: 007272

Date: Tuesday, October 11, 2016

Expres: Tuesday, November 08, 2016

Hardware

Description	Price	Qty	Ext. Price
 ICX7450-48P-E Brocade ICX 7450-48P Layer 3 Switch - 48 Ports - Manageable - Stack Port - 6 x Expansion Slots - 1000Base-T, 10GBase-X, 40GBase-X - Uplink Port - Modular - 48 x Network, 4 x Expansion Slot, 2 x Expansion Slot - Twisted Pair, Optical Fiber - Gigabit Ethernet	\$3,737.45	5	\$18,687.25
ICX7450-PREM-LIC ICX 7450 LAYER 3 PREM S/W LIC	\$440.21	5	\$2,201.05
ICX7450-SVL-RMT-5 Brocade Essential Direct Support Remote Support - 5 Year - Service - 24 x 7 - Technical - Electronic Service	\$1,019.82	5	\$5,099.10
40G-QSFP-QSFP-C-0101 Brocade Twinax Network Cable - Twinaxial for Network Device - 3.28 ft - 1 Pack - 1 x QSFP+ Network - 1 x QSFP+ Network - Black	\$156.40 53.53 00	5	\$782.00
 ICX7450-24P-E Brocade Layer 3 Switch - 48 Ports - Manageable - Stack Port - 6 x Expansion Slots - 1000Base-T, 10GBase-X, 40GBase-X - Uplink Port - Modular - 24 x Network, 4 x Expansion Slot, 2 x Expansion Slot - Twisted Pair, Optical Fiber - Gigabit Ether	\$2,466.08	1	\$2,466.08
ICX7450-PREM-LIC ICX 7450 LAYER 3 PREM S/W LIC	\$440.21	1	\$440.21
ICX7450-SVL-RMT-5 Brocade Essential Direct Support Remote Support - 5 Year - Service - 24 x 7 - Technical - Electronic Service	\$1,019.82	1	\$1,019.82
40G-QSFP-QSFP-C-0101 Brocade Twinax Network Cable - Twinaxial for Network Device - 3.28 ft - 1 Pack - 1 x QSFP+ Network - 1 x QSFP+ Network - Black	\$156.40 4082.50	1	\$156.40









Alpha Technologies

Main: 3042017485

Email: dchambers@alpha-tech.us

Web: www.alpha-tech.us

Hardware

Description	Price	Qty	Ext. Price
 ICX7250-48P-2X10G Brocade ICX 7250 Switch - 48 Ports - Manageable - Stack Port - 10 x Expansion Slots - 10/100/1000Base-TX, 10GBase-X - Uplink Port - Modular - 48 x Network, 10 x Expansion Slot - Optical Fiber, Twisted Pair - Gigabit Ethernet, 10 Gigabit Ethernet - 10 x SF	\$1,981.83	2	\$3,963.66
 10G-SFP+ TWX-0101 1PK 1M DA SFP+ COP	\$46.92	2	\$93.84
ICX7250-SVL-RMT-2 2YR ESSENTIAL REM SUP	\$196.87	2	\$393.74
 ASA5508-K9 ASA 5508-X FIREPOWER SVC 8GE AC 3DES AES	\$1,654.06	1	\$1,654.06
 CON-SNT-ASA5508K 8X5XNBD SMARTNET	\$324.92	5	\$1,624.60
 ASA5508-BRACKET= ASA 5508-X BRKT SPARE	\$37.66	1	\$37.66
 C2951-CME-SRST/K9 2951 VOICE BDL PVD3-32 FL-CME-SRST-25 U	\$4,865.82	1	\$4,865.82
 CON-SNT-2951CMST SMARTNET 8X5XNBD 2951 VOICE BDL W/ UC LI	\$745.58	5	\$3,727.90
 VIC2-2FXO CTO CISCO 2PT VOICE I/F CARD FXO UNIV	\$235.40	1	\$235.40
Hardware Subtotal			\$47,448.59

2225.62

1624.60

3316.32

3727.90

8829.12

Alpha Technologies

Main: 3042017485

Email: dchambers@alpha-tech.us

Web: www.alpha-tech.us

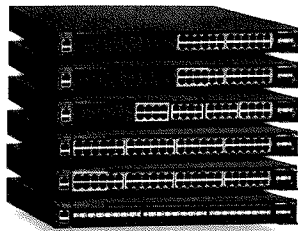
Quote Summary

Description	Amount
Hardware	\$47,448.59
Subtotal	\$47,448.59
Tax	\$0.00
Total	\$47,448.59

Signature _____

Date _____

Brocade ICX 7450 Switch



HIGHLIGHTS

- Offers ultimate flexibility and "pay as you grow" scalability in a modular design with three expansion slots for a choice of 1 GbE, 10 GbE, or 40 GbE uplinks, and a service module
- Supports next-generation 802.11ac Wave 2 wireless enterprise access points with 2.5 GbE ports
- Delivers market-leading stacking scalability of up to 12 switches per stack, 960 Gbps of aggregated stacking bandwidth, and long-distance stacking to enable single point management
- Provides OpenFlow support in true hybrid port mode, enabling a gradual transition to Software-Defined Networking (SDN) without disruption
- Offers Power over HDBaseT (PoH), to power video surveillance and video conferencing equipment, VDI terminals, and HD displays
- Meets compliance and data confidentiality requirements across corporate networks and cloud deployments by extending IPsec VPN to the wiring closet

Enterprise Stackable Switch Delivers Premium Capabilities and Ultimate Flexibility

The Brocade® ICX® 7450 Switch delivers the performance, flexibility, and scalability required for enterprise Gigabit Ethernet (GbE) access deployment. It offers market-leading stacking density with up to 12 switches (576 1 GbE and 48 1/10 GbE ports) per stack and combines chassis-level performance and reliability with the flexibility, cost-effectiveness, and "pay as you grow" scalability of a stackable solution. The mid-market stackable switch is one of the first in its class to offer 40 GbE uplinks, enabling enterprises to dramatically increase their network capacity while using their existing optical wire infrastructure. In addition, the Brocade ICX 7450 is the industry's first stackable switching solution to combine the performance and flexibility of network switching with the advantages of site-to-site IPsec VPN security to ensure end-to-end data integrity without the need for dedicated encryption appliances.

The unique design of the Brocade ICX 7450 provides three modular slots, offering up to 12 1/10 GbE SFP/SFP+ ports, 12 10GBASE-T ports, or up to three 40 GbE QSFP+ ports for uplink or stacking. As a result, the Brocade ICX 7450 can easily deliver sufficient bandwidth between the edge and aggregation layers to support expanding video traffic, VDI adoption, and high-speed wireless 802.11ac deployment. Additionally, the Brocade ICX 7450 delivers high performance across all ports for flawless support of latency-sensitive applications.

The Brocade ICX 7450 is an ideal network solution for campus network 1 GbE and 2.5 GbE access or small aggregation deployment with 10 GbE or 40 GbE uplinks to the core. The Brocade ICX 7450 also makes a very suitable data center Top-of-Rack (ToR) solution, delivering a mix of 1 GbE and 10 GbE server connectivity ports with 10 GbE or 40 GbE uplinks to the data center aggregation or core.

Scaling Out Ports as Demand Grows

The Brocade ICX 7450 is easy to deploy, manage, and integrate into both new and existing networks. Organizations can buy only what they need today, and easily

BROCADE CAMPUS FABRIC TECHNOLOGY

Brocade Campus Fabric technology brings campus networks into the modern era to better support seamless wireless mobility, security, and ease of application deployment. This innovative technology collapses multiple network layers into a single logical switch, flattening the network and eliminating deployment complexity while simplifying network management and reducing operating costs.

Brocade Campus Fabric technology enables organizations to build networks that deliver:

- **Consolidated management:** Reduces unnecessary network layers to create large management domains that eliminate individual switch touch points, reducing maintenance time and costs.
- **Shared network services:** Allows premium and entry-level switches to mesh together into a single logical switch and share advanced Layer 2/3 services, delivering lower price-per-port functionality without compromising performance.
- **Scale-out networking:** Integrates high-performance, fixed form-factor switches to create a single distributed logical switch that is independent of physical location and allows organizations to add ports whenever and wherever needed across the campus without adding complexity.

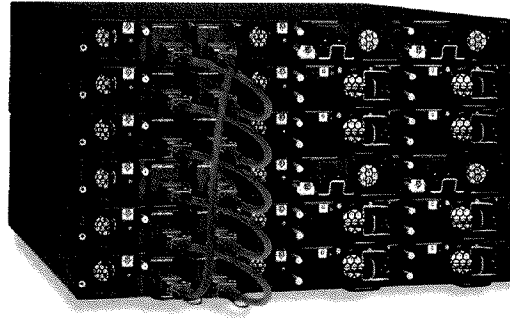


Figure 1: Up to 12 Brocade ICX 7450 switches can be stacked together using two full-duplex QSFP+ 40 Gbps ports that provide a fully redundant backplane with 960 Gbps of stacking bandwidth.

scale out as demand grows and new technologies emerge.

With three modular slots, the Brocade ICX 7450 enables organizations to grow their networks when necessary. Organizations can initially deploy 1 GbE or 10 GbE uplink ports and upgrade to 40 GbE ports on-demand with a new, high-speed module.

The Brocade ICX 7450 also offers a low-cost entry point. By providing the flexibility of a stackable switch, the Brocade ICX 7450 saves organizations from having to invest in a costly chassis upfront and tie up valuable capital. Instead, they can buy a single Brocade ICX 7450 Switch to get started and add new Brocade ICX 7450 Switches to the stack as their business grows.

Integrating High-Performance IPsec Service

As organizations move to a hybrid cloud architecture with geographically dispersed business partners, concerns about security breaches are increasing. Many organizations seek to better meet compliance and protect their data in transit—whether across the Internet or the enterprise network. Brocade offers an industry-first stackable switching solution that delivers encryption from the wiring closet, providing a cost-effective way to ensure data security and integrity across the premises without needing to purchase dedicated encryption appliances.

The Brocade ICX 7450 switch with the integrated IPsec VPN service module consolidates network switching and encryption to provide unprecedented VPN deployment flexibility and cost savings. By initiating an IPsec tunnel from the Brocade ICX 7450 for transporting selected traffic, organizations save the time and reduce the costs from having to install and manage encryption software on individual computers or deploy purpose-built encryption appliances.

The Brocade ICX 7450 Service Module provides hardware-based acceleration for IPsec VPNs using Advanced Encryption Standards (AES). It leverages programmable hardware technology to future-proof data protection, enabling more capabilities to be added as business needs evolve.

Brocade Campus Fabric Technology: Extending Options and Scalability

Brocade Campus Fabric technology, offered for Brocade ICX 7250*, 7450, and 7750 Switches, extends network options and scalability. It integrates premium Brocade ICX 7750, midrange Brocade ICX 7450, and entry-level Brocade ICX 7250 Switches, collapsing network access, aggregation, and core layers into a single logical switch. This logical device

* Support on the Brocade ICX 7250 to be available in a future release.

shares network services while reducing management touch points and network hops through a single-layer design spanning the entire campus network. These powerful deployments deliver equivalent or better functionality than large, rigid modular chassis systems, but with significantly lower costs and smaller carbon footprints.

Brocade ICX switches support a distributed chassis deployment model that uses standards-based optics and cabling interface connections to help ensure maximum distance between campus switches—up to 10 km—and minimum cabling costs. This gives organizations the flexibility to deliver ports wherever they are needed on campus at a fraction of the cost.

