Woodburn School District
Woodburn, Oregon

Request for Proposals
Network Switch Expansion Project
E-RATE Form 470
Category Two Request
RFP: #016-103

2016-2017

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Request for Proposal #16-103
Woodburn School District
965 N. Boones Ferry Road
Woodburn, Oregon 97071

Woodburn School District

Bid Instructions and Conditions

1. GENERAL REQUIREMENTS

The Woodburn School District wishes to replace the network switch infrastructure. The School Board of Woodburn School District is hereby inviting bids for this Category Two request.

We are seeking bids on the following items. 1) Network Switch Expansion
We welcome bidders to read the following RFP and are free to bid on all of the items presented. The school district is located in Marion County, Oregon. The District consists of four elementary schools, two middle schools, four small high schools (that are all located in one building/LAN), one alternative high school, a special education facility, and Welcome Center/Administration building. .

Bidder must have acquired a Schools and Libraries Corporation SPIN number and be willing to comply with all regulations pertaining to the Universal Service Fund Criteria for E-Rate providers.

A MANDATORY pre-proposal conference will be held Monday, January 25, 2016
 at 9:00 AM onsite at the Woodburn School District. The event will start at the Information Technology Services (ITS) office at 1081 Newberg Highway, Woodburn, OR, 97071.

Pre-proposal Conference
   a. Purpose. The pre-proposal conference is held with prospective Proposers to explain the Procurement requirements, obtain information, or to conduct site inspections.
   b. Required Attendance. The District REQUIRES attendance at the pre-proposal conference as a condition for making an Offer. No Offer will be accepted from a Proposer who did not attend the mandatory pre-proposal conference.
   c. Statements Not Binding. Statements made by the District's representative at the pre-proposal conference do not change the Solicitation Document unless the District confirms such statements in a Written Addendum

The bid must be received by Forrest Fisher, Technology Coordinator, by 4:30 PM PST, February 16, 2016. If the chosen vendor/bidder refuses or is unable to meet the terms set forth by the Woodburn School Board, the award may be given to the next lowest qualified vendor. The School Board reserves the right to waive any irregularities, accept or reject any or all bids, and to accept or reject any items therein.

Electronic submissions in PDF format are required. Proposals should be addressed to Forrest J. Fisher, Technology Coordinator (ffisher@woodburnsd.org and erate@woodburnsd.org) and plainly marked:
 "Proposal for Network Switch Replacement for Woodburn School District". Send any email messages to both addresses.

For a copy of the RFP or questions related to this bid, please first access:
http://wsd2016.edimension.us or the EPC system at portal.usac.org
The primary site is the EPC system and all answers to bid questions will be posted there.

The District reserves the right to cancel the procurement, reject any or all bids or any part thereof, adjust quantities, and to make award in such manner as it deems right and proper.

2. BID TIMELINE
   - Advertise RFP   January 19, 2016
   - Mandatory Vendor Meeting   January 25, 2016 (9:00 am – 12:00 including optional walkthrough)
   - Deadline for Questions   February 8, 2016
   - Deadline for Proposal Protests   February 8, 2016
   - Issue Addenda   February 9, 2016
   - Proposal Due   February 16, 2016 (4:30 PM PST)
   - Notice of Intent to Award   February 18, 2016
   - Board Award   March 3, 2016
   - Notice to Proceed   May 31, 2016 (Work not to commence before July 1)

3. SUBCONTRACTORS
   The bidder shall set forth on Attachment B: (A) the name and business address of each Subcontractor who will perform work or labor or render services; and (B) the portion of work to be done by each such Subcontractor. A Subcontractor is defined as an individual, partnership, or corporation who contracts with the Bidder to furnish material and labor or labor only, for the performance of work at the site. Suppliers of materials only are not deemed to be Subcontractors. No Subcontractors will be recognized as other than an employee of the Contractor. The Bidder shall be entirely responsible for the fulfillment of the contract.

4. REJECTION - Should any portion of the work done, or any materials delivered, fail to comply with requirements of the contract, such work or materials shall be rejected, and shall immediately be made satisfactory to the Woodburn School District by the Contractor, at no additional expense to the School District.

5. BIDDER - The Bidder, and the agents and employees of the Bidder, in the performance of the agreement, shall act in an independent capacity and not as officers or employees of agents of Woodburn School District.

6. NAME AND NATURE OF BIDDER'S AND SUPPLIERS LEGAL ENTITY - The bidder shall specify in the bid and on the bond, if furnishing a bid guarantee, the name and nature of its legal entity and any fictitious name under which it does business as covered by the bond. An authorized officer or person(s) shall sign the bid under the correct firm name.

   The successful bidder may be required to furnish a letter of organization listing the firm members, officers of corporation, and those persons authorized to sign legal documents. Should a change be contemplated to the name or nature of the bidder's legal entity, the bidder shall first notify the District in order that proper steps may be taken to have the change reflected on the contract or purchase order.

7. ASSIGNMENT OF CONTRACT OR PURCHASE ORDER - The bidder shall not assign or transfer by operation of law or otherwise any or all of its rights, burdens, duties or obligations without the prior written consent of the surety on the contract bond, if any, and the District.

8. PRICES - Prices should be shown (preferably typed) on the Bid form; and on each item separately, on the units specified in the bid form or on trade standards. Errors may be crossed off and corrections made prior to bid opening only, but should be initialed in ink by the person signing the bid or bidder's authorized representative. During the period of deliveries under a contract resulting from this bid, should there be a decrease in prices of the items listed therein, a corresponding decrease in prices on the balance of the deliveries shall be made to the District for as long as the lower prices are in effect, but at no time shall the prices charged the District exceed the prices herein quoted.

   The District shall be given the benefit of any lower prices which may, for comparable quality and delivery, be given by the contractor to any other school district or any other State, County, Municipal, or local government agency in Marion County for the products listed herein.

9. EXECUTION OF CONTRACT - The successful bidder shall within ten (10) days of notice of award of contract, sign the contract, and bond, if any, have the bond executed by a surety satisfactory to the District and return the contract to the District Director of Business.

10. DEFAULT BY CONTRACTOR - The District shall hold the contractor responsible for any damages which may be sustained because of the failure or neglect of the contractor to comply with any term or condition herein, it being specifically provided and agreed that time shall be of the essence of the contract delivery requirements.

    If the contractor fails or neglects to furnish or deliver any of the materials, supplies or services listed herein at the prices named and at the times and places herein stated or otherwise fails or neglects to comply with the terms of the contract, the District may, upon written notice to the contractor, cancel the contract in its entirety or cancel or rescind any or all items affected by such default, and may, whether or not the contract is canceled in whole or in part, purchase the materials, supplies or services elsewhere without notice to the contractor. The prices paid by the District at the time such purchases are made shall be considered the prevailing market prices. The District may collect any extra cost incurred by such default from the contractor and the surety on the performance bond, if any.

11. FORCE MAJEURE CLAUSE - The parties to the contract shall be excused from performance there under during the time and to the extent that they are prevented from obtaining, delivering or performing by act of God, fire strike, loss or shortage of transportation facilities, lockout, or commandeering of materials products, plants of facilities by the government, when satisfactory evidence thereof is presented to the other party, provided that it is satisfactorily established that the nonperformance is not due to the fault or neglect of the party not performing.

12. HOLD HARMLESS CLAUSE - The contractor shall hold harmless and indemnify the District and the Woodburn School District School Board, its officers and employees from every claim or demand, which may be made by reason of:
    a.) Any injury to person or property sustained by any person, firm or corporation, employed directly or indirectly by him upon or in connection with his performance under the contract.

    b.) Any injury to person or property sustained by any person, firm or corporation, caused by an act, neglect, default, or omission of the contractor of any person, firm, or corporation, directly or indirectly employed by him upon or in connection with his performance under the contract; and

    c.) Any liability that may arise from the furnishing or use of any copyrighted or uncopyrighted composition, secret process or patented or unpatented invention, under this contract.

    The contractor at his own expense and risk shall defend any legal proceedings that may be brought against the District or the Board, its officers or employees or any such claim or demand, and satisfy any judgment that may be rendered against any of them.

13. INSURANCE - The contractor shall maintain insurance adequate to protect him from claims under Worker's Compensatory Acts, and from claims for damages for personal injury, including death, and damage to property, which may arise from operations under the contract. The contractor may be required to file with the District certificates of such insurance. Failure to furnish such evidence, if required, may be considered default of the contractor.

14. INVOICES AND PAYMENTS - Unless otherwise specified, the Contractor shall render invoices in triplicate for materials delivered or services performed under the contract, to the Business Department of the Woodburn School District, 965 N. Boones Ferry Road, Woodburn, Oregon 97071. Invoices shall be submitted immediately in a form payable by the District. The District shall make payment for materials, supplies, or services furnished under the contract within a reasonable and proper time after acceptance hereof and approval of the invoices by the authorized District representative.

    Universal Service Fund (E-Rate)
    The District is planning on using Federal Universal Service Funds for a substantial portion of funding of these services; therefore the seller should be familiar with this process. The seller will invoice the buyer and the Schools and Libraries Corporation (SLC) for payment for the percent of the cost of the project that is E-Rate eligible that is awarded in the Funding Commitment Letter.

15. CASH DISCOUNTS - All cash discounts shall be taken and computed from the date of delivery of acceptable material or the date of the receipt of the invoice, whichever is the later.

16. PERMITS AND LICENSES - The contractor and all of his employees or agents shall secure and maintain in force such licenses and permits as are required by law. In connection with the furnishing of materials, articles or services herein listed. All operations and materials shall be in accordance with the law.

17. CONTRACT DOCUMENTS - The complete contract includes the following documents: The advertisement for bids (when required), the bid and general contract conditions, the specifications and drawings, and bid of the contractor and its acceptance by the District, the contract, the performance bond, and all amendments thereto. Any of these documents shall be interpreted to include all provisions of the other documents as though fully set out therein.

18. CONTRACTOR IS NOT AN OFFICER, EMPLOYEE OR AGENT OF DISTRICT - While engaged in carrying out and complying with the terms and conditions of the contract, the contractor is an independent contractor and not an officer, employee or agent of the District.

19. ANTI DISCRIMINATION - It is the policy of the Woodburn School District School Board that in connection with all work performed under Construction and Purchasing Contracts there be no discrimination against any prospective or active employee engaged in the work because of race, color, ancestry, national origin, sex, or religious creed, and therefore, the contractor agrees to comply with applicable Federal and Oregon laws including, but not limited to, Oregon Prevailing Wage laws. In addition, the contractor agrees to require full compliance by all subcontractors employed on the work by him. The Contractor shall comply with pertinent statutory provisions relating to public works.

20. STATUTES The Contractor shall abide by the provisions of all applicable Oregon statutes. Although a number of statutes are referenced in the Contract, it is not meant to be a complete list and should not be relied upon as such.

21. PROVISIONS FOR AGED AND HANDICAPPED PERSONS - Contractor shall comply with pertinent statutory provisions relating to public works.

22. SAFETY STANDARDS - The Contractor shall comply with pertinent provisions of the Oregon workplace safety laws and regulations.

