



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

Solicitation

NUMBER
HHR14099

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF
ROBERTA WAGNER
304-558-0067

RFQ COPY

TYPE NAME/ADDRESS HERE

Vology Inc.

4035 Tampa Rd. Suite 6000

Oldsmar, FL. 34677

HEALTH AND HUMAN RESOURCES
MANAGEMENT INFORMATION SERVICE

321 CAPITOL STREET, SUITE 200
CHARLESTON, WV
25301 304-558-9195

DATE PRINTED
10/02/2013

BID OPENING DATE

11/05/2013

BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	EA	725-57	THE WEST VIRGINIA PURCHASING DIVISION IS SOLICITING BIDS ON BEHALF OF THE WEST VIRGINIA DEPARTMENT OF HEALTH AND HUMAN RESOURCES TO ESTABLISH A CONTRACT FOR THE ONE-TIME PURCHASE OF SWITCHES TO REPLACE EXISTING NETWORK SWITCHES OPERATING WITHIN AN EXISTING CISCO NETWORK INFRASTRUCTURE LOCATED AT VARIOUS DEPARTMENT OF HEALTH AND HUMAN RESOURCES' OFFICES ACROSS THE STATE.		
					See Vology Alternative Product Exhibit B.	
					STANDARD MANUFACTURER WARRANTY ON ALL EQUIPMENT	
					LISTED ON PRICING PAGE OR EQUAL.	
0002	126	EA	725-57	CATALYST 2960S 48 GIGE POE 740W, 4 X SFP LAN BASE		
					See Vology Alternative Product Exhibit B.	
					SWITCH, PART NUMBER WS-C2960S-48FPS-L OR EQUAL.	
					11/05/13 10:37:20 AM West Virginia Purchasing Divisio	

SIGNATURE

TELEPHONE

813-490-6878

DATE

11/01/2013

TITLE

Gov. Account Mgr.

FEIN

59-3760415

ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



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Department of Administration
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LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0003	23	EA	725-57	23 CATALYST 2960S 24 GIGE POE 370W, 2 X SFP LAN BASE SWITCH, PART NUMBER WS-C2960S-24PS-L OR EQUAL.	See Vology Alternative Product Exhibit B.	
0004	127	EA	725-57	CISCO CATALYST 2960S FLEXSTACK STACK MODULE, PART NUMBER C2960S-STACK OR EQUAL.	See Vology Alternative Product Exhibit B.	
0005	86	EA	725-57	CISCO FLEXSTACK 50CM STACKING CABLE, PART NUMBER CAB-STK-E-0.5M OR EQUAL.	See Vology Alternative Product Exhibit B.	
0006	20	EA	725-57	CISCO FLEXSTACK 1M STACKING CABLE, PART NUMBER CAB-STK-E-1M OR EQUAL.	See Vology Alternative Product Exhibit B.	

SIGNATURE	TELEPHONE	DATE
	813-490-6878	11/01/2013
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
Gov. Account Mgr,	59-3760415	

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BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0007	29	EA		725-57	See Vology Alternative Product Exhibit B.	
				CISCO FLEXSTACK 3M STACKING CABLE, PART NUMBER		
				CAB-STK-E-3M OR EQUAL.		
0008	52	EA		725-57	See Vology Alternative Product Exhibit B.	
				CISCO GE SFP, LC CONNECTOR SX TRANSCEIVER, PART		
				NUMBER GLC-SX-MM OR EQUAL.		
0009	149	EA		725-57	See Vology Alternative Product Exhibit B.	
				AC POWER CORD, 16AWG, PART NUMBER CAB-16AWG-AC OR		
				EQUAL.		
***** THIS IS THE END OF RFQ HHR14099 ***** TOTAL:						\$548,442.50

SIGNATURE

TELEPHONE 813-490-6878

DATE 11/01/2013

TITLE Gov. Account Mgr.

FEIN 59-3760415

ADDRESS CHANGES TO BE NOTED ABOVE

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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

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 non-binding.

Question Submission Deadline: October 17, 2013 - end of business

Submit Questions to: Roberta A. Wagner

2019 Washington Street, East

Charleston, WV 25305

Fax: 304-558-4115

Email: roberta.a.wagner@wv.gov

5. **VERBAL COMMUNICATION:** Any verbal communication between the Vendor and any State personnel is not binding, including that made 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 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 bid delivery address is:

Department of Administration, Purchasing Division
2019 Washington Street East
Charleston, WV 25305-0130

The bid should contain the information listed below on the face of the envelope or the bid may not be considered:

SEALED BID
 BUYER: State of WV Department of Administration, Purchasing Div.
 SOLICITATION NO.: HHR14099
 BID OPENING DATE: 11/05/2013
 BID OPENING TIME: 1:30 PM
 FAX NUMBER: 304-558-4115

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 _____ 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: ☐ 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 time stamped by the official Purchasing Division time clock.

Bid Opening Date and Time: November 5, 2013
 @ 1:30 P.M.

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.

GENERAL TERMS AND CONDITIONS:

1. **CONTRACTUAL AGREEMENT:** Issuance of a Purchase Order 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 **"Contract"** means the binding agreement that is entered into between the State and the Vendor to provide the goods and services requested in the Solicitation.
 - 2.3 **"Director"** means the Director of the West Virginia Department of Administration, Purchasing Division.
 - 2.4 **"Purchasing Division"** means the West Virginia Department of Administration, Purchasing Division.
 - 2.5 **"Purchase Order"** 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 successful bidder and Contract holder.
 - 2.6 **"Solicitation"** means the official solicitation published by the Purchasing Division and identified by number on the first page thereof.
 - 2.7 **"State"** means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.
 - 2.8 **"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 must be submitted to the Purchasing Division Director 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. 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.

Reasonable Time Extension: At the sole discretion of the Purchasing Division Director, and with approval from the Attorney General's office (Attorney General approval is as to form only), this Contract may be extended for a reasonable time after the initial Contract term or after any renewal term as may be necessary to obtain a new contract or renew this Contract. Any reasonable time extension shall not exceed twelve (12) months. Vendor may avoid a reasonable time extension by providing the Purchasing Division Director with written notice of Vendor's desire to terminate this Contract 30 days prior to the expiration of the then current term. During any reasonable time extension period, the Vendor may terminate this Contract for any reason upon giving the Purchasing Division Director 30 days written notice. Automatic extension of this Contract is prohibited. Notwithstanding the foregoing, Purchasing Division approval is not required on agency delegated or exempt purchases, but Attorney General approval may be required.

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

☒ **One Time Purchase:** The term of this Contract shall run from the issuance of the Purchase Order until all of the goods contracted for have been delivered, but in no event shall 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 Purchase Order 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. **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.

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

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

- ☐ **BID BOND:** All Vendors shall furnish a 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 issued and 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 issued and 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.
- ☐ **WORKERS' COMPENSATION INSURANCE:** The apparent successful Vendor shall have appropriate workers' compensation insurance and shall provide proof thereof upon request.
- ☐ **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:**

or more.

☐ **Builders Risk Insurance:** builders risk – all 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.

☐
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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.

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. **ALTERNATES:** Any model, brand, or specification listed herein 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. LIQUIDATED DAMAGES: Vendor shall pay liquidated damages in the amount
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.

13. ACCEPTANCE/REJECTION: The State may accept or reject any bid in whole, or in part. Vendor's signature on its bid signifies acceptance of the terms and conditions contained in the Solicitation and Vendor agrees to be bound by the terms of the Contract, as reflected in the Purchase Order, upon receipt.

14. 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.

15. 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.

16. 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.

17. 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, to the Agency at the address on the face of the purchase order labeled "Invoice To."

18. UNIT PRICE: Unit prices shall prevail in cases of a discrepancy in the Vendor's bid.

19. DELIVERY: All quotations are considered freight on board destination ("F.O.B. destination") unless alternate shipping terms are clearly identified in the bid. Vendor's listing of shipping terms that contradict the shipping terms expressly required by this Solicitation may result in bid disqualification.

20. INTEREST: Interest attributable to late payment will only be permitted if authorized by the West Virginia Code. Presently, there is no provision in the law for interest on late payments.

21. 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 Resident Vendor Certification form has been attached hereto to allow Vendor to apply for the preference. Vendor's

failure to submit the Resident Vendor Certification form with its bid will result in denial of Vendor Preference. Vendor Preference does not apply to construction projects.

22. **SMALL, WOMEN-OWNED, OR MINORITY-OWNED BUSINESSES:** For any solicitations publicly advertised for bid on or after July 1, 2012, 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 submission of its bid 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.
23. **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.
24. **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 cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-7.16.2.
25. **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.
26. **TIME:** Time is of the essence with regard to all matters of time and performance in this Contract.
27. **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.
28. **COMPLIANCE:** Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendors acknowledge that they have reviewed, understand, and will comply with all applicable law.
29. **PREVAILING WAGE:** On any contract for the construction of a public improvement, Vendor and any subcontractors utilized by Vendor shall pay a rate or rates of wages which shall not be less than the fair minimum rate or rates of wages (prevailing wage), as established by the West Virginia Division of Labor under West Virginia Code §§ 21-5A-1 et seq. and available at <http://www.sos.wv.gov/administrative-law/wagerates/Pages/default.aspx>. Vendor shall be responsible for ensuring compliance with prevailing wage requirements and determining when prevailing wage

requirements are applicable. The required contract provisions contained in West Virginia Code of State Rules § 42-7-3 are specifically incorporated herein by reference.

- 30. 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.
- 31. 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). **No Change shall be implemented by the Vendor until such time as the Vendor receives an approved written change order from the Purchasing Division.**
- 32. 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.
- 33. 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.
- 34. 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.
- 35. 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.
- 36. 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.
- 37. 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.

38. [RESERVED]

39. 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>.

40. DISCLOSURE: Vendor's response to the Solicitation and the resulting Contract are considered public documents and will be disclosed to the public in accordance with the laws, rules, and policies governing the West Virginia Purchasing Division. Those laws include, but are not limited to, the Freedom of Information Act found in West Virginia Code § 29B-1-1 et seq.

If a Vendor considers any part of its bid to be exempt from public disclosure, Vendor must so indicate by specifically identifying the exempt information, identifying the exemption that applies, providing a detailed justification for the exemption, segregating the exempt information from the general bid information, and submitting the exempt information as part of its bid but in a segregated and clearly identifiable format. Failure to comply with the foregoing requirements will result in public disclosure of the Vendor's bid without further notice. A Vendor's act of marking all or nearly all of its bid as exempt is not sufficient to avoid disclosure and WILL NOT BE HONORED. Vendor's act of marking a bid or any part thereof as "confidential" or "proprietary" is not sufficient to avoid disclosure and WILL NOT BE HONORED. In addition, a legend or other statement indicating that all or substantially all of the bid is exempt from disclosure is not sufficient to avoid disclosure and WILL NOT BE HONORED. Vendor will be required to defend any claimed exemption for nondisclosure in the event of an administrative or judicial challenge to the State's nondisclosure. Vendor must indemnify the State for any costs incurred related to any exemptions claimed by Vendor. Any questions regarding the applicability of the various public records laws should be addressed to your own legal counsel prior to bid submission.

41. LICENSING: In accordance with West Virginia Code of State Rules §148-1-6.1.7, 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.

42. ANTITRUST: In submitting a bid to, signing a contract with, or accepting a Purchase Order 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.

- 43. VENDOR CERTIFICATIONS:** By signing its bid or entering into this Contract, Vendor certifies (1) that its bid was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid for the same material, supplies, equipment or services; (2) that its bid 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 RFQ in its entirety; understands the requirements, terms and conditions, and other information contained herein. Vendor's signature on its bid 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 on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid 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.

- 44. 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.

- 45. 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.

- 46. 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.

- 47. 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.
- 48. ADDITIONAL AGENCY AND LOCAL GOVERNMENT USE:** This Contract may be utilized by and extends to 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"). This Contract shall be extended to the aforementioned Other Government Entities on the same prices, terms, and conditions as those offered and agreed to in this Contract. 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.
- 49. CONFLICT OF INTEREST:** Vendor, its officers or members or employees, shall not presently have or acquire any 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.
- 50. 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.
- 51. 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.

52. 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 hearth, 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:

- a. 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
- b. 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.

53. 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
HHR14099 Network & infrastructure Switches

SPECIFICATIONS

1. **PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of West Virginia Department of Health and Human Resources to establish a contract for the one time purchase of switches to replace existing network switches operating within an existing Cisco network infrastructure located at various Department of Health and Human Resource offices across the state. Stacking Ethernet switches reduces the network administration cost of ownership as it results in fewer devices to manage, and increases network uptime. From an operations standpoint the current standalone switches supporting various county offices are determined to be end of life and due replacement will avoid untimely disruption to workflow. The intended switches will support their call management system, which currently uses Voice over Internet Protocol (VoIP) to provide telephony services. Its installation will increase availability of network access and provides users with high-speed and reliable access to communications and business productivity tools. The programs housed within the DHHR facilities are scheduled to grow with the expansion of the Recipient Automated Payment Information Data System (RAPIDS), DHHR is driven to meet these demands with adaptable network infrastructure solutions and design.
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 switches provided by a qualified, manufacturer-authorized, vendor which is fully compatible and interoperable with the existing network equipment system, in order to upgrade and extend the capabilities of the system.
 - 2.2 **"Gigabit"** a gigabit is one billion bits
 - 2.3 **"Redundancy"** This refers to building or designing into the equipment a number of systems that can "take over " if one part of the system fails to work
 - 2.4 **"Pricing Page"** means the pages upon which Vendor should list its proposed price for the Contract Items in the manner requested. The Pricing Page is attached hereto as Exhibit A.
 - 2.5 **"RFQ"** means the official request for quotation published by the Purchasing Division and identified as HHR14099.

REQUEST FOR QUOTATION
HHR14099 Network & Infrastructure Switches

3. GENERAL REQUIREMENTS:

- 3.1 Mandatory Contract Item Requirements:** Contract Item must meet or exceed the mandatory requirements listed below. The use of brand name or equal specifications is for the purpose of describing the minimum standard of quality, technical performance and installation characteristics required and are not intended to limit or restrict competition.

Alternate bids that meet or exceed those of the brand name or equal specifications and features are invited. In order to receive full consideration, such alternate bids should be accompanied by sufficient descriptive literature and/or samples to clearly identify the offer and allow for a complete evaluation.

- 3.1.1** Vendor must provide standard manufacturer warranty on all equipment listed on the Pricing Page or the proposed equivalent equipment listing. Once received from the vendor, installation and maintenance of all equipment will be the sole responsibility of the West Virginia Office of Technology.
- 3.1.2** Vendor must provide switches Cisco Catalyst 2960S; part number WS-C2960S-48FPS-L or equal. This switch allows for 48 ports of Gigabit Ethernet desktop connectivity with Power over Ethernet equivalent to 740 Watts, and 4 expansion slots for Gigabit over Ethernet uplinks
- 3.1.3** Vendor must provide equipment Cisco Catalyst 2960S; part number WS-C2960S-24PS-L or equal. This equipment provides 24 ports of Gigabit Ethernet desktop connectivity with Power over Ethernet equivalent to 370 Watts, and 2 expansion slots Gigabit over Ethernet uplinks
- 3.1.4** Vendor must provide equipment Cisco Catalyst 2960S FlexStack Stack Module; part number C2960S-STACK or equal. This unit must allow for redundancy and pre-provisioning of network switches detailed in 3.1.2 & 3.1.3.
- 3.1.5** Vendor must provide equipment Cisco GE SFP, LC connector SX Transceiver; part number GLC-SX-MM or equal. Equivalent equipment must plug into a Gigabit Ethernet port or slot, linking the port with the network allowing for transition between fiber and copper connections.
- 3.1.6** Vendor must provide equipment Cisco FlexStack 50cm Stacking Cable, connecting the switches or equal. (current part number CAB-STK-E-0.5M)

REQUEST FOR QUOTATION
HHR14099 Network & infrastructure Switches

- 3.1.7 Vendor must provide equipment equivalent to the Cisco FlexStack 1m Stacking Cable, connecting the switches or equal. (current part number CAB-STK-E-1M)
- 3.1.8 Vendor must provide equipment equivalent to the Cisco FlexStack 3m Stacking Cable, connecting the switches or equal. (current part number CAB-STK-E-3M)
- 3.1.9 AC Power cord, 16AWG or equal for the equipment listed in 3.1.2 & 3.1.3.

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 grand total as shown on the Pricing Page.
- 4.2 **Pricing Page:** Vendor should complete the Pricing Page by filling out the Unit Price and Extended Price making sure that the Grand Total Bid is correct. 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 may provide "**or equal**" but if providing an "**or equal**" product, Vendor must provide a line-by-line comparison of the product parts listed on the Pricing Page as well as any additional products required to meet the requirements of this RFQ.

Notwithstanding the foregoing, the Purchasing Division may correct errors as it deems appropriate. Vendor should type or electronically enter the information into the Pricing Page to prevent errors in the evaluation.

5. PAYMENT:

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

REQUEST FOR QUOTATION
HHR14099 Network & Infrastructure Switches

6. DELIVERY AND RETURN:

6.1 Shipment and Delivery: Vendor shall ship the Contract Items within 15 calendar days after being awarded this Contract and receiving a purchase order or notice to proceed. Vendor shall deliver the Contract Items by the stated delivery dates for each item after receiving a purchase order or notice to proceed. Contract Items must be delivered to Agency at: Accounting Technician III, West Virginia Department of Health and Human Resources OMIS, 321 Capitol Street, Suite 200, 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.

Any Agency seeking to obtain the Contract Items from a third party under this provision must first obtain approval of the Purchasing Division.

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.

Exhibit A
REQUEST FOR QUOTATIONS
HHR14099 CISCO NETWORK SWITCHES

PRICING PAGE

Desired Item #	Quantity	Description	Unit Price	Extended Price
#1 (3.1.1)	1	Standard manufacturer warranty on all equipment listed on pricing page or equal	See Vology Alternative Product Exhibit B.	
#2 (3.1.2)	126	Catalyst 2960S 48 GigE PoE 740W, 4 x SFP LAN Base Switch, part number WS-C2960S-48FPS-L or equal.	See Vology Alternative Product Exhibit B.	
#3 (3.1.3)	23	23 Catalyst 2960S 24 GigE PoE 370W, 2 x SFP LAN Base Switch, part number WS-C2960S-24PS-L or equal.	See Vology Alternative Product Exhibit B.	
#4 (3.1.4)	127	Cisco Catalyst 2960S FlexStack Stack Module, part number C2960S-STACK or equal.	See Vology Alternative Product Exhibit B.	
#5 (3.1.5)	86	Cisco FlexStack 50cm Stacking Cable, part number CAB-STK-E-0.5M or equal.	See Vology Alternative Product Exhibit B.	
#6 (3.1.6)	20	Cisco FlexStack 1m Stacking Cable, part number CAB-STK-E-1M or equal.	See Vology Alternative Product Exhibit B.	
#7 (3.1.7)	29	Cisco FlexStack 3m Stacking Cable, part number CAB-STK-E-3M or equal.	See Vology Alternative Product Exhibit B.	
#8 (3.1.8)	52	Cisco GE SFP, LC connector SX Transceiver, part number GLC-SX-MM or equal.	See Vology Alternative Product Exhibit B.	