BROCADE ICX 7450 SWITCH AND CONTROLLER INTEROPERABILITY

The Brocade ICX 7450 Switch operates seamlessly with the Brocade SDN Controller and the applications running on the controller. This gives organizations the flexibility to move toward a dynamic infrastructure, benefiting from network application developments that help meet the operational or regulatory requirements of their industries.

Table 1: Brocade ICX 7450 models.

Brocade ICX 7450 Product Family

All Brocade ICX 7450 models offer three modular slots for interchangeable uplink/stacking modules (one in the front, two in the back), dual power supply slots, dual fan trays, one RJ-45 network management port, one mini USB serial management port, and one USB storage port on the front panel.



Brocade ICX 7450-24 Switch
24×10/100/1000 Mbps RJ-45 ports



Brocade ICX 7450-24P Switch
24×10/100/1000 Mbps RJ-45 PoE+ ports with eight pre-assigned ports supporting PoH (95 W)



Brocade ICX 7450-32ZP Switch
24×10/100/1000 Mbps RJ-45 PoE+ ports with eight pre-assigned ports supporting PoH (95 W) and 8×100/1000 Mbps/2.5 GbE RJ-45 PoE+ ports



Brocade ICX 7450-48 Switch
48×10/100/1000 Mbps RJ-45 ports



Brocade ICX 7450-48P Switch
48×10/100/1000 Mbps RJ-45 PoE+ ports with eight pre-assigned ports supporting PoH (95 W)



Brocade ICX 7450-48F Switch
48×100/1000 Mbps SFP ports



Figure 2: Brocade ICX 7450 rear view shown with two optional Brocade ICX7400-IX40GQ QSFP+ uplink/stacking modules, two AC power supplies, and two fan trays.

The distributed chassis design future-proofs campus networks by allowing networks to easily and cost-effectively expand in scale and capabilities.

Flexible, Long-Distance Stacking for the Most Demanding Enterprise Environments

Brocade Ethernet switch stacking technology makes it possible to stack up to 12 Brocade ICX 7450 Switches together into a single logical switch using standard QSFP+ or SFP+ stacking ports. This allows the Brocade ICX 7450 to deliver a class-leading 960 Gbps of aggregated stacking bandwidth and offer simple and robust expandability for future growth at the network edge (see Figure 1).

A selection of standard QSFP+ or SFP+ copper cables or standard QSFP+ or SFP+ optics can be used to stack Brocade ICX 7450 Switches together, enabling stacking over distance and thereby eliminating the need for stacked switches to be colocated in the same wiring closet. This stacked logical switch also has only a

single IP address to simplify management and offers transparent STP-free traffic forwarding and shared Link Aggregation Groups (LAG) across a pool of up to 576 1 GbE ports and 48 10 GbE ports. When new switches join the stack, they automatically inherit the stack's existing configuration file, enabling plug-and-play network expansion.

Brocade stacking technology also delivers high availability, enabling instantaneous hitless failover to a standby stack controller if the master stack controller fails. In addition, organizations can use hot-insertion and removal of stack members to avoid interrupting network services.

Simplified, Open-Standards-based Management and Monitoring

The Brocade ICX 7450 provides simplified, standards-based management capabilities that help organizations reduce administrative time and effort while securing their networks.

sFlow-based "Always-On" Network Monitoring

sFlow is a modern, standards-based network export protocol (RFC 3176) that addresses many of the challenges that network managers face today. By embedding sFlow hardware support into the Brocade ICX 7450, Brocade delivers an "always-on" technology that operates with wire-speed performance. sFlow dramatically reduces implementation costs compared to traditional network monitoring solutions that rely on mirrored ports, probes, and line-tap technologies. Moreover, sFlow gives organizations full, enterprise-wide monitoring capability for every port in the network.

Simplified, Automated Deployment with Auto-Provisioning

The Brocade ICX 7450 supports Zero Touch Provisioning, simplifying deployment with a truly plug-and-play experience. Organizations can use this feature to automate IP address and feature configuration of the switches without requiring a highly trained network engineer onsite. When the switches power up, they automatically receive an IP address and configuration from DHCP and Trivial File Transport Protocol (TFTP) servers. At this time, the switches can also automatically receive a software update to be at the same code revision as currently installed switches.

Open-Standards Management

The Brocade ICX 7450 includes an industry-standard Command Line Interface (CLI) and supports Secure Shell (SSHv2), Secure Copy (SCP), and SNMPv3 to restrict and encrypt management communications to the

Table 2: Port and service module options for the Brocade ICX 7450.

Brocade ICX 7450 Port and Service Module Options

Five different optional modules are offered for the Brocade ICX 7450. These modules are interchangeable and can be inserted in the three modular slots within the Brocade ICX 7450.[†]

Brocade ICX7400-4X1GF Module	4-port 100 Mbps/1 GbE SFP
Brocade ICX7400-4X10GF Module	4-port 1/10 GbE SFP/SFP+ for uplink or stacking
Brocade ICX7400-4X10GC Module	4-port 1/10 GbE 10GBASE-T copper
Brocade ICX7400-1X40GQ Module	1-port 40 GbE QSFP+ for uplink or stacking
Brocade ICX7400-SERVICE-MOD Module	Service module for IPsec VPN encryption

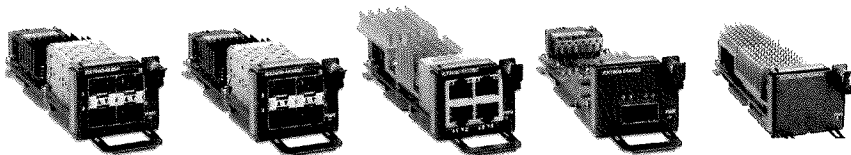


Figure 3: Five different optional port modules are offered for the Brocade ICX 7450 with a choice of 1 GbE SFP, 10 GbE SFP/SFP+, 10GBASE-T, and 40 GbE QSFP+ options and an IPsec VPN service module.

[†] The Brocade ICX7400-1X40GQ module cannot be installed in the front-facing slot of the 48-port Brocade ICX 7450 models (Brocade ICX 7450-48, 7450-48P, 7450-48F, 7450-32ZP). The Brocade ICX7400-4X1GF module cannot be installed in the rear slots of any model of the Brocade ICX 7450 Switch and is not supported by the Brocade ICX 7450-32ZP model.

Table 3: Power supply options for the Brocade ICX 7450.

Brocade ICX 7450 Power Supply Options	
The Brocade ICX 7450 offers a selection of PoE/non-PoE and AC/DC power supply options with front-to-back or back-to-front airflow cooling options. The DC power supply can be installed in either PoE or no-PoE switches.	
RPS15-E power supply	Non-PoE 250 W AC with front-to-back airflow
RPS15-I power supply	Non-PoE 250 W AC with back-to-front airflow
RPS16-E power supply	PoE 1,000 W AC with front-to-back airflow
RPS16-I power supply	PoE 1,000 W AC with back-to-front airflow
RPS16DC-E power supply	PoE 510 W DC with front-to-back airflow
RPS16DC-I power supply	PoE 510 W DC with back-to-front airflow



Figure 4: The Brocade ICX 7450 offers a choice of 250 W AC, 1,000 W AC, or 510 W DC power supply options. All power supplies are available with front-to-back or back-to-front airflow.

system. In addition, support for Terminal Access Controller Access Control System (TACACS/TACACS+) and RADIUS authentication helps ensure secure operator access.

Out-of-Band Management

The Brocade ICX 7450 includes a 10/100/1000 Mbps RJ-45 Ethernet port dedicated to out-of-band management, providing a remote path to manage the switches, regardless of the status or configuration of the data ports.

SDN-Enabled Programmatic Control of the Network

Software-Defined Networking (SDN) is a powerful new network paradigm designed for the world's most demanding networking environments and promises breakthrough levels of customization,

security, and efficiency. The Brocade ICX 7450 enables SDN by supporting the OpenFlow 1.3 protocol, which facilitates communication between the Brocade SDN Controller and the underlying network infrastructure.

In today's increasingly mobile world, organizations are looking to OpenFlow and SDN to achieve programmability in the campus LAN. The business needs driving SDN deployment are improved Quality of Service (QoS), enhanced security, and management simplification. With new policies such as BYOD significantly impacting campus networks, SDN is a powerful solution that better prioritizes and forwards traffic based on the context of a flow and to easily enforce granular policies for regulatory compliance or security reasons.

With hybrid-port mode on the Brocade ICX 7450 and all other Brocade ICX 7000 series switches, organizations can run traditional protocols and OpenFlow-directed flows at the same time. The Brocade ICX family supports the Brocade SDN Controller and other OpenDaylight-based controllers, enabling organizations to benefit from programmatic control through gradual transition of their network into the controller domain without disruption. Brocade ICX 7450 hardware support for OpenFlow ensures these traffic flows at line-rate speeds.

Unified Wired/Wireless Network Management with Brocade Network Advisor

Managing enterprise campus networks continues to become more complex due to the growth in services that rely on wired and wireless networks. Services such as Internet, e-mail, video conferencing, real-time collaboration, and distance learning all have specific configuration and management requirements. At the same time, organizations face increasing demand to provide uninterrupted services for high-quality voice and Unified Communications (UC), wireless mobility, and multimedia applications.

To reduce complexity and the time spent managing these environments, the easy-to-use Brocade Network Advisor discovers, manages, and deploys configurations to groups of IP devices. By using Brocade Network Advisor, organizations can configure Virtual LANs (VLANs) within the network, manage wireless access points, and execute commands on specific IP

devices or groups of IP devices. sFlow-based proactive monitoring is ideal for performing network-wide troubleshooting, generating traffic reports, and gaining visibility into network activity from the edge to the core. Brocade Network Advisor also centralizes the management of the entire family of Brocade wired products and Open Mobility partners' wireless products.

Ready for Next-Generation Wireless Technology

Between the phenomenal expansion of wireless networks and the fast-paced evolution of enterprise wireless technology, wired networks are being pushed to their limits. At the same time, the current lifecycle for wireless network technologies is much shorter than it is for wired Ethernet networks, meaning that today's wireless networks will likely be upgraded two or three times over the life of the wired network. It is therefore critical that organizations choose a wired network solution capable of supporting next-generation wireless technology.

The Brocade ICX 7450 is designed to handle next-generation 802.11ac Wave 2 wireless access points. The Brocade ICX 7450-32ZP offers 8x2.5 GbE ports to connect multigigabit wireless access points. Moreover, the switch's non-blocking architecture offers up to 240 Gbps of uplink bandwidth with up to 3x40 GbE uplink ports, ensuring smooth end-to-end traffic flow from the wireless edge to the core.

EEE Power Savings

The Brocade ICX 7450 Switch supports the IEEE 802.3az standard for Energy Efficient Ethernet (EEE), reducing power consumption during periods of low utilization. Ports are placed into a low power mode when no data is being transmitted.

Enterprise-Class Availability

When every second matters, Brocade ICX 7450 switches help deliver continuous availability to optimize the user experience. Brocade stacking technology delivers high availability, performing real-time state synchronization across the stack and enabling instantaneous hitless failover to a standby controller in the unlikely event of a failure of the master stack controller. Organizations also can use hot-insertion/removal of stack members to avoid interrupting service when adding a switch to increase the capacity of a stack or replacing a switch that needs servicing.

In addition to stack-level high availability, Brocade ICX 7450 Switches include system-level high-availability features, such as dual hot-swappable, load-sharing, and redundant power supplies. The modular design also has dual hot-swappable fan trays. These features provide another level of availability for the campus wiring closet, all in a compact form factor.