23. UNEMPLOYMENT COMPENSATION - The Contractor shall pay contributions for wages for personal services performed under this Contract or arrange for a bond acceptable to the commissioner.

24. DRUG-FREE WORKPLACE - The Contractor shall fully comply with all applicable federal, state, and local laws and regulations regarding drug-free workplace, including the Drug-Free Workplace Act of 1988. Any person not fit for duty for any reason, including the use of alcohol, controlled substances, or drugs, shall immediately be removed from the Work.

25. TOBACCO PRODUCTS –
Smoking and any use of tobacco products will not be allowed on District property. Contractor may be fined up to $500.00 for each incident of tobacco use within the area of work by the Contractor or Subcontractor. Tobacco is defined in Board Policy Tobacco-Free Environment.

26. CRIMINAL BACKGROUND CHECKS –

   a) Contractor shall perform or have performed criminal background checks for every employee on all active campus (i.e., children are present) projects prior to that employee's admittance to the project site. Once an employee passes the criminal background check, he or she will receive an ID badge and a hard hat sticker which they must wear at all times while they are on site. Contractor may be fined up to $500.00 for every worker working on site without the proper ID badge or hat sticker.

   a. No Contractor's employee or subcontractor's employee, or principal/owner who has been convicted of a crime listed in ORS 163.095, 163.115, 163.185, 163.235, 163.355, 163.365, 163.375, 163.385, 163.395, 163.405, 163.408, 163.411, 163.415, 163.425, 163.427, 163.432, 163.433, 163.435, 163.445, 163.465, 163.515, 163.525, 163.547, 163.575, 163.670, 163.675 (1985 Replacement Part), 163.680 (1993 Edition), 163.684, 163.686, 163.687, 163.688, 163.689, 164.325, 164.415, 166.005, 166.087, 167.007, 167.008, 167.012,

167.017, 167.057, 167.062, 167.075, 167.080, 167.090, 475.808, 475.810, 475.812, 475.818, 475.820, 475.822, 475.828, 475.830, 475.832, 475.848, 475.852, 475.858, 475.860, 475.862, 475.868, 475.872, 475.878, 475.880, 475.882, 475.888, 475.890, 475.892, 475.904 or 475.906 shall be allowed on District property.

b. No Contractor's employee or subcontractor's employee, or principal/owner who has been convicted under ORS 161.405 of an attempt to commit any of the crimes listed in subparagraph (b) of this paragraph shall be allowed on District property.

c. No Contractor's employee or subcontractor's employee, or principal/owner who has been convicted in another jurisdiction of a crime that is substantially equivalent, as defined by rule, to any of the crimes listed in subparagraphs (b) and (c) of this paragraph shall be allowed on District property.

27. SECURITY PROCEDURES -

a. Construction/Maintenance Building Security Rules
   i. The Contractor shall enforce strict discipline and good order among the Contractor's employees, Sub-Contractors, and other persons carrying out the contract on District property. The District may require that the Contractor immediately remove, from the project site and District property, any employee or other person carrying out the contract who the District considers objectionable.
   ii. District Personnel (ie; Building Administrator, Custodian, or a building monitor) should be present when a Contractor is performing work within an existing school facility.
   iii. Only District Personnel will deactivate the security system upon arriving and reactive the system when they leave the facility. (Note: If the responsible District Personnel for a particular day changes during the day, the District Personnel shall coordinate this change in responsibility and advise the Contractor's superintendent.)
   iv. Contractor personnel shall not be furnished District security badges and/or access codes to the Building security system.
   v. The Contractor shall have a responsible party such as a superintendent, foreman, or supervisor on site during any work performed by either their own forces or that of their subcontractors.
   vi. The superintendent shall check in with responsible District Personnel upon arrival and advise when all work is complete, contract personnel have left, and the area is secure.
   vii. The Contractor's superintendent shall be responsible for security in areas where work is performed as well as ingress and egress to that area.
   viii. At the WSD Representative's discretion, the superintendent may be issued a building key to allow access to areas where work is being performed.
   ix. The superintendent shall maintain a daily log defining what areas within the building were accessed by Contractor personnel, which personnel from their firm were in the building, and which subcontracting firms were in the building.
   x. Each of the Contractor's employees, subcontractor's employees, and principals/owners involved at the site may, at the option of the District, be subject to a security check, at any time, by the Woodburn Police Department or other venue.

STANDARD PROVISIONS

1. INTRODUCTION
    This solicitation is issued pursuant to the Oregon Attorney General Model Rules and Woodburn School District Public Contracting Rules (Rules). The term "District" throughout this Solicitation means the Woodburn School District. The term Proposer means the Person or Firm that submits an Offer in response to this Solicitation. The term Provider or Contractor means the Proposer(s) awarded a Contract as a result of this Solicitation.

2. SOLICITATION REVIEW
    Proposers must carefully review this Solicitation document and are responsible for knowing and understanding the terms and conditions. Unless defects, ambiguities, omissions, or errors are brought to the attention of the District in writing by noon, February 8, 2016 then protests or appeals based on such defects, ambiguities, omissions, or errors received after issuance of the Notice of Intent to Award (NIA) may not be favorably considered.

3. OFFER
    Pursuant to OAR 137-47-0310, a Proposer's submission in response to this Solicitation is an offer to enter into a Contract. By Signing and returning the Offer, the Proposer acknowledges it has read, understands and agrees to be bound by the terms and conditions herein. The Offer is a "firm offer," and must be held open by the Proposer for the District acceptance for sixty (60) days. The District's Award of a Contract constitutes acceptance of the Offer and binds a Provider to the Contract. The Proposer must not make its Offer contingent upon the District acceptance of any terms or conditions (including Specifications) other than those contained in this Solicitation.

4. OFFER PREPARATION
    Pursuant to OAR 137-47-0400, failure to submit Offers in accordance with the provisions of this Solicitation shall be grounds to declare the Offer as non-Responsive.
    a. Proposers must electronically submit a completed Proposal (an Offer in accordance with this Request for Proposal).
    b. Proposers must electronically submit a completed Attachment A (provided at the end of this document)
    c. Provide the District with all required or requested documents and descriptive literature in PDF format.
    d. Initial any corrections or erasures to their Offer;
    e. Identify (on Attachment A) whether the Proposer is/is not a "resident Proposer," as defined in ORS 279A.120(1);
    f. Provide (on Attachment A) certification of nondiscrimination in obtaining any required subcontractors in accordance with ORS 279A.110(4); and
    g. Provide (on Attachment A) Written acknowledgment of receipt of all Addenda.

5. OFFER SUBMISSION
    The offer should be submitted in Adobe's Portable Document Format (PDF) and sent as an electronic mail attachment or multiple attachments to both addresses:

    Forrest Fisher   Forrest Fisher
    Technology Coordinator   Technology Coordinator
    Woodburn School District   Woodburn School District

    ffisher@woodburnsd.org   erate@woodburnsd.org

    The file attachments must include a signed and scanned copy of Attachment A as well as any other pertinent materials.

6. ADDENDA
Pursuant to OAR 137-47-0430:
   a. The District may change this Solicitation only by Written Addenda.
   b. Proposers must provide written digital acknowledgment of receipt of any Addenda on the provided Attachment A.
   c. The District shall issue Addenda by posting/publication on the proposal website: (http://portal.usac.org).
   d. Proposers are responsible to make inquiry as to any addenda issued by checking the proposal website: (http://portal.usac.org).
   e. At its discretion, the District may extend the Closing to allow Proposers time to analyze and adjust to changes.

7. MODIFICATION OR WITHDRAWAL
Pursuant to OAR 137-47-0440: a Proposer may modify or withdraw its Offer in writing only prior to Closing. Modification or withdrawal must be marked and delivered as described in OFFER SUBMISSION above. A Proposer may also deliver its modification or withdrawal in person. Proposers are responsible for ensuring that the District receives its modification or withdrawal. Modification or withdrawals must be prepared and submitted on the Proposer's letterhead, signed by an authorized representative of the Proposer.

8. RECEIPT, OPENING, AND RECORDING OF OFFERS
Pursuant to OAR 137-47-0450:
   a. The District must electronically time-stamp or hand-mark each Offer and any modification upon receipt. The District official proposal time clock is located in the lobby of the District Office, 965 N. Boones Ferry Road, Woodburn, OR 97071. In the event an Offer is too large to be time stamped a separate piece of paper will be time stamped and attached to the Offer or the envelope will be marked by hand with the date and time received.
   b. The District shall not be responsible for the premature opening or failure to open an Offer that is not properly addressed and/or identified.
   c. Offers will be opened and recorded. The number of Offers received, the identity of Proposers, or the contents of any Offer will not be disclosed to the public until all Offers have been evaluated, negotiations completed if required, and a recommendation for Award has published.

9. LATE OFFERS, WITHDRAWALS, OR MODIFICATIONS
Pursuant to OAR 137-47-0460, any Offer received after Closing is late. A Proposers request for withdrawal or modification of an Offer received after Closing is late. The District must not consider late Offers, withdrawals or modifications except as permitted in MISTAKES below. The District reserves the right to consider Offers that have been delayed or mishandled by the District.

10. MISTAKES BY PROPOSER
Pursuant to OAR 137-47-0470, the District shall carefully consider whether to permit waiver, correction or withdrawal of Offers for certain mistakes. The District must not allow a Proposer to correct or withdraw an Offer for an error in judgment. The District must reject any Offer in which a mistake is evident on the face of the Offer and the intended correct Offer is not evident or cannot be substantiated from documents accompanying the Offer. If mistakes in an Offer are discovered after Opening, but before Award of the Contract, the District may:
   a. Waive, or permit a Proposer to correct, a minor informality; a matter of form rather than of substance that is evident on the face of the Offer, or an insignificant mistake that can be waived or corrected without prejudice to other Proposers.
   b. The District may correct a clerical error if the error is evident on the face of the Offer, or other documents submitted with the Offer, and the Proposer confirms the District correction in writing.
   c. The District may permit a Proposer to withdraw an Offer based on one or more clerical errors in the Offer only in accordance with OAR 137-47-0470(2)(c) and (d).

11. AWARD
   Pursuant to OAR 137-47-0600:
   a.   Award in part or in whole is contingent upon available funding. In the event adequate funds are not appropriated and allocated by the School Board, the District reserves the right to cancel any Solicitation at no penalty.
   b.   If awarded, the District shall award a Contract only to the Responsible Proposer(s) that submit the most Advantageous of those submitted, and that meets the minimum requirements of this solicitation.
   c.   The District may award by item, groups of items or the entire Offer.
   d.   The District may Award multiple Contracts if beneficial to the District for adequate availability, delivery, service, competition, pricing, product capabilities, or other factors deemed significant by the District. This notice of Multiple Awards does not preclude the District from awarding a single Contract.
   e.   The District may award a Contract for parts of the Solicitation for which acceptable Offers have been received.
   f.   The District may award all or none of the Offers if the evaluation shows an all or none Award to be the most Advantageous or in the best interest of the District.
   g.   The District may reject all or part of Offers and may issue a new Solicitation on the same or revised terms, conditions and Specifications.
   h.   When Offers are identical the District must Award the contract Pursuant to OAR 137-46-0300.