#9 (3.1.9)	149	AC Power cord, 16AWG, part number CAB-16AWG-AC or equal.	See Vology Alternative Product Exhibit B.	
Grand Total Bid				\$548,442.50

THIS IS A ONE-TIME PURCHASE OF CISCO SWITCHES AND RELATED HARDWARE

CONTRACT ITEMS MUST BE SHIPPED F.O.B. DESTINATION.

AGENCY WILL EVALUATE BIDS BASED ON THE LOWEST GRAND TOTAL BID. A CONTRACT WILL BE AWARDED TO THE VENDOR THAT PROVIDES THE CONTRACT ITEMS MEETING THE REQUIRED SPECIFICATIONS FOR THE LOWEST GRAND TOTAL BID PRICE.

PAYMENT TO VENDOR WILL BE MADE IN ARREARS AFTER DELIVERY, AND 100% ACCEPTANCE OF CONTRACT ITEMS BY AGENCY.

Vendor Name: Vology Inc.


Vendor Address: 4035 Tampa Rd. Suite 6000
Oldsmar, FL. 34677

Vendor Telephone Number: 813-460-6878

Vendor Fax Number: 813-490-7091

Vendor Email: bweaver@vology.com

Vendor Authorized Representative: Beau Weaver

Vendor Authorized Representative Signature:  (Please Print)

Date: 11/01/2013

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 Resident Vendor Preference, if applicable.

1. Application is made for 2.5% resident 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; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; **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% resident 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% resident vendor preference for the reason checked:

- ____ Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or**,

4. Application is made for 5% resident 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% resident 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% resident 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) reject the bid; 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.

Under penalty of law for false swearing (West Virginia Code, §61-5-3), 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: Vology Inc.

Signed: _____

Date: 11/01/2013

Title: Government Account Manager

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 exceeds 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: Vology Inc.

Authorized Signature: [Signature] Date: 11/01/2013

State of Florida

County of Pinellas, to-wit:

Taken, subscribed, and sworn to before me this 1st day of November, 2013.

My Commission expires 20

AFFIX SEAL HERE



NOTARY PUBLIC

[Signature]
Purchasing Affidavit (Revised 07/01/2012)

CERTIFICATION AND SIGNATURE PAGE

By signing below, I certify that I have reviewed this Solicitation in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid or proposal for review and consideration; that I am authorized by the bidder to execute this bid or any documents related thereto on bidder's behalf; that I am authorized to bind the bidder in a contractual relationship; and that to the best of my knowledge, the bidder has properly registered with any State agency that may require registration.

Vology Inc.

(Company)



(Authorized Signature)

Beau Weaver, Government Account Manager

(Representative Name, Title)

813-490-6878

(Phone Number)

813-490-7091

(Fax Number)

11/01/2013

(Date)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: HHR14099

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.

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Addendum Numbers Received:

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<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.

Vology Inc.

Company



Authorized Signature

11/01/2013

Date

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

Vology Alternative Product Exhibit B.

Desired Item #	Quantity	Description	Alternate Description	Alternative Price	Extended Price
#1 (3.1.1)	1	Standard manufacturer warranty on all equipment listed on pricing page or equal.	Brocade Assurance Limited Lifetime Warranty. Advanced Part Replacement, Next Business Day Service for lifetime (or 5 years after End of Sale (EOS) announcement) of the product for the original owner. (ICX 6450 Also includes 3 years of software upgrades and 8x5 TAC support).	inc	\$ -
#2 (3.1.2)	126	Catalyst 2960S 48 GigE PoE 740W, 4xSFP Lan Base Switch, part number WS-C2960S-48FPS-L or equal.	ICX 6610 48 GigE PoE Switch, 48 port 1G RJ45 PoE+, plus 8 x 1G SFPP uplinks ports(upgradeable to 10G). 4 x 40G stacking ports. Exhaust air flow. Base S/W, part number ICX6610-48P-E	\$ 3,950.00	\$ 497,700.00
#3 (3.1.3)	23	23 Catalyst 2960S 24 GigE PoE 370W, 2 x SFP LAN Base Switch, part number WS_C2960PS-L or equal.	ICX 6450 24 GigE PoE Switch, 24-port 1G Switch PoE+ 390W, 2x1G SFP+ (upgradable to 10G) & 2x1G/10G SFP+ Uplink/Stacking Ports, part number ICX6450-24P	\$ 1,697.50	\$ 39,042.50
#4 (3.1.4)	127	Cisco Catalyst 2960S FlexStack Stack Module, part number C2960S-STACK or equal.	NA	inc	\$ -
	252		40GE QSFP Direct Attached Copper Cable, 1m, 1-pack, part number 40G-QSFP-C-0101	inc	\$ -
#5 (3.1.5)	86	Cisco FlexStack 56cm Stacking Cable, part number CAB-STK-E-.5M or equal.	DIRECT ATTACHED 10G SFP+ COPPER CABLE, 1M, STACKING CABLE, part number 10G-SFPP-TWX-0101	inc	\$ -
#6 (3.1.6)	20	Cisco FlexStack 1m Stacking Cable, part number CAB-STK-E-1M or equal.	DIRECT ATTACHED 10G SFP+ COPPER CABLE, 1M, STACKING CABLE, part number 10G-SFPP-TWX-0101	inc	\$ -
#7 (3.1.7)	29	Cisco FlexStack 3m Stacking Cable, part number CAB-STK-E-3M or equal.	DIRECT ATTACHED 10G SFP+ COPPER CABLE, 3M, STACKING CABLE, part number 10G-SFPP-TWX-0301	inc	\$ -
#8 (3.1.8)	52	Cisco GE SFP, LC connector SX Transceiver, part number GLC-SC-MM or equal.	1000Base-SX SFP optic, MMF, LC connector, Optical Monitoring Capable, part number E1MG-SX-OM	\$ 225.00	\$ 11,700.00
#9 (3.1.9)	149	AC Power cord, 16AWG, Part number CAB-16AWG-AC or Equal.	Power Cord for USA version	inc	\$ -
				Total	\$ 548,442.50



Vology
4027 Tampa Road, Suite 3900
Oldsmar, FL 34677
(813)-852-6400 office (813)-490-7090 fax
Sales@vology.com

SALES QUOTE

SQ-412254

11/1/2013

Customer			Contact	Ship To			
State of WV Department of Administration Purchasing Division 2019 Washington Street East Post Office Box 50130 Charleston , WV 25305-0130 US			Wagner, Roberta 2019 Washington Street East Charleston , WV 25305 US 304-558-4115	HEALTH AND HUMAN RESOURCES MANAGEMENT INFORMATION SERVICES 321 CAPITOL STREET SUITE 200 CHARLESTON , WV 25301 USA 304-558-9195			
Account	Terms	Due Date	Account Manager		Schedule Date	Ship VIA	P.O. #
37714 / Stat37714	CC	10/31/2013	Beau Weaver Ph# (813) 490-6878	bweaver@vology.com (813) 490-7090	10/31/2013	UPS Ground	

Line #	Manufacturer/ Model / Description	Product Condition	Qty	Unit Price	Extended Amount
1	Brocade Assurance Limited Lifetime Warranty Included				
2	Brocade / ICX6610-48P-E / 48 port 1G RJ45 PoE+, plus 8 x 1G SFPP uplinks ports (upgradeable to 10G). 4 x 40G stacking ports. Exhaust air flow. Base S/W	New	126	3,950.00	497,700.00
3	Brocade / ICX6450-24P / 24-port 1G switch PoE+ 390W, 2x1G SFP+ (upgradable to 10G) & 2x1G/10G SFP+ uplink/stacking	New	23	1,697.50	39,042.50
4	Brocade / 10G-SFPP-TWX-0101 / DIRECT ATTACHED SFPP COPPER,1M,1-PACK	New	86	0.00	0.00
5	Brocade / 10G-SFPP-TWX-0101 / DIRECT ATTACHED SFPP COPPER,1M,1-PACK	New	20	0.00	0.00
6	Brocade / 10G-SFPP-TWX-0301 / DIRECT ATTACHED SFPP COPPER,3M,1-PACK	New	29	0.00	0.00
7	Brocade / E1MG-SX-OM / 1000Base-SX SFP optic, MMF, LC connector, Optical Monitoring Capable	New	52	225.00	11,700.00
				SubTotal:	\$548,442.50
				Est. Freight	\$0.00
Memo :				Total Amount	\$548,442.50

All certified pre-owned products have passed our 5 Star Certification Process and is backed by our 5 year Warranty. (End-User Customers only) For detailed information regarding our 5 year warranty, 5 Star Certified Process and returns please visit our website at <http://www.vology.com/services-solutions/warranty-solutions>. For all other products, Vology makes no claim as to the warranty of any products or services in this quotation. Only the written warranty offered by the equipment manufacturer or service provider will apply. This agreement will expire 7 days from the quote date above. Prices are subject to change without notice. Unless noted, this quote does not include shipping charges or taxes.

Check out how the products you order are processed - Video Tour
www.vology.com/company/vology-virtual-tour

Accept this quote - Signature: _____

Purchase Order #: _____

Cisco ° Juniper Networks ° Extreme ° Avaya/Nortel ° HP ° Brocade/Foundry ° Gencom ° Citrix



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

Solicitation

NUMBER
HHR14099

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
ROBERTA WAGNER 304-558-0067

RFQ COPY

TYPE NAME/ADDRESS HERE
Vology Inc.

4035 Tampa Rd. Suite 6000
Oldsmar, FL. 34677

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HEALTH AND HUMAN RESOURCES
MANAGEMENT INFORMATION SERVICE

321 CAPITOL STREET, SUITE 200
CHARLESTON, WV
25301 304-558-9195

S
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T
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DATE PRINTED
10/18/2013

BID OPENING DATE: 11/05/2013

BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
ADDENDUM NO. 1						
ADDENDUM IS ISSUED:						
1. TO PROVIDE RESPONSES TO VENDORS' QUESTIONS REGARDING THE ABOVE SOLICITATION. QUESTION AND ANSWER PAGES ARE ATTACHED.						
2. TO PROVIDE ADDENDUM ACKNOWLEDGEMENT. THIS DOCUMENT SHOULD BE SIGNED AND RETURNED WITH YOUR BID. FAILURE TO SIGN AND RETURN MAY RESULT IN THE DISQUALIFICATION OF YOUR BID.						
***** END OF ADDENDUM NO. 1 *****						

SIGNATURE

TELEPHONE

813-490-6878

DATE

11/01/2013

TITLE Gov. Account Mgr.

FEIN

59-3760415

ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



4027 Tampa Rd
Suite 3900
Oldsmar, FL 34677
tel: 800 998 9862
fax: 813 490 7090
vology.com

Table of Contents

Tab 1.....	Addendum
Tab 2.....	Vology Overview
Tab 3.....	Solicitation
Tab 4.....	Alternate Product Description (Alternative Product Exhibit B), Price and Quote
Tab 5.....	Brocade Technology Documents and Specifications
Tab 6.....	Brocade Warranty

SOLICITATION NUMBER: HHR14099

Addendum Number: 1

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:

1. To provide copy of vendor questions and responses.
2. To provide Addendum Acknowledgement form.

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

HHR14099 Addendum #1
October 17, 2013

1. **Q:** Line Number 0002: What is the actual POE requirement of the Cisco IP phones to be used? The question is: Are 750 watt switches a requirement or could a more cost effective switch be used that provides less POE 350 watts for example?

A: The phones will be a combination of Class 2 and class 3 devices which according to the 802.3af specification draw a maximum of 7.0 AND 15.4 Watts respectively. There are also POE devices other than phones such as wireless access points which have varying power requirements. The requirement specified in the RFQ is correct, 740W for the 48 port model of switch and 370W for the 24 port model.

2. **Q:** Line Number 0005: Is a 50cm cable a requirement? Different manufactures build cables to interconnect stacked switches and these lengths vary. For example a 30 CM may be all that is necessary to connect adjacent switches.

A: No, exact lengths are not required. These are stacking cables specified in three different lengths, 50cm, 1M, and 3M and they are meant as examples. The shortest cable (50CM) in the example) is to connect adjacent switches in a stack, the medium size cable (1M in the example) is for connecting the bottom switch to the top in a stack of three switches, and longest cable (3M in the example) is for connecting the bottom switch to the top in a stack of more than 3 switches.

3. **Q:** Will standard warranty be compared and weighted? For example: Advanced switch replacement in event of a failure, bug fixes and firmware upgrades included, Technical Phone support included, etc.?

A: The requirement is standard manufacturer warranty. For the switches used as example in the RFQ the manufacturer is Cisco, and the standard warranty for these models of switches is the Cisco Limited Lifetime Hardware Warranty. The warranty must meet or exceed Cisco's Limited Lifetime Hardware Warranty Terms. See attached terms of the warranty.

4. **Q:** Also a note regarding lines number 0004 and 0009. In many cases these parts are included with the switch purchase and do not have a separate chargeable line item from various manufacturers.

A: If an item is included then indicate so and specify 0.00 on the price sheet.

Cisco Limited Lifetime Hardware Warranty Terms

The following are special terms applicable to your hardware warranty. Your formal Warranty Statement, including the warranty applicable to Cisco software, appears below and in the *Cisco Information Packet* that accompanies your Cisco product.

Duration of Hardware Warranty: As long as the original End User continues to own or use the Product. In the event of discontinuance of product manufacture, Cisco warranty support is limited to five (5) years from the announcement of discontinuance.

Replacement, Repair or Refund Procedure for Hardware: Cisco or its service center will use commercially reasonable efforts to ship a replacement part within ten (10) working days after receipt of the RMA request. Actual delivery times may vary depending on Customer location.

Cisco reserves the right to refund the purchase price as its exclusive warranty remedy.

To Receive a Return Materials Authorization (RMA) Number: Please contact the party from whom you purchased the product. If you purchased the product directly from Cisco, contact your Cisco Sales and Service Representative.

Complete the form below and keep for ready reference.

Product purchased from:	
Their telephone number:	
Product Model and Serial number:	
Maintenance Contract number:	

Product warranty terms and other information applicable to Cisco products are available at the following URL:

<http://www.cisco.com/go/warranty>

78-6310-02F0

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www.cisco.com



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SOLICITATION NO.: HHR14099

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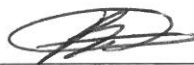
(Check the box next to each addendum received)

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Vology Inc.

Company



Authorized Signature

11/01/2013

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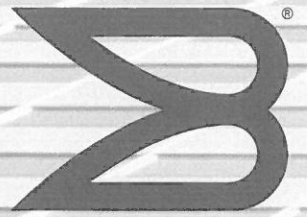
Revised 6/8/2012



4027 Tampa Rd
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vology.com

Vology serves 10,000+ customers comprising civilian, educational, healthcare and government verticals across all U.S. states and territories and over 65 countries worldwide. Vology approximately employs 200 professionals across engineering, sales, logistics, customer service and operations functions that collaborate to deliver uncompromising quality products and services solutions. Vology was nominated to the Inc 500/5000 growth lists eight (8) times, and was voted "Best Places to Work" 5 consecutive times. Customers that have chosen to rate their experiences with us average a 9.8 on a 10 point scale for Overall Customer Satisfaction, as verified by resellerratings.com. Vology is ISO 9001:2008 certified by National Quality Assurance USA (NQA), receiving certificate renewal in 2012 and passing our 2013 surveillance audit with perfect marks.

Vology is the fastest Brocade partner to ever reach its highest level of authorization. As an Elite partner with Brocade, Vology is able to offer tremendous cost savings and technical expertise to its customers. Vology is pleased to offer a Brocade solution to The State of West Virginia Health and Human Resources for Solicitation HHR14099. Vology has submitted a complete bid, and looks forward to receiving the award for this contract.



**CAMPUS
NETWORK**

**The Effortless Network:
HyperEdge Architecture
for the Campus Network**

BROCADE

The Effortless Network, enabled by HyperEdge Architecture, seamlessly integrates new innovations with legacy technologies, improving network flexibility and reducing management complexity, application deployment time, and operational costs.

Today's campus network is critical for business connectivity to customers, vendors, partners, and growth. At the same time, to ensure business agility and competitiveness, the campus network must support new applications, cloud-based services, and mobile users. However, after decades of limited innovation, legacy campus networks remain rigid, complex, and costly to maintain. Organizations are learning the hard way that these networks were not built to meet today's business challenges and user demands.

INTRODUCTION

The campus network for today and tomorrow should be flexible, easy to manage, and cost-effective. The Effortless Network™ is the Brocade vision to meet these objectives, enabled by the Brocade® HyperEdge™ Architecture as the cornerstone of delivering on that vision. HyperEdge Architecture seamlessly integrates new innovations with legacy technologies to improve network flexibility and reduce management complexity, allowing organizations to deploy applications quickly and cost-efficiently.

NEW APPLICATIONS AND NEW DEVICES ADD NEW STRESSES

Applications and devices continue to increase in sophistication. They provide greater services, a rich multimedia user experience and increased mobility. But they also place immense pressure on the network—a network that was not originally designed to handle such technology.

Applications: Video, Unified Communications (UC), and Virtual Desktop Infrastructure (VDI) are all having significant impact in user productivity, and also the campus network.

Video: As end-user devices increase performance at the speed of Moore's Law, user expectations increase just as fast. Nowhere is the expectation gap more evident than with video. Today, users expect real-time access to streaming video for corporate training, executive briefings, and even when conducting meetings with remote customers. This "video-on-demand" expectation requires the campus network to deliver high bandwidth with low latency and jitter.

UC: Enterprises are experiencing a historic transition in how employees communicate. Previously, voice, e-mail, instant messaging, and video conferencing were deployed with separate applications, used different devices, and often had independent networks. Today, UC brings all forms of communication to a single device—a desktop/laptop computer, tablet, iPad, or smartphone—delivering real-time collaboration. Human collaboration is dynamic. For example, a low-bandwidth text message can instantly transform into a shared desktop with joint editing of documents, and—with a mouse click—can expand to a video chat before disappearing again at the end of the collaboration. The campus network has to scale, better support peer-to-peer (aka East-West) traffic patterns, ensure consistent security policies, and provide low latency and jitter while maintaining continuous uptime.