Support for PoH to Power Next-Generation Edge Devices

The Brocade ICX 7450 can deliver both power and data across network connections, providing a single-cable solution for the latest edge devices. In addition to supporting the Power over Ethernet (PoE/PoE+) standards, the Brocade ICX 7450 also supports Power over HDBaseT (PoH). This new, high power standard delivers up to 95 watts per port through a standard Ethernet cable, simplifying the wiring of next-generation Ethernet-connected devices such as large HD displays, video surveillance equipment, and VDI thin terminals, enabling data and power to be carried by a single Ethernet wire. The PoE/PoE+ and PoH capabilities reduce the number of required power receptacles and power adapters while increasing reliability and wiring flexibility.

With a 1,500-watt power budget per switch (with two power supplies), the Brocade ICX 7450 24- and 48-port PoE models can supply up to Class 4 PoE+ power (30 watts) to every port and PoH power (95 watts) on eight dedicated ports.

Full Layer 3 Capabilities

Brocade ICX 7450 Switches offer powerful IPv4 and IPv6 Layer 3 switching capabilities. Organizations can use optional premium Layer 3 features (available as an option)—such as IPv4/IPv6 OSPF and RIP routing, Policy-Based Routing (PBR), VRRP, and Protocol-Independent Multicast (PIM)—to reduce complexity and enhance the reliability of large enterprise networks by bringing Layer 3 capabilities to the network edge and/or aggregation layer. Premium Layer 3 capabilities include BGP routing, enabling remote offices to connect Brocade ICX 7450 Switches to service provider networks. Premium routing capabilities can be added to any Brocade ICX 7450 Switch model through software licensing.

Data Center ToR Switch for 1 GbE and 10 GbE Server Connectivity

Thanks to its class-leading 10 GbE and 40 GbE port count, the Brocade ICX 7450 is a great solution as a Top-of-Rack (ToR) switch in a mixed 1 GbE/10 GbE server connectivity environment. It is designed to fit in server racks, consuming only one rack unit and offering dual integrated power supplies and fan assemblies with front-to-back or back-to-front airflow for flexible cooling options. In data center environments where most servers have 1 GbE and some 10 GbE network interfaces, the Brocade ICX 7450 provides a compact and cost-effective 1 GbE/10 GbE ToR switch. In this configuration some of the Brocade ICX 7450 10 GbE or 40 GbE ports can be used to connect to the data center aggregation switches.

Warranty

The Brocade ICX 7450 Switch is covered by the Brocade Assurance® Limited Lifetime Warranty. For details, visit www.brocade.com/warranty.

Maximum Operational Efficiency and Investment Protection

To further improve operational efficiency, Brocade ICX 7450 Switches come with 90 days of free technical support from the Brocade Technical Assistance Center and free software updates. With these capabilities, organizations gain peace of mind while freeing up IT budget and resources to grow their businesses.

Brocade Global Services

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 20 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, network monitoring services, and education, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

Affordable Acquisition Options

Brocade Capital Solutions helps organizations easily address their IT requirements by offering flexible network acquisition and support alternatives. Organizations can select from purchase, lease, Brocade Network Subscription, and Brocade Subscription Plus options to align network acquisition with their unique capital requirements and risk profiles. To learn more, visit www.brocade.com/capitalsolutions.

Maximizing Investments

To help optimize technology investments, Brocade and its partners offer complete solutions that include professional services, technical support, and education. For more information, contact a Brocade sales partner or visit www.brocade.com.

Brocade ICX 7450 Feature/Model Comparison

	24 or 48 RJ-45 Ports		24, 32, or 48 PoE+ Ports			48 SFP Ports
	Brocade ICX 7450-24	Brocade ICX 7450-48	Brocade ICX 7450-24P	Brocade ICX 7450-32ZP	Brocade ICX 7450-48P	Brocade ICX 7450-48F
Switching capacity (data rate, full duplex)	288 Gbps	336 Gbps	288 Gbps	328 Gbps	336 Gbps	336 Gbps
Forwarding capacity (data rate, full duplex)	214 Mpps	250 Mpps	214 Mpps	244 Mpps	250 Mpps	250 Mpps
Fixed ports: 10/100/1000 Mbps RJ45	24	48	24	24	48	
Fixed ports: 100/1000 Mbps SFP						48
Fixed ports: 100 Mbps/1000 Mbps/ 2.5 Gbps RJ45				8		
Modular slots	3	3	3	3	3	3
Modular ports: 1 GbE SFP (max.)	4	4	4		4	4
Modular ports: 1/10 GbE SFP/SFP+ (max.)	12	12	12	12	12	12
Modular ports: 1/10GBASE-T RJ45 (max.)	12	12	12	12	12	12
Modular ports: 40 GbE QSFP+ (max.)	3	2	3	2	2	2
Modular service: IPsec VPN	Supported	Supported	Supported		Supported	Supported
Maximum PoE ports (15.4 W)			24 (1 AC PSU)	32 (1 AC PSU)	48 (1 AC PSU)	
Maximum PoE+ ports (30 W)			24 (1 AC PSU)	32 (2 AC PSU)	48 (2 AC PSU)	
Maximum PoH ports (95 W)			8 (1 AC PSU)	8 (1 AC PSU)	8 (1 AC PSU)	
Advanced IPv4/v6 L3 routing (RIP, OSPF, BGP)	With license	With license	With license	With license	With license	With license
Aggregated stacking bandwidth	960 Gbps	960 Gbps	960 Gbps	960 Gbps	960 Gbps	960 Gbps
Stacking density (maximum switches in a stack)	12	12	12	12	12	12
Maximum stacking distance (distance between stacked switches)	10 km	10 km	10 km	10 km	10 km	10 km
Power						
Power inlet (AC)	C14					
Input voltage / frequency	AC: 100 to 240 VAC @ 50 to 60 Hz DC: 40 to 60 VDC					
Power supply rated maximum output (AC)	2x250 W	2x250 W	2x1,000 W	2x1,000 W	2x1,000 W	2x250 W
Power supply rated maximum output (DC)	2x510 W	2x510 W	2x510 W	2x510 W	2x510 W	2x510 W
PoE power budget (AC) (two AC power supplies)			1,500 W	1,500 W	1,500 W	
PoE power budget (DC) (two DC power supplies)			516 W	516 W	516 W	
Switch power draw¹ (25°C)						
Idle (no PoE load)	63 W	93 W	75 W	90 W	106 W	119 W
10% traffic³ (full PoE load)	64 W	95 W	91 W	92 W	93 W	120 W
100% traffic³ (full PoE load)	69 W	100 W	96 W	93 W	93 W	123 W
Switch heat dissipation² (25°C)						
Idle (no PoE load)	215 BTU/hr	317 BTU/hr	256 BTU/hr	307 BTU/hr	362 BTU/hr	406 BTU/hr
10% traffic³ (full PoE load)	218 BTU/hr	324 BTU/hr	259 BTU/hr	314 BTU/hr	369 BTU/hr	409 BTU/hr
100% traffic³ (full PoE load)	235 BTU/hr	341 BTU/hr	276 BTU/hr	330 BTU/hr	386 BTU/hr	420 BTU/hr
Environment						
Weight⁴	6.4 kg (14.11 lb)	6.5 kg (14.33 lb)	6.9 kg (15.21 lb)	7.2 kg (15.87 lb)	7.2 kg (15.87 lb)	6.8 kg (14.99 lb)
Dimensions	440 mm (17.323 in.) W x 393.7 mm (15.5 in.) D x 43.7 mm (1.720 in.) H; 1U					
Acoustics¹ (25°C, ISO 7779)	46 dBA	47 dBA	49 dBA	49 dBA	49 dBA	46 dBA
MTBF¹ (25°C)	628,369 hours	571,520 hours	466,576 hours	448,376 hours	444,360 hours	576,586 hours

¹ Switch includes one AC power supply, one fan, one 4x10 GbE SFP+ uplink module, two QSFP+ stacking modules

³ Traffic load on all ports connected with maximum possible PoE/PoE+ loads (if equipped)

² PoE power not included in switch heat dissipation figures since the heat is not dissipated at the switch

Brocade ICX 7450 Specifications

Capabilities

Connector options	<ul style="list-style-type: none"> • 10/100/1000 Mbps, 2.5 Gbps, 10 Gbps 10GBASE-T ports: RJ-45 • 100 Mbps SFP ports • 1 Gbps SFP ports • 10 Gbps SFP+ ports • 40 Gbps QSFP+ ports • Out-of-band Ethernet management: 10/100/1000 Mbps RJ-45 • Console management: Mini-USB RS232 serial port (Mini-B plug) • Storage: USB port, standard-A plug <p>For the latest information about supported optics, please visit www.brocade.com/optics.</p>
Maximum MAC addresses	32,768
Maximum VLANs	4,096
Maximum STP (spanning trees)	254
Maximum routes (in hardware)	15,168 (IPv4) 5,120 (IPv6)
Trunking	Maximum ports per trunk: 16 Maximum trunk groups: 256
Maximum jumbo frame size	9,216 bytes
QoS priority queues	8 per port
IPsec performance	Maximum throughput: 10 Gbps, full-duplex Maximum tunnels: 20
Multicast Groups	8192
VRF	16

Features

Layer 2 switching	<ul style="list-style-type: none"> • 802.1s Multiple Spanning Tree • 802.1x Authentication • Auto MDI/MDIX • BPDU Guard, Root Guard • Dual-Mode VLANs • MAC-based VLANs, Dynamic MAC-based VLAN activation • Dynamic Voice VLAN Assignment • Fast Port Span • GVRP • IGMP Snooping (v1/v2/v3) • IGMP Proxy for Static Groups • IGMP v2/v3 Fast Leave • IGMP Tracking • Inter-Packet Gap (IPG) adjustment • Link Fault Signaling (LFS) • MAC Address Filtering 	<ul style="list-style-type: none"> • MAC Learning Disable • MLD Snooping (v1/v2) • Multi-device Authentication • Per-VLAN Spanning Tree (PVST/PVST+/PVRST) • Mirroring - Port-based, ACL-based, MAC Filter-based, and VLAN-based • Port Loop Detection • Private VLAN • Remote Fault Notification (RFN) • Single-instance Spanning Tree • Single-link LACP • Trunk Groups (static, LACP) • Uni-Directional Link Detection (UDLD) • Metro-Ring Protocol (MRP) (v1, v2) • Virtual Switch Redundancy Protocol (VSRP) • VLAN Stacking (Q-in-Q) • Topology Groups
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Brocade ICX 7450 Specifications (Continued)