12. NOTICE OF INTENT TO AWARD
   Pursuant to OAR 137-47-0610, the District must provide written notice of its Intent to Award (NIA) to all Proposers at least SEVEN (7) calendar days before the Award of a Contract, unless the District determines that circumstances require prompt execution of the Contract. The NIA will be sent by Email to all Proposers and posted on the proposal website (http://wsd2016.edimension.us), the district website (www.woodburnsd.org) and the EPC system (portal.usac.org). The District Award must not be final until the latter of the following: SEVEN (7) calendar days after the date of the NIA, or until the District provides written response to all timely filed protests denying the protest(s) and affirming the Award.

13. OFFER REJECTION
   Pursuant to OAR 137-47-0640:
   a. The District may reject any Offer:
      i.   When the rejection is in the best interest of the District.
      ii.   When the Offer is contingent upon the District acceptance of terms and conditions (including Specifications) that differ from the Solicitation.
      iii. When the Offer takes exception to terms and conditions (including Specifications) set forth in the Solicitation.
      iv.   That fails to meet the Specifications of the Solicitation.
      v.   That is submitted late
      vi.   Not in substantial compliance with the Solicitation or with all prescribed public procurement procedures.
      vii. Not in compliance with ORS 279B.120, 279B.130, 279A.105, OAR 137-046-0210(3), ORS 279A.110(4).
      viii. When the Proposer is non-Responsible pursuant to ORS 279B.110.
   b. The District may reject all Offers based upon the following criteria:
      i.   As set forth in ORS 279B.100. The District must notify all Proposers of the rejection, along with the reasons for rejection
      ii.   The content of or an error in the Solicitation or the Procurement Process unnecessarily restricted competition for the Contract.
      iii. The price, quality or performance presented by the Proposers are too costly or of insufficient quality to justify acceptance of any Offer.
      iv.   Misconduct, error, or ambiguous or misleading provisions in the Solicitation threaten the fairness and integrity of the competitive process.
      v.   Causes other than legitimate market forces threaten the integrity of the competitive process. Such as collusion, corruption, and/or inadvertent or intentional errors in the Solicitation.
      vi.   Any other circumstance indicating that awarding the Contract would not be in the public interest.

14. PROTEST, CHANGE, CLARIFICATION
Pursuant to OAR 137-47-0730, Proposers may request changes or clarification to, or protest, the terms and conditions and/or the specifications of this Solicitation:
   a. Questions. All questions regarding this Solicitation must be submitted electronically in writing to the attention of Forrest Fisher, Technology Coordinator by February 8, 2016. No oral questions will be accepted other than at the pre-proposal conference. All questions received prior to the deadline will be answered by Addenda.
      i. Questions shall be submitted in writing via email to Forrest Fisher, Technology Coordinator (ffisher@woodburnsd.org and erate.woodburnsd.org)
      ii. No other contact regarding this solicitation during the solicitation process shall be permitted. Unauthorized contact regarding this solicitation may subject the contacting vendor's proposal to rejection.
   b. Change, Clarification, Protest. A prospective Proposer may protest the Procurement Process or the Solicitation Document as set forth in ORS 279B.405(2). Proposer written comments shall include:
      i. A detailed statement of the legal and factual grounds for the change, clarification, or protest;
      ii. A description of the resulting prejudice to the Proposer; and
      iii. A statement of the form of relief requested or any proposed changes to the contract terms and conditions or specifications.
   c. Delivery. Written questions, changes, clarification, or protest must be emailed to ffisher@woodburnsd.org and erate@woodburnsd.org.
   d. Deadline. Questions, changes, clarifications, or protests must be received by the District by noon on February 8, 2016.
   e. Response. Notice of the District determination (i.e. entirely rejects or agrees with) in written addenda to any questions, changes, clarification or protest will be provided by posting/publication on the proposal website: (http://wsd2016.edimension.us), the district website (www.woodburnsd.org) and the EPC system (portal.usac.org).
   f. Protesters must exhaust all administrative remedies before seeking judicial review.

15. AGGRIEVED PROPOSER
   a. An adversely affected or aggrieved Proposer may submit to the District a Written protest of the District intent to award within seven (7) days after issuance of the notice of intent to award the Contract, unless a different protest period is provided under the Solicitation.
   b. The Proposers protest must be in Writing and must specify the grounds upon which the protest is based.
      i. Protests may be emailed to (nhall@woodburnsd.org and erate@woodburnsd.org) or mailed to Nancy Hall, Director of Business, 965 N. Boones Ferry Road, Woodburn, OR 97071. Aggrieved Proposer is responsible to ensure receipt of the protest.
      ii. The aggrieved Proposer must serve all other Proposers by email, fax or mail with notice of its appeal to allow for rebuttal.
   c. A Proposer is adversely affected or aggrieved only if the Proposer is eligible for Award of the Contract as the Responsible Proposer submitting the best and next highest scored Responsive Offer, i.e., the protesting Proposer must claim that all higher scored Proposers are ineligible for Award:
      i. Because their Offers were non-responsive; or
      ii. The District committed a substantial violation of a provision in the Solicitation or of an applicable procurement statute or administrative rule, and the protesting Proposer was unfairly evaluated and would have, but for such substantial violation, been the Responsible Proposer offering the lowest Offer or the Responsible Proposer offering the highest- ranked Proposal.
   d. The District must not consider a protest submitted after the time period established in this Rule or such different period as may be provided in the Solicitation.
   e. Authority to Resolve Protests. The Director of Business, or such Person's designee, may settle or resolve a written protest submitted in accordance with the requirements of this Rule.
   f. Decision. If a protest is not settled, the Superintendent, or such Person's designee, must promptly issue a written decision on the protest. Judicial review of this decision will be available if provided by statute.
   g. Award. The successful Proposer must promptly execute the Contract after the Award is final. The District must execute the Contract only after it has obtained all applicable required documents and approvals. A sample Contract is enclosed, the terms and conditions of which are incorporated by reference.
   h. The District will issue a Written Disposition of the Protest in a timely manner. The District Director of Business has the authority to settle any protest.

i. If the District upholds the Protest, in whole or in part, the District may in its sole discretion either Award the Contract to the successful protestor or cancel the Solicitation.

i. Proposers must exhaust all administrative remedies before seeking judicial review.

16. OFFER COSTS

The District is not liable for any costs incurred by the Proposer in its Offer preparation.

17. CONFIDENTIALITY OF PROPOSALS

The District is subject to the Oregon Public Records Law (ORS 192.410 to 192.505), which requires the District to disclose all records generated or received in the transaction of District business, except as expressly exempted in ORS 192.501, 192.502, or other applicable law. The District may withhold from disclosure information in accordance with ORS 279B.055(5)(c): trade secrets or confidential information pursuant to ORS 192.501 or 192.502.

a. The District will not disclose records submitted by a Proposer that are exempt from disclosure under the Public Records Law, subject to the following procedures and limitations.

   i. All pages containing the records exempt from disclosure shall be marked "confidential" and segregated in the following manner:

      A. It shall be clearly marked in bulk and on each page of the confidential document.

      B. It shall be kept separate from the other solicitation (proposal) documents in a separate envelope or package.

      C. Where this specification conflicts with other formatting and response instruction specifications, this specification shall prevail.

      D. Where such conflict (in C. above) occurs, the proposer is instructed to respond with the following: "Refer to confidential information enclosed."

   (i) This statement "Refer to confidential information enclosed." shall be inserted in the place where the requested information was to have been placed.

b. Proposers who desire that additional information be treated as confidential shall mark those pages as "confidential", cite a specific statutory basis for the exemption, and the reasons why the public interest would be served by the confidentiality. The entire proposal shall not be marked confidential, nor, shall any pricing. Should a proposal be submitted in this manner, no portion of it shall be held as confidential unless that portion is segregated in the above manner and meets the above criteria.

c. Notwithstanding the above procedures, the District reserves the right to disclose information that the District determines, in its sole discretion, is not exempt from disclosure or that the District is directed to disclose by the District Attorney or a court of competent jurisdiction. Prior to disclosing such information, the District will notify the Proposer. If the Proposer disagrees with the District decision, the District may, but is not required to enter into an agreement not to disclose the information so long as the Proposer bears the entire cost, including reasonable attorney's fees, of any legal action, including any appeals, necessary to defend or support a no-disclosure decision.

E-Rate Requirement

Note that Woodburn School District will be applying for Universal Service (E-rate) discounts to help support the cost of the eligible services that are the subject of this RFP. Therefore, the successful provider(s) must agree to cooperate fully and in a timely manner with any and all requests for information that Woodburn School District needs to secure the E-rate discounts.

Note further that the services that are the subject of this RFP are mostly eligible for E-rate support. Some of the services, however, may not be. Therefore where applicable, service providers MUST provide separate price quotes for eligible and ineligible services/equipment.

All inquiries must include the vendor SPIN number and the E-Rate request number listed on this proposal form.

Award of this proposal may be contingent upon the approval of funding from the Universal Service Fund's Schools and Libraries Program, otherwise known as E-rate. The successful bidder agrees to bill and receive a portion of the payment for the provisions of goods and services described herein directly from the Universal Service Administrative Company ("USAC"), and/or the Schools and Libraries Division ("SLD") via the Form 474 Service Provider Invoice (SPI). Woodburn School District will NOT file a Form 472, and will only be responsible for paying its non-discounted share of costs. The Woodburn School District and the successful bidder will act in a reasonable manner and comply with any Schools and Libraries Universal Service Fund Program requirements.

Within seven (7) days of award, the awarded vendor will provide the District with a bill of materials suitable for the Form 471 Item 21 Attachment. Approval for any deviation from the Item 21 Attachment must be obtained from District. Subsequent schedules of values and invoices must match Item 21 Attachment or subsequent service substitutions.

In the event of questions during the E-Rate audit process, the awarded vendor is expected to reply within 3 days to questions associated with its proposal.

No billing or work can take place prior to July 1, 2016.

1. VENDOR PROPOSAL REQUIREMENTS

Vendor proposal in response to this RFP will be incorporated into the final agreement between Woodburn School District and the selected vendor. The submitted proposal at a minimum should include the following sections, and numbered as such:

1) Company information, including number of years in business, office locations, and key personnel that will support the project
2) Identification of any subcontractors
3) Services Rendered, project schedule and scope of work
4) Itemized Pricing, including shipping costs, if any
5) Exclusions and/or exceptions to RFP and contract terms and conditions
6) WSD and Vendor Responsibilities
7) Fees, Payments and any applicable Trade-in credits
8) References in the K-12 education market
9) Evidence of Service Provider Identification Number (SPIN), FCC Registration Number, and proof of Green Light status
10) Additional information regarding firm's qualifications such as licensing and certifications

2. WIRELESS COMPLETION PROJECT EVALUATION CRITERIA

RFPs will be evaluated according to the following criteria:

Criteria	Percentage
Vendor Reputation/Past Performance	16%
Proximity to District (must be able to be onsite within 2 hours)	8%
Product Quality/Features	17%
Ability to be incorporated with existing district systems (Brocade).	24%
Ease of management, training provided to district technology staff	10%
Cost of Eligible Products/Services	25%

Questions on the RFP: All questions or inquiries concerning this Request for Proposal should be submitted via email (ffisher@woodburnsd.org and erate@woodburnsd.org), the project website (http://wsd2016.edimension.us) or the EPC system (portal.usac.org) no later than January 25, 2016 and will be responded to within 3 business days. The response/answer will be posted on the project website. If it is a clarification to the RFP, an ADDENDA will be issued and also posted on the project website (http://wsd2016.edimension.us) and the EPC system (portal.usac.org) for all bidders.