VDI: VDI leverages server virtualization to reduce the cost and complexity of desktop application support, application upgrades, data management, and data security. While VDI addresses desktop application problems including upgrades, patching, and security of desktop data, it also creates new challenges for the campus network. User mouse clicks, typing, and screen refreshes have to move from the local device to the virtual machine hosting the desktop from the datacenter, and back again.

New Devices: The explosion of smartphones, tablet computers, and iPads sets an expectation that access to the data, applications, and social networks users rely on in their personal lives will be available when they are at work. Bring Your Own Device (BYOD) has a positive impact on IT budgets when users purchase and maintain their own devices, yet it creates concerns about securing access to sensitive corporate data. User expectations of high-quality anywhere, anytime access require consistently applied security policies across both wired and wireless segments and corporate or consumer-owned devices.

The impact of these applications and devices on the campus network creates a need for higher bandwidth, lower latency, pervasive access, and always-up availability. Incremental improvement to networking protocols such as Quality-of-Service (QoS), rate limiting, and traffic prioritization helps to maintain the quality experience but also adds additional layers of complexity that impedes an organization's ability to deploy new applications or maintain the ones they have.

MOBILITY DEFINES THE NEW "NORMAL"

One billion smartphones and tablets to be sold in 2013.

Gartner 2012

THE MOBILITY REVOLUTION

Number of mobile works to grow to 1.3 billion by 2015; 37% of the total workforce.

IDC (Worldwide Mobile Worker Population 2011-2015 Forecast) 2012

**Running costs of IT impact
organization's ability to grow
and transform**

**65% of IT spend
KEEP SYSTEMS RUNNING**

**21% of IT spend
GROWING THE BUSINESS**

**15% of IT spend
TRANSFORMING THE
BUSINESS**

**\$8,578 per employee spent
"keeping the lights on"**

FRICTION POINTS: BUSINESS EXPECTATIONS CONFRONT CAMPUS REALITIES

Every network in the enterprise, whether it is the data center or the campus, must be designed to meet business expectations that are balanced with technology choices. This has not been easy, with IT budgets and personnel remaining flat or shrinking while applications, data, and user devices continue to grow rapidly.

The cost of running the campus network is out of control in many organizations. Gartner estimates that companies spend 17 percent of their total IT budget (CapEx plus OpEx) on their networks. In 2011, more than half of the operating expense was devoted to maintaining the campus network. Gartner also found that companies who had a single vendor procurement strategy for the campus incurred a 25 percent premium in Total Cost of Ownership (TCO) over a five-year period. This adds up to an average cost of \$1,400 per person per year for campus networks—clearly a major investment. For this reason, focused actions that reduce the cost of the campus LAN are a top strategic objective at many companies.

A survey of Fortune 1000 enterprise network administrators (taken by InfoPro) identified the following top four pain points for companies operating a campus network:

1. Keeping up with technology
2. Capacity planning
3. Reliability and performance
4. Managing growth

The root cause of this pain is complexity caused by years of stagnant innovation and patchwork improvements. Campus networks originally provided a connection from desktop computers to file/print servers or application servers hosting back-office applications in the data center. This traffic flow is commonly referred to as North-South traffic flow, with servers at the top and user devices at the bottom. Legacy campus network architectures have been used for decades to support this usage model. Today, Unified Communications, virtual desktop infrastructure, streaming video, and Web 2.0 applications create complex multidirectional traffic flows that put unplanned stresses on these legacy architectures. In addition to traffic moving North-South, accessing server and cloud-based applications, traffic flow to support communication and videocentric applications now travels peer-to-peer or East-West. In a legacy campus architecture, this traffic is forced to move North-South before reaching its destination—creating immense inefficiencies and placing an undue burden on the expensive, high-performance infrastructure.

Increasingly, work happens at any time and any place an employee chooses. It is common for employees to use several devices during the day: a desktop or laptop computer, a tablet computer, an iPad, and a smartphone. Employees expect the freedom to choose the device that best meets their needs, with unfettered access to applications and data and a consistent high-quality user experience. Also, because the majority of these devices lack the ability to connect a network cable, their increased use is causing an explosion in wireless traffic in the campus.

To keep pace with these changes, administrators need intelligent wireless technology that works seamlessly with wired infrastructure, is easy to deploy and manage, and cost-effectively provides a secure, high-quality user experience.

WHERE IS THE INNOVATION?

For organizations to remain competitive, they must be agile—able to adapt to changing conditions quickly. The legacy campus network is a barrier to that agility. New bandwidth-intensive and QoS-sensitive applications, new sophisticated devices, and evolving usage patterns and traffic flow put immense stresses on IT and the campus network, while legacy network architectures make it extremely difficult to quickly roll out new technologies. Clearly, there is a need for innovation in the campus network.

Gartner points out, however, that for the past 20 years there has been little innovation in the enterprise network. Venture capital investment—a measure of innovation—has drastically dropped, from a high in 2000 of \$11 billion to less than \$1 billion in 2011. Combined with the fact that the leaders in campus networking, both at the high and low end of the market, have not made significant investments beyond incremental “speed and feed” enhancements, it becomes clear why innovation in the campus network has stalled.

BUILDING THE EFFORTLESS NETWORK

As Brocade has considered today's campus network and the impact of new applications and business demands, it has become clear that solving emerging problems using old assumptions is an inadequate approach. To achieve the required flexibility, automation, and dramatic reductions in cost of ownership requires a new vision. Brocade calls this vision The Effortless Network, and it is built from the innovations found in HyperEdge Architecture.

BROCADE HYPEREDGE ARCHITECTURE

The Brocade HyperEdge Architecture increases organizational agility by bringing the campus network into the modern era. This evolutionary architecture collapses the aggregation and access network layers of legacy campus architectures to radically simplify networks by eliminating legacy protocols such as spanning tree and controller-centric tunneled wireless traffic. HyperEdge Architecture integrates innovative new wired and wireless features with existing network technologies to streamline application deployment, simplify management, and reduce operational costs.

“There have been few substantial changes to the [enterprise] networking vendors’ approaches in the last 20 years.”

—Gartner

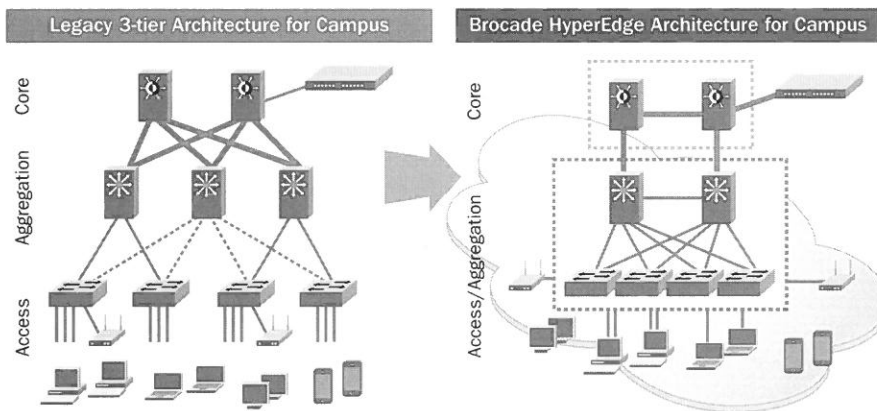


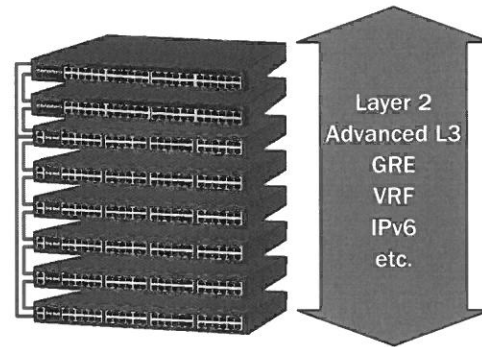
Figure 1. Simplifying legacy three-tier architectures with Brocade HyperEdge Architecture.

HYPEREDGE ARCHITECTURE ENABLING TECHNOLOGIES

Mixed Stacking with HyperEdge Distributed Services

Mixed stacking is the ability to combine premium and entry level switches in the same stack. Mixed stacking provides all the benefits of traditional stacking—in which all switch members are alike, all links within the stack are active (no spanning-tree protocol), and management is accomplished from a single IP address. However, when HyperEdge Distributed Services is used, a mixed stack becomes unique and powerful. HyperEdge Distributed Services enables the premium switch services to be extended to all ports of all members of the stack—including the entry-level switches. This capability provides two distinct advantages: significant per-port cost reduction and long-term investment protection.

Figure 2.
Mixed Stacking with
HyperEdge Distributed Services



Per-Port Cost Reduction: With premium services available to all switches and ports within a mixed stack, organizations no longer need to buy an entire stack of premium switches to provide these services. Adding just one Brocade ICX® 6610 Switch to a stack of Brocade ICX 6450 Switches reduces the aggregate per-port acquisition costs by nearly 50 percent as compared to an equivalent stack of Cisco premium switches. For a more detailed cost comparison, go to www.brocade.com/CampusTCO.

Long-Term Investment Protection: With mixed stacking enabling HyperEdge Distributed Services, organizations no longer need to rip-and-replace entire stacks of switches to meet new service demands. Using Brocade mixed stacking and Distributed Services, organizations can initially deploy a stack of Brocade ICX 6450s to inexpensively provide Layer 2 and some Layer 3 services. As the need for more comprehensive advanced Layer 3 services increases, organizations can simply add one Brocade ICX 6610 (or two for high availability) to the stack of Brocade ICX 6450s, and HyperEdge Distributed Services will extend the premium services to all switches in the stack—eliminating the need to replace the entire stack of switches, as is the case with competitive switches.

Consolidated Network Management

Campus networks extend between buildings and across multiple floors, and—with wireless access points—they span outdoor as well as indoor spaces. With traditional networks, adding a switch, changing a network policy, or adding another user device requires manual changes to multiple configuration settings in many switches, routers, access points, and controllers. The opportunity for making mistakes, as well as the time and effort required to maintain such complex networks, is the reason operating costs in the campus network have grown out of control.

The HyperEdge Architecture consolidated management enables organizations to monitor and maintain their networking infrastructure effortlessly. With HyperEdge Architecture, mixed or traditional stacks of switches—whether they are stacked on top of each other in a wiring closet or dispersed throughout the campus using distance stacking capability—can be managed as a single logical unit, while the policies for an entire wireless network can be set and maintained from a centralized controller. And with Brocade Network Advisor, an organization's entire networking infrastructure—storage, data, and wireless—can be viewed, monitored, and managed from one console.

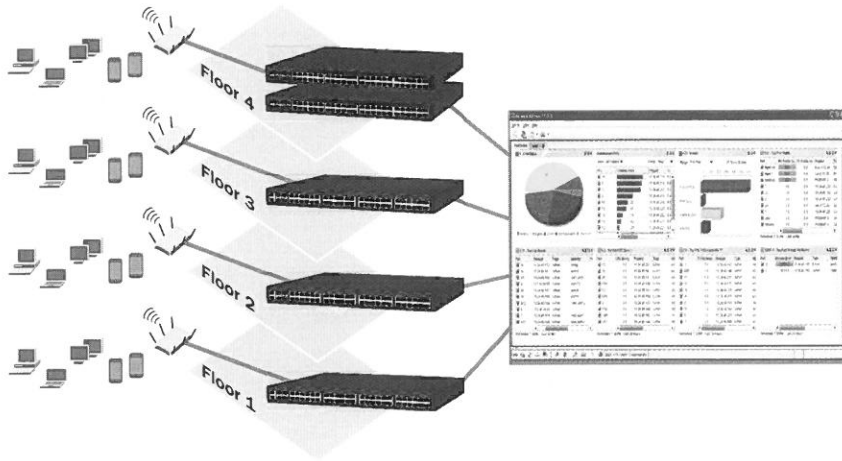


Figure 3.
Consolidated management with Brocade HyperEdge Architecture.

In many campus networks, switch operating system updates, security patches, and ongoing policy updates create significant extra work for administrators and delay application deployment time. With HyperEdge Consolidated Management through traditional or mixed stacks, each stack of switches can be managed as a single entity. Administrators can apply all configuration changes, firmware updates, and policy settings to every member of the switch stack from a single point of management. This significantly reduces the time and cost associated with these frequent tasks and reduces the time required to deploy new applications. Additionally, when a new switch is added to a stack, HyperEdge auto-configuration features discover the switch and its capabilities and apply existing configuration and policy settings without operator intervention.

For wireless networks, regardless of the number of access points (APs) or the location in a HyperEdge Architecture, using a centralized wireless controller makes management and policy enforcement effortless. With wireless networks, security is a high priority. Access points frequently require the latest security patches and firmware updates. With HyperEdge Architecture, these patches are applied one time at the centralized controller. Each AP intelligently checks for updates and then automatically downloads and applies them as needed. This capability significantly reduces the time it takes for an administrator to apply updates while also offering the assurance that the wireless network is secure.

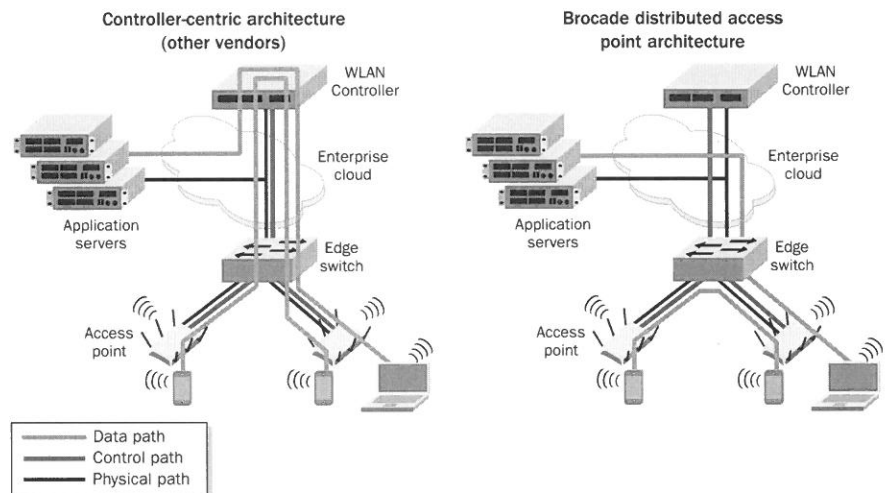
Lastly, viewing and managing the entire campus network is made effortless with Brocade Network Advisor. Brocade Network Advisor is the industry's first unified network management solution for data, storage, and wireless network—providing consolidated end-to-end visibility and management of all network assets (remote or local) through a single management console. With Brocade Network Advisor, organizations reduce network downtime with change management, proactive monitoring, security, and traffic analysis. Brocade Network Advisor also easily integrates with existing security, VoIP, Unified Communications, and other third-party solutions.

HyperEdge Distributed AP Forwarding

Wireless architectures from other vendors typically route data traffic through a centralized controller connected at the network core. As device, application, and user sophistication increases, so does the amount of data passing through the network and the controller. This inefficient design delivers a poor and unreliable user experience by creating a traffic bottleneck at the controller. This design is also more expensive, because it requires additional bandwidth capacity to be purchased, installed, and maintained across the wired infrastructure, to carry all the extra wireless traffic. As the new 802.11ac wireless standard and its promise of over 1 Gbps performance is adopted, the problem will only get worse.

HyperEdge Distributed AP Forwarding leverages the strength of intelligent Brocade Mobility wireless access points to forward data traffic directly to its destination using the shortest, most efficient path possible, while still providing centralized policy management for all access points via the wireless controller. This efficient design ensures high-performance and a high-quality user experience for users of wireless devices, while reducing the cost for the wired infrastructure needed to carry wireless traffic to and from a centralized controller. Additionally, the HyperEdge Distributed AP Forwarding efficient data forwarding design is ideal for organizations preparing to adopt the 802.11ac standard.

Figure 4.
Distributed AP Forwarding with Brocade
HyperEdge Architecture.



Intelligent, Self-Healing Access Points

Providing high-quality wireless access to demanding users can be difficult and time-consuming for administrators. However, as part of the Brocade HyperEdge Architecture, intelligent wireless access points can self-configure, self-heal, and even automatically balance loads during peak usage periods. Brocade Mobility APs are able to contact a centralized controller or a neighboring AP to obtain the latest configuration information, making them self-configuring.

Additionally, Brocade Mobility APs can self-heal to cover nearly every failure scenario. For example, Brocade Mobility APs automatically increase radio strength to cover a failed neighboring AP backhaul wireless traffic to a neighboring AP to overcome a failed switch, or even stand alone in the event that communication to the wireless controller is lost. In all cases, Brocade Mobility APs continue providing service to users while buying time for administrators to address the failure on their own terms.

Lastly, providing a high-quality wireless user experience during peak loads and in high-density environments, such as a lecture hall, can be quite challenging for network administrators—but Brocade Mobility APs make it easy by leveraging intelligent load balancing capabilities. Brocade Mobility APs are able to automatically adjust to high load conditions by balancing load between radios on a single AP, between APs, or even by directing devices based on their frequency capabilities. The intelligence and capability of Brocade Mobility APs means administrators spend less time in the field tracking down issues, making adjustments, or replacing failed components, while users on wireless devices enjoy a consistent, reliable, and high-quality experience.

Ports on Demand

In support of the Brocade vision for The Effortless Network, the new Brocade ICX Series of switches are enabled with an innovative feature called Ports on Demand. This feature allows an organization to upgrade the bandwidth of a port via a simple software license key. This capability provides excellent investment protection and cost control, because organizations pay only for the bandwidth they need today. They can then easily upgrade as their needs change, which helps avoid costly switch replacements.

Active-Active Links

For larger campus deployments, Brocade Multi-Chassis Trunking (MCT) is a proven method for interconnecting multiple traditional or mixed-stack configurations to increase scalability and expand the forwarding domain, while keeping all links active. Using MCT, shortest path forwarding is ensured at Layer 2 and Layer 3. Using this approach, organizations can evolve their architectures slowly as business needs and budget permit, while also gaining increased confidence in the capabilities and savings promised with HyperEdge Architecture.