Base Layer 3 IP routing	<ul style="list-style-type: none"> • IPv4 and IPv6 static routes • ECMP • Port-based Access Control Lists • L3/L4 ACLs • Host routes 	<ul style="list-style-type: none"> • Virtual Interfaces • Routed Interfaces • Route-only Support • Routing Between Directly Connected Subnets • "MSDP" in Base Layer 3 IP routing
Premium Layer 3 IP routing (with software license)	<ul style="list-style-type: none"> • IPv4 and IPv6 dynamic routes • RIP v1/v2, RIPng (IPv6) • OSPF v2, OSPF v3 (IPv6) • PIM-SM, PIM-SSM, PIM-DM, PIM passive (IPv4/IPv6 multicast routing functionality) • PBR 	<ul style="list-style-type: none"> • Virtual Route Redundancy Protocol VRRP v3 (IPv6) • VRRP-E, VRRP-E (IPv6) • BGP4, BGP4+ (IPv6) • GRE • IPv6 over IPv4 tunnels • VRF (IPv4 and IPv6)
Quality of Service (QoS)	<ul style="list-style-type: none"> • ACL Mapping and Marking of ToS/DSCP (CoS) • ACL Mapping and Marking of 802.1p • ACL Mapping to Priority Queue • Classifying and Limiting Flows Based on TCP Flags • DiffServ Support 	<ul style="list-style-type: none"> • Honoring DSCP and 802.1p (CoS) • MAC Address Mapping to Priority Queue • Priority Queue Management using Weighted Round Robin (WRR), Strict Priority (SP), and a combination of WRR and SP • Priority Flow Control
Traffic management	<ul style="list-style-type: none"> • ACL-based inbound rate limiting and traffic policies • Broadcast, multicast, and unknown unicast rate limiting 	<ul style="list-style-type: none"> • Inbound rate limiting per port • Outbound rate limiting per port and per queue • Multicast traffic reduction
Security	<ul style="list-style-type: none"> • IPsec 128/256 AES-GCM (with service module) • MACsec • 802.1X Authentication • MAC Authentication • Flexible authentication • Web authentication • DHCP snooping • Dynamic ARP inspection • Ndiian inspection • Bi-level Access Mode (Standard and EXEC Level) • EAP pass-through support • IEEE 802.1X username export in sFlow • Protection against Denial of Service (DoS) attacks • Authentication, Authorization, and Accounting (AAA) • MAC Address Locking MAC Port Security • Advanced Encryption Standard (AES) with SSHv2 • RADIUS/TACACS/TACACS+ • Secure Copy (SCP) • Secure Shell (SSHv2) • Local Username/Password • Change of Authorization (CoA) RFC 5176 • Dynamic VLAN assignment 	<ul style="list-style-type: none"> • RFC Conformance for Encryption: <ul style="list-style-type: none"> - RFC 5996 Internet Key Exchange Protocol Version 2 (IKEv2) - RFC 4303 IP Encapsulating Security Payload (ESP) - RFC 6379 Suite B Cryptographic Suites for IPsec (Suite-B-GCM-256 and Suite-B-GCM-128) - RFC 5903 Elliptic Curve Groups Modulo a Prime (ECP Groups) for IKEv2 - RFC 4868 Using HMAC-SHA-256, HMAC-SHA-384, and HMAC-SHA-512 with IPsec - RFC 4754 IKEv2 Authentication Using the Elliptic Curve Digital Signature Algorithm (ECDSA) - RFC 4106 The use of Galois/Counter Mode (GCM) in IPsec Encapsulating Security Payload (ESP) - SP800-56A Recommendation for Pair-Wise Key Establishment Schemes Using Discrete Logarithm Cryptography
SDN features	<ul style="list-style-type: none"> • OpenFlow v1.0 and v1.3 • OpenFlow with hybrid port mode 	<ul style="list-style-type: none"> • Operates with the Brocade SDN Controller and the applications running on the controller

Brocade ICX 7450 Specifications (Continued)

High availability

- Redundant hot-swappable power supplies
- Hot-swappable fan trays
- L3 VRRP/VRRP-E protocol redundancy
- Real-time state synchronization across the stack
- Hitless failover and switchover from master to standby stack controller
- Hot insertion and removal of stacked units
- L2 VSRP switch redundancy

Network and Device Management

Management

- DHCP Auto Configuration
- CLI Logging
- Digital Optical Monitoring
- Display Log Messages on Multiple Terminals
- Embedded Web Management (HTTP/HTTPS)
- Embedded DHCP Server
- Industry-standard Command Line Interface (CLI)
- Brocade Network Advisor (sold separately)
- Integration with HP OpenView:
- USB file management and storage
- Macro for batch execution
- Out-of-band Ethernet Management
- ERSPAN support for remote troubleshooting and traffic monitoring
- TFTP
- TELNET Client and Server
- Bootp
- SNMPv1/v2c
- DHCP Server and DHCP Relay
- SNMPv3 Intro to Framework
- Architecture for Describing SNMP Framework
- SNMP Message Processing and Dispatching
- SNMPv3 Applications
- SNMPv3 User-based Security Model
- SNMP View-based Access Control Model SNMP
- Embedded HTTPS
- sFlow
- NTP Network Time Protocol
- Multiple Syslog Servers
- SCP

For management MIB, please visit www.brocade.com.

IEEE standards compliance

- 802.1AB LLDP
- 802.1D MAC Bridging
- 802.1p Mapping to Priority Queue
- 802.1s Multiple Spanning Tree (MST)
- 802.1w Rapid Reconfiguration of Spanning Tree
- 802.1x Port-based Network Access Control (PNAC)**
- 802.3 Carrier Sense Multiple Access/Collision Detection (CSMA/CD)
- 802.3ab 100BASE-T
- 802.1 AX-2008 Link Aggregation
- 802.3ae 10 Gigabit Ethernet
- 802.3af Power over Ethernet (15.4 W)
- 802.3at Power over Ethernet Plus
- 802.3u 100Base-TX
- 802.3x Full duplex and Flow Control
- 802.3z 1000Base-SX/LX
- 802.3 MAU MIB (RFC 2239)
- 802.3ba 40 and 100 Gbps Ethernet
- 802.1AE-MACsec (with license)
- 802.3az Energy Efficient Ethernet
- 802.1Q VLAN Tagging
- 802.1BR Bridge Port Extension

IETF RFC standards compliance

For a complete list of RFCs supported by the Brocade FastIron® software platform, please visit www.brocade.com/fastIronrfc.

** Partial support

Brocade ICX 7450 Specifications (Continued)

Environment	
Temperature	Operating temperature: -5°C to 50°C/23°F to 122°F Storage temperature: -40°C to 70°C/-40°F to 158°F
Humidity	Operating relative humidity: 10% to 90% at 50°C, non-condensing Non-operating relative humidity: 5% to 95% at 70°C, non-condensing
Altitude	Operating altitude: 10,000 ft. (3,000 m) maximum Storage altitude: 39,000 ft. (12,000 m) maximum
Compliance/Certification	
Electromagnetic emissions	FCC Class A (Part 15); EN 55022/CISPR-22 Class A; VCCI Class A; ICES-003 Electromagnetic Emission; AS/NZS 55022; EN 61000-3-2 Power Line Harmonics; EN 61000-3-3 Voltage Fluctuation and Flicker; EN 61000-6-3 Emission Standard
Safety	CAN/CSA-C22.2 NO. 60950-1-07; UL 60950-1; IEC60950-1; EN 60950-1:2006 Safety of Information Technology Equipment; EN 60825-1 Safety of Laser Products
Immunity	EN 61000-6-1 Generic Immunity and Susceptibility; EN 55024 Immunity Characteristics; EN 61000-4-3 Radiated, Radio Frequency, Electromagnetic Field; EN 61000-4-4 Electrical Fast Transient; EN 61000-4-5 Surge; EN 61000-4-6 Conducted Disturbances Induced by Radio-Frequency Fields; EN 61000-4-8 Power Frequency Magnetic Field; EN 61000-4-11 Voltage Dips and Sags
Environmental regulatory compliance	RoHS-compliant (6 of 6); WEEE-compliant
Vibration	IEC 68-2-36, IEC 68-2-6
Shock and drop	IEC 68-2-27, IEC 68-2-32

Brocade ICX 7450 Ordering Information

Part Number	Description
Switch Bundles	
ICX7450-24-E	24-port 1 GbE switch bundle includes 4x10 GbE SFP+ uplinks/stacking, 2x40 GbE QSFP+ uplinks/stacking, 1x250 W AC power supply and one fan, front-to-back airflow
ICX7450-24-40G-E	24-port 1 GbE switch bundle includes 3x40 GbE QSFP+ uplinks/stacking, 1x250 W AC power supply and one fan, front-to-back airflow
ICX7450-24P-E	24-port 1 GbE switch PoE+ bundle includes 4x10 GbE SFP+ uplinks/stacking, 2x40 GbE QSFP+ uplinks/stacking, 1x1,000 W AC power supply and one fan, front-to-back airflow
ICX7450-24P-40G-E	24-port 1 GbE switch PoE+ bundle includes 3x40 GbE QSFP+ uplinks/stacking, 1x1,000 W AC power supply and one fan, front-to-back airflow
ICX7450-24P-E-RMT3	24-port 1 GbE switch PoE+ bundle includes 4x10 GbE SFP+ uplinks/stacking, 2x40 GbE QSFP+ uplinks/stacking, 1x1,000 W AC power supply and one fan, front-to-back airflow, three years 24x7 remote support
ICX7450-32ZP-E	24-port 1 GbE and 8-port 2.5 GbE switch PoE+ bundle includes 4x10 GbE SFP+ uplinks/stacking, 2x40 GbE QSFP+ uplinks/stacking, 1x1,000 W AC power supply, and one front-to-back airflow fan
ICX7450-48-E	48-port 1 GbE switch bundle includes 4x10 GbE SFP+ uplinks/stacking, 2x40 GbE QSFP+ uplinks/stacking, 1x250 W AC power supply and one fan, front-to-back airflow
ICX7450-48P-E	48-port 1 GbE switch PoE+ bundle includes 4x10 GbE SFP+ uplinks/stacking, 2x40 GbE QSFP+ uplinks/stacking, 1x1,000 W AC power supply and one fan, front-to-back airflow
ICX7450-48P-E-RMT3	48-port 1 GbE switch PoE+ bundle includes 4x10 GbE SFP+ uplinks/stacking, 2x40 GbE QSFP+ uplinks/stacking, 1x1,000 W AC power supply and one fan, front-to-back airflow, three years 24x7 remote support
ICX7450-48P-STK-E	48-port 1 GbE switch PoE+ bundle includes 2x40 GbE QSFP+ uplinks/stacking, 1x1,000 W AC power supply and one fan, front-to-back airflow (stack member with no uplink module)
ICX7450-48P-STK-E-RMT3	48-port 1 GbE switch PoE+ bundle includes 2x40 GbE QSFP+ uplinks/stacking, 1x1,000 W AC power supply and one fan, front-to-back airflow, three years 24x7 remote support (stack member with no uplink module)
ICX7450-48F-E	48-port 1 GbE SFP fiber switch bundle includes 4x10 GbE SFP+ uplinks/stacking, 2x40 GbE QSFP+ uplinks/stacking, 1x250 W AC power supply and one fan, front-to-back airflow
ICX7450-48F-E-RMT3	48-port 1 GbE SFP fiber switch bundle includes 4x10 GbE SFP+ uplinks/stacking, 2x40 GbE QSFP+ uplinks/stacking, 1x250 W AC power supply and one fan, front-to-back airflow, three years 24x7 remote support
Bare Switches	
ICX7450-24	24-port 1 GbE switch with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-24P	24-port 1 GbE switch PoE+ with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-32ZP	24-port 1 GbE and 8-port 2.5 GbE switch PoE+ with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-48	48-port 1 GbE switch with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-48P	48-port 1 GbE switch PoE+ with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-48F	48-port 1 GbE switch SFP with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.