Please provide a complete proposal based on all sections of this RFP.

Please provide separate quotes based on the E-Rate Eligible Services List for FY2016 with a complete bill of materials for:
1. Eligible equipment and services
2. Ineligible equipment services

Vendor Proposal Cover Information and Bid Signatory Page

TO: Information Technology Services
            Woodburn School District
            965 N Boones Ferry Road
            Woodburn, OR 97071

Bidder understands that the Woodburn School District reserves the right to reject any or all bids or any part thereof or cancel the entire project.   This RFP can be dependent on E-Rate funding and may be cancelled if E-Rate funding is not available.

Total Project Cost:

 _____

Total Project Cost with Estimated 85% Discount on Eligible Items and Services:

_____

Approximate Annual Maintenance Cost after first year:

_____

Submitted by:

_____
Company Name
_____
Contact Name
_____
Address
_____
Address
_____
Telephone
_____
Fax
_____
Email

General Articles and Signatory Page

1. **ARTICLE 1 - SCOPE OF WORK**
   The Contractor shall perform services within the time stipulated in the contract as herein defined, and shall provide all services, and transportation to complete in a workman like manner all of the work required in connection with the following titled: Network Switch Replacement (See End of Document)

   IT IS THE DUTY OF THE Contractor to complete the work covered by this contract in exact accordance with the approved plans, specifications, and other contract documents as specified in Article 6 below. The Contractor shall be liable to the District for any damages arising as a result of a failure to fully comply with that obligation, and the Contractor shall not be excused with respect to any failure to so comply by any act or omission of the architect, Engineer, Inspector, Office of the State Architect, or representative of any of them, unless such act or omission actually prevents the Contractor from fully complying with the requirements of the documents, and unless the Contractor protests at the time of such alleged prevention that the act or omission is preventing the Contractor from fully complying with the contract documents. Such protest shall not be effective unless reduced to writing and filed with the district office within three working days of the date of occurrence of the act or omission preventing the Contractor from fully complying with the contract documents.

2. **ARTICLE 2 - CONTRACT PRICE**
   The District shall pay to the Contractor as full consideration for the faithful performance of the contract, the sum of _____, said sum being the total amount of the following amounts stipulated in the bid:

3. **ARTICLE 3 - HOLD HARMLESS AGREEMENT**
   The Contractor agrees to and does hereby indemnify and hold harmless the District, its officers, agents, and employees from every claim or demand made, and every liability, loss, damages, or expense, of any nature whatsoever including attorney fees and costs, which may be incurred by reason of:

   (a) Liability for damages (1) death or bodily injury to persons, (2) injury to, loss or theft of property, or (3) any other loss, damage or expense arising under either (1) or (2) above, sustained by the Contractor or any person, firm or corporation employed by the Contractor upon or in connection with the work called for in this Agreement, except for liability resulting from the sole negligence or willful misconduct of the District, its officers, employees, agents or independent contractors who are directly employed by the District; and

   (b) Any injury to or death of persons or damage to property caused by any act, neglect, default or omission of the Contractor, or any person, firm, or corporation employed by the contractor, either directly or by independent contract, including all damages due to loss or theft, sustained by any person, firm or corporation, including the District, arising out of, or in any way connected with the work covered by this agreement, whether said injury of damage occurs either on or off school district property, if the liability arose from the negligence or willful misconduct of anyone employed by the Contractor, either directly or by independent contract.

   (c) The Contractor, at his own expense, cost and risk, shall defend any and all actions, suits, or other proceedings that may be brought or instituted against the District, its officer, agents or employees, on any such claim, demand or liability, and shall pay or satisfy any judgment that may be rendered against the district, its officers, agents or employees in any action, suit or other proceedings as a result thereof.

4. ARTICLE 4 - PROPERTY LIABILITY AND PROPERTY DAMAGE INSURANCE
Contractor shall take out and maintain during the life of this contract such public liability and property damage insurance, $1,000,000.00 minimum, as shall protect him/her and the District from all claims for personal injury, including accidental death, as well as from all claim for property damage arising from operations under this contract.

Prior to commencement of the work, the Contractor shall submit to the District Director of Business verification of adequate Liability Insurance Coverage and name Woodburn School District as an Additional Insured.

5. ARTICLE 5 - PROVISIONS REQUIRED BY LAW
Each and every provision of law and clause required to be inserted in this contract shall be deemed to be inserted herein and this Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or is not inserted correctly, then upon application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

All of the above-named contract documents are intended to be complementary. Work required by one of the above-named contract documents and not by others shall be done as if required by all.

IN WITNESS WHEREOF, this Agreement has been duly executed by the above-named parties, on the day and year first above written.

DISTRICT: CONTRACTOR

By _____

By _____

Authorized Officers or Agents

CORPORATE SEAL

DESCRIPTION OF PROJECT: Network Switch Expansion

The Woodburn School District is seeking 16 switches and one router to expand our network and accommodate new construction.   We are expecting a network with 10 GB fiber uplink connection speeds between all network closets/switches within each building.   The buildings are inter-connected via a 1GB (currently) Metro-E service. The District's connection to the Internet is currently at 400 MB but will likely be upgraded this summer.

The proposal should include equipment, software, installation, one year of maintenance/support, configuration and training. An estimation, but not a bid, of the following years annual maintenance cost should also be included.

The configuration of units should include the protocols, IP addresses, subnets and VLANs of WSD specifications.   We currently have a separate subnet for each location and each location has six standard subnets: Wired computers (data), staff wireless, student wireless, security cameras, switch/access point management and VOIP telephones. There may be a few additional building specific subnets as well.

The equipment should be provided according to the following specifications:

1. All equipment should be installed with the latest stable Operating System and/or Firmware unless otherwise approved by WSD.   All ports should be full duplex and POE capable.

2. Equipment should be compatible with the existing district network switches (Brocade – see attachment C for specifications) and the existing management system (Brocade Network Advisor)

3. One (1) Layer 3 backbone switch/router for inter-building connections with 1/10 GB capacity for fiber (SFP) links and 10/100/1000 MB speeds for RJ45 ports.

    This unit should have at least eight 1/10 GB capacity fiber ports and at least 24 RJ45 ports with 10/100/1000 MB speeds and Power over Ethernet (POE) capability.

    Be certain to include a fiber module (GBIC or similar) for each 10GB port.

    Protocols to be indicated as available/not available for backbone switches/routers:
    - BGP v4
    - Multiprotocol BGP (for IPv6)
    - OSPF v2
    - OSPF v3
    - Multiprotocol BGP (for IPv6)
    - Multicast Listener Discovery v1
    - Multicast Listener Discovery v2
    - MLD snooping v1
    - MLD snooping v2
    - PIM-DM (IPv4)
    - PIM-SM (IPv4) RFC 4601
    - PIM-SM (IPv6)
    - RIP v1
    - RIP v2
    - RIP ng
    - SNMP v1
    - SNMP v2c
    - SNMP v3
    - Unicast RPF (uRPF) RFC 3704
    - Others as appropriate

4. Sixteen (16) Access Layer 2 48 port POE+ (IEEE 802.3at-2009) stackable switches with 10/100/1000 MB capable RJ45 ports and with at least two 10 GB uplink ports. These are sometimes referred to as access or edge switches.

   Protocols to be indicated as available/not available for edge switches:
   - Multicast Listener Discovery v1
   - Multicast Listener Discovery v2
   - MLD snooping v1
   - MLD snooping v2
   - SNMP v1
   - SNMP v2c
   - SNMP v3
   - LLDP
   - LLDP-MED
   - Others as appropriate

   Be certain to include a fiber module (GBIC or similar) for each 10GB port.

5. The vendor shall provide and install all equipment, materials, cabling, power cables, hardware and labor required to deliver a complete and fully functional infrastructure. Any necessary Local Area Network cabling will be installed separately. (See Network Cable Expansion RFP.)

6. The vendor shall be responsible for the assembly and configuration of all proposed equipment in each of the designated MDF and IDF locations. The vendor shall be responsible for the accuracy of final configuration, testing and documentation for the project.

7. Detailed Visio diagrams should be provided at the end of the project which includes all interconnects for each IDF and the MDF as well as district-wide connections. An inventory spreadsheet will also be provided which includes at the minimum: serial number, make and model, IP address, firmware version and system name. Backup configurations for each switch and a common configuration template for switch types will also be provided.

   - Vendor will train the district Technology Department on all day-to-day operations as well as any additional features of proposed equipment upon installation.

Pre-Proposal Conference
The mandatory Pre-Proposal Conference is Monday, January 25, 2016 at 9:00 AM.   Meet in the Information Technology Services (ITS) office at 1081 Newberg Highway, Woodburn, OR 97071. Any questions related to this meeting can be sent via email at (ffisher@woodburnsd.org and erate@woodburnsd.org) or by phone: **(971) 983-3040.**

ATTACHMENT A

TO: WOODBURN SCHOOL DISTRICT 103 _____/_____/_____

The undersigned hereby proposed to furnish, within the time specific, the several items hereinbefore listed, to be delivered in accordance with the forgoing specifications hereto attached, for the amount set opposite each item.

BIDDERS EMPLOYER'S FEDERAL IDENTIFICATION NUMBER: _____

EQUAL EMPLOYMENT COMPLIANCE REQUIREMENT
By submitting this bid, the undersigned certifies conformance to the applicable Federal Acts, Executive orders, and Oregon Statutes and regulations concerning Affirmative Action toward equal employment opportunities. All information and reports required by the Federal or Oregon State Governments, having responsibility for the enforcement of such laws, shall be supplied to the District upon request for purposes of investigation to ascertain compliance with such acts, regulations, and orders.

ADDENDA: Receipt is hereby acknowledged of Addenda _____, through _____.

Date _____/_____/_____   x_____

Are you domiciled in the State of Oregon? _____Yes _____No

If you are not headquartered in Oregon, do you or your firm receive, or are you or your firm eligible for, any preference in the award of contracts with your state or with government bodies in your state: _____yes _____no

If so, site the law or regulation (legal citation preferred): _____

_____

Percent of Preference _____%   State Preference Received _____
        Providing incorrect information may be grounds for bid rejection or contract cancellation.