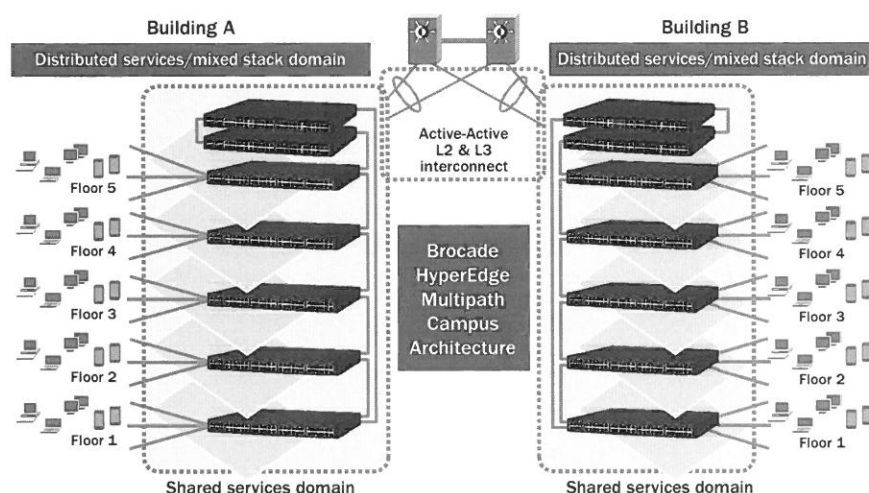


Figure 5.
Scaling simplified HyperEdge Domains
across the campus.

Distance Stacking

Traditionally, stacking technology was relegated to a wiring closet or rack in a data center, because proprietary limited architectures introduced excessive latency that could be overcome only by keeping the switches close together. While there are many advantages to stacking, despite the need to be close together, this approach required network administrators to run cabling for every port to reach the remote devices, sometimes over distances up to 100 meters. If administrators wanted switches closer to the devices, they were no longer able to keep them as stack members and gain the advantages of centralized management.

With the Brocade HyperEdge Architecture distance stacking feature, organizations can deploy switches to remote locations across campus (currently, up to 150 meters apart), where they are needed, while still keeping them as stack members. Management is still consolidated and centralized despite the distances between the switches. Policy changes, operating system, security updates, and other routine tasks can all still be managed from a single point, allowing the entire dispersed stack to be managed as one logical unit. Also, by taking advantage of HyperEdge Distributed Services, entry-level switches can be placed at the point of need, while providing advanced services that extend from the premium switches in the same stack.

sFlow Traffic Monitoring

As traffic patterns become more complex and devices grow, tools that simplify traffic monitoring and management are critical for a high-quality user experience. An important capability built into the hardware of all Brocade campus networking products, and which is part of the HyperEdge Architecture, is the open standard sFlow protocol. With sFlow, administrators have immediate access to traffic statistics. They can see an overview of the entire campus network and zoom into a single virtual machine hosting a VDI application or UC server. sFlow support across a set of switches pooled together as part of the HyperEdge Architecture means administrators can continue to use their favorite sFlow monitoring applications such as InMon.

Campus networks built with HyperEdge Architecture technologies are ready to take on the challenges of streaming video, Unified Communications, VDI, and cloud-based applications, as well as demanding mobile users, with flexible, application-centric, automated, and cost-effective network solutions. With innovations such as Distributed Services, Consolidated Management, and Distributed AP Forwarding combined with existing technologies such as intelligent self-healing APs and Multi-Chassis Trunking, HyperEdge Architecture improves organizational agility by reducing network complexity, application deployment time, and operational costs. With Brocade, owning and maintaining your entire campus network is one step closer to being effortless.

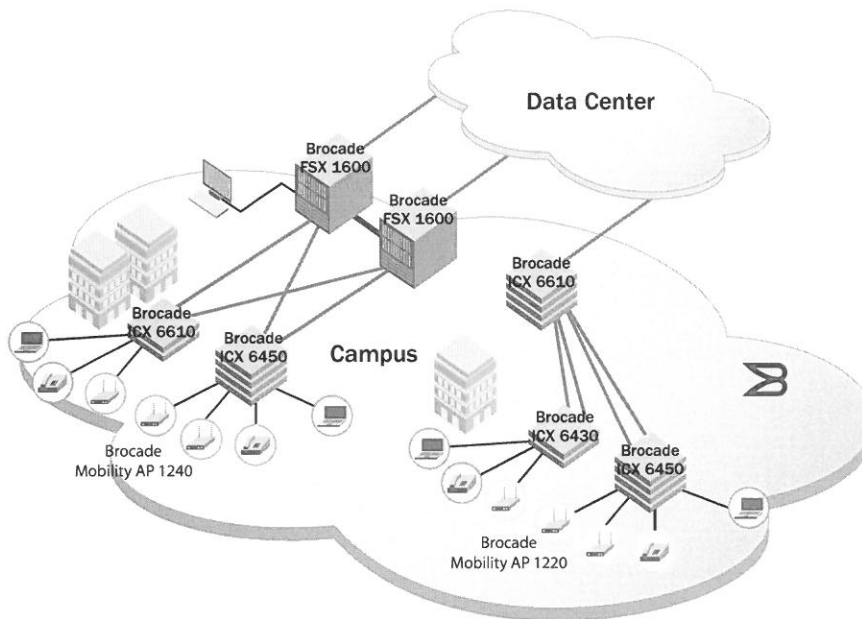


Figure 6.
The Effortless Network enabled by
Brocade HyperEdge Architecture.

To learn more about The Effortless Network, Brocade HyperEdge Architecture, the Brocade ICX Campus Switch family and Brocade Mobility solutions, visit www.brocade.com/campus.

ABOUT BROCADE

Brocade networking solutions help the world's leading organizations transition smoothly to a world where applications and information reside anywhere. This vision is realized through the Brocade One™ strategy, which is designed to deliver key business benefits such as unmatched simplicity, non-stop networking, application optimization, and investment protection.

Innovative Ethernet and storage networking solutions for data center, campus, and service provider networks help reduce complexity and cost while enabling virtualization and cloud computing to increase business agility.

To help ensure a complete solution, Brocade partners with world-class IT companies and provides comprehensive education, support, and professional services offerings.

To learn more, visit www.brocade.com

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BROCADE ICX 6610 SWITCH

ENTERPRISE LAN SWITCHING

Chassis-Like Capabilities in a Stackable Form Factor

HIGHLIGHTS

- Delivers chassis-level performance and availability, providing an optimal user experience for streaming video, VDI, UC, and other critical applications
- Offers unprecedented stacking performance with 320 Gbps of stacking bandwidth, eliminating inter-switch bottlenecks
- Provides up to 1 Tbps of total switching capacity with up to 384 1 GbE and 64 10 GbE per stack for campus network edge and aggregation layers
- Provides unmatched availability with four redundant 40 Gbps stacking ports per switch, hitless stacking failover, hot switch replacement, and dual hot-swappable power supplies and fans
- Simplifies network operations and protects investments with the Brocade HyperEdge™ Architecture, enabling consolidated network management and advanced services sharing across heterogeneous switches

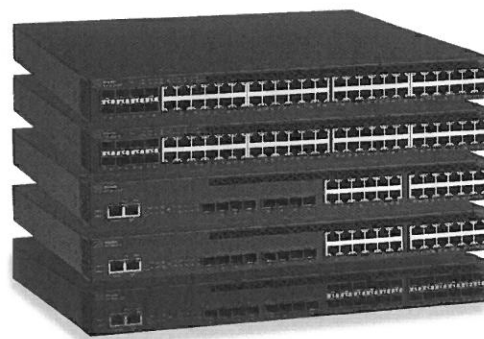
Today's enterprise networks are expected to deliver services thought impossible just a few years ago. High-Definition (HD) video conferencing, real-time collaboration, Unified Communications (UC), and Virtual Desktop Infrastructure (VDI) are only a few of the applications that organizations are deploying to enhance employee productivity, improve customer service, and create a competitive advantage. These same networks must also provide anytime, anywhere mobile access and scale to meet rising user expectations. At the same time, organizations face continued pressure to reduce costs and do more with less. More than ever, campus networks need to quickly and efficiently evolve with the ever-changing business environment.

COMBINING THE BEST OF A CHASSIS AND A STACKABLE SWITCH

The Brocade® ICX® 6610 Switch redefines the economics of enterprise networking by providing unprecedented levels of performance, availability, and flexibility in a stackable form factor—delivering the capabilities of a chassis with the flexibility and cost-effectiveness of a stackable switch.

Class-Leading Performance for Today and Tomorrow

The Brocade ICX 6610 delivers wire-speed, non-blocking performance across all ports to support latency-sensitive applications such as real-time voice/video streaming and VDI. Brocade ICX 6610 Switches can be stacked using four full-duplex 40 Gbps stacking ports that provide an



BROCADE

unprecedented 320 Gbps of backplane stacking bandwidth with full redundancy, eliminating inter-switch bottlenecks. Additionally, each switch can provide up to eight 10 Gigabit Ethernet (GbE) ports for high-speed connectivity to the aggregation or core layers.

High Availability

When every second matters, Brocade ICX 6610 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 6610 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 in a compact form factor. Additional design features include intake and exhaust temperature sensors and fan spin detection to quickly identify abnormal or failed operating conditions—helping to minimize mean time to repair.

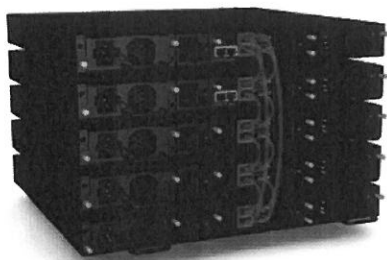


Figure 1.

Brocade ICX 6610 Switches can be stacked using four standard 40 Gbps QSFP ports that provide a fully redundant virtual chassis backplane with 320 Gbps of stacking bandwidth.

Unmatched Simplicity and Investment Protection

The Brocade ICX 6610 is easy to deploy, manage, and integrate into both new and existing networks. Organizations can buy only what they need today and easily scale up as demand grows and new technologies emerge.

The flexibility of a stackable switch allows organizations to forgo investing in a chassis upfront and put precious capital to better use elsewhere. Organizations can purchase an initial switch to get started and add a new Brocade ICX 6610 Switch to the stack as their business grows.

With capabilities such as bandwidth on demand, the Brocade ICX 6610 enables organizations to grow their networks when necessary. Organizations can initially deploy 1 GbE uplink ports and upgrade to 10 GbE ports when desired with an easy-to-activate software license.

Organizations also have peace of mind with the Brocade Assurance® Limited Lifetime Warranty. This warranty can help improve Total Cost of Ownership (TCO) while freeing up both capital and resources to re-invest into the business. For warranty details, visit www.brocade.com/warranty.

The Brocade ICX 6610 uses standard 40 GbE ports and QSFP cables for stacking. This not only delivers class-leading stacking performance and availability, but also increases cabling options and reduces cable costs—unlike competitive offerings, which rely on proprietary stacking ports and cables.

Hardware support for the new MACsec, Energy Efficient Ethernet (EEE), and 40 GbE standards provides maximum future-proofing and investment protection, enabling organizations to deploy these capabilities as needed when more network devices supporting them become available.

BUILT FOR THE MOST DEMANDING ENTERPRISE NETWORK ENVIRONMENTS

Brocade stacking technology makes it possible to stack up to eight Brocade ICX 6610 Switches into a single logical chassis switch, providing simple and robust expandability for future growth at the network edge or aggregation layer. Also, this stacked virtual switch has only a single IP address to simplify management, and offers transparent forwarding across a pool of up to 384 1 GbE and 64 10 GbE ports. When new switches are added to the stack, they automatically inherit the stack's existing configuration file, enabling true plug-and-play network expansion.

Brocade stacking technology also delivers high availability, performing real-time state synchronization across the stack and enabling instantaneous hitless failover to a standby controller, if the master stack controller fails. In addition, organizations can use hot-insertion/removal of stack members to avoid interrupting service.

Brocade ICX 6610 Switches offer four dedicated full-duplex 40 Gbps stacking ports that provide full redundancy and an unprecedented 320 Gbps of stacking bandwidth, essentially eliminating the need to work around inter-switch bottlenecks (see Figure 1).

Unlike competitive offerings that use proprietary stacking ports, the use of standard 40 Gbps QSFP ports offers optimum flexibility and future-proofing. These dedicated stacking ports free up the 10 GbE ports for high-speed connectivity to the aggregation or core layers.

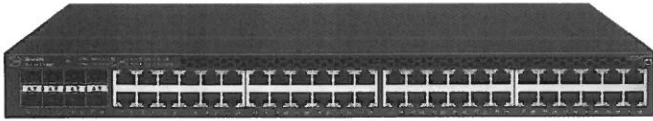


Figure 2.

Brocade ICX 6610 Switches support eight dual-mode 1 GbE/10 GbE SFP/SFP+ ports (left) and up to 48 1 GbE RJ-45 or 24 1 GbE SFP ports (right).

Up to Eight 10 GbE Ports on Demand per Switch

Brocade ICX 6610 Switches offer eight dual-mode Small Form-Factor Pluggable (SFP)/SFP+ ports, enabling high-bandwidth connectivity to the aggregation or core layers. These ports can be upgraded from 1 GbE to 10 GbE by simply applying a software license, eliminating the need to install a hardware module. In addition, organizations can aggregate these ports across the stack to provide high-speed, redundant links between the wiring closet and the aggregation layer, or between the aggregation and the core layer. With the ability to use short-range and long-range optics, along with copper Twinax cables, the Brocade ICX 6610 supports flexible and cost-effective network architectures (see Figure 2).

The Brocade ICX 6610 delivers industry-leading 8-port 10 GbE density in a 1U switch, providing up to 80 Gbps of uplink bandwidth to the aggregation or core layers of the network. This bandwidth enables a 1:1 subscription ratio throughout the network. As a result, organizations can deploy highly utilized networks to avoid congestion during peak hours.

Built to Power Next-Generation Edge Devices

The Brocade ICX 6610 can deliver both power and data across network connections, providing a single-cable solution for the latest edge devices. Brocade ICX 6610 Switches are compatible with industry-standard VoIP equipment as well as legacy IP phones. In addition, they support the Power over Ethernet (PoE+) standard (802.3at) to provide up to 30 watts of power to each device. This high-powered solution simplifies wiring for next-generation edge devices, such as video conferencing and Voice over IP (VoIP) phones, pan/tilt surveillance cameras, and 802.11n wireless Access Points (APs). The PoE capability reduces the number of power receptacles and power adapters while increasing reliability and wiring flexibility. With a 1500-watt power budget per switch (with two power supplies), the Brocade ICX 6610 24- and 48-port PoE models can supply up to Class 4 PoE+ (30 watts) power to every port.

Plug-and-Play Operations for Powered Devices

The Brocade ICX 6610 supports 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 UC. Configuring IP endpoints such as VoIP phones can be a complex task, requiring manual and time-consuming configuration. LLDP and LLDP-MED address this challenge by providing a standard, open method for configuring, discovering, and managing network infrastructure. The LLDP protocols also help reduce operational costs by simplifying and automating network operations. For example, LLDP-MED provides an open protocol for configuring Quality of Service (QoS), security policies, Virtual LAN (VLAN) assignments, PoE power levels, and service priorities.

Flexible Cooling Options

All Brocade ICX 6610 Switches support reversible front-to-back airflow options. This data center-friendly design improves mounting flexibility in racks, while adhering to the cooling guidelines of the hosting environment. Organizations can specify airflow direction at the time of order and can reverse the direction after deployment by swapping the power supplies and fan assembly (see Figure 3).

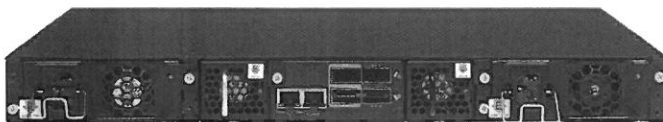


Figure 3.

The Brocade ICX 6610 provides four 40 Gbps high-performance QSFP stacking ports (center) and dual, hot-swappable load-sharing power supplies and fan trays (left and right).

BROCADE HYPEREDGE ARCHITECTURE

The Brocade HyperEdge Architecture brings campus networks into the modern era to better support mobility, security, and application agility. This evolutionary architecture integrates innovative wired and wireless technologies to streamline application deployment, simplify network management, and reduce operating costs.

The HyperEdge Architecture enables organizations to build networks that are:

- **Agile:** By eliminating Spanning Tree Protocol (STP) between HyperEdge Domain switches through a flatter Layer 2 design, the HyperEdge Architecture increases link utilization and reduces application deployment complexity. The Distributed AP Forwarding functionality of Brocade wireless Access Points (APs) efficiently secures and directs mobile traffic at the network edge without tunneling data back to a central controller at the network core.
- **Automated:** By grouping premium and entry-level switches with intelligent wireless APs into a consolidated management domain, HyperEdge Domains eliminate the need to provision and manage devices individually—simplifying network deployment and management.
- **Cost-effective:** The HyperEdge Architecture enables the propagation of advanced features and services from premium switches to entry-level switches, allowing IT organizations to purchase only what they need today and add intelligent services as the business evolves. Further cost savings is achieved with Brocade wireless solutions using controller-less or controller-shared license deployment options.

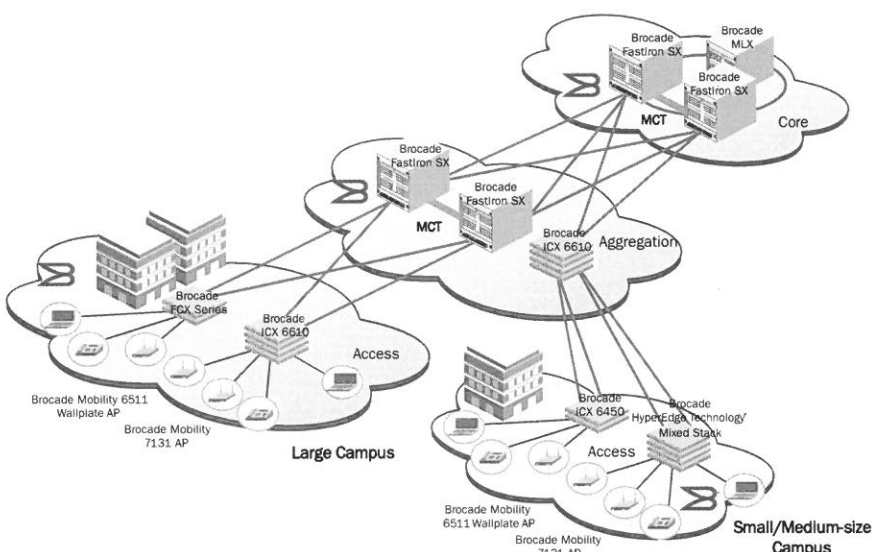


Figure 4.