Brocade ICX 7450 Ordering Information (Continued)

Part Number	Description
Modules	
ICX7400-4X1GF	Brocade ICX 7450 4-port 100 Mbps/1 GbE SFP module
ICX7400-4X10GF	Brocade ICX 7450 4-port 1/10 GbE SFP/SFP+ module (for stacking or uplinks)
ICX7400-4X10GC	Brocade ICX 7450 4-port 1/10 GbE 10GBASE-T copper module
ICX7400-1X40GQ	Brocade ICX 7450 1-port 40 GbE QSFP+ module (for stacking or uplink)
ICX7400-SERVICE-MOD	Brocade ICX 7450 Service Module for IPsec VPN encryption
Power Supplies and Fans	
RPS15-E	Brocade ICX 7450/6610 non-PoE 250 W AC power supply with front-to-back airflow
RPS15-I	Brocade ICX 7450/6610 non-PoE 250 W AC power supply with back-to-front airflow
RPS16-E	Brocade ICX 7450/6610 PoE 1,000 W AC power supply with front-to-back airflow
RPS16-I	Brocade ICX 7450/6610 PoE 1,000 W AC power supply with back-to-front airflow
RPS16DC-E	Brocade ICX 7450/6610 PoE 510 W DC power supply with front-to-back airflow
RPS16DC-I	Brocade ICX 7450/6610 PoE 510 W DC power supply with back-to-front airflow
ICX-FAN10-E	Brocade ICX 7450 front-to-back airflow fan
ICX-FAN10-I	Brocade ICX 7450 back-to-front airflow fan
Feature License and Accessories	
ICX7450-PREM-LIC	Brocade ICX 7450 Layer 3 Premium Software License
ICX-MACSEC-LIC	License to enable MACsec encryption
ICX7000-RMK	FRU, rack mount kit, two post, Brocade ICX 7750/7450
XBR-R000295	FRU, rack mount kit, four post, 24 in. to 32 in. depth rack
BR-NTWADV-IP-BASE	Brocade Network Advisor IP management software license for up to 50 devices; required for initial purchase of IP only management; minimum of one year of support required.
Optics	
EIMG-100FX-OM	100BASE-FX SFP optic MMF, LC connector, optical monitoring capable
EIMG-100FX-IR-OM	100BASE-FX IR SFP optic for SMF with LC connector, optical monitoring capable. For distances up to 15 km.
EIMG-100FX-LR-OM	100BASE-FX LR SFP optic for SMF with LC connector, optical monitoring capable. For distances up to 40 km.
EIMG-TX	1000BASE-TX SFP copper, RJ-45 connector
EIMG-SX-OM	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring capable
EIMG-LX-OM	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring capable
EIMG-LHA-OM-T	1000BASE-LHA SFP optic, SMF, LC connector, optical monitoring capable
EIMG-BXU	1000BASE-BXU SFP optic SMF, transmits at 1,310 nm and receives at 1,490 nm, LC connector, single-strand SMF fiber

Brocade ICX 7450 Ordering Information (Continued)

Part Number	Description
EIMG-BXD	1000BASE-BXD SFP optic SMF, transmits at 1,490 nm and receives at 1,310 nm, LC connector, single-strand SMF fiber
10G-SFPP-USR	10GE USR SFP+ optic (LC), target range 100 m over MMF, 1-pack
10G-SFPP-SR	10GBASE-SR, SFP+ optic (LC), target range 300 m over MMF
10G-SFPP-LR	10GBASE-LR, SFP+ optic (LC), for up to 10 km over SMF
10G-SFPP-ER	10GBASE-ER SFP+ optic (LC), for up to 40 km over SMF
10G-SFPP-ZR	10GBASE-ZR SFP+ optic (LC), for up to 80 km over SMF
10G-SFPP-LRM	10GBASE-LRM, 1,310 nm SFP+ optic (LC), TAR
40G-QSFP-SR-BIDI	40GE SR QSFP+ optic (LC), Bidirectional, 100 m over OM3 MMF
40G-QSFP-SR4	40GBASE-SR4 QSFP+ optic (MTP 1x8 or 1x12), 100 m over MMF, 1-pack
40G-QSFP-ESR4	40GBASE-ESR4 QSFP+ optic 400 m over MMF, 1 pack
40G-QSFP-LM4	40GBASE-LM4 QSFP+ optic (LC), for up to 160 m over MMF and 2 km over SMF, 1-pack
40G-QSFP-LR4	40GBASE-LR4 QSFP+ optic (LC), for up to 10 km over SMF, 1-pack
Direct-Attached Cables	
10G-SFPP-TWX-0101	Direct-attached SFP+ active copper cable, 1 m, 1-pack
10G-SFPP-TWX-0301	Direct-attached SFP+ active copper cable, 3 m, 1-pack
10G-SFPP-TWX-0501	Direct-attached SFP+ active copper cable, 5 m, 1-pack
10GE-SFPP-AOC-0701	Direct-attached SFP+ active optic cable, 7 m, 1-pack
10GE-SFPP-AOC-1001	Direct-attached SFP+ active optic cable, 10 m, 1-pack
40G-QSFP-C-00501	40 GbE QSFP+ direct-attached passive copper cable, 0.5 m, 1-pack
40G-QSFP-C-00508	40 GbE QSFP+ direct-attached passive copper cable, 0.5 m, 8-pack
40G-QSFP-C-0101	40 GbE QSFP+ direct-attached passive copper cable, 1 m, 1-pack
40G-QSFP-QSFP-C-0101	40 GbE QSFP+ direct-attached QSFP+ to QSFP+ active copper cable, 1 m, 1-pack
40G-QSFP-QSFP-C-0301	40 GbE QSFP+ direct-attached QSFP+ to QSFP+ active copper cable, 3 m, 1-pack
40G-QSFP-QSFP-C-0501	40 GbE QSFP+ direct-attached QSFP+ to QSFP+ active copper cable, 5 m, 1-pack
40G-QSFP-QSFP-AOC-1001	40 GbE QSFP+ direct-attached QSFP+ to QSFP+ active optic cable, 10 m, 1-pack

For the latest information about supported optics and cables, please visit www.brocade.com/optics.

Ordering Instructions

Customers have two options when ordering a Brocade ICX 7450 Switch. They can select one of the six pre-built units from the "Switch Bundles" section, or they can build their own custom unit by selecting a "Bare Switch" and adding their choice of power supplies, fans, port modules, and the IPsec VPN service module.

Pre-built units ordered from the "Switch Bundles" section include a power cord, two-post rack mounting brackets, and a USB serial console cable. Units ordered from the "Bare Switches" section include two-post rack mounting brackets and a USB serial console cable. AC power supplies ordered separately include a power cord. Stacking cables must be ordered separately.

Corporate Headquarters

San Jose, CA USA
T: +1-408-333-8000
info@brocade.com

European Headquarters

Geneva, Switzerland
T: +41-22-799-56-40
emea-info@brocade.com

Asia Pacific Headquarters

Singapore
T: +65-6538-4700
apac-info@brocade.com



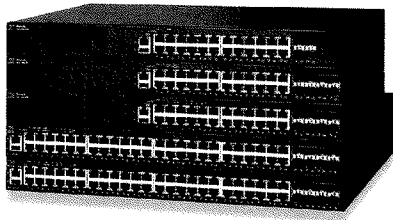
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BROCADE 

Brocade ICX 7250 Switch



HIGHLIGHTS

- Offers enterprise-class stackable switching at an entry-level price, allowing organizations to buy what they need now and easily scale as demand grows and new technologies emerge
- Future-proofs campus networks via flexible stacking, software licensing of 1 GbE to 10 GbE ports, Brocade Campus Fabric technology*, and future upgrades to OpenFlow support in true hybrid port mode, enabling Software-Defined Networking (SDN) for programmatic network control
- Enables enterprise-class manageability with up to 8×10 GbE ports for stacking or uplinks
- Delivers market-leading stacking scalability with up to 12 switches per stack, 80 Gbps of stacking bandwidth, and long-distance stacking using open standards
- Offers full Power over Ethernet (PoE+) to power wireless access points, video surveillance and video conferencing equipment, VDI terminals, and HD displays directly from the switch
- Includes the Brocade Assurance Limited Lifetime Warranty and three years of technical support

Entry-Level, Enterprise-Class Stackable Switch with Future-Proof Expandability

The Brocade® ICX® 7250 Switch delivers the performance, flexibility, and scalability required for enterprise Gigabit Ethernet (GbE) access deployment. It raises the bar with up to 8×10 GbE ports for uplinks or stacking and market-leading stacking density with up to 12 switches (576×1 GbE) per stack. In addition, the Brocade ICX 7250 combines enterprise-class features, manageability, performance, and reliability with the flexibility, cost-effectiveness, and “pay as you grow” scalability of a stackable solution.

Premium Performance in an Entry-Level Switch

The Brocade ICX 7250 Switch provides enterprise-class stackable LAN switching solutions to meet the growing demands of campus networks. Designed for small to medium-size enterprises, branch offices, and distributed campuses, these intelligent, scalable edge switches deliver enterprise-class functionality at an affordable price—without compromising performance and reliability. The Brocade ICX 7250 delivers wire-speed, non-blocking performance across all ports to support latency-sensitive applications, such as real-time voice/video streaming and Virtual Desktop Infrastructure (VDI). The Brocade ICX 7250 is available in 24- and 48-port 10/100/1000 Mbps models with 1 GbE uplink or 10 GbE dual-purpose uplink/stacking ports (see Figure 1)—with or without PoE and PoE+—to support

enterprise edge networking, wireless mobility, and IP communications without the need for additional power outlets or power injectors.

The new Brocade Campus Fabric technology* maximizes the value of Brocade ICX 7250 Switches. It enables the Brocade ICX 7250 to extend ports in combination with Brocade ICX 7450 and 7750 Switches, creating a complete campus network solution with consolidated management across aggregation and core layers, shared network services—adding advanced Layer 3 capabilities to all switches—and scale-out flexibility to expand port density as needed (see Figure 2). The Brocade ICX 7250 with Campus Fabric technology* provides an ideal network access solution for the campus network.

* Support on the Brocade ICX 7250 to be available in a future release

Scaling Out Ports and Services as Demand Grows

The Brocade ICX 7250 is easy to deploy, manage, and integrate into both new and existing networks. Organizations can buy only what they need today, and easily scale out as demand grows and new technologies emerge.

Brocade stacking technology makes it easy to scale ports by stacking up to 12 Brocade ICX 7250 Switches into a single logical switch. This allows the Brocade ICX 7250 to provide a class-leading 80 Gbps of backplane bandwidth as well as simple and robust expandability for future growth at the network edge. In addition, this stacked switch has only a single IP address to simplify management and offers transparent forwarding across a pool of up to 576x1 GbE ports and 96x10 GbE ports. When new switches join the stack, they automatically inherit the stack's existing configuration file, enabling true plug-and-play network expansion. Flexible licensing of 1 GbE to 10 GbE ports, for uplink and stacking, allows organizations to optimize network performance based on specific requirements.

Furthermore, Brocade Campus Fabric technology* enables organizations to add advanced Layer 3 services across the stack by simply adding premium Brocade ICX 7750 Switches to existing Brocade ICX 7250 deployments. This eliminates the need for "rip and replace" upgrades, since low-cost Brocade ICX 7250 ports can live on to inherit new services.

Brocade Campus Fabric Technology: Extending Options and Scalability

Brocade Campus Fabric technology, offered for Brocade ICX 7250*, 7450, and 7750 Switches, extends network options and scalability. It integrates premium Brocade ICX 7750, midrange Brocade ICX 7450, and entry-level Brocade ICX 7250 Switches, collapsing network access, aggregation, and core layers into

Brocade ICX 7250 Switches

Except as noted, all Brocade ICX 7250 models offer eight uplink/stacking ports, a single integrated power supply and fan, one RJ-45 network management port, one mini USB serial management port, and one USB storage port on the front panel.