SIGNATURE FOR INDIVIDUAL (signed by individual)

Address _____   X_____

City, State _____   _____
                                                  (Print or Type Name)

Zip _____ Telephone_____   Company _____

SIGNATURE FOR PARTNERSHIP (signature of one Partner required)

Names of Partners: (please print)   Name of Partnership:

_____   _____

_____   Address _____

_____   City, State _____

_____   Zip _____ Telephone _____

                                                  X _____

                                                  _____
                                                  (Print or Type Name)

SIGNATURE OF CORPORATION (signatures as indicated)

Address _____   _____
                                                  (Corporate Name)

City, State _____   X _____
                                                  (Signature of Officer or Agent)

Zip _____ Telephone _____   _____
                                                  (Print Name & Title of Officer or Agent)

DESIGNATION OF SUBCONTRACTORS

Copy as needed

WOODBURN SCHOOL DISTRICT

_____   _____

Portion of Work   Subcontractor Location & Place of Business

_____

Proper Name of Bidder

Date: _____ By: _____

Signature of Bidder_____

ATTACHMENT C

Newspaper Advertisement Copy

The purpose of these Request for Proposals (Solicitations) is to obtain competitive Offers from qualified Firms (Proposers) interested in the provision to upgrade portions of our wireless network project to the 802.11ac standard, expand the network cabling infrastructure and/or expand to the network switch infrastructure for new construction.

A MANDATORY pre-proposal conference will be held on Wednesday, January 25, 2016 at 9:00 AM starting at the ITS Office, 1081 Newberg Highway, Woodburn, OR 97071.

Proposers must submit an Offer pursuant to the provisions of this Solicitation electronically to ffisher@woodburnsd.org and erate@woodburnsd.org in PDF format.

SOLICITATION DUE DATE AND TIME (CLOSING)
February 16, 2016 at 4:30 PM PST

No public opening will occur; the number of Offers received, the identity of Proposers, or the contents of any Offer will not be disclosed to the public until all Offers have been evaluated, negotiations completed if required, and a recommendation for Award has been published.

Proposers are solely responsible for ensuring that the District receives its Offer. Late Offers will not be accepted.

Questions and comments regarding this solicitation must be in writing and directed only to the undersigned by email to ffisher@woodburnsd.org and erate@woodburnsd.org

Forrest Fisher, Technology Coordinator

OFFERS SHALL BE PURSUANT TO THE PROVISIONS OF THIS SOLICITATION

THE DISTRICT MAY REJECT ANY OFFER NOT IN COMPLIANCE WITH ALL PRESCRIBED REQUIREMENTS

Specification Sheets on existing Brocade ICX 7450 Switch and Brocade ICX 7250 Switch

BROCADE

DATA SHEET

Brocade ICX 7450 Switch

Highlights

- Provides a unique modular design with three expansion slots for a choice of 1 GbE, 10 GbE, or 40 GbE uplinks, providing ultimate flexibility and "pay as you grow" scalability

- Delivers market-leading stacking scalability with up to 12 switches per stack, 160 Gbps of stacking bandwidth, and long-distance stacking using open-standards QSFP or SFP+ ports to enable single point management across the campus

- Provides OpenFlow support in true hybrid port mode, enabling Software-Defined Networking (SDN) for programmatic control of network data flows

- Offers Power over HDBaseT (PoH), to power video surveillance and video conferencing equipment, VDI terminals, and HD displays directly from the switch

Enterprise Stackable Switch Delivers Premium Capabilities and Ultimate Flexibility

The Brocade® ICX® 7450 Switch delivers the performance, flexibility, and scalability required for enterprise Gigabit Ethernet (GbE) access deployment. It offers market-leading stacking density with up to 12 switches (576 1 GbE and 48 10 GbE ports) per stack and combines chassis-level performance and reliability with the flexibility, cost-effectiveness, and "pay as you grow" scalability of a stackable solution. In addition, this mid-market stackable switch is the first in its class to offer 40 GbE uplinks, enabling enterprises to dramatically increase their network capacity while using their existing optical wire infrastructure.

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

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

Scaling Out Ports as Demand Grows

The Brocade ICX 7450 is easy to deploy, manage, and integrate into both new and existing networks. Organizations can buy only what they need today, and easily scale out as demand grows and new technologies emerge.

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

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

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 deliver:

- **Consolidated management:** Reduces unnecessary network layers to create large HyperEdge management domains that eliminate individual switch touch points, easing maintenance time and costs.
- **Shared network services:** Allows premium and entry-level switches that share a common HyperEdge management domain to also share advanced Layer 2/3 services, achieving lower price-per-port functionality.
- **Scale-out networking:** Integrates high-performance, fixed form-factor switches to create a single logical device that is independent of physical location and allows organizations to scale ports when and where needed across the campus.

Brocade Switch Port Extender Technology: Extending Options and Scalability

Brocade Switch Port Extender* technology, offered for Brocade ICX 7250, 7450, and 7750 Switches, extends network options and scalability. It integrates premium Brocade ICX 7750, midrange Brocade ICX 7450, and entry-level Brocade ICX 7250 Switches, collapsing network access, aggregation, and core layers into a single HyperEdge domain. This domain shares network services while reducing management touch points and network hops through a single-layer design spanning the entire campus network. These powerful deployments deliver equivalent or better functionality than large, rigid modular chassis systems, but with significantly lower costs and smaller carbon footprints.

Brocade ICX switches support Distributed Chassis deployment models that use standards-based optics and cabling interface connections to help ensure maximum distance between campus switches—up to 80 km—and minimum cabling costs—up to 50 percent less than incumbent solutions. This gives organizations the flexibility to deliver ports wherever they are needed on campus at a fraction of the cost.

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

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

Brocade Ethernet switch stacking technology makes it possible to stack up to 12 Brocade ICX 7450 Switches together into a single logical switch using standard QSFP+ or SFP+ stacking ports. This allows the Brocade ICX 7450 to deliver a class-leading 160 Gbps of backplane bandwidth and offer simple and robust expandability for future growth at the network edge (see Figure 1).

A selection of standard QSFP+ or SFP+ copper cables or standard QSFP+ or SFP+ optics can be used to stack Brocade ICX 7450 Switches together, enabling stacking over distance and thereby eliminating the need for stacked switches to be colocated in the same wiring closet. This stacked logical switch also has only a single IP address to simplify management and offers transparent STP-free traffic forwarding and shared Link Aggregation Groups (LAG) across a pool of up to 576 1 GbE ports and 48 10 GbE ports. When new switches join the stack, they automatically inherit the stack's existing configuration file, enabling true plug-and-play network expansion.

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

Figure 1: Up to 12 Brocade ICX 7450 switches can be stacked together using two full-duplex QSFP+ 40 Gbps ports that provide a fully redundant backplane with 160 Gbps of stacking bandwidth.

Simplified Open Standards-Based Management and Monitoring

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

sFlow-based "Always-On" Network Monitoring

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

BROCADE ICX 7450 SWITCH AND CONTROLLER INTEROPERABILITY

The Brocade ICX 7450 Switch operates seamlessly under the Brocade Vyatta* Controller. This controller is a quality-assured edition of the OpenDaylight controller code supported by an established networking provider and its leaders within the OpenDaylight community.

Table 1: Brocade ICX 7450 models.

Brocade ICX 7450 Product Family

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

Brocade ICX 7450-24 Switch	24×10/100/1000 Mbps RJ-45 ports
Brocade ICX 7450-24P Switch	24×10/100/1000 Mbps RJ-45 PoE+ ports with eight pre-assigned ports supporting PoH (95 W)
Brocade ICX 7450-48 Switch	48×10/100/1000 Mbps RJ-45 ports
Brocade ICX 7450-48P Switch	48×10/100/1000 Mbps RJ-45 PoE+ ports with eight pre-assigned ports supporting PoH (95 W)
Brocade ICX 7450-48F Switch	48×100/1000 Mbps SFP ports

Figure 2: Brocade ICX 7450-48 shown with optional Brocade ICX7400-4X10GC module.

Figure 3: Brocade ICX 7450-24P shown with optional Brocade ICX7400-1X40GQ QSFP+ module.

Figure 4: Brocade ICX 7450-48F shown with optional Brocade ICX7400-4X10GF SFP+ module.

Figure 5: Brocade ICX 7450 rear view shown with two optional Brocade ICX7400-1X40GQ QSFP+ uplink/stacking modules, two AC power supplies, and two fan trays.

* The Brocade ICX7400-1X40GQ module cannot be installed in the front-facing slot of the 48-port Brocade ICX 7450 models (Brocade ICX 7450-48, 7450-48P, 7450-48F). The Brocade ICX7400-4X1GF module cannot be installed in the rear slots of any model of the Brocade ICX 7450 Switch.

Simplified, Automated Deployment with Auto-Configuration

The Brocade ICX 7450 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 7450 includes an industry-standard Command Line Interface (CLI) and supports Secure Shell (SSHv2), Secure Copy (SCP), and SNMPv3 to restrict and encrypt management communications to the system. In addition, support for Terminal Access Controller Access Control System (TACACS/TACACS+) and RADIUS authentication helps ensure secure operator access.

Out-of-Band Management

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

SDN-Enabled Programmatic Control of the Network

Software-Defined Networking (SDN) is a powerful new network paradigm designed for the world's most demanding networking environments and promises breakthrough levels of customization, scale, and efficiency. The Brocade ICX 7450 enables SDN by supporting the OpenFlow 1.3 protocol , which allows communication between an OpenFlow controller and an OpenFlow-enabled switch. Using this approach, organizations can control their networks programmatically, transforming the network into a platform for innovation through new network applications and services.

The Brocade ICX 7450 delivers OpenFlow in true hybrid port mode, which allows organizations to simultaneously deploy traditional Layer 2/3 forwarding with OpenFlow on the same port. This unique capability provides a pragmatic path to SDN by enabling network administrators to progressively integrate OpenFlow into existing networks, giving them the programmatic control offered by SDN for specific flows while the remaining traffic is forwarded as before. Brocade ICX 7450 hardware support for OpenFlow enables organizations to apply these capabilities at line rate.

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

Brocade ICX 7450 Port Module Options

Four different optional port modules are offered for the Brocade ICX 7450. These modules are interchangeable and can be installed in the three modular slots within the Brocade ICX 7450.*

Brocade ICX7400-4X1GF Module	4-port 100 Mbps/1 GbE SFP
Brocade ICX7400-4X10GF Module	4-port 1/10 GbE SFP/SFP+ for uplink or stacking
Brocade ICX7400-4X10GC Module	4-port 1/10 GbE 10GBASE-T copper
Brocade ICX7400-1X40GQ Module	1-port 40 GbE QSFP+ for uplink or stacking

Figure 6: Four different optional port modules are offered for the Brocade ICX 7450 with a choice of 1 GbE SFP, 10 GbE SFP/SFP+, 10GBASE-T, and 40 GbE QSFP+ options.

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

Brocade ICX 7450 Power Supply Options

The Brocade ICX 7450 offers a selection of PoE/non-PoE and AC/DC power supply options with front-to-back or back-to-front airflow cooling options. The DC power supply can be installed in either PoE or no-PoE switches.

RPS15-E power supply	Non-PoE 250 W AC with front-to-back airflow
RPS15-I power supply	Non-PoE 250 W AC with back-to-front airflow
RPS16-E power supply	PoE 1,000 W AC with front-to-back airflow
RPS16-I power supply	PoE 1,000 W AC with back-to-front airflow
RPS16DC-E power supply	PoE 510 W DC with front-to-back airflow
RPS16DC-I power supply	PoE 510 W DC with back-to-front airflow

Figure 7: The Brocade ICX 7450 offers a choice of 250 W AC, 1,000 W AC, or 510 W DC power supply options. All power supplies are available with front-to-back or back-to-front airflow.