The Brocade ICX 6610 is suitable for deployment at the network access and aggregation layers, thanks to its high performance, availability, and flexibility.

Full Layer 3 Capabilities

Brocade ICX 6610 Switches also offer powerful IPv4 and IPv6 Layer 3 switching capabilities. Organizations can use premium Layer 3 features—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 (see Figure 4). Advanced Layer 3 capabilities include BGP routing, enabling remote offices to connect Brocade ICX 6610 Switches to service provider networks. Premium and advanced routing capabilities can be added to any Brocade ICX 6610 Switch model through software key-based activation.

SIMPLIFIED, SECURE STANDARDS-BASED MANAGEMENT AND MONITORING

The Brocade ICX 6610 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 into the Brocade ICX 6610, 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 Deployment with Auto-Configuration

The Brocade ICX 6610 supports auto-configuration, 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 6610 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.

Out-of-Band Management

The Brocade ICX 6610 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.

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

Thanks to its class-leading 10 GbE port count, the Brocade ICX 6610 is an ideal 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 reversible front-to-back/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 6610 provides a compact and cost-effective 1 GbE/10 GbE ToR switch (see Figure 5). This configuration uses 10 GbE links to connect to Brocade ICX data center aggregation switches.

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 the Brocade Network Advisor Device Configuration Manager tool, organizations can configure Virtual LANs (VLANs) within the network, manage wireless access point realms, or execute CLI 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 and wireless products, including the Brocade ICX switches.

WARRANTY

The Brocade ICX 6610 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 6610 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.

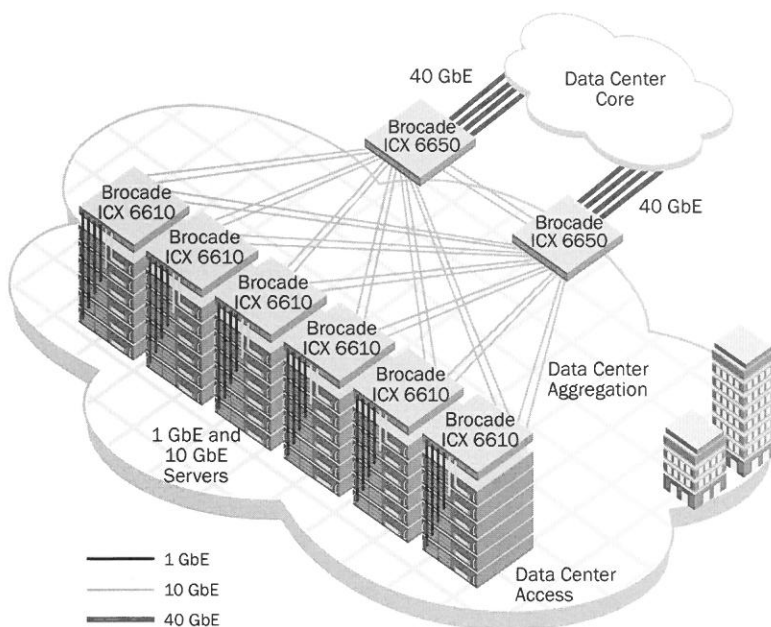


Figure 5.

The Brocade ICX 6610 provides ToR 1 GbE and 10 GbE server connectivity with the Brocade ICX 6650 providing data center aggregation.

BROCADE GLOBAL SERVICES

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 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.

CLOUD-OPTIMIZED NETWORK ACQUISITION

Brocade helps organizations easily address their information technology requirements by offering flexible network acquisition and support alternatives to meet their financial needs. Organizations can select from purchase, lease, and Brocade Network Subscription 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 6610 FEATURE/MODEL COMPARISON

	24 or 48 RJ-45 Ports		24 SFP Ports	24 or 48 PoE+ Ports	
	Brocade ICX 6610-24	Brocade ICX 6610-48	Brocade ICX 6610-24F	Brocade ICX 6610-24P	Brocade ICX 6610-48P
Switching capacity (data rate, full duplex)	528 Gbps	576 Gbps	528 Gbps	528 Gbps	576 Gbps
Forwarding capacity (data rate, full duplex)	396 Mpps (wire speed)	432 Mpps (wire speed)	396 Mpps (wire speed)	396 Mpps (wire speed)	432 Mpps (wire speed)
Stacking bandwidth (data rate, full duplex)	320 Gbps	320 Gbps	320 Gbps	320 Gbps	320 Gbps
10/100/1000 Mbps RJ-45 ports	24	48	N/A	24	48
100/1000 Mbps SFP ports	N/A	N/A	24	N/A	N/A
Dual-mode 1/10 GbE SFP/SFP+ ports (10 GbE SFP+ optional upgrade license)	8	8	8	8	8
40 Gbps QSFP stacking ports	4	4	4	4	4
PoE power budget (two power supplies)	N/A	N/A	N/A	1500 W	1500 W
Maximum PoE Class 3 ports	N/A	N/A	N/A	24 (one power supply)	48 (one power supply)
Maximum PoE+ ports	N/A	N/A	N/A	24 (one power supply)	48 (two power supplies)
Redundant/load sharing; hot-swappable power supplies Max output (second optional)	2×250 W	2×250 W	2×250 W	2×1000 W	2×1000 W
Weight (one power supply/one fan tray)	6.42 kg (14.15 lb)	6.78 kg (14.95 lb)	6.69 kg (14.75 lb)	7.10 kg (15.65 lb)	7.46 kg (16.45 lb)
Dimensions	429 mm (16.880 in.) W × 406.4 mm (16.00 in.) D × 44 mm (1.732 in.) H - 1RU				
Airflow	Front to back (reversible)				

BROCADE ICX 6610 SPECIFICATIONS

System Architecture

Connector options	<ul style="list-style-type: none"> • 10/100/1000 ports: RJ-45 • 1 Gbps SFP ports: SX, LX, LHA, LHB, 1000Base-BX, CWDM • 10 Gbps SFP+ ports: Direct-attached copper (Twinax), SR, LR • Stacking ports: 40 GbE QSFP for use with direct-attached 1 meter or 5 meter stacking cable • Out-of-band Ethernet management: 10/100/1000 Mbps RJ-45 • Console management: RJ-45 serial
Maximum MAC addresses	32,000
Maximum VLANs	4096
Maximum STP (spanning trees)	254
Maximum routes (in hardware)	16,000
Trunking	Maximum ports per trunk: 8 Maximum trunk groups: 124
Maximum jumbo frame size	9216 bytes
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 • Dynamic VLAN Assignment • Dynamic Voice VLAN Assignment • Fast Port Span • GARP VLAN Registration Protocol • IGMP Snooping (v1/v2/v3) • Link Fault Signaling (LFS) • MAC Address Locking; Port Security • 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 • Port Loop Detection • Private VLAN • Protected Link Groups • Protocol VLAN (802.1v), Subnet VLAN • Remote Fault Notification (RFN) • Single-instance Spanning Tree • Single-link LACP • Trunk Groups • Uni-Directional Link Detection (UDLD)

Base Layer 3 routing	<ul style="list-style-type: none"> • IPv4 static routes • ECMP • Port-based Access Control Lists • L3/L4 ACLs • Host routes • Virtual Interfaces • Routed Interfaces • Route-only Support • Routing Between Directly Connected Subnets • HyperEdge service propagation
Premium Layer 3 routing	<ul style="list-style-type: none"> • IPv4 and IPv6 static and dynamic routes • OSPF v2, OSPF v3 (IPv6) • PIM-SM, PIM-SSM, PIM-DM, PIM passive (IPv4/IPv6 multicast routing functionality) • PBR • RIP v1/v2, RIPv6 (IPv6) • Virtual Route Redundancy Protocol (VRRP) • VRRP-E, VRRP-E (IPv6) • VRRPv3 (IPv6)
Advanced Layer 3 routing	<ul style="list-style-type: none"> • BGP4, BGP4+(IPv6) • GRE • IPv6 over IPv4 tunnels • VRF (IPv4 and IPv6)
Metro features	<ul style="list-style-type: none"> • Metro-Ring Protocol (v1, v2) • Virtual Switch Redundancy Protocol (VSRP) • VLAN Stacking (Q-in-Q) • 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 • 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

- 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
- 802.1x Port-based Network Access Control
- 802.3 10 Base-T
- 802.3ab 1000 Base-T
- 802.3ad Link Aggregation (Dynamic and Static)
- 802.3ae 10 Gigabit Ethernet
- 802.3af Power over Ethernet
- 802.3at Power over Ethernet Plus
- 802.3u 100 Base-TX
- 802.3x Flow Control
- 802.3z 1000Base-SX/LX
- 802.3 MAU MIB (RFC 2239)
- 802.3ba 40 Gbps Ethernet
- 802.1AE- MACsec (HW Capable)
- 802.3az-2010 - EEE (HW Capable)
- 802.1Q VLAN Tagging

Traffic management

- ACL-based inbound rate limiting and traffic policies
- Broadcast, multicast, and unknown unicast rate limiting
- Inbound rate limiting per port
- Outbound rate limiting per port and per queue

High availability

- Redundant hot-swappable internal power supplies
- Hot-swappable fan trays
- L3 VRRP protocol redundancy
- Real-time state synchronization across the stack
- Hitless failover from master to standby stack controller
- Protected link groups
- Hot insertion and removal of stacked units

Management

Management and control

- Auto Configuration
- Brocade HyperEdge technology
- Configuration Logging
- Digital Optical Monitoring
- Display Log Messages on Multiple Terminals
- Embedded Web Management
- Embedded DHCP Server
- 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 support
- MIB Support for MRP, Port Security, MAC Authentication, and MAC-based VLANs
- Out-of-band Ethernet Management
- 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 1643 Ethernet MIB
- RFC 1724 RIP v1/v2 MIB
- RFC 1757 RMON MIB
- RFC 2068 Embedded HTTP
- 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
- Support for Multiple Syslog Servers

Power Draw (w/ no PoE loads)		
Models	With 1 Power Supply	With 2 Power Supplies
Brocade ICX 6610-24	120 W	140 W
Brocade ICX 6610-48	165 W	185 W
Brocade ICX 6610-24F	125 W	145 W
Brocade ICX 6610-24P	120 W	140 W
Brocade ICX 6610-48P	165 W	185 W
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	

BROCADE ICX 6610 ORDERING INFORMATION

Part Number	Description
ICX6610-24-E	24-port 1 GbE RJ45, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 250 W power supply. Base software.
ICX6610-24-PE	24-port 1 GbE RJ45, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 250 W power supply. Premium software.
ICX6610-24-I	24-port 1 GbE RJ45, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 250 W power supply. Base software.
ICX6610-24-PI	24-port 1 GbE RJ45, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 250 W power supply. Premium software.
ICX6610-24P-E	24-port 1 GbE RJ45 PoE+, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 1000 W power supply. Base software.
ICX6610-24P-PE	24-port 1 GbE RJ45 PoE+, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 1000 W power supply. Premium software.
ICX6610-24P-I	24-port 1 GbE RJ45 PoE+, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 1000 W power supply. Base software.
ICX6610-24P-PI	24-port 1 GbE RJ45 PoE+, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 1000 W power supply. Premium software.
ICX6610-24F-E	24-port 1 GbE SFP, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 250 W power supply. Base software.
ICX6610-24F-PE	24-port 1 GbE SFP, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 250 W power supply. Premium software.
ICX6610-24F-I	24-port 1 GbE SFP, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 250 W power supply. Base software.
ICX6610-24F-PI	24-port 1 GbE SFP, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 250 W power supply. Premium software.
ICX6610-48-E	48-port 1 GbE RJ45, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 250 W power supply. Base software.
ICX6610-48-PE	48-port 1 GbE RJ45, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 250 W power supply. Premium software.
ICX6610-48-I	48-port 1 GbE RJ45, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 250 W power supply. Base software.
ICX6610-48-PI	48-port 1 GbE RJ45, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 250 W power supply. Premium software.
ICX6610-48P-E	48-port 1 GbE RJ45 PoE+, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 1000 W power supply. Base software.
ICX6610-48P-PE	48-port 1 GbE RJ45 PoE+, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side exhaust, hot-swappable fan assembly and 1000 W power supply. Premium software.
ICX6610-48P-I	48-port 1 GbE RJ45 PoE+, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 1000 W power supply. Base software.
ICX6610-48P-PI	48-port 1 GbE RJ45 PoE+, plus 8×1 GbE SFPP uplink ports (upgradable to 10 GbE). 4×40 GbE QSFP stacking ports. 1 power-supply-side intake, hot-swappable fan assembly and 1000 W power supply. Premium software.
Accessories and Options	
ICX6610-PREM-LIC	Brocade ICX 6610 premium software license
ICX6610-ADV-LIC	Brocade ICX 6610 advanced software license
ICX6610-ADV-UPG-LIC	Brocade ICX 6610 premium to advanced software upgrade
ICX6610-10G-LIC-POD	License to upgrade 4 ports of 1 GbE SFPP uplink to 10 GbE
RPS15-E	Brocade ICX 6610/6650 non-PoE 250 W PSU, power-supply-side exhaust airflow
RPS15-I	Brocade ICX 6610/6650 non-PoE 250 W PSU, power-supply-side intake airflow
RPS16-E	1000 W power supply for Brocade ICX 6610 PoE models, power-supply-side exhaust airflow
RPS16-I	1000 W power supply for Brocade ICX 6610 PoE models, power-supply-side intake airflow
RPS16DC-E	510 W DC power supply for Brocade ICX 6610, power-supply-side exhaust airflow
RPS16DC-I	510 W DC power supply for Brocade ICX 6610, power-supply-side intake airflow
ICX6610-FAN-E	Power-supply-side exhaust airflow fan for the Brocade ICX 6610 (two fans required with two power supplies)
ICX6610-FAN-I	Power-supply-side intake airflow fan for the Brocade ICX 6610 (two fans required with two power supplies)
40G-QSFP-C-0101	40 GbE QSFP direct-attached copper cable, 1 m, one-pack
40G-QSFP-C-0501	40 GbE QSFP direct-attached copper cable, 5 m, one-pack

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BROCADE ICX 6430 AND 6450 SWITCHES

ENTERPRISE LAN SWITCHING

Enterprise-Class Stackable Switching at an Entry-Level Price

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
- Delivers unprecedented feature/price value for enterprise applications, including Unified Communications (UC) and mobility, with 10 Gigabit Ethernet (GbE) and PoE/PoE+
- Provides unmatched availability for low-cost switching with redundant uplink/stacking ports, hitless stacking failover, and configurable power redundancy
- Simplifies network operations and protects investments with the Brocade HyperEdge Architecture, enabling consolidated network management and advanced services sharing across heterogeneous switches
- Offers an attractive 12-port, compact, and enterprise-class fanless switch model for deployments outside the wiring closet
- Includes the Brocade Assurance Limited Lifetime Warranty and three years of technical support

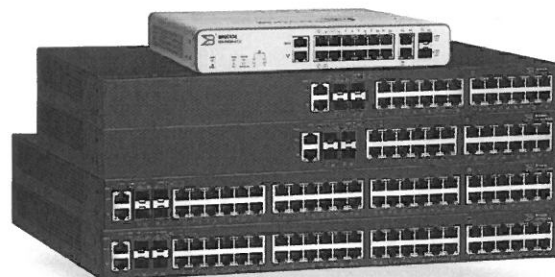
Today's organizations expect their enterprise campus LANs to deliver more services to more users at a lower cost. These services include next-generation business applications as well as anytime, anywhere access for mobile devices. At the same time, campus LANs must be able to scale easily to meet future demands and efficiently evolve within dynamic business environments.

Brocade® ICX® 6430 and 6450 Switches provide 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 on performance and reliability. The Brocade ICX 6430 and 6450 are available

in 12-, 24-, and 48-port 10/100/1000 Mbps models and 1 Gigabit Ethernet (GbE) or 10 GbE dual-purpose uplink/stacking ports (see Figures 1 and 2)—with or without IEEE 802.3af Power over Ethernet (PoE) and 802.3at Power over Ethernet Plus (PoE+)—to support enterprise edge networking, wireless mobility, and IP communications.

BUILT FOR MAXIMUM COST-EFFICIENCY AND INVESTMENT PROTECTION

With Brocade ICX 6430 and 6450 Switches, organizations can buy only what they need today and easily scale user ports and services as their network requirements evolve. Brocade offers maximum investment protection through flexible software licensing options that bring advanced services and performance to lower-cost ports.



BROCADE

In particular, the Brocade HyperEdge™ Architecture allows premium switch features and services to be shared with entry-level switches (Brocade ICX 6450 only). The Brocade ICX switches also are hardware-capable for easy software implementation (software available in a future release) of emerging security (IEEE 802.1AE MACsec) and energy savings (IEEE 802.3az EEE) standards, helping to protect today's investments while supporting tomorrow's needs.

Brocade ICX 6430 and 6450 Switches come with three years of technical support from the Brocade Technical Assistance Center and software maintenance updates. With these capabilities, organizations gain peace of mind while freeing up IT budget and resources to grow their businesses.

AUTOMATED DEPLOYMENT AND MANAGEMENT

Brocade ICX 6430 and 6450 Switches help simplify network deployment and management by enabling auto-discovery of new Brocade ICX switches within the stack. IT organizations can auto-configure switches using pre-set instructions on the network. To further simplify management, these stacked switches collectively utilize only a single IP address and offer transparent forwarding across the stack.

By embedding sFlow capabilities into the Brocade ICX 6450, Brocade delivers an "always-on" monitoring technology that operates with wire-speed performance. sFlow dramatically reduces implementation complexity compared to traditional network monitoring solutions that rely on mirrored ports, probes, and line-tap technologies.

HIGH AVAILABILITY AND RESILIENCY

Brocade Ethernet switch stacking technology helps IT organizations meet growing user demand by delivering high availability through real-time state synchronization across the stack and instantaneous hitless failover support. In addition, organizations can use hot-insertion and removal of stack members to avoid interrupting network service when adding or replacing a switch. High-performance Link Aggregation Groups (LAGs) increase 10 GbE uplink bandwidth and redundancy to the core, giving users uninterrupted high performance to support the most demanding applications. Brocade ICX 6430 and 6450 Switches also offer an external power supply for added resiliency and increased PoE/PoE+ port availability (see Figure 3).

STACKING TECHNOLOGY FOR THE MOST DEMANDING CAMPUS LAN ENVIRONMENTS

Brocade Ethernet switch stacking technology makes it possible to stack up to eight Brocade ICX 6450 Switches into a single logical switch, providing simple and robust expandability for future growth at the network edge. This stacked switch has only a single IP address to simplify management and offers transparent forwarding across a pool of up to 384 1 GbE ports and 32 10 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. 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.