Brocade ICX 7250-24G

24x10/100/1000 Mbps RJ-45 ports

4x1 GbE uplink ports

Not upgradable; no EPS connector

Premium Layer 3 licenses not applicable



Brocade ICX 7250-24

24x10/100/1000 Mbps RJ-45 ports

8x1 GbE uplink/stacking ports

Upgradable to 10 GbE



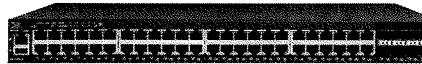
Brocade ICX 7250-24P

24x10/100/1000 Mbps RJ-45 PoE+ ports

370 W PoE budget

8x1 GbE uplink/stacking ports

Upgradable to 10 GbE



Brocade ICX 7250-48

48x10/100/1000 Mbps RJ-45 ports

8x1 GbE uplink/stacking ports

Upgradable to 10 GbE



Brocade ICX 7250-48P

48x10/100/1000 Mbps RJ-45 PoE+ ports

740 W PoE budget

8x1 GbE uplink/stacking ports

Upgradable to 10 GbE

a single logical switch. This logical device shares network services while reducing management touch points and network hops through a single-layer design spanning the entire campus network.

These powerful deployments deliver equivalent or better functionality than large, rigid modular chassis systems, but with significantly lower costs and smaller carbon footprints.

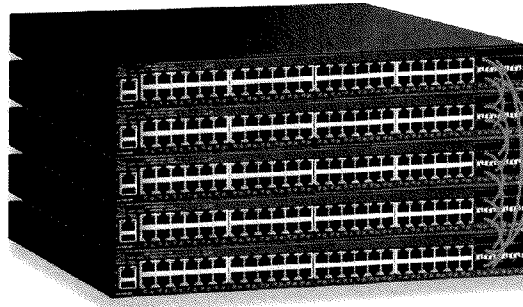


Figure 1: Up to 12 Brocade ICX 7250 Switches can be stacked together using up to four full-duplex SFP+ 10 Gbps ports for a fully redundant backplane with 80 Gbps of stacking bandwidth.

* Support on the Brocade ICX 7250 to be available in a future release

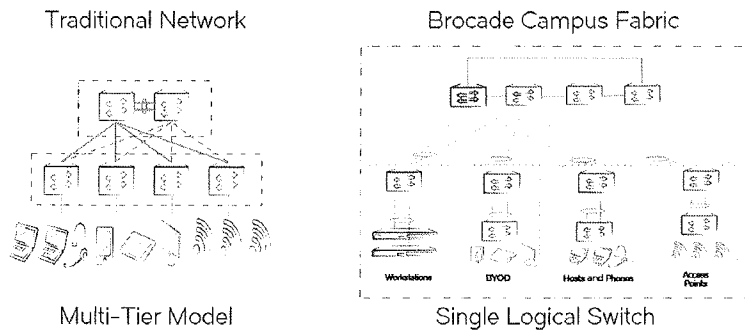


Figure 2: Brocade Campus Fabric technology.

Brocade ICX switches support a Distributed Chassis deployment model that uses standards-based optics and cabling interface connections to help ensure maximum distance between campus switches—up to 80 km—and minimum cabling costs—up to 50 percent less than incumbent solutions. This gives organizations the flexibility to deliver ports wherever they are needed on campus at a fraction of the cost. The Distributed Chassis design future-proofs campus networks by allowing networks to easily and cost-effectively expand in scale and capabilities.

Full Layer 3 Capabilities

Brocade ICX 7250 Switches offer an upgrade option to bring full Layer 3 capabilities to the network edge, reducing complexity and enhancing the reliability of enterprise networks.

Power to Spare

The Brocade ICX 7250 can deliver both power and data across network connections, supporting Power over Ethernet (PoE/PoE+) standards and providing a single-cable solution for edge devices, such as wireless access points, VoIP phones, video surveillance equipment, and VDI thin terminals. Carrying data and power through a single Ethernet wire reduces the number of power receptacles and power adapters while increasing reliability and wiring flexibility. The Brocade ICX 7250-24P provides 370 watts and can deliver PoE power to all 24 ports, while the Brocade ICX 7250-48P provides

740 watts and can deliver PoE+ power for up to 12 or 24 ports. Both switches can provide PoE and PoE+ (30 watts) power to all ports when an external power supply is deployed.

The optional Brocade ICX-EPS 4000 is an external power supply source that delivers additional power for up to 16 Brocade ICX 7250 Switches (see Figures 3 and 4). It can be used for system power redundancy and an increased PoE/PoE+ power budget to enable additional ports.

EEE Power Savings

The Brocade ICX 7250 Switch supports the IEEE 802.3az standard for Energy Efficient Ethernet (EEE), reducing power consumption during periods of low utilization. Ports are placed into a low power mode when no data is being transmitted.

Enterprise-Class Availability

When every second matters, Brocade ICX 7250 Switches help deliver continuous availability to optimize the user experience. Brocade stacking technology delivers high availability, performing real-time state synchronization across the stack and enabling instantaneous hitless failover to a standby controller in the unlikely event of a failure of the master stack controller. Organizations also can use hot-insertion/removal of stack members to avoid interrupting service when adding a switch to increase the capacity of a stack or replacing a switch that needs servicing.

BROCADE CAMPUS FABRIC TECHNOLOGY

Brocade Campus Fabric technology brings campus networks into the modern era to better support seamless wireless mobility, security, and ease of application deployment. This innovative technology collapses multiple network layers into a single logical switch, flattening the network and eliminating deployment complexity while simplifying network management and reducing operating costs.

Brocade Campus Fabric technology enables organizations to build networks that deliver:

- **Consolidated management:** Reduces unnecessary network layers to create large management domains that eliminate individual switch touch points, reducing maintenance time and costs.
- **Shared network services:** Allows premium and entry-level switches to mesh together into a single logical switch and share advanced Layer 2/3 services, delivering lower price-per-port functionality without compromising performance.
- **Scale-out networking:** Integrates high-performance, fixed form-factor switches to create a single distributed logical switch that is independent of physical location and allows organizations to add ports whenever and wherever needed across the campus without adding complexity.

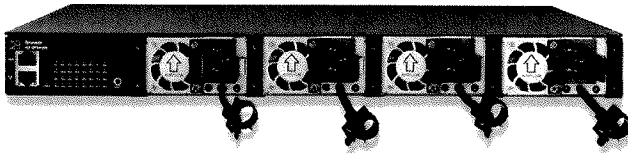


Figure 3: Brocade ICX-EPS 4000 for the Brocade ICX 7250, shown with four AC power supplies.

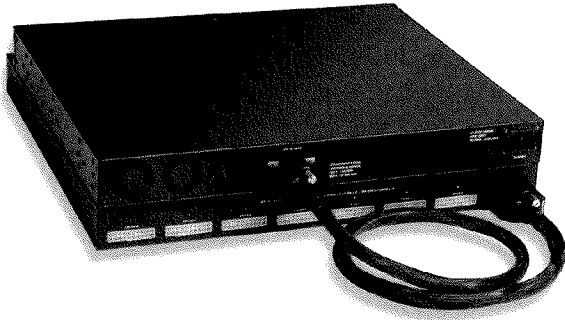


Figure 4: Rear view of the Brocade ICX-EPS 4000 connectivity.

In addition to stack-level high availability, Brocade ICX 7250 Switches also offer an external power supply for failover resiliency, as well as increased PoE/PoE+ port availability.

Simplified, Open-Standards-based Management and Monitoring

The Brocade ICX 7250 provides simplified, standards-based management capabilities that help organizations reduce administrative time and effort while securing their networks.

sFlow-based "Always-On" Network Monitoring

sFlow is a modern, standards-based network export protocol (RFC 3176) that addresses many of the challenges that network managers face today. By embedding sFlow hardware support into the Brocade ICX 7250, Brocade delivers an "always-on" technology that operates with wire-speed performance. sFlow dramatically reduces implementation costs compared to traditional network monitoring solutions that rely on mirrored ports, probes, and line-tap technologies. Moreover, sFlow gives organizations full, enterprise-wide monitoring capability for every port in the network.

Simplified, Automated Deployment with Auto-Provisioning

The Brocade ICX 7250 supports auto-provisioning, simplifying deployment with a truly plug-and-play experience. Organizations can use this feature to automate IP address and feature configuration of the switches without requiring a highly trained network engineer onsite. When the switches power up, they can automatically receive their IP addresses and configuration files from DHCP and Trivial File Transport Protocol (TFTP) servers. They also can automatically receive a software update to be at the same code revision as currently installed switches.

Open-Standards Management

The Brocade ICX 7250 includes an industry-standard Command Line Interface (CLI) and supports Secure Shell (SSHv2), Secure Copy (SCP), and SNMPv3 to restrict and encrypt management communications to the system. In addition, support for Terminal Access Controller Access Control System (TACACS/TACACS+) and RADIUS authentication helps ensure secure operator access.

SDN-Enabled Programmatic Control of the Network

Software-Defined Networking (SDN) is a powerful new network paradigm designed for the world's most demanding networking environments and promises breakthrough levels of customization, scale, and efficiency. The Brocade ICX 7250 enables SDN by supporting the OpenFlow 1.3 protocol, which allows communication between an OpenFlow controller and an OpenFlow-enabled switch. Using this approach, organizations can control their networks programmatically, transforming the network into a platform for innovation through new network applications and services.

The Brocade ICX 7250 delivers OpenFlow in true hybrid port mode, which allows organizations to simultaneously deploy traditional Layer 2/3 forwarding with OpenFlow on the same port. This unique capability provides a pragmatic path to SDN by enabling network administrators to progressively integrate OpenFlow into existing networks, giving them the programmatic control offered by SDN for specific flows while the remaining traffic is forwarded as before. Brocade ICX 7250 hardware support for OpenFlow enables organizations to apply these capabilities at line rate.

Plug-and-Play Operations for Powered Devices

Brocade ICX switches support the IEEE 802.1AB Link Layer Discovery Protocol (LLDP) and ANSI TIA 1057 Link Layer Discovery Protocol-Media Endpoint Discovery (LLDP-MED) standards that enable organizations to deploy interoperable multivendor solutions for Unified Communications (UC). Configuring IP endpoints such as VoIP phones can be a complex task, requiring manual and time-consuming

configuration. LLDP and LLDP-MED provide a standard, open method for configuring, discovering, and managing network infrastructure.

Unified Wired/Wireless Network Management with Brocade Network Advisor

Managing enterprise campus networks continues to become more complex due to the growth in services that rely on wired and wireless networks. Services such as Internet, e-mail, video conferencing, real-time collaboration, and distance learning all have specific configuration and management requirements. At the same time, organizations face increasing demand to provide uninterrupted services for high-quality voice and UC, wireless mobility, and multimedia applications. To reduce complexity and the time spent managing these environments, the easy-to-use Brocade Network Advisor discovers, manages, and deploys configurations to groups of IP devices. By using Brocade Network Advisor, organizations can configure Virtual LANs (VLANs) within the network, manage wireless access points, and execute commands on specific IP devices or groups of IP devices. sFlow-based proactive monitoring is ideal for performing network-wide troubleshooting, generating traffic reports, and gaining visibility into network activity from the edge to the core. Brocade Network Advisor centralizes management of the entire family of Brocade wired products and Aruba wireless products.