Unified Wired/Wireless Network Management with Brocade Network Advisor

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

To reduce complexity and the time spent managing these environments, the easy-to-use Brocade Network Advisor discovers, manages, and deploys configurations to groups of IP devices. By using Brocade Network Advisor, organizations can configure Virtual LANs (VLANs) within the network, manage wireless access points, and execute commands on specific IP devices or groups of IP devices. sFlow-based proactive monitoring is ideal for performing network-wide troubleshooting, generating traffic reports, and gaining visibility into network activity from the edge to the core. Brocade Network Advisor centralizes management of the entire family of Brocade wired products and Aruba wireless products.

EEE Power Savings

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

Enterprise-Class Availability

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

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

Support for PoH to Power Next-Generation Edge Devices

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

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

Full Layer 3 Capabilities

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

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

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

Warranty

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

Maximum Operational Efficiency and Investment Protection

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

Brocade Global Services

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

Affordable Acquisition Options

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

Maximizing Investments

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

Brocade ICX 7450 Feature / Model Comparison

	24 or 48 RJ-45 Ports		48 SFP Ports	24 or 48 PoE+ Ports	
	Brocade ICX 7450-24	Brocade ICX 7450-48	Brocade ICX 7450-48F	Brocade ICX 7450-24P	Brocade ICX 7450-48P
Switching capacity (data rate, full duplex)	288 Gbps	336 Gbps	336 Gbps	288 Gbps	336 Gbps
Forwarding capacity (data rate, full duplex)	214 Mpps	250 Mpps	250 Mpps	214 Mpps	250 Mpps
Fixed ports: 10/100/1000 Mbps RJ45	24	48		24	48
Fixed ports: 100/1000 Mbps SFP			48		
Modular slots	3	3	3	3	3
Modular ports: 1 GbE SFP (max.)	4	4	4	4	4
Modular ports: 1/10 GbE SFP/SFP+ (max.)	12	12	12	12	12
Modular ports: 1/10GBASE-T RJ45 (max.)	12	12	12	12	12
Modular ports: 40 GbE QSFP+ (max.)	3	2	2	3	2
Maximum PoE Class 3 ports				24 (1 AC PSU)	48 (1 AC PSU)
Maximum PoE+ ports				24 (1 AC PSU)	48 (2 AC PSU)
Maximum PoH ports				8 (1 AC PSU)	8 (1 AC PSU)
Advanced IPv4/v6 L3 routing (RIP, OSPF, BGP)	With license	With license	With license	With license	With license
Stacking bandwidth (data rate, full duplex)	160 Gbps	160 Gbps	160 Gbps	160 Gbps	160 Gbps
Stacking density (maximum switches in a stack)	12	12	12	12	12
Maximum stacking distance (distance between stacked switches)	10 Km	10 Km	10 Km	10 Km	10 Km
Power					
Power inlet (AC)			C14		
Input voltage / frequency			AC: 100 to 240 VAC @ 50 to 60 Hz | DC: 40 to 60 VDC		
Power supply rated maximum (AC)	2×250 W	2×250 W	2×250 W	2×1,000 W	2×1,000 W
Power supply rated maximum (DC)	2×510 W	2×510 W	2×510 W	2×510 W	2×510 W
PoE power budget (AC) (two AC power supplies)				1,500 W	1,500 W
PoE power budget (DC) (two DC power supplies)				516 W	516 W
Switch power utilization[*] (25°C) Idle (no PoE load) 10% traffic[‡] (full PoE load) 100% traffic[‡] (full PoE load)	63 W 64 W 69 W	93 W 95 W 100 W	119 W 120 W 123 W	75 W 911 W 916 W	106 W 930 W 935 W
Switch heat dissipation[*], [§] (25°C) Idle (no PoE load) 10% traffic[‡] (full PoE load) 100% traffic[‡] (full PoE load)	215 BTU/hr 218 BTU/hr 235 BTU/hr	317 BTU/hr 324 BTU/hr 341 BTU/hr	406 BTU/hr 409 BTU/hr 420 BTU/hr	256 BTU/hr 259 BTU/hr 276 BTU/hr	362 BTU/hr 369 BTU/hr 386 BTU/hr
Environment					
Weight[*]	6.4 kg (13.95 lb)	6.6 kg (14.55 lb)	6.8 kg (14.99 lb)	6.9 kg (15.21 lb)	7.2 kg (15.87 lb)
Dimensions			440 mm (17.323 in.) W × 393.7 mm (15.5 in.) D × 43.7 mm (1.720 in.) H; 1U		
Acoustics[*] (25°C, ISO 7779)	46 dBA	47 dBA	46 dBA	49 dBA	49 dBA
MTBF[*] (25°C)	399,973 hours	376,635 hours	330,154 hours	317,719 hours	297,862 hours

[*] Switch includes one AC power supply, one fan, one 4×10 GbE SFP+ uplink module, two QSFP+ stacking modules.

[‡] Traffic load on all ports connected with maximum possible PoE/PoE+ loads (if equipped).

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

Brocade ICX 7450 Specifications

Specifications

Connector options	• 10/100/1,000 ports: RJ-45 • 100 Mbps SFP ports: 100BASE-FX • 1 Gbps SFP ports: SX, LX, LHA, BXU, BXD • 10 Gbps SFP+ ports: USR, SR, LR, ER, ZR, LRM • 40 Gbps QSFP+ ports: SR4, LR4, direct-attached copper cables for stacking • Out-of-band Ethernet management: 10/100/1000 Mbps RJ-45 • Console management: Mini-USB serial port (Mini-B plug) • Storage: USB port, standard-A plug (available in a future software release) • For the latest information about supported optics, please visit www.brocade.com/Optics.
Maximum MAC addresses	32,000
Maximum VLANs	4,096
Maximum STP (spanning trees)	254
Maximum routes (in hardware)	16,000 (IPv4) 3000 (IPv6)
Trunking	Maximum ports per trunk: 8 Maximum trunk groups: 124
Maximum jumbo frame size	9,216 bytes
QoS priority queues	8 per port
Layer 2 switching	• 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 • 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 IP routing	• IPv4 and IPv6 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

Premium Layer 3 IP routing (with software license)	• IPv4 and IPv6 dynamic routes • RIP v1/v2, RIPng (IPv6) • OSPF v2, OSPF v3 (IPv6) • PIM-SM, PIM-SSM, PIM-DM, PIM passive (IPv4/IPv6 multicast routing functionality) • PBR • Virtual Route Redundancy Protocol (VRRP) • VRRP-E, VRRP-E (IPv6) • VRRPv3 (IPv6) • BGP4, BGP4+(IPv6) • GRE • IPv6 over IPv4 tunnels • VRF (IPv4 and IPv6)
SDN features	• Support for OpenFlow v1.0 and v1.3 • OpenFlow support with true hybrid port mode • Operates seamlessly under the Brocade Vyatta* Controller
Metro features	• Metro-Ring Protocol (MRP) (v1, v2) • Virtual Switch Redundancy Protocol (VSRP) • VLAN Stacking (Q-in-Q) • VRRP • Topology Groups
Quality of Service (QoS)	• 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 (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) • 802.3ba 40 Gbps Ethernet • 802.1AE- MACsec (With License) • 802.3az-2010 - EEE • 802.1Q VLAN Tagging
RFC standards compliance	For a complete list of RFCs supported by the Brocade FastIron* software platform, please visit www.brocade.com/FastIronRFC.
Traffic management	• 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 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 unitsx

Network and Device Management

Management	• Auto Configuration • 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 • 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 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 • Multiple Syslog Servers
Security	• 802.1X Accounting • MAC Authentication • DHCP snooping • Dynamic ARP Inspection • Bi-level Access Mode (Standard and EXEC Level) • EAP pass-through support • IEEE 802.1X username export in sFlow • Protection against Denial of Service (DoS) attacks • Authentication, Authorization, and Accounting (AAA) • Advanced Encryption Standard (AES) with SSHv2 • RADIUS/TACACS/TACACS+ • Secure Copy (SCP) • Secure Shell (SSHv2) • Username/Password • Web authentication • Change of Authorization (CoA) RFC 5176 • Flexible authentication

Environment

Temperature	Operating temperature: –5°C to 50°C/23°F to 122°F Storage temperature: –25°C to 70°C/–13°F to 158°F
Humidity	Operating relative humidity: 5% to 95% at 50°C, non-condensing Non-operating relative humidity: 5% to 95% at 70°C, non-condensing
Altitude	Operating altitude: 10,000 ft. (3,000 m) maximum Storage altitude: 39,000 ft. (12,000 m) maximum

Compliance/Certification

Electromagnetic emissions	FCC Class A (Part 15); EN 55022/CISPR-22 Class A; VCCI Class A; ICES-003 Electromagnetic Emission; AS/NZS 55022; EN 61000-3-2 Power Line Harmonics; EN 61000-3-3 Voltage Fluctuation and Flicker; EN 61000-6-3 Emission Standard (supersedes: EN 50081-1)
Safety	CAN/CSA-C22.2 NO. 60950-1-07; UL 60950-1 Second Edition; IEC 60950-1 Second Edition; EN 60950-1:2006 Safety of Information Technology Equipment; EN 60825-1 Safety of Laser Products—Part 1: Equipment Classification, Requirements and User's Guide; EN 60825-2 Safety of Laser Products—Part 2: Safety of Optical Fibre Communication Systems
Immunity	EN 61000-6-1 Generic Immunity and Susceptibility (supersedes EN 50082-1); EN 55024 Immunity Characteristics (supersedes EN 61000-4-2 ESD); EN 61000-4-3 Radiated, Radio Frequency, Electromagnetic Field; EN 61000-4-4 Electrical Fast Transient; EN 61000-4-5 Surge; EN 61000-4-6 Conducted Disturbances Induced by Radio-Frequency Fields; EN 61000-4-8 Power Frequency Magnetic Field; EN 61000-4-11 Voltage Dips and Sags
Environmental regulatory compliance	RoHS-compliant (6 of 6); WEEE-compliant
Vibration	IEC 68-2-36, IEC 68-2-6
Shock and drop	IEC 68-2-27, IEC 68-2-32

Brocade ICX 7450 Ordering Information

Part Number	Description
Switch Bundles	
ICX7450-24-E	24-port 1 GbE switch bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×250 W AC power supply and one fan, front-to-back airflow
ICX7450-24P-E	24-port 1 GbE switch PoE+ bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow
ICX7450-48-E	48-port 1 GbE switch bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×250 W AC power supply and one fan, front-to-back airflow
ICX7450-48P-E	48-port 1 GbE switch PoE+ bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow
ICX7450-48P-STK-E	48-port 1 GbE switch PoE+ bundle includes 2×40 GbE QSFP+ uplinks/stacking, 1×1,000 W AC power supply and one fan, front-to-back airflow (stack member with no uplink module)
ICX7450-48F-E	48-port 1 GbE SFP fiber switch bundle includes 4×10 GbE SFP+ uplinks/stacking, 2×40 GbE QSFP+ uplinks/stacking, 1×250 W AC power supply and one fan, front-to-back airflow
Bare Switches	
ICX7450-24	24-port 1 GbE switch with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-24P	24-port 1 GbE switch PoE+ with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-48	48-port 1 GbE switch with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-48P	48-port 1 GbE switch PoE+ with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
ICX7450-48F	48-port 1 GbE switch SFP with three modular slots for optional uplink/stacking ports. Power supplies, fans, and modules need to be ordered separately.
Port Modules	
ICX7400-4X1GF	Brocade ICX 7450 4-port 100 Mbps/1 GbE SFP module
ICX7400-4X10GF	Brocade ICX 7450 4-port 1/10 GbE SFP/SFP+ module (for stacking or uplinks)
ICX7400-4X10GC	Brocade ICX 7450 4-port 1/10 GbE 10GBASE-T copper module
ICX7400-1X40GQ	Brocade ICX 7450 1-port 40 GbE QSFP+ module (for stacking or uplink)