For networks with lower bandwidth requirements, the Brocade ICX 6430 offers the same rugged stacking capability (except the Brocade ICX 6430-C) at a reduced price, providing a lower-density solution of up to 192 1 GbE access ports with 16 1 GbE uplink and stacking ports, and a maximum stack height of four switches.

Built to Power Next-Generation Edge Devices

The Brocade ICX 6430 and 6450 can deliver both PoE power and data across network connections, providing a single-cable solution for the latest edge devices (see Figure 4). Brocade ICX switches are compatible with industry-standard Voice over IP (VoIP) equipment as well as legacy IP phones. In addition, they support the PoE+ standard (IEEE 802.3at) to provide up to Class 4 (30 watts) power to each device. This high-powered solution simplifies wiring for next-generation edge devices, such as video conferencing and VoIP phones, surveillance cameras, and 802.11n wireless Access Points (APs). The PoE capability reduces the number of power receptacles and power adapters while increasing reliability and wiring flexibility. The Brocade ICX 6450 can provide PoE power to all ports and PoE+ (30 watts) to all ports when an external power supply is deployed.

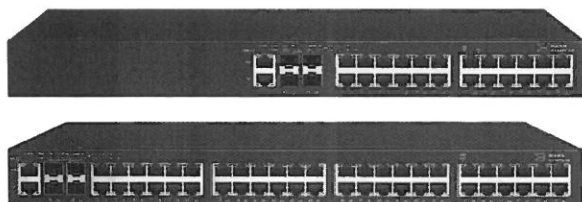


Figure 1.

Brocade ICX 6450 Switches support four dual-mode 1 GbE/10 GbE SFP/SFP+ ports for uplink and stacking, and up to 48 1 GbE RJ-45 ports. Brocade ICX 6430-24 and 6430-48 Switches support four 1 GbE SFP ports for uplink and stacking to provide a cost-optimized solution for lower-traffic networks.

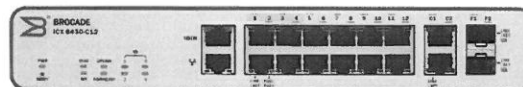


Figure 2.

The Brocade ICX 6430-C Compact Switch supports two 1 GbE RJ-45 and two 1 GbE SFP ports for uplink and 12 1 GbE RJ-45 ports with four PoE/PoE+ capable ports in a compact and fanless design—ideal for deployment outside the wiring closet.

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.

The LLDP protocols also reduce operational costs by simplifying and automating network operations. For example, LLDP-MED provides an open protocol for configuring Quality of Service (QoS), security policies, Virtual LAN (VLAN) assignments, PoE power levels, and service priorities.

Compact Switch Solution for Deployment Outside the Wiring Closet

The Brocade ICX 6430-C Compact Switch offers enterprise-class LAN switching capabilities, performance, reliability, security, and manageability in a small form factor with fanless operation for deployment outside the wiring closet. It is ideal for deployment in classrooms, retail locations,

factories, small offices, workgroup, and space-constrained environments. The Brocade ICX 6430-C is available in a 12-port 10/100/1000 Mbps model with IEEE 802.3af PoE and 802.3at PoE+ support on four ports plus four additional 1 GbE uplink ports.

In the enterprise, the Brocade ICX 6430-C Compact Switch can be used to extend the reach of the network outside the wiring closet, bringing connectivity to more users and supporting additional wireless AP deployment without running more wires. To simplify deployment in-situ, the Brocade ICX 6430-C offers flexible mounting options, such as wall brackets and a magnetic mount kit.

Cost-Optimized Cooling Options

The Brocade ICX 6430 48-port and Brocade ICX 6450 24- and 48-port switches offer industry-standard side-to-back airflow with quiet fans at less than 40 dB (except the Brocade ICX 6450-48P). The Brocade ICX 6430-C and 6430-24 Switches are available in a fanless configuration, helping to minimize sound and costs for deployments where users are present, such as classrooms and open office environments.

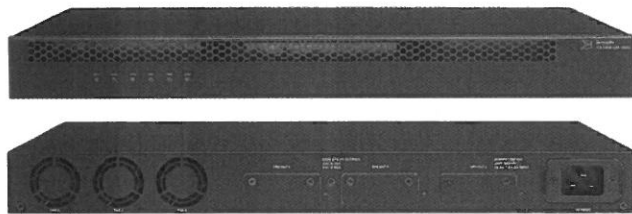


Figure 3.

The optional Brocade ICX 6400-EPS1500 is an external power supply source to provide additional power to the Brocade ICX switches (except the Brocade ICX 6430-C and 6430-24). It also can be used for system power redundancy and increased PoE/PoE+ power budget to enable additional PoE/PoE+ ports. Each Brocade ICX 6400-EPS1500 can connect up to three Brocade ICX 6430 and 6450 Switches.

BROCADE HYPEREDGE ARCHITECTURE

The Brocade HyperEdge Architecture brings campus networks into the modern era to better support mobility, security, and application agility. This evolutionary architecture integrates innovative wired and wireless technologies to streamline application deployment, simplify network management, and reduce operating costs.

The HyperEdge Architecture enables organizations to build networks that are:

- **Agile:** By eliminating Spanning Tree Protocol (STP) between HyperEdge Domain switches through a flatter Layer 2 design, the HyperEdge Architecture increases link utilization and reduces application deployment complexity. The Distributed AP Forwarding functionality of Brocade wireless Access Points (APs) efficiently secures and directs mobile traffic at the network edge without tunneling data back to a central controller at the network core.
- **Automated:** By grouping premium and entry-level switches with intelligent wireless APs into a consolidated management domain, HyperEdge Domains eliminate the need to provision and manage devices individually—simplifying network deployment and management.
- **Cost-effective:** The HyperEdge Architecture enables the propagation of advanced features and services from premium switches to entry-level switches, allowing IT organizations to purchase only what they need today and add intelligent services as the business evolves. Further cost savings is achieved with Brocade wireless solutions using controller-less or controller-shared license deployment options.

Brocade ICX 6450 Switches offer an upgrade option to bring Layer 3 capabilities to the network edge, reducing complexity and enhancing the reliability of enterprise networks.

The Brocade ICX 6430 and 6450 are 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 6430 and 6450 provide a compact and cost-effective 1 GbE Top-of-Rack (ToR) switch by simply connecting the 1 GbE Network Interface Cards (NICs) in the servers to the Brocade ICX 6430 and 6450 1 GbE ports (see Figure 5). This configuration uses 10 GbE links (Brocade ICX 6450) or 1 GbE links (Brocade ICX 6430) to connect to Brocade ICX data center aggregation switches.

Brocade ICX 6430 and 6450 Switches provide simplified, standards-based management capabilities that help organizations reduce administrative time and effort while securing their networks.

sFlow is a standards-based network export protocol (RFC 3176) that addresses many of the challenges that network managers face

Brocade ICX 6430 and 6450 Switches support auto-configuration, simplifying deployment with a truly plug-and-play experience. Organizations can use this feature to automate IP address and feature configuration 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.

Brocade ICX 6430 and 6450 Switches include an industry-standard Command Line Interface (CLI) and support 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+)

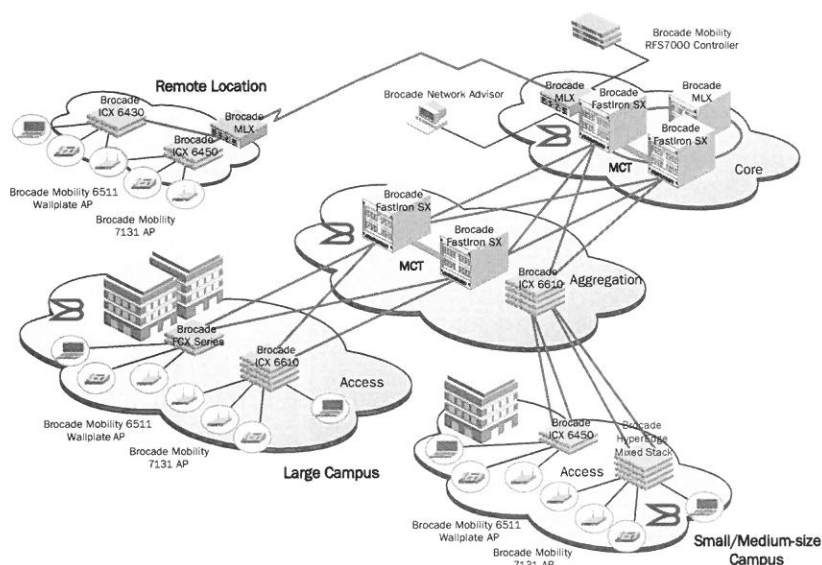
and RADIUS authentication helps ensure secure operator access. Embedded Web management is also provided through a GUI-based device interface, and organizations can use Brocade Network Advisor to achieve full device and network management visibility.

Brocade ICX 6430 and 6450 Switches include a 10/100/1000 Mbps RJ-45 Ethernet port dedicated for out-of-band management, providing a remote path to manage the switches, regardless of the status or configuration of the data ports.

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 the Brocade Network Advisor Device Configuration Manager tool, organizations can configure Virtual LANs (VLANs) within the network, manage wireless access point realms, or execute CLI 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 and wireless products, including the Brocade ICX switches.

Brocade ICX 6430 and 6450 Switches are covered by the Brocade Assurance Limited Lifetime Warranty. For details, visit www.brocade.com/warranty.



Brocade ICX 6430 and 6450 Switches are suitable for a wide range of small to medium-size enterprises and branch office deployments at the network access layer.

BEST-IN-CLASS SUPPORT

Brocade ICX 6430 and 6450 Switches are 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 6430 and 6450 Switches, providing direct access to the Brocade Technical Assistance Center during normal 8x5 business hours.

BROCADE GLOBAL SERVICES

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 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.

CLOUD-OPTIMIZED NETWORK ACQUISITION

Brocade helps organizations easily address their information technology requirements by offering flexible network acquisition and support alternatives to meet their financial needs. Organizations can select from purchase, lease, and Brocade Network Subscription 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.

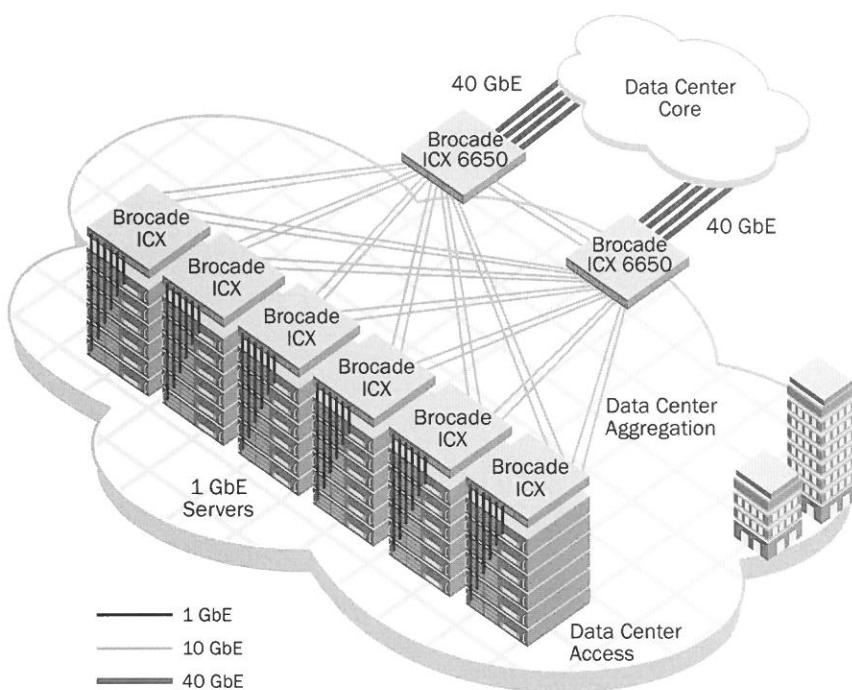


Figure 5.

Brocade ICX 6430 and 6450 Switches provide ToR access while Brocade ICX 6650 Switches provide data center aggregation.

BROCADE ICX 6430/6450 FEATURE AND MODEL SPECIFICATIONS

	Brocade ICX 6430					Brocade ICX 6450			
	6430-C12	6430-24	6430-24P	6430-48	6430-48P	6450-24	6450-24P	6450-48	6450-48P
10/100/1000 Mbps RJ-45 ports	12	24	24	48	48	24	24	48	48
10/100/1000 Mbps RJ-45 uplink ports	2								
1 GbE SFP ports (uplink/stacking)	2*	4	4	4	4				
1/10 GbE SFP/SFP+ ports (uplink/stacking)						4 (Optional 2-port license)	4 (Optional 2-port license)	4 (Optional 2-port license)	4 (Optional 2-port license)
Stacking bandwidth (data rate, full duplex)		4 Gbps	4 Gbps	4 Gbps	4 Gbps	40 Gbps	40 Gbps	40 Gbps	40 Gbps
Units per stack		4	4	4	4	8	8	8	8
Internal AC power supply rating	100 W	36 W	525 W	65 W	525 W	65 W	525 W	100 W	880 W
External power supply (redundant power and PoE power)			Optional 525 W	Optional 525 W	Optional 525 W	Optional 525 W	Optional 525 W	Optional 525 W	Optional 525 W × 2
PoE/PoE+ power budget (internal power supply)	68 W		390 W		390 W		390 W		780 W
PoE Class 3 ports (internal power supply)	4		24		24		24		48
PoE+ ports (internal power supply)	2		12		12		12		24
Max PoE Class 3 ports (with internal and external power supplies)	4		24		48		24		48
Max PoE+ ports (with internal and external power supplies)	2		24		24		24		48
Base software	Layer 2	Layer 2	Layer 2	Layer 2	Layer 2	Layer 3 with static routes	Layer 3 with static routes	Layer 3 with static routes	Layer 3 with static routes
Layer 3 routing (RIP, OSPF)						Optional	Optional	Optional	Optional
Switching capacity (data rate, full duplex)	32 Gbps	56 Gbps	56 Gbps	104 Gbps	104 Gbps	128 Gbps	128 Gbps	176 Gbps	176 Gbps
Forwarding capacity (data rate, full duplex)	24 Mpps	42 Mpps	42 Mpps	77 Mpps	77 Mpps	96 Mpps	96 Mpps	132 Mpps	132 Mpps

* Stacking is not supported on the Brocade ICX 6430-C12. 100Base-FX is supported on the Brocade ICX 6430-C12.

BROCADE ICX 6430/6450 SPECIFICATIONS

System Architecture

Connector options	<p>10/100/1000 Mbps ports: RJ-45</p> <p>Brocade ICX 6430: 1 Gbps SFP ports for uplink/stacking: SX, LX, TX, LHA, LHB, direct-attached copper cable (Twinax) for stacking</p> <p>Brocade ICX 6430-C: 100 Mbps/1 Gbps SFP ports for uplink: FX, SX, LX, TX, LHA, LHB; 10/100/1000 Mbps RJ-45 ports for uplink</p> <p>Brocade ICX 6450: 1/10 Gbps SFP+ ports for uplink/stacking: USR, SR, LR, ER, LRM, direct-attached copper cable (Twinax) for stacking</p> <p>Out-of-band Ethernet management: 10/100/1000 Mbps RJ-45</p> <p>Console management: RJ-45 serial</p> <p>External power connector: Redundant system power supply and extended PoE power supply</p>
Maximum MAC addresses	<p>Brocade ICX 6430, 6430-C: 8000</p> <p>Brocade ICX 6450: 16,000</p>
Maximum VLANs	<p>Brocade ICX 6430-C: 1024</p> <p>Brocade ICX 6430, 6450: 4096</p>
Maximum STP (spanning trees)	<p>Brocade ICX 6430, 6430-C: 32</p> <p>Brocade ICX 6450: 253</p>
Maximum routes (in hardware)	<p>Brocade ICX 6450: 12,000 (IPv4)</p> <p>Brocade ICX 6450: 1070 (IPv6)</p>
Trunking	<p>Brocade ICX 6430</p> <p>Maximum ports per trunk: 8</p> <p>Maximum trunk groups: 29</p> <p>Brocade ICX 6430-C</p> <p>Maximum ports per trunk: 8</p> <p>Maximum trunk groups: 16</p> <p>Brocade ICX 6450</p> <p>Maximum ports per trunk: 8</p> <p>Maximum trunk groups: 124</p>
Priority queues	<p>Brocade ICX 6430, 6430-C: 4</p> <p>Brocade ICX 6450: 8</p>
Maximum jumbo frame size	9216 bytes
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 • MAC-Layer Filtering, Filtering on source and destination MAC address

Layer 2 switching (continued)	<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 • Protected Link Groups • Protocol VLAN (802.1v), Subnet VLAN • Remote Fault Notification (RFN) • Single-instance Spanning Tree • Single-link LACP • Trunk Groups • Uni-Directional Link Detection (UDLD)
IPv6 support	<ul style="list-style-type: none"> • Host functionality management • Hardware support for IPv6 • IPv6 static routing (Brocade ICX 6450 only)
Base Layer 3 routing (Brocade ICX 6450)	<ul style="list-style-type: none"> • IPv4 and IPv6 Static Routes • Port-based Access Control Lists • Host Routes • Virtual Interfaces, up to 255 virtual interfaces • Routed Interfaces • Route-only Support • IP helper • Routing Between Directly Connected Subnets • ECMP • Layer 3/Layer 4 ACLs
Premium Layer 3 routing (Brocade ICX 6450)	<ul style="list-style-type: none"> • OSPF v2 • RIP v1/v2 • Virtual Route Redundancy Protocol (VRRP) • VRRP-E
Metro features (except Brocade ICX 6430-C)	<ul style="list-style-type: none"> • Metro-Ring Protocol MRP (v1, v2) • Virtual Switch Redundancy Protocol (VSRP) • VLAN Stacking (Q-in-Q) • 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 • 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 • 802.1Q with Tagging • 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) • 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) • 802.1AE-MACsec (HW-capable): Brocade ICX 6450 only • 802.3az-2010 - EEE (HW-capable)
Traffic management	<ul style="list-style-type: none"> • ACL-based inbound rate limiting and traffic policies • Broadcast, multicast, and unknown unicast rate limiting • Inbound rate limiting per port • Outbound rate limiting per port and per queue
High availability	<ul style="list-style-type: none"> • Redundant external power supply • Layer 3 VRRP protocol redundancy • Real-time state synchronization across the stack • Hitless failover from master to standby stack controller • Protected link groups • Hot insertion and removal of stacked units