Data Center ToR Server Connectivity

The Brocade ICX 7250 is designed to fit in server racks by consuming only one rack unit. In data center environments where most servers are 1 GbE-capable, the Brocade ICX 7250 provides a compact and cost-effective 1 GbE Top-of-Rack (ToR) switch by simply connecting 1 GbE Network Interface Cards (NICs) in the servers to Brocade ICX 7250 1 GbE ports. This configuration uses 10 GbE links to connect to Brocade ICX data center aggregation switches.

Warranty

Brocade ICX 7250 Switches are covered by the Brocade Assurance® Limited Lifetime Warranty. For details, visit www.brocade.com/warranty.

Best-in-Class Support

The Brocade ICX 7250 Switch is supported by next-business-day advance replacement where available, as well as software defect repairs and maintenance updates. In an effort to further improve service levels and operational efficiency, Brocade includes three years of technical support for Brocade ICX 7250 Switches, providing direct 24x7 access to the Brocade Technical Assistance Center.

Brocade Global Services

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 20 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, network monitoring services, and education, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

Affordable Acquisition Options

Brocade Capital Solutions helps organizations easily address their IT requirements by offering flexible network acquisition and support alternatives. Organizations can select from purchase, lease, Brocade Network Subscription, and Brocade Subscription Plus options to align network acquisition with their unique capital requirements and risk profiles. To learn more, visit www.brocade.com/CapitalSolutions.

Maximizing Investments

To help optimize technology investments, Brocade and its partners offer complete solutions that include professional services, technical support, and education. For more information, contact a Brocade sales partner or visit www.brocade.com.

BROCADE ICX 7250 SWITCH AND CONTROLLER INTEROPERABILITY

The Brocade ICX 7250 Switch operates seamlessly under the Brocade SDN Controller. This controller is a quality-assured edition of the OpenDaylight controller code supported by an established networking provider and its leaders within the OpenDaylight community.

Brocade ICX 7250 Feature/Model Comparison

	24 RJ-45 Ports	24 or 48 Ports Non-PoE		24 or 48 PoE+ Ports	
	Brocade ICX 7250-24G	Brocade ICX 7250-24	Brocade ICX 7250-48	Brocade ICX 7250-24P	Brocade ICX 7250-48P
Switching capacity (data rate, full duplex)	128 Gbps	208 Gbps	256 Gbps	208 Gbps	256 Gbps
Forwarding capacity (data rate, full duplex)	96 Mpps	154 Mpps	190 Mpps	154 Mpps	190 Mpps
Fixed ports: 10/100/1000 Mbps RJ-45	24	24	48	24	48
Fixed ports: 100/1000 Mbps SFP	4				
Fixed ports: 1/10 Gbps SFP+ (10 GbE SPF+ optional upgrade license)		8	8	8	8
Maximum PoE Class 3 ports (internal AC power supply only)	N/A	N/A	N/A	24	48
Maximum PoE+ ports (internal AC power supply only)	N/A	N/A	N/A	12	24
Maximum PoE+ ports (with external power supply)	N/A	N/A	N/A	24	48
Advanced IPv4/v6 L3 routing (RIP, OSPF)	N/A	with license	with license	with license	with license
Aggregated stacking bandwidth	N/A	480 Gbps	480 Gbps	480 Gbps	480 Gbps
Stacking density (maximum switches in a stack)	N/A	12	12	12	12
Maximum stacking distance (distance between stacked switches)	N/A	10 km	10 km	10 km	10 km
Power					
Power inlet (AC)	C14				
Input voltage/frequency	AC: 100 to 240 VAC @ 50 to 60 Hz				
Power supply rated maximum (AC)	135 W	135 W	135 W	525 W	880 W
PoE power budget (AC) (internal AC power supply only)	N/A	N/A	N/A	370 W	740 W
Switch power consumption (25°C)					
Idle (no PoE load)	33.6 W	42.6 W	50.64 W	50 W	66 W
10% traffic* (full PoE load)	42.6 W	51.6 W	63.55 W	63 W	84 W
100% traffic* (full PoE load)	44.4 W	57.6 W	69.51 W	73 W	96 W
Airflow	front-to-back	side-to-back	side-to-back	side-to-back	side-to-back
Switch heat dissipation (25°C)[†]					
Idle (no PoE load)	114.6 BTU/Hr	145.3 BTU/Hr	172.7 BTU/Hr	170.6 BTU/Hr	225.2 BTU/Hr
10% traffic* (full PoE load)	145.3 BTU/Hr	176.06 BTU/Hr	216.8 BTU/Hr	214.9 BTU/Hr	286.6 BTU/Hr
100% traffic* (full PoE load)	151.4 BTU/Hr	196.5 BTU/Hr	237.1 BTU/Hr	249.08 BTU/Hr	327.5 BTU/Hr

* Traffic load on all ports connected with maximum possible PoE/PoE+ loads (if equipped) PoE power delivered to powered devices not included

[†] PoE power not included in switch heat dissipation figures since the heat is not dissipated at the switch

Brocade ICX 7250 Feature/Model Comparison (Continued)

	24 RJ-45 Ports	24 or 48 Ports Non-PoE	48 RJ-45 Ports	24 or 48 PoE+ Ports	
Environment					
Weight (kg)	3.58	3.76	4.84	4.73	5.86
Dimensions	48 port: 440 mm (17.323 in.) W×370 mm (14.56 in.) D×43.7 mm (1.720 in.) H – 1U 24 port: 440 mm (17.323 in.) W×280 mm (11.02 in.) D×43.7 mm (1.720 in.) H – 1U				
Acoustics (25°C)	40 dB	41.9 dB	44.5 dB	44.7 dB	45.9 dB
MTBF (hours) (25°C)	767,718	676,362	665,319	429,209	411,187

Brocade ICX 7250 Specifications

Specifications

Connector options	<ul style="list-style-type: none"> • 10/100/1000 ports: RJ-45 • 1 Gbps SFP ports (Brocade ICX 7250-24G only) • 1/10 Gbps SFP+ ports (not available on Brocade ICX 7250-24G) • Out-of-band Ethernet management: 10/100/1000 Mbps RJ-45 • Console management: Mini-USB serial port (Mini-B plug) • File transfer: USB port (Standard-A plug) <p>For the latest information about supported optics, please visit www.Brocade.com/Optics.</p>	
Maximum MAC addresses	16,000	
Maximum VLANs	4,095	
Maximum STP (spanning trees)	254	
Maximum routes (in hardware)	12,000	
Trunking	16	
Maximum jumbo frame size	9,216 bytes	
Average latency	1.5 µs	
QoS Priority Queues	8	
Layer 2 switching	<ul style="list-style-type: none"> • 802.1s Multiple Spanning Tree • 802.1x Authentication • Auto MDI/MDIX • BPDU Guard, Root Guard • Dual-Mode VLANs • MAC-based VLANs, Dynamic MAC-based VLAN activation • Dynamic VLAN Assignment • Dynamic Voice VLAN Assignment • Fast Port Span • GARP VLAN Registration Protocol • IGMP Snooping (v1/v2/v3) • IGMP Proxy for Static Groups • IGMP v2/v3 Fast Leave • IGMP Tracking • Inter-Packet Gap (IPG) adjustment • Link Fault Signaling (LFS) • MAC Address Locking; MAC Port Security 	<ul style="list-style-type: none"> • MAC-Layer Filtering • MAC Learning Disable • MLD Snooping (v1/v2) • Multi-device Authentication • Per-VLAN Spanning Tree (PVST/PVST+/PVRST) • Mirroring—Port-based, ACL-based, MAC Filter-based, and VLAN-based • PIM-SM v2 Snooping • Port Loop Detection • Private VLAN • Protocol VLAN (802.1v), Subnet VLAN • Remote Fault Notification (RFN) • Single-instance Spanning Tree • Single-link LACP • Trunk Groups • Uni-Directional Link Detection (UDLD)

Brocade ICX 7250 Specifications (Continued)

Base Layer 3 IP routing	<ul style="list-style-type: none"> • IPv4 and IPv6 static routes • ECMP • Port-based Access Control Lists • L3/L4 ACLs • Host routes 	<ul style="list-style-type: none"> • Virtual interfaces • Routed interfaces • Route-only support • Routing between directly connected subnets
Premium Layer 3 IP routing	<ul style="list-style-type: none"> • IPv4 and IPv6 dynamic routes • RIP v1/v2 • OSPF v2 • Virtual Route Redundancy Protocol (VRRP) • VRRP-E • IPv6 over IPv4 tunnels 	<ul style="list-style-type: none"> • PIM-SM, PIM-SSM, PIM-DM, PIM passive (IPv4/IPv6 multicast routing functionality) • OSPF v3 • VRRP v3 • RIPng
SDN features	<ul style="list-style-type: none"> • Support for OpenFlow v1.0 and v1.3 • OpenFlow support with true hybrid port mode 	<ul style="list-style-type: none"> • Operates seamlessly under the Brocade SDN Controller
Metro features	<ul style="list-style-type: none"> • Metro-Ring Protocol MRP (v1, v2) • Virtual Switch Redundancy Protocol (VSRP) • VLAN Stacking (Q-in-Q) 	<ul style="list-style-type: none"> • VRRP • Topology Groups
Quality of Service (QoS)	<ul style="list-style-type: none"> • ACL Mapping and Marking of ToS/DSCP • ACL Mapping and Marking of 802.1p • ACL Mapping to Priority Queue • ACL Mapping to ToS/DSCP • Classifying and Limiting Flows Based on TCP Flags • DHCP Relay 	<ul style="list-style-type: none"> • DiffServ Support • Honoring DSCP and 802.1p • MAC Address Mapping to Priority Queue • Priority Queue Management using Weighted Round Robin (WRR), Strict Priority (SP), and a combination of WRR and SP
IEEE standards compliance	<ul style="list-style-type: none"> • 802.1AB LLDP/LLDP-MED • 802.1D-2004 MAC Bridging • 802.1p Mapping to Priority Queue • 802.1s Multiple Spanning Tree • 802.1w Rapid Spanning Tree (RSTP) • 802.1x Port-based Network Access Control • 802.3 10Base-T • 802.3ab 1000Base-T • 802.3ad Link Aggregation (Dynamic and Static) 	<ul style="list-style-type: none"> • 802.3ae 10 Gigabit Ethernet • 802.3af Power over Ethernet • 802.3at Power over Ethernet Plus • 802.3u 100Base-TX • 802.3x Flow Control • 802.3z 1000Base-SX/LX • 802.3 MAU MIB (RFC 2239) • 802.3az-2010 - EEE • 802.1Q VLAN Tagging
RFC standards compliance	For a complete list of RFCs supported by the Brocade FastIron® software platform, please visit www.brocade.com/fastironrfc .	
Traffic management	<ul style="list-style-type: none"> • ACL-based inbound rate limiting and traffic policies • Broadcast, multicast, and unknown unicast rate limiting 	<ul style="list-style-type: none"> • Inbound rate limiting per port • Outbound rate limiting per port and per queue
High availability	<ul style="list-style-type: none"> • L3 VRRP protocol redundancy • Real-time state synchronization across the stack 	<ul style="list-style-type: none"> • Hitless failover from master to standby stack controller • Hot insertion and removal of stacked units
Network and Device Management		
Management	<ul style="list-style-type: none"> • Auto Configuration • Configuration Logging • Digital Optical Monitoring • Display Log Messages on Multiple Terminals • Embedded Web Management • Embedded DHCP Server 	<ul style="list-style-type: none"> • Industry-standard Command Line Interface (CLI) • Key-based activation of optional software features • Integration with HP OpenView for Sun Solaris, HP-UX, IBM AIX, and Windows • Brocade Network Advisor • MIB Support for MRP, Port Security, MAC Authentication, and MAC-based VLANs