Power Supplies and Fans

RPS15-E	Brocade ICX 7450/6610 non-PoE 250 W AC power supply with front-to-back airflow
RPS15-I	Brocade ICX 7450/6610 non-PoE 250 W AC power supply with back-to-front airflow
RPS16-E	Brocade ICX 7450/6610 PoE 1,000 W AC power supply with front-to-back airflow
RPS16-I	Brocade ICX 7450/6610 PoE 1,000 W AC power supply with back-to-front airflow
RPS16DC-E	Brocade ICX 7450/6610 510 W DC power supply with front-to-back airflow
RPS16DC-I	Brocade ICX 7450/6610 510 W DC power supply with back-to-front airflow
ICX-FAN10-E	Brocade ICX 7450/6610 front-to-back airflow fan
ICX-FAN10-I	Brocade ICX 7450/6610 back-to-front airflow fan

Feature License and Accessories

ICX7450-PREM-LIC	Brocade ICX 7450 Layer 3 Premium Software License
ICX-MACSEC-LIC	License to enable MACsec encryption
ICX7000-RMK	FRU, rack mount kit, two post, Brocade ICX 7750/7450
XBR-R000295	FRU, rack mount kit, four post, 24 in. to 32 in. depth rack
BR-NTWADV-IP-BASE	Brocade Network Advisor IP management software license for up to 50 devices; required for initial purchase of IP only management; minimum of one year of support required.

Optics

E1MG-100FX-OM	100BASE-FX SFP optic MMF, LC connector, optical monitoring capable
E1MG-100FX-IR-OM	100BASE-FX IR SFP optic for SMF with LC connector, optical monitoring capable. For distances up to 15 km.
E1MG-100FX-LR-OM	100BASE-FX LR SFP optic for SMF with LC connector, optical monitoring capable. For distances up to 40 km.
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-T	1000BASE-LHA SFP optic, SMF, LC connector, optical monitoring capable
E1MG-BXU	1000BASE-BXU SFP optic SMF, transmits at 1,310 nm and receives at 1,490 nm, LC connector, single-strand SMF fiber
E1MG-BXD	1000BASE-BXD SFP optic SMF, transmits at 1,490 nm and receives at 1,310 nm, LC connector, single-strand SMF fiber
10G-SFPP-USR	10GE USR SFP+ optic (LC), target range 100 m over MMF, 1-pack
10G-SFPP-SR	10GBASE-SR, SFP+ optic (LC), target range 300 m over MMF
10G-SFPP-LR	10GBASE-LR, SFP+ optic (LC), for up to 10 km over SMF
10G-SFPP-ER	10GBASE-ER SFP+ optic (LC), for up to 40 km over SMF
10G-SFPP-ZR	10GBASE-ZR SFP+ optic (LC), for up to 80 km over SMF
10G-SFPP-LRM	10GBASE-LRM, 1,310 nm SFP+ optic (LC), TAR
40G-QSFP-SR4	40GBASE-SR4 QSFP+ optic (MTP 1×8 or 1×12), 100 m over MMF, 1-pack
40G-QSFP-LR4	40GBASE-LR4 QSFP+ optic (LC), for up to 10 km over SMF, 1-pack

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Direct-Attached Cables

40G-QSFP-C-00501	40 GbE QSFP+ direct-attached copper cable, 0.5 m, 1-pack, passive
40G-QSFP-C-00508	40 GbE QSFP+ direct-attached copper cable, 0.5 m, 8-pack, passive
40G-QSFP-C-0101	40 GbE QSFP+ direct-attached copper cable, 1 m, 1-pack, passive
40G-QSFP-QSFP-C-0101	40 GbE QSFP+ direct-attached QSFP+ to QSFP+ active copper cable, 1 m, 1-pack
40G-QSFP-QSFP-C-0301	40 GbE QSFP+ direct-attached QSFP+ to QSFP+ active copper cable, 3 m, 1-pack
40G-QSFP-QSFP-C-0501	40 GbE QSFP+ direct-attached QSFP+ to QSFP+ active copper cable, 5 m, 1-pack
10G-SFPP-TWX-0101	Direct-attached SFP+ copper cable, 1 m, 1-pack, active
10G-SFPP-TWX-0301	Direct-attached SFP+ copper cable, 3 m, 1-pack, active
10G-SFPP-TWX-0501	Direct-attached SFP+ copper cable, 5 m, 1-pack, active

Ordering Instructions

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

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

BROCADE

BROCADE

Brocade ICX 7250 Switch

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

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

HIGHLIGHTS

- Offers enterprise-class stackable switching at an entry-level price, allowing organizations to buy what they need now and easily scale Brocade HyperEdge Architecture as demand grows and new technologies emerge

- Future-proofs campus networks via flexible stacking, software licensing of 1 GbE to 10 GbE ports, Brocade Switch Port Extender, and future upgrades to OpenFlow support* in true hybrid port mode, enabling Software-Defined Networking (SDN) for programmatic network control

- Enables enterprise-class manageability with up to 8×10 GbE ports for stacking or uplinks

- Delivers market-leading stacking scalability with up to 12 switches per stack, 80 Gbps of stacking bandwidth, and long-distance stacking using open standards

- Offers full Power over Ethernet (PoE+) to power wireless access points, video surveillance and video conferencing equipment, VDI terminals, and HD displays directly from the switch

- Includes the Brocade Assurance Limited Lifetime Warranty and three years of technical support

Premium Performance in an Entry-Level Switch

The Brocade ICX 7250 Switch provides enterprise-class stackable LAN switching solutions to meet the growing demands of campus networks. Designed for small to medium-size enterprises, branch offices, and distributed campuses, these intelligent, scalable edge switches deliver enterprise-class functionality at an affordable price—without compromising performance and reliability. The Brocade ICX 7250 is available in 24- and 48-port 10/100/1000 Mbps models with 1 GbE or 10 GbE dual-purpose uplink/stacking ports—with or without PoE and PoE+—to support enterprise edge networking, wireless mobility, and IP communications without the need for additional power outlets or power injectors.

The new Brocade Switch Port Extender* technology extends the capabilities of the Brocade HyperEdge® Architecture while maximizing the value of Brocade ICX

7250 Switches. It enables the Brocade ICX 7250 to extend ports in combination with Brocade ICX 7450 and 7750 Switches, creating a complete campus network solution with consolidated management across aggregation and core layers, shared network services—adding advanced Layer 3 capabilities to all switches—and scale-out flexibility to expand port density as needed (see Figure 1). The Brocade ICX 7250 with Switch Port Extender provides an ideal network access solution for the campus network.

Scaling Out Ports and Services as Demand Grows

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

*Support to be available in a future release.

Brocade stacking technology makes it easy to scale ports by stacking up to 12 Brocade ICX 7250 Switches into a single logical switch. This allows the Brocade ICX 7250 to provide a class-leading 80 Gbps of backplane bandwidth as well as simple and robust expandability for future growth at the network edge (see Figure 2). In addition, this stacked switch has only a single IP address to simplify management and offers transparent forwarding across a pool of up to 576×1 GbE ports and 96×10 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.

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

Switch Port Extender Technology: Extending Options and Scalability

Brocade Switch Port Extender technology, offered for Brocade ICX 7250, 7450, and 7750 Switches, extends network options and scalability. It integrates premium Brocade ICX 7750, midrange Brocade ICX 7450, and entry-level Brocade ICX 7250 Switches, collapsing network access, aggregation, and core layers into a single HyperEdge domain. This domain shares network services while reducing management touch points and network hops through a single-layer design spanning the entire campus network.

Brocade ICX 7250 Switches

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

Brocade ICX 7250-24G	24×10/100/1000 Mbps RJ-45 ports
	4×1 GbE uplink ports
	Not upgradable
	Premium Layer 3 licenses not applicable
Brocade ICX 7250-24	24×10/100/1000 Mbps RJ-45 ports
	8×1 GbE uplink/stacking ports
	Upgradable to 10 GbE
Brocade ICX 7250-24P	24×10/100/1000 Mbps RJ-45 PoE+ ports
	360 W PoE budget
	8×1 GbE uplink/stacking ports
	Upgradable to 10 GbE
Brocade ICX 7250-48	48×10/100/1000 Mbps RJ-45 ports
	8×1 GbE uplink/stacking ports
	Upgradable to 10 GbE
Brocade ICX 7250-48P	48×10/100/1000 Mbps RJ-45 PoE+ ports
	720 W PoE budget
	8×1 GbE uplink/stacking ports
	Upgradable to 10 GbE

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

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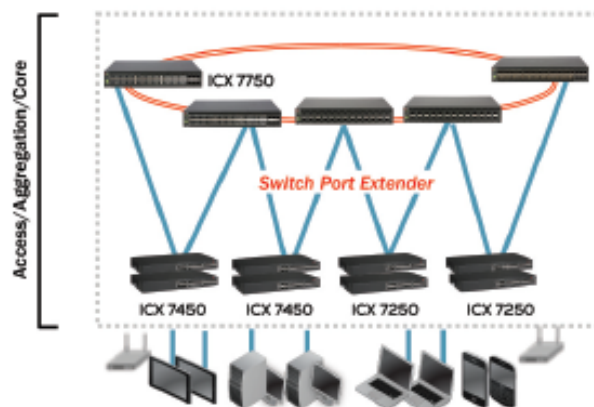

Figure 1: Brocade Switch Port Extender technology.

Figure 2: Up to 12 Brocade ICX 7250 Switches can be stacked together using up to four full-duplex SFP+ 10 Gbps ports for a fully redundant backplane with 80 Gbps of stacking bandwidth.

Full Layer 3 Capabilities

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

Power to Spare

The Brocade ICX 7250 can deliver both power and data across network connections, supporting Power over Ethernet (PoE/PoE+) standards and providing a single-cable solution for edge devices, such as wireless access points, VoIP phones, video surveillance equipment, and VDI thin terminals. Carrying data and power through a single Ethernet wire reduces the number of power receptacles and power adapters while increasing reliability and wiring flexibility. The Brocade ICX 7250-24P provides 360 watts and can deliver PoE power to all 24 ports, while the Brocade ICX 7250-48P provides 720 watts and can deliver PoE+ power for up to 12 or 24 ports. Both switches can provide PoE and PoE+ (30 watts) power to all ports when an external power supply is deployed.