Management

Management and control

- Auto Configuration
- Brocade HyperEdge technology (Brocade ICX 6450 only)
- Configuration Logging
- Digital Optical Monitoring (DOM)
- Display Log Messages on Multiple Terminals
- Embedded Web Management
- Embedded DHCP Server
- 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 support
- MIB Support for MRP, Port Security, MAC Authentication, MAC-based VLANs
- Out-of-band Ethernet Management
- 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 1643 Ethernet MIB
- RFC 1724 RIP v1/v2 MIB
- RFC 1757 RMON MIB
- RFC 2068 Embedded HTTP
- 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 (Brocade ICX 6450 only)
- SNTP Simple Network Time Protocol
- Multiple Syslog Servers

Embedded 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 • Packet filtering on TCP Flags • IEEE 802.1X username export in sFlow • Protection against Denial of Service (DoS) attacks
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Secure management	<ul style="list-style-type: none"> • Authentication, Authorization, and Accounting (AAA) • Advanced Encryption Standard (AES) with SSHv2 • Bi-level Access Mode (Standard and EXEC Level) • RADIUS/TACACS/TACACS+ • Secure Copy (SCP) • Secure Shell (SSHv2) • Username/password • Web authentication
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Physical Specifications

Dimensions	<ul style="list-style-type: none"> • Brocade ICX 6430-C12 model: 1.7 in. (H) × 10.6 in. (W) × 8.4 in. (D) 4.34 cm (H) × 26.92 cm (W) × 21.33 cm (D) • All 24-port models: 1.7 in. (H) × 17.44 in. (W) × 9.45 in. (D) 4.34 cm (H) × 44.3 cm (W) × 24 cm (D) • All 48-port models: 1.7 in. (H) × 17.44 in. (W) × 14.57 in. (D) 4.34 cm (H) × 44.3 cm (W) × 37 cm (D) • ICX6400-EPS1500: 1.7 in. (H) × 17.44 in. (W) × 14.57 in. (D) 4.34 cm (H) × 44.3 cm (W) × 37 cm (D)
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Weight	<ul style="list-style-type: none"> • Brocade ICX 6430-C12: 4 lb (1.81 kg) • Brocade ICX 6430-24: 7.58 lb (3.44 kg) • Brocade ICX 6430-24P: 10.08 lb (4.57 kg) • Brocade ICX 6430-48: 11.09 lb (5.03 kg) • Brocade ICX 6430-48P: 13.8 lb (6.26 kg) • Brocade ICX 6450-24: 7.39 lb (3.35 kg) • Brocade ICX 6450-24P: 10.03 lb (4.55 kg) • Brocade ICX 6450-48: 11.07 lb (5.02 kg) • Brocade ICX 6450-48P: 14.11 lb (6.4 kg) • Brocade ICX 6400-EPS1500: 14.85 lb (6.75 kg)
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Environment

Temperature	<ul style="list-style-type: none"> • Operating temperature: 0°C to 45°C / 32°F to 113°F (Brocade ICX 6430-C12: 0°C to 40°C / 32°F to 104°F) • Storage temperature: -40°C to 70°C / -40°F to 158°F
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Humidity	<ul style="list-style-type: none"> • Relative humidity: 5% to 95%, non-condensing
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Storage altitude	<ul style="list-style-type: none"> • 10,000 ft (3000 m) maximum
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Acoustic (25°C)	<ul style="list-style-type: none"> • Brocade ICX 6430-C12: Fanless (ambient) • Brocade ICX 6430-24: Fanless (ambient) • Brocade ICX 6430-24P: 39.2 dBA • Brocade ICX 6430-48: 37.2 dBA • Brocade ICX 6430-48P: 39.3 dBA • Brocade ICX 6450-24: 37.9 dBA • Brocade ICX 6450-24P: 39.2 dBA • Brocade ICX 6450-48: 37.2 dBA • Brocade ICX 6450-48P: 55.5 dBA • Brocade ICX 6400-EPS1500: 60.9 dBA
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Vibration	<ul style="list-style-type: none"> • IEC 68-2-36, IEC 68-2-6
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Shock and drop	<ul style="list-style-type: none"> • IEC 68-2-27 • IEC 68-2-32
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MTBF (25°C, CL: 60%)	<ul style="list-style-type: none"> • Brocade ICX 6430-C12: 1,124,442 hours • Brocade ICX 6430-24: 1,229,732 hours • Brocade ICX 6430-24P: 505,469 hours • Brocade ICX 6430-48: 748,262 hours • Brocade ICX 6430-48P: 384,288 hours • Brocade ICX 6450-24: 906,243 hours • Brocade ICX 6450-24P: 485,749 hours • Brocade ICX 6450-48: 756,081 hours • Brocade ICX 6450-48P: 397,590 hours • Brocade ICX 6400-EPS1500: 789,923 hours
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Power	
Power supplies	<ul style="list-style-type: none"> Integrated AC power supply for system and PoE power External 1500 W AC power supply for redundant system power and extended PoE power
Power inlet (Max current rating at 100 V input)	<ul style="list-style-type: none"> Brocade ICX 6430-C12: 1.5 Amp Brocade ICX 6430-24: 0.9 Amp Brocade ICX 6430-24P: 6 Amp Brocade ICX 6430-48: 1.5 Amp Brocade ICX 6430-48P: 6 Amp Brocade ICX 6450-24: 1.5 Amp Brocade ICX 6450-24P: 6 Amp Brocade ICX 6450-48: 2 Amp Brocade ICX 6450-48P: 10 Amp Brocade ICX 6400-EPS1500: 16 Amp
Input voltage	<ul style="list-style-type: none"> Universal 100 to 240 VAC
AC power cord current rating	<ul style="list-style-type: none"> Brocade ICX 6430-C12: 10 Amp, 100 to 240 V Brocade ICX 6430 and 6450 switches: 13 Amp, 100 to 240 V Brocade ICX 6400-EPS1500: 20 Amp, 100 to 240 V
DC power cord current rating	<ul style="list-style-type: none"> Brocade ICX 6400-EPS1500: 5.6 Amp at 12 V rail; 6.85 Amp at 54 V rail Brocade ICX 6400-EPS1500: 3 DC cables included; cable length: 3 feet
Input line frequency	<ul style="list-style-type: none"> 50 to 60 Hz
Heat dissipation (no PoE load)	<ul style="list-style-type: none"> Brocade ICX 6430-C12: 62 BTU/hr Brocade ICX 6430-24: 67 BTU/hr Brocade ICX 6430-24P: 104 BTU/hr Brocade ICX 6430-48: 128 BTU/hr Brocade ICX 6430-48P: 132 BTU/hr Brocade ICX 6450-24: 124 BTU/hr Brocade ICX 6450-24P: 129 BTU/hr Brocade ICX 6450-48: 186 BTU/hr Brocade ICX 6450-48P: 192 BTU/hr

Regulatory Compliance and Safety Approvals	
Electromagnetic compatibility	<ul style="list-style-type: none"> FCC Part 15, Subpart B, Class A ICES-003: 2004 VCCI—Technical Requirement (V-3/2011.04)/ Class A EN 55022: 2006+A1: 2007 Class A EN 61000-3-2: 2006+A1:2009+A2:2009 Class A EN 61000-3-3: 2008 EN 61000-6-1: 2007 EN 61000-6-3: 2007 EN 55024: 1998+A1:2001+A2:2003 EN 300 386 (V1.4.1): 2008 IEC 61000-4-2: 2008 ED. 2.0 IEC 61000-4-3: 2006+A1:2007+A2:2010 ED. 3.2 IEC 61000-4-4: 2004+A1:2010 ED. 2.0 IEC 61000-4-5: 2005 ED. 2.0 IEC 61000-4-6: 2008 ED. 3.0 IEC 61000-4-8: 2009 ED. 2.0 IEC 61000-4-11: 2004 ED. 2.0
Safety	<ul style="list-style-type: none"> CAN/CSA-C22.2 NO. 60950-1-07; UL 60950-1 2nd Edition; IEC 60950-1 2nd 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
Environmental regulatory compliance	<ul style="list-style-type: none"> RoHS-compliant (6 of 6); WEEE-compliant

Measured Power Utilization			
Models	Idle ¹	5% Throughput ²	100% Throughput ³
Brocade ICX 6430-C12	10 W	56 W	93 W
Brocade ICX 6430-24	7 W	19 W	20 W
Brocade ICX 6430-24P	9 W	391 W	396 W
Brocade ICX 6430-48	15 W	37 W	38 W
Brocade ICX 6430-48P	16 W	401 W	403 W
Brocade ICX 6450-24	20 W	29 W	37 W
Brocade ICX 6450-24P	21 W	395 W	400 W
Brocade ICX 6450-48	30 W	51 W	55 W
Brocade ICX 6450-48P	31 W	771 W	776 W

¹ All ports are disconnected with no PoE load.

² 5 percent traffic load on all ports connected with maximum possible PoE loads (if equipped).

³ 100 percent traffic load on all ports connected with maximum possible PoE loads (if equipped).

BROCADE ICX 6430/6450 ORDERING INFORMATION

Part Number	Description
ICX6430-C12	12-port 1 GbE compact switch (4 PoE+), 2×100 Mbps/1 GbE SFP and 2×100 Mbps/1 GbE copper uplinks, fanless
ICX6430-24	24-port 1 GbE switch, 4×1 GbE SFP uplink/stacking ports, fanless
ICX6430-24P	24-port 1 GbE switch PoE+ 390 W, 4×1 GbE SFP uplink/stacking ports
ICX6430-48	48-port 1 GbE switch, 4×1 GbE SFP uplink/stacking ports
ICX6430-48P	48-port 1 GbE switch PoE+ 390 W, 4×1 GbE SFP uplink/stacking ports
ICX6450-24	24-port 1 GbE switch, 2×1 GbE SFP+ (upgradable to 10 GbE) and 2×1 GbE/10 GbE SFP+ uplink/stacking ports
ICX6450-24P	24-port 1 GbE switch PoE+ 390 W, 2×1 GbE SFP+ (upgradable to 10 GbE) and 2×1 GbE/10 GbE SFP+ uplink/stacking ports
ICX6450-48	48-port 1 GbE switch, 2×1 GbE SFP+ (upgradable to 10 GbE) and 2×1 GbE/10 GbE SFP+ uplink/stacking ports
ICX6450-48P	48-port 1 GbE switch PoE+ 780 W, 2×1 GbE SFP+ (upgradable to 10 GbE) and 2×1 GbE/10 GbE SFP+ uplink/stacking ports
Accessories and Options	
ICX6450-PREM-LIC	Brocade ICX 6450 premium license (Layer 3 features)
ICX6450-2X10G-LIC-POD	Brocade ICX 6450 2×10 GbE capacity-based license; upgrade 1 GbE uplink/stacking ports to 1GbE/10 GbE
ICX6400-EPS1500	Brocade ICX 6430/6450 1500 W external power supply for RPS/EPS (connect up to three switches)
ICX6400-RMK	Brocade ICX 6400 two-post rack mount kit, spare
ICX6400-C12-RMK	Brocade ICX 6400-C compact switch 2-post rack mount kit
ICX6400-C12-MGNT	Brocade ICX 6400-C compact switch magnet mount kit
10G-SFPP-TWX-0101	Direct-attached SFP+ copper cable, 1 m, one-pack, stacking cable
10G-SFPP-TWX-0301	Direct-attached SFP+ copper cable, 3 m, one-pack, stacking cable
10G-SFPP-TWX-0501	Direct-attached SFP+ copper cable, 5 m, one-pack, stacking cable
1G-SFP-TWX-0101	Direct-attached 1 Gbps SFP copper cable, 1 m, stacking cable
1G-SFP-TWX-0501	Direct-attached 1 Gbps SFP copper cable, 5 m, stacking cable
10G-SFPP-USR	10GE USR SFP+ optic (LC), target range 100 m over MMF, one-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-LRM	10GBASE-LRM, 1310 nm SFP+ optic (LC), TAR
E1MG-TX	1000BASE-TX SFP copper, RJ-45 connector
E1MG-SX-OM	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring-capable
E1MG-LX-OM	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring-capable
E1MG-LHA-OM	1000BASE-LHA SFP optic, SMF, LC connector, optical monitoring-capable; 80 km
E1MG-LHB	1000BASE-LHB SFP optic, SMF, LC connector, 150 km maximum reach
E1MG-100FX-OM	100BASE-FX SFP optic MMF, LC connector, optical monitoring-capable (Brocade ICX 6400-C only)

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Warranties

- **Brocade Branded Product Warranty Summary**
- **Product Repair Information**
- **Product Warranty Details**
 - Standard Limited Warranty
 - Host Bus Adaptor and Converged Network Adapter Warranty
 - Limited Lifetime Warranty
 - Brocade Assurance Limited Lifetime Warranty

Brocade Branded Product Warranty Summary*

Warranty Category	Products Covered	Hardware Warranty Duration	Hardware Coverage	Software Warranty Duration	Software Coverage	Exclusion
Standard Limited Warranty	IP & SAN	13 months from ship	Return to Factory 30 day turn around	90 days from ship	Substantial conformance to published specifications & media replacement	None
Host Bus Adaptor & Converged Network Adapter Warranty	Host Bus Adaptor & Converged Network Adapter (HBAs & CNAs)	36 months from ship	Advanced Hardware Replacement	36 months from ship	24x7 phone & email support, lifetime access to updates	None
Limited Lifetime Warranty	EIF, FES, FLS, FGS, FESX	5 years from ship	Return to Factory 30 day turn around	90 days from ship	Substantial conformance to published specifications & media replacement	Power supply, fan, removable optics, LEDs ²
Brocade Assurance Limited Lifetime Warranty³	FCX, FSX800/1600, ICX6610, ICX6430, ICX6450 FWS & TI-24X	Life of product ¹ Initial registered end user only	Advanced Hardware Replacement (Next Business Day where available)	Life of product ¹ Initial registered end user only	Software defect repairs and software maintenance updates through the product end of support date, Knowledge portal access. Software defect repairs for firmware release current at time of purchase only, Knowledge portal access.	Removable optics, LEDs ²
Stand Alone Software Warranty	Stand Alone Software	Not Applicable	Not Applicable	90 days from ship	Substantial conformance to published specifications & media replacement	None

* For informational purposes only. Terms and conditions apply. Brocade branded products only.

¹ Covered through product end of support date

² Subject to Brocade's Standard Limited Warranty

³ Applies only to Brocade branded products purchased on or after October 1, 2009. Brocade branded products purchased prior to October 1, 2009 are covered under Brocade's Standard Limited Warranty.

Product Repair Information

To submit a request for repair (non-Assurance Limited Lifetime warranty products); please complete the product repair form.

[RMA Request »](#)

Product Warranty Details

The terms and conditions governing your warranty on Brocade branded products are located below. Such terms and conditions supersede all other terms, unless otherwise agreed in writing by Brocade.

Warranty Start Date

"Start Date" as used in this policy means the date the product is shipped from the manufacturing facilities of Brocade.

Standard Limited Warranty

Brocade branded Products are subject to the Standard Limited warranty other than as specified below.

Hardware

For a period of thirteen (13) months from the Start Date, Brocade warrants that the Brocade branded product hardware will be free from defects in materials and workmanship under normal use. End User's sole and exclusive remedy and the entire liability of Brocade and its suppliers under this limited warranty will be, at Brocade's option, repair or replacement of such product hardware within thirty (30) working days of its receipt of the failed hardware, if in advance of its receipt, such hardware received a Technical Support RMA number from Brocade. Further, the product hardware must be shipped, shipment pre-paid, to Brocade, and the RMA number must be clearly indicated on the shipping box and papers. Where applicable, for shipments to locations outside the US, Customer or Customer's assigned agent will act as Importer of Record for shipments of repaired/replacement units and will be responsible for payment of any import duties, taxes and fees. See other Warranty Limitations and Restrictions below.

Software (embedded in Brocade hardware)

For a period of ninety (90) days from the Start Date, Brocade warrants (a) that the media on which the software is delivered will be free of defects in material and workmanship, and (b) the software will operate substantially as set forth in the applicable Brocade specifications when used in accordance with the terms of the Brocade software license. End User's exclusive remedy and the entire liability of Brocade and its suppliers under this limited warranty will be replacement of the software media. Except for the foregoing, the software is provided AS IS. This limited warranty extends only to the End User as the original licensee. See other Warranty Limitations and Restrictions below.

Software (Stand Alone Software Products)

For a period of ninety (90) days from the Start Date, Brocade warrants (a) that the media on which the software is delivered will be free of defects in material and workmanship, and (b) the software will operate substantially as set forth in the applicable Brocade specifications when used in accordance with the terms of the Brocade software license. End User's exclusive remedy and the entire liability of Brocade and its suppliers under this limited warranty will be replacement of the software media. Except for the foregoing, the software is provided AS IS. This limited warranty extends only to the End User as the original licensee. See other Warranty Limitations and Restrictions below.

Host Bus Adaptor and Converged Network Adapter Warranty**Hardware**

For a period of thirty-six (36) months from the Start Date, Brocade warrants that the Brocade branded hardware will be free from defects in material and workmanship under normal use. End User's sole and exclusive remedy and the entire liability of Brocade and its suppliers under this limited warranty will be advanced replacement of such product hardware. Replacement response times are based on local standard business days and working hours and commercially reasonable efforts. Response times commence when Brocade is notified of the warranty failure via web request. In some countries and regions and under certain supplier constraints, actual response times may vary. If your location is outside the customary service area, your response time may be longer. Where applicable, for shipments to locations outside the US, Customer or Customer's assigned agent will act as Importer of Record for shipments of repaired/replacement units and will be responsible for payment of any import duties, taxes and fees. Please contact Brocade's Support Team for response time availability in your area. See other Warranty Limitations and Restrictions below.

Software (embedded in Brocade hardware)

For a period of thirty-six (36) months from the Start Date, Brocade warrants (a) that the media on which the software is delivered will be free of defects in material and workmanship, and (b) that the software, when used in accordance with the terms of the Brocade software license, will operate substantially as set forth in the applicable Brocade specifications for a period of ninety (90) days following delivery of the software to licensee. End User's exclusive remedy and the entire liability of Brocade and its suppliers under this limited warranty will be to provide 24x7 telephone and email support and web access to Brocade Technical Support resources when purchased from Brocade or an approved Brocade partner. Except for the foregoing, the software is provided AS IS. This limited warranty extends only to the End User as the original licensee. See other Warranty Limitations and Restrictions below.

Limited Lifetime Warranty

For select products, Brocade provides a limited lifetime (five year) warranty.