Brocade ICX 7250 Specifications (Continued)

Management (continued)	<ul style="list-style-type: none"> • Out-of-band Ethernet Management • ERSPAN support for remote traffic monitoring • RFC 783 TFTP • RFC 854 TELNET Client and Server • RFC 951 Bootp • RFC 1157 SNMPv1/v2c • RFC 1213 MIB-II • RFC 1493 Bridge MIB • RFC 1516 Repeater MIB • RFC 1573 SNMP MIB II • RFC 1643 Ethernet Interface MIB • RFC 1724 RIP v1/v2 MIB • RFC 1757 RMON MIB • RFC 2068 Embedded HTTP 	<ul style="list-style-type: none"> • RFC 2131 DHCP Server and DHCP Relay • RFC 2570 SNMPv3 Intro to Framework • RFC 2571 Architecture for Describing SNMP Framework • RFC 2572 SNMP Message Processing and Dispatching • RFC 2573 SNMPv3 Applications • RFC 2574 SNMPv3 User-based Security Model • RFC 2575 SNMP View-based Access Control Model SNMP • RFC 2818 Embedded HTTPS • RFC 3176 sFlow • SNTP Simple Network Time Protocol • Multiple Syslog Servers
Security	<ul style="list-style-type: none"> • 802.1X Accounting • MAC Authentication • DHCP snooping • Dynamic ARP inspection • Bi-level Access Mode (Standard and EXEC Level) • EAP pass-through support • IEEE 802.1X username export in sFlow • Protection against Denial of Service (DoS) attacks • Authentication, Authorization, and Accounting (AAA) 	<ul style="list-style-type: none"> • Advanced Encryption Standard (AES) with SSHv2 • RADIUS/TACACS/TACACS+ • Secure Copy (SCP) • Secure Shell (SSHv2) • Username/Password • Web authentication • Change of Authorization (CoA) RFC 5176 • Flexible authentication
Environment		
Temperature	<ul style="list-style-type: none"> • Operating temperature: -5°C to 50°C/23°F to 122°F • Storage temperature: -25°C to 70°C/-13°F to 158°F 	
Humidity	<ul style="list-style-type: none"> • Operating relative humidity: 5% to 95% at 50°C, non-condensing • Non-operating relative humidity: 0% to 95% at 70°C, non-condensing 	
Altitude	<ul style="list-style-type: none"> • Operating altitude: 10,000 ft (3,000 m) maximum • Storage altitude: 39,000 ft (12,000 m) maximum 	
Compliance/Certification		
Electromagnetic emissions	FCC Class A (Part 15); EN 55022/CISPR-22 Class A; VCCI Class A; ICES-003 Electromagnetic Emission; AS/NZS 55022; EN 61000-3-2 Power Line Harmonics; EN 61000-3-3 Voltage Fluctuation and Flicker; EN 61000-6-3 Emission Standard (supersedes: EN 50081-1)	
Safety	CAN/CSA-C22.2 NO. 60950-1-07; UL 60950-1 Second Edition; IEC 60950-1 Second Edition; EN 60950-1:2006 Safety of Information Technology Equipment; EN 60825-1 Safety of Laser Products—Part 1: Equipment Classification, Requirements and User's Guide; EN 60825-2 Safety of Laser Products—Part 2: Safety of Optical Fibre Communication Systems	
Immunity	EN 61000-6-1 Generic Immunity and Susceptibility (supersedes EN 50082-1); EN 55024 Immunity Characteristics (supersedes EN 61000-4-2 ESD); EN 61000-4-3 Radiated, Radio Frequency, Electromagnetic Field; EN 61000-4-4 Electrical Fast Transient; EN 61000-4-5 Surge; EN 61000-4-6 Conducted Disturbances Induced by Radio-Frequency Fields; EN 61000-4-8 Power Frequency Magnetic Field; EN 61000-4-11 Voltage Dips and Sags	
Environmental regulatory compliance	RoHS-compliant (6 of 6); WEEE-compliant	
Vibration	IEC 68-2-36, IEC 68-2-6	
Shock and drop	IEC 68-2-27, IEC 68-2-32	

Brocade ICX 7250 Ordering Information

Part Number	Description
Brocade ICX 7250 Switches	
ICX7250-24G	Brocade ICX 7250 Switch 24-port, 4x1 GbE (basic, non-upgradable switch) with front-to-back airflow, no EPS connector
ICX7250-24	Brocade ICX 7250 Switch 24-port, 8x1/10 GbE, no 10 GbE PoD license preloaded, with side-to-back airflow
ICX7250-24P	Brocade ICX 7250 Switch 24-port PoE, 8x1/10 GbE, no 10 GbE PoD license preloaded, with side-to-back airflow
ICX7250-48	Brocade ICX 7250 Switch 48-port, 8x1/10 GbE, no 10 GbE PoD license preloaded, with side-to-back airflow
ICX7250-48P	Brocade ICX 7250 Switch 48-port PoE, 8x1/10 GbE, no 10 GbE PoD license preloaded, with side-to-back airflow
Switches	With 2x10 GbE PoD Licenses
ICX7250-24-2X10G	Brocade ICX 7250 Switch 24-port, 8x1/10 GbE, 2x10 GbE PoD license preloaded
ICX7250-24P-2X10G	Brocade ICX 7250 Switch 24-port PoE, 8x1/10 GbE, 2x10 GbE PoD license preloaded
ICX7250-48-2X10G	Brocade ICX 7250 Switch 48-port, 8x1/10 GbE, 2x10 GbE PoD license preloaded
ICX7250-48P-2X10G	Brocade ICX 7250 Switch 48-port PoE, 8x1/10 GbE, 2x10 GbE PoD license preloaded
Brocade ICX-EPS 4000 External Power Supply Options for the Brocade ICX 7250 Switch	
The Brocade ICX-EPS4000 supports up to four removable power supplies. Each power supply provides 920 W.	
ICX-EPS4000-SHELF	1U EPS
RPS17	EPS power supply, 920 W
ICX-EPS4000-CBL-01	Brocade ICX-EPS4000 power cable 1:1
ICX-EPS4000-CBL-02	Brocade ICX-EPS4000 power cable 1:2
Feature License and Accessories	
ICX7250-PREM-LIC	Brocade ICX 7250 Layer 3 Premium software license (non-node lock)
ICX7250-2X10G-LIC-POD	2x10 GbE PoD license (node lock)—upgrade uplink/stacking ports from 8x1 GbE to 2x1 GbE/10 GbE + 6x1 GbE
ICX7250-8X10G-LIC-POD	Upgrade uplink/stacking ports from 2x1 GbE/10 GbE + 6x1 GbE to 8x1 GbE/10 GbE (node lock)
ICX7000-RMK	FRU, rack mount kit, two-post, Brocade ICX 7750/7450
XBR-R000295	FRU, rack mount kit, four-post, 24 in. to 32 in. depth rack
BR-NTWADV-IP-BASE	Brocade Network Advisor IP management software license for up to 50 devices; required for initial purchase of IP-only management; minimum of one year of support required
Optics	For Brocade ICX 7250-24G Only
EIMG-BXD	1000BASE-BXD SFP optic SMF, transmits at 1,490 nm and receives at 1,310 nm, LC connector, single strand SMF fiber. This optic should only be connected to an EIMG-BXU at the far end.
EIMG-BXU	1000BASE-BXU SFP optic SMF, transmits at 1,310 nm and receives at 1,490 nm, LC connector, single strand SMF fiber. This optic should only be connected to an EIMG-BXD at the far end.
EIMG-LHA-OM-T	1000BASE-LHA SFP optic, SMF, LC connector, optical monitoring capable (70 km), industrial temperature
EIMG-LX-OM	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring capable
EIMG-SX-OM	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring capable
EIMG-TX	1000BASE-TX SFP copper, RJ-45 connector

Brocade ICX 7250 Ordering Information (Continued)

Optics	For Brocade ICX 7250-24/24P/48/48P
10G-SFPP-ER	10GBASE-ER SFP+ optic (LC), for up to 40 km over SMF
10G-SFPP-LR	10GBASE-LR, SFP+ optic (LC), for up to 10 km over SMF
10G-SFPP-SR	10GBASE-SR, SFP+ optic (LC), target range 300 m over MMF
10G-SFPP-USR	10GE USR SFP+ optic (LC), target range 100 m over MMF, 1-pack
10G-SFPP-ZR	10GBASE-ZR SFP+ optic (LC), for up to 80 km over SMF
EIMG-BXD	1000BASE-BXD SFP optic SMF, transmits at 1,490 nm and receives at 1,310 nm, LC connector, single strand SMF fiber. This optic should only be connected to an EIMG-BXU at the far end.
EIMG-BXU	1000BASE-BXU SFP optic SMF, transmits at 1,310 nm and receives at 1,490 nm, LC connector, single strand SMF fiber. This optic should only be connected to an EIMG-BXD at the far end.
EIMG-LHA-OM-T	1000BASE-LHA SFP optic, SMF, LC connector, optical monitoring capable (70 km), industrial temperature
EIMG-LX-OM	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring capable
EIMG-SX-OM	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring capable
EIMG-TX	1000BASE-TX SFP Copper, RJ-45 connector
Direct-Attached Cables	For Brocade ICX 7250-24/24P/48/48P
10G-SFPP-TWX-0101	Direct-attached SFP+ copper cable, 1 m, 1-pack, active
10G-SFPP-TWX-0301	Direct-attached SFP+ copper cable, 3 m, 1-pack, active
10G-SFPP-TWX-0501	Direct-attached SFP+ copper cable, 5 m, 1-pack, active
10GE-SFPP-AOC-0701	10 GbE SFP+ direct-attached active optical cable, 7m, 1-pack
10GE-SFPP-AOC-1001	10 GbE SFP+ direct-attached active optical cable, 10 m, 1-pack
1G-SFP-TWX-0101	Direct-attached 1 GbE SFP copper cable, 1 m
1G-SFP-TWX-0501	Direct-attached 1 GbE SFP copper cable, 5 m

For a list of cables and fiber optics approved for stacking, visit www.brocade.com/fastironstacking.

Ordering Instructions

Customers have two options when ordering a Brocade ICX 7250 Switch. They can order one of the five Brocade ICX 7250 Switch models with 1 GbE uplink/stacking ports, or order a switch preloaded with a PoD license for two 10 GbE uplink/stacking ports.

The Brocade ICX 7250 (-24/-24P/-48/-48P) can be upgraded to 2x10 GbE uplink/stacking ports by purchasing a PoD license (ICX7250-2X10G-LIC-POD).

A Brocade ICX 7250 Switch with 2x10 GbE uplink/stacking ports can be upgraded to 8x10 GbE by purchasing an additional PoD license (ICX7250-8X10G-LIC-POD). Only switches that already have 2x10 GbE can be upgraded to 8x10 GbE.

Note that the Brocade ICX 7250-24G Switch is not upgradable and will support 4x1 GbE uplink ports only.

All Brocade ICX 7250 Switches include a power cord, two-post rack mounting brackets, and a USB serial console cable. Stacking cables must be ordered separately.

Corporate Headquarters
San Jose, CA USA
T: +1-408-333-8000
info@brocade.com

European Headquarters
Geneva, Switzerland
T: +41-22-799-56-40
emea-info@brocade.com

Asia Pacific Headquarters
Singapore
T: +65-6538-4700
apac-info@brocade.com



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