Hardware

Brocade warrants only to the original end-user, that for a period of five (5) years the Brocade branded hardware will be free from defects in material and workmanship under normal use. End User's sole and exclusive remedy and the entire liability of Brocade and its suppliers under this limited warranty will be, at Brocade's option, repair or replacement of such product hardware within thirty (30) working days of its receipt of the failed hardware, if in advance of its receipt, such hardware received a Technical Support RMA number from Brocade. Further, the product hardware must be shipped, shipment pre-paid, to Brocade, and the RMA number must be clearly indicated on the shipping box and papers. Where applicable, for shipments to locations outside the US, Customer or Customer's assigned agent will act as Importer of Record for shipments of repaired/replacement units and will be responsible for payment of any import duties, taxes and fees. This warranty excludes power supplies, fans, removable optics, and LEDs. See other Warranty Limitations and Restrictions below.

Software (embedded in Brocade hardware)

For a period of ninety (90) days from the Start Date, Brocade warrants (a) that the media on which the software is delivered will be free of defects in material and workmanship, and (b) that the software, when used in accordance with the terms of the Brocade software license, will operate substantially as set forth in the applicable Brocade specifications for a period of ninety (90) days following delivery of the software to licensee. End User's exclusive remedy and the entire liability of Brocade and its suppliers under this limited warranty will be replacement of the software media. Except for the foregoing, the software is provided AS IS. This limited warranty extends only to the End User as the original licensee. See other Warranty Limitations and Restrictions below.

Brocade Assurance Limited Lifetime Warranty

For select products, Brocade provides a limited lifetime warranty beginning on the Start Date and continuing for as long as the original End User continues to own and use the Brocade branded equipment, as set forth below.

Hardware

Brocade warrants that the Brocade branded hardware will be free from defects in material and workmanship under normal use. End User's sole and exclusive remedy and the entire liability of Brocade and its suppliers under this limited warranty will be replacement of such product hardware next business day, provided the request is received before 2PM local time.* Defective hardware must be received by Brocade within 30 days of End User's receipt of replacement Product. This warranty excludes removable optics and LEDs. In the event of discontinuance of product manufacture, the warranty is limited to five (5) years from the announced product end of life date. *Response times are based on local standard business days and working hours and commercially reasonable efforts. Response times commence when Brocade is informed of the warranty failure via web request. In some countries and regions and under certain supplier constraints, actual response times may vary. If your location is outside the customary service area, your response time may be longer. Please contact Brocade's Support Team for response time availability in

your area. Where applicable, for shipments to locations outside the US, Customer or Customer's assigned agent will act as Importer of Record for shipments of repaired/replacement units and will be responsible for payment of any import duties, taxes and fees. See other Warranty Limitations and Restrictions below.

Software (embedded in Brocade product)

Brocade warrants (a) that the media on which the software is delivered will be free of defects in material and workmanship, and (b) the software will operate substantially as set forth in the applicable Brocade Documentation when used in accordance with the terms of the Brocade software license. End User's exclusive remedy and the entire liability of Brocade and its suppliers under this limited warranty will be replacement of the software media. In addition, End User may download defect repairs from Brocade.com for the firmware release current at time of purchase or any previous release and may also access Brocade's Knowledge Portal. On certain products (as indicated in the table above) End User may also download software maintenance updates through the product end of support date. Except for the foregoing, the software is provided AS IS. This limited warranty extends only to the End User as the original licensee. See other Warranty Limitations and Restrictions below.

Warranty Limitations and Restrictions

Brocade warranties as set forth herein ("Warranty") are contingent on proper use of the Brocade branded hardware and software ("Products") and do not apply if (a) the Products have been modified without the written approval of Brocade, (b) the Products' serial number label is removed, (c) the Product has been damaged or subjected to abnormal physical or electrical stress, abnormal environmental conditions, misuse, negligence, or accident, or (d) the Product is licensed for beta, evaluation, testing or demonstration purposes. The terms of the Warranty are limited to the remedies as set forth in this Warranty. THIS WARRANTY IS PROVIDED IN LIEU OF ALL OTHER RIGHTS, CONDITIONS AND WARRANTIES. BROCADE MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE SOFTWARE, HARDWARE, PRODUCTS, DOCUMENTATION OR BROCADE SUPPORT, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OF THIRD PARTY RIGHTS. BROCADE DOES NOT WARRANT THAT ANY PRODUCTS WILL BE ERROR-FREE, OR THAT ANY DEFECTS THAT MAY EXIST IN ITS PRODUCTS CAN BE CORRECTED. IN NO EVENT SHALL BROCADE BE LIABLE FOR COST OF PROCUREMENT OF SUBSTITUTE GOODS, LOST PROFITS OR ANY OTHER SPECIAL, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES (INCLUDING BUT NOT LIMITED TO LOST DATA), HOWEVER CAUSED WHETHER OR NOT BROCADE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME JURISDICTIONS DO NOT ALLOW LIMITATION OR EXCLUSION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, SO THAT LIMITATION OR EXCLUSION MAY NOT APPLY.

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 Double-Take
 Drobo
 EMC
 Ergotron
 Eaton
 ExaGrid
 Fujitsu
 GFI
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 InMage
 Intel
 IpsiSwitch
 Kingston
 Lenovo
 LifeSize
 McAfee
 Microsoft
 NetApp
 NEC
 Palo Alto Networks
 Panasonic
 Plantronics
 Polycom
 Quantum
 Quest Software
 Raritan
 Red Hat
 RIM
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VOLOGY PRODUCT PORTFOLIO

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networks**

**JUNIPER®
NETWORKS**



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 **Microsoft**

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 **ShoreTel®**

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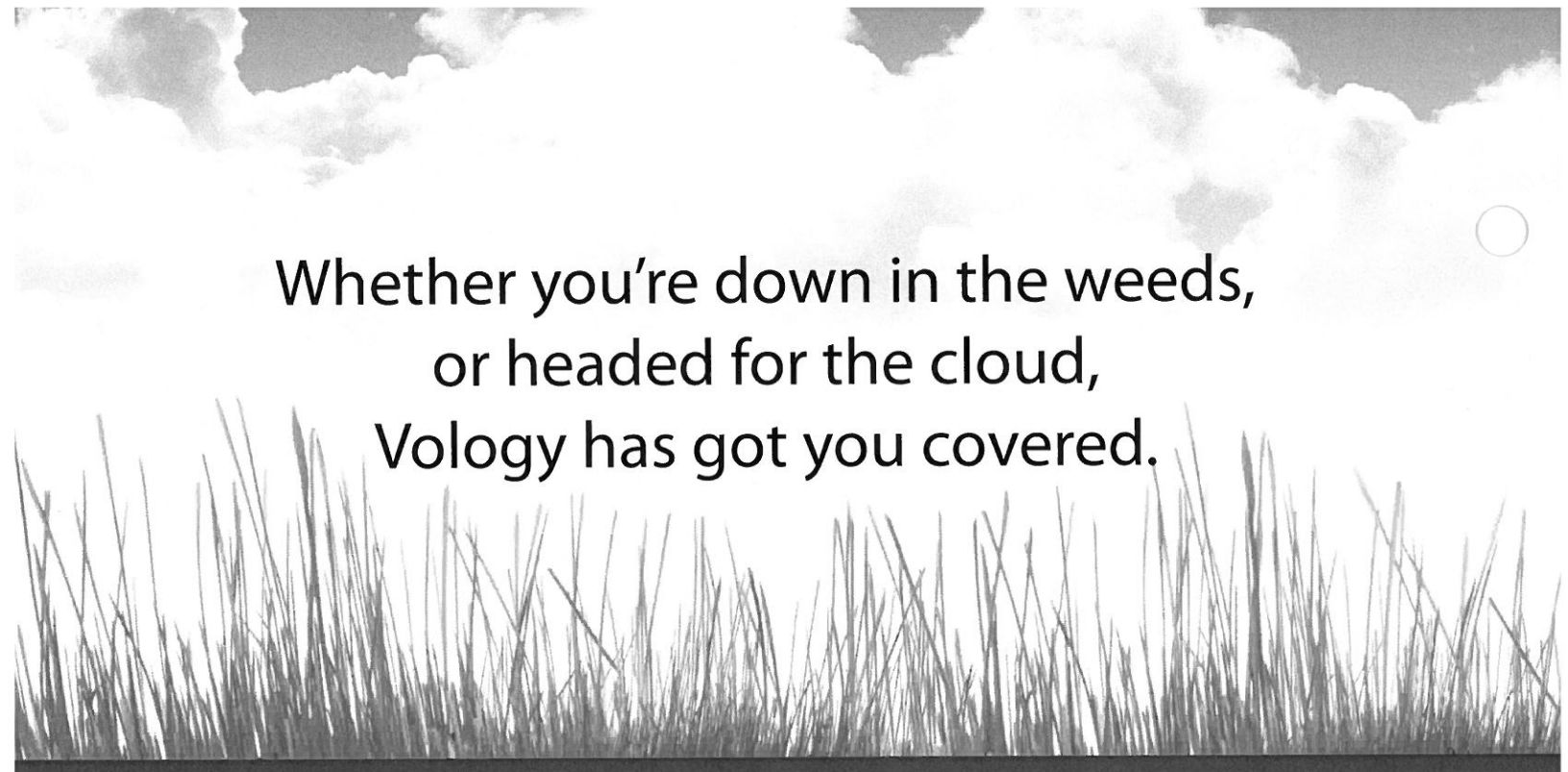
After a comprehensive inspection, full product testing and certification in our state-of-the-art warehouse, all Vology Certified Pre-owned products come with our standard 5-year warranty.



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VOLOGY



Whether you're down in the weeds, or headed for the cloud, Vology has got you covered.

At Vology, we partner with our customers to create best-in-class IT solutions using the most appropriate products and services, regardless of brand. Reliable and responsive, Vology is dedicated to providing the right solution for the situation, big or small, while lowering your total cost of technology ownership.

VOLOGY SOLUTIONS & SERVICES

VIRTUALIZATION

Vology has the expertise to effectively deliver any virtualization solution set, including servers, desktops and applications. Whether it be lowering your cost of ownership or more efficient application delivery, Vology is a proven expert on everything virtual.

- Application Virtualization
- Desktop Virtualization (VDI)
- Server Virtualization
- Storage Virtualization
- Cloud Technologies
- Consulting & Design
- Managed Services
- Remote Access

STORAGE

Vology is nationally recognized as experts in designing best-of-breed storage platform solutions. We strive to effectively advise our customers to make the best decisions based on the data requirements, while also minimizing costs.

- Storage Area Networks (SAN)
- Network Area Storage (NAS)
- Fibre Channel
- Business Continuity
- Disaster Recovery
- Backup Recovery
- Consulting & Design
- Virtual Storage
- Data De-duplication

NETWORK/TELEPHONY

In today's workplace, effective collaboration and communication in a secure environment are key concerns. Let Vology help you improve your network in order to increase performance for private or public cloud environments.

- Network Design/Consulting
- Firewalls/Security
- Switches
- Routers
- WAN/LAN
- Managed Services
- Data Center Design
- VOIP
- Mobile Management

Find out more about how we can help with your IT needs at **vology.com**

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Maximize Agility. Minimize Complexity. Realize A More Efficient Network with Brocade.

Brocade leads the industry in providing reliable, high-performance network solutions that help the world's leading organizations transition smoothly to a virtualized world where applications and information reside anywhere.

Today, Brocade is extending its proven data center expertise across the entire network with future-proofed solutions built for consolidation, network convergence, virtualization, and cloud computing.

With a complete family of Ethernet and converged networking solutions, Brocade helps organizations achieve their most critical business objectives through:

- Unmatched simplicity to overcome today's complexity
- Non-stop networking to maximize business uptime
- Optimized applications to increase business agility and gain a competitive advantage
- Investment protection to provide a smooth transition to new technologies while leveraging existing infrastructure

As a Brocade Elite Partner, we're helping companies meet the demands for higher levels of performance, availability and mobility, while also increasing efficiency.

Why Vology?

Vology Delivers Speed, Price, Quality... And Total Customer Satisfaction

Vology offers best-in-class solutions from a team of industry-certified experts. As a market leader with a \$50 million-plus inventory of networking and telecommunications products, Vology provides:

- Lightning quick quotes and competitive pricing
- Same or next-day delivery
- Brocade Certified team of sales professionals & engineers
- Professional Services for design, implementation & consulting
- Buyback programs for decommissioned IT equipment (cash or trade-in credit)
- Cable solutions and accessories for all networking and telecom equipment
- State-of-the-art configuration and staging lab



Brocade
Alliance Partner Network
Elite

Vology offers a wide range of advanced IP Network Solutions from Brocade, including:

Campus Network Switching and Routing

- Access
 - FastIron WS Switch
 - FCX Switch
- Access/Aggregation
 - ICX™ 6610
- Aggregation/Core
 - FastIron SX 800/1600 Switch
- Core
 - MLX

Data Center Network Switching and Routing

- Access
 - FCX Switch
 - NetIron CES Switch
 - Turbolron 24X Switch
- Aggregation
 - 8000 Switch
 - VDX® 6710 Switch
 - VDX 6720 Switch
 - VDX 6730 Switch
- Access/Aggregation
 - BigIron RX
- Core
 - MLXe
 - MLX

Service Provider Network Routing

- Access
 - Brocade 6910
 - NetIron CES 2000 Switch
- Aggregation
 - NetIron CER 2000 Router
 - MLX
 - Brocade ADX
- Core
 - MLXe
 - NetIron XMR

Wireless

- WLAN Controllers
 - Brocade Mobility RFS4000
 - Brocade Mobility RFS6000
 - Brocade Mobility RFS7000
- Wireless Aps
 - Brocade Mobility 7131
 - Brocade Mobility 650
- AirDefense WLAN Security Appliances

1860 Fabric Adaptor

- Brocade 1860-1
- Brocade 1860-2

Contact your Vology solutions professional
to learn more about Brocade

Call Your Account Manager
or
1.888.808.2199



Brocade

Alliance Partner Network

Elite



Release the power of your unneeded IT networking and telecom assets.

When it's time to take your old equipment offline, think Vology.

If you're thinking about replacing your current IT assets — or if you have decommissioned equipment taking up storage space — now is a great time to explore your IT asset recovery and disposition options.

Vology pays market value for excess or decommissioned technology assets and disposes of end-of-lifecycle equipment in a safe, environmentally responsible way.

We help you maximize value and minimize hassles

To get the most value from your decommissioned IT assets, it's important to know when to sell them. It's also essential to know the fair market value. Vology provides:

- Complete IT lifecycle management solutions — we buy, sell and help you maintain all your technology assets
- Quotes on new and used equipment delivered at warp speed
- As industry leaders in the secondary marketplace we understand market value and the best timing to remove equipment
- Cash or trade-in credit toward new or certified pre-owned networking and telecommunications equipment from Cisco, Juniper, Extreme, Avaya/Nortel, HP, Brocade/Foundry, Kemp and many more
- Ensuring sensitive data is erased prior to equipment being refurbished and placed back into service
- Offering complete packaging and shipping services at an affordable rate

Our IT lifecycle management expertise means we know how to maximize the value of your decommissioned assets. Vology's asset recovery and disposition service make the process easy for you. Don't let decommissioned equipment collect dust. Collect a check instead. Contact Vology today to learn more about how we can help you safely recover the value in your unneeded IT assets.

"I found Vology to be a great partner for our disposition needs. Their market knowledge made me confident throughout the process that I was getting a fair deal. The customer service was terrific. From beginning to end the guys at Vology made the process easy. I will certainly be back when I'm ready to dispose of my next batch of gear."

Mike Neff

V.P. Engineering
Gold Coast Storage Solutions

Discover the power of green with IT asset disposition

When it's time to dispose of end-of-life IT assets, make sure you comply with privacy laws and protect your sensitive data. Vology can help with a hassle-free, custom solution that protects your company without harming the environment by:

- Recycle decommissioned IT assets responsibly while protecting sensitive data
- Disposing of your end-of-life assets while upholding the highest security standards, providing an audit trail and a certificate of destruction at a facility that meets Department of Defense standards
- Disposing of obsolete equipment without adding to already overburdened landfills or shipping waste overseas – our zero landfill policy complies with local, state and federal guidelines

Help save the planet by disposing of decommissioned assets in a compliant, environmentally responsible way. Contact Vology to learn more.

**Get a fast quote from your
Vology solutions professional**



**Looking for a top quality technology solution
that meets strict government budget requirements?**

Take a look at Vology

- Florida headquartered Solution Provider
- \$50+ million inventory of new & certified pre-owned networking and telecommunications solutions
- Florida SLED Team focusing on departments, agencies, counties, cities and public education entities
- Lightning quick quotes and same/next day deliveries on most orders
- 50- 90% savings and a 5-Year Warranty on Certified Pre-Owned Solutions
- Customer Care Team to meet your every need - even after the sale is complete
- Full range of professional services from highly certified and experienced engineers
- Buyback programs for decommissioned IT equipment (cash or trade-in credit)

The power to do more at a price your organization can afford.

Vology delivers powerful savings for hundreds of government agencies:

Proudly serving more than 850 federal, state, county and military branch customers

- Delivering networking and telecommunications solutions for the following agencies and branches:
 - US Armed Forces: Army, Navy, Air Force, Coast Guard, National Guard
 - US Departments: State, Energy, Transportation, Commerce, Defense
 - Government Contractors
 - Florida departments, agencies, counties, cities and public education entities
- Saving government agencies millions of dollars with top-quality new and certified pre-owned technology solutions from brands you know and trust:

Brocade	Cisco Systems
Juniper Networks	Gencom
Polycom	Palo Alto
Extreme Networks	Meru Networks
HP ProCurve	Avaya/Nortel

And many more

You proudly serve the State of Florida. We proudly serve you.

5-Year Warranty comes standard on Certified Pre-Owned equipment

1 Comprehensive physical inspection

Vology technicians ensure internal and external serial numbers match and manufacturer's markings / labels are intact

2 Full product testing

Our technicians power equipment up and perform diagnostics and rigorous testing

3 Certification

Only products that pass our rigorous testing process can attain our certified pre-owned standard

4 State-of-the-art warehousing

Inventory is carefully stored and handled with the highest possible standards

5 Quality packaging

Products are shipped in manufacturer's box or a custom-fit Insta-Pak system

Vology Government Service delivers technology solutions to Florida state, local and public education entities:

- \$2 million lab to stage and configure your custom IT solution
- ISO 9001-2008 certified company- we're committed to quality and customer satisfaction
- INC 500/5000 list of fastest-growing private companies since 2006- do business with an IT leader
- Ability to purchase 24 x 7 at vology.com
- Extensive inventory of cables and accessories

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