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

EEE Power Savings

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

Enterprise-Class Availability

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

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

Simplified, Open-Standards-Based Management and Monitoring

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

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 deliver:

- Consolidated management: Reduces unnecessary network layers to create large HyperEdge management domains that eliminate individual switch touch points, easing maintenance time and costs.
- Shared network services: Allows premium and entry-level switches that share a common HyperEdge management domain to also share advanced Layer 2/3 services, achieving lower price-per-port functionality.
- Scale-out networking: Integrates high-performance, fixed form-factor switches to create a single logical device that is independent of physical location and allows organizations to scale ports when and where needed across the campus.

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

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

sFlow-based "Always-On" Network Monitoring

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

Simplified, Automated Deployment with Auto-Configuration

The Brocade ICX 7250 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. They also can automatically receive a software update to be at the same code revision as currently installed switches.

Open-Standards Management

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

SDN-Enabled Programmatic Control of the Network

Software-Defined Networking (SDN) is a powerful new network paradigm designed for the world's most demanding networking environments and promises breakthrough levels of customization, scale, and efficiency. The Brocade ICX 7250 enables SDN by supporting the OpenFlow 1.3 protocol,* which

allows communication between an OpenFlow controller and an OpenFlow-enabled switch. Using this approach, organizations can control their networks programmatically, transforming the network into a platform for innovation through new network applications and services.

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

Plug-and-Play Operations for Powered Devices

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

Unified Wired/Wireless Network Management with Brocade Network Advisor

Managing enterprise campus networks continues to become more complex due to the growth in services that rely on wired

*Support to be available in a future release.

and wireless networks. Services such as Internet, e-mail, video conferencing, real-time collaboration, and distance learning all have specific configuration and management requirements. At the same time, organizations face increasing demand to provide uninterrupted services for high-quality voice and UC, wireless mobility, and multimedia applications.

To reduce complexity and the time spent managing these environments, the easy-to-use Brocade Network Advisor discovers, manages, and deploys configurations to groups of IP devices. By using Brocade Network Advisor, organizations can configure Virtual LANs (VLANs) within the network, manage wireless access points, and execute commands on specific IP devices or groups of IP devices. sFlow-based proactive monitoring is ideal for performing network-wide troubleshooting, generating traffic reports, and gaining visibility into network activity from the edge to the core. Brocade Network Advisor centralizes management of the entire family of Brocade wired products and Aruba wireless products.

Data Center ToR Server Connectivity

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

Warranty

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

Best-in-Class Support

The Brocade ICX 7250 Switch is supported by next-business-day advance replacement where available, as well as software defect repairs and maintenance updates. In an effort to further improve service levels and operational efficiency, Brocade includes three years of technical support for Brocade ICX 7250 Switches, providing direct access to the Brocade Technical Assistance Center during normal 8×5 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.

Affordable Acquisition Options

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

Maximizing Investments

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

BROCADE ICX 7250 SWITCH AND CONTROLLER INTEROPERABILITY

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

'Support to be available in a future release.

Brocade ICX 7250 Feature/Model Comparison

	24 RJ-45 Ports	24 or 48 Ports Non-PoE		24 or 48 PoE+ Ports	
	Brocade ICX 7250-24G	Brocade ICX 7250-24	Brocade ICX 7250-48	Brocade ICX 7250-24P	Brocade ICX 7250-48P
Switching capacity (data rate, full duplex)	128 Gbps	208 Gbps	256 Gbps	208 Gbps	256 Gbps
Forwarding capacity (data rate, full duplex)	96 Mpps	154 Mpps	190 Mpps	154 Mpps	190 Mpps
Fixed ports: 10/100/1000 Mbps RJ-45	24	24	48	24	48
Fixed ports: 100/1000 Mbps SFP	4				
Fixed ports: 1/10 Gbps SFP+ (10 GbE SPF+ optional upgrade license)		8	8	8	8
Maximum PoE Class 3 ports (internal AC power supply only)	N/A	N/A	N/A	24	48
Maximum PoE+ ports (internal AC power supply only)	N/A	N/A	N/A	12	24
Maximum PoE+ ports (with external power supply)	N/A	N/A	N/A	24	48
Advanced IPv4/v6 L3 routing (RIP, OSPF)	N/A	with license	with license	with license	with license
Stacking bandwidth (data rate, full duplex)	N/A	80 Gbps	80 Gbps	80 Gbps	80 Gbps
Stacking density (maximum switches in a stack)	N/A	12	12	12	12
Maximum stacking distance (distance between stacked switches)	N/A	10 km	10 km	10 km	10 km
Power					
Power inlet (AC)			C14		
Input voltage/frequency	AC: 100 to 240 VAC ⏀ 50 to 60 Hz		DC: 40 to 60 VDC		
Power supply rated maximum (AC)	135 W	135 W	135 W	525 W	880 W
PoE power budget (AC) (internal AC power supply only)	N/A	N/A	N/A	360 W	720 W
Switch power consumption (25°C) Idle (no PoE load)	33.6 W	42.6 W	50.64 W	50 W	66 W
10% traffic¹ (full PoE load)	42.6 W	51.6 W	63.55 W	63 W	84 W
100% traffic¹ (full PoE load)	44.4 W	57.6 W	69.51 W	73 W	96 W
Airflow	front-to-back	side-to-back	side-to-back	side-to-back	side-to-back
Switch heat dissipation (25°C)² Idle (no PoE load)	114.6 BTU/Hr	145.3 BTU/Hr	172.7 BTU/Hr	170.6 BTU/Hr	225.2 BTU/Hr
10% traffic¹ (full PoE load)	145.3 BTU/Hr	176.06 BTU/Hr	216.8 BTU/Hr	214.9 BTU/Hr	286.6 BTU/Hr
100% traffic¹ (full PoE load)	151.4 BTU/Hr	196.5 BTU/Hr	237.1 BTU/Hr	249.08 BTU/Hr	327.5 BTU/Hr

[1] Traffic load on all ports connected with maximum possible PoE/PoE+ loads (if equipped). PoE power delivered to powered devices not included.
[2] PoE power not included in switch heat dissipation figures since the heat is not dissipated at the switch.

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Brocade ICX 7250 Feature/Model Comparison (Continued)

Environment

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

Brocade ICX 7250 Specifications

Specifications

Connector options	• 10/100/1000 ports: RJ-45
	• 1 Gbps SFP ports (Brocade ICX 7250-24G only)
	• 1/10 Gbps SFP+ ports (not available on Brocade ICX 7250-24G)
	• Out-of-band Ethernet management: 10/100/1000 Mbps RJ-45
	• Console management: Mini-USB serial port (Mini-B plug)
	• File transfer: USB port (Standard-A plug)
	For the latest information about supported optics, please visit www.Brocade.com/Optics.
Maximum MAC addresses	16,000
Maximum VLANs	4,095
Maximum STP (spanning trees)	254
Maximum routes (in hardware)	12,000
Trunking	16
Maximum jumbo frame size	9,216 bytes
Average latency	1.5 µs
QoS Priority Queues	8
Layer 2 switching	• 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

Brocade ICX 7250 Specifications (Continued)

Layer 2 switching (Continued)	• MAC-Layer Filtering • MAC Learning Disable • MLD Snooping (v1/v2) • Multi-device Authentication • Per-VLAN Spanning Tree (PVST/PVST+/PVRST) • Mirroring—Port-based, ACL-based, MAC Filter-based, and VLAN-based • PIM-SM v2 Snooping • Port Loop Detection • Private VLAN • 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 IP routing	• IPv4 and IPv6 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
Premium Layer 3 IP routing	• IPv4 and IPv6 dynamic routes • RIP v1/v2 • OSPF v2 • Virtual Route Redundancy Protocol (VRRP) • VRRP-E • IPv6 over IPv4 tunnels • VRF (IPv4 and IPv6) • PIM-SM, PIM-SSM, PIM-DM, PIM passive (IPv4/IPv6 multicast routing functionality)* • OSPF v3* • VRRP v3* • RIPng*
SDN features*	• Support for OpenFlow v1.0 and v1.3 (future) • OpenFlow support with true hybrid port mode • Operates seamlessly under the Brocade Vyatta Controller
Metro features	• Metro-Ring Protocol MRP (v1, v2) • Virtual Switch Redundancy Protocol (VSRP) • VLAN Stacking (Q-In-Q) • VRRP • Topology Groups

*Support to be available in a future release.

Brocade ICX 7250 Specifications (Continued)

Quality of Service (QoS)	• 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 (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) • 802.3az-2010 - EEE • 802.1Q VLAN Tagging
RFC standards compliance	• For a complete list of RFCs supported by the Brocade Fastiron® software platform, please visit www.brocade.com/fastironrfc.
Traffic management	• 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	• 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

Brocade ICX 7250 Specifications (Continued)

Network and Device Management

Management	• Auto Configuration • Configuration Logging • Digital Optical Monitoring • Display Log Messages on Multiple Terminals • Embedded Web Management
Management (Continued)	• 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 • 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 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 • Multiple Syslog Servers

Brocade ICX 7250 Specifications (Continued)

Security	• 802.1X Accounting • MAC Authentication • DHCP snooping • Dynamic ARP Inspection • Bi-level Access Mode (Standard and EXEC Level) • EAP pass-through support • IEEE 802.1X username export in sFlow • Protection against Denial of Service (DoS) attacks • Authentication, Authorization, and Accounting (AAA) • Advanced Encryption Standard (AES) with SSHv2 • RADIUS/TACACS/TACACS+ • Secure Copy (SCP) • Secure Shell (SSHv2) • Username/Password • Web authentication • Change of Authorization (CoA) RFC 5176 • Flexible authentication

Environment

Temperature	• Operating temperature: –5°C to 50°C/23°F to 122°F • Storage temperature: –25°C to 70°C/–13°F to 158°F
Humidity	• Operating relative humidity: 5% to 95% at 50°C, non-condensing • Non-operating relative humidity: 0% to 95% at 70°C, non-condensing
Altitude	• Operating altitude: 10,000 ft (3,000 m) maximum • Storage altitude: 39,000 ft (12,000 m) maximum

Compliance/Certification

Electromagnetic emissions	FCC Class A (Part 15); EN 55022/CISPR-22 Class A; VCCI Class A; ICES-003 Electromagnetic Emission; AS/NZS 55022; EN 61000-3-2 Power Line Harmonics; EN 61000-3-3 Voltage Fluctuation and Flicker; EN 61000-6-3 Emission Standard (supersedes: EN 50081-1)
Safety	CAN/CSA-C22.2 NO. 60950-1-07; UL 60950-1 Second Edition; IEC 60950-1 Second Edition; EN 60950-1:2006 Safety of Information Technology Equipment; EN 60825-1 Safety of Laser Products—Part 1: Equipment Classification, Requirements and User's Guide; EN 60825-2 Safety of Laser Products—Part 2: Safety of Optical Fibre Communication Systems
Immunity	EN 61000-6-1 Generic Immunity and Susceptibility (supersedes EN 50082-1); EN 55024 Immunity Characteristics (supersedes EN 61000-4-2 ESD); EN 61000-4-3 Radiated, Radio Frequency, Electromagnetic Field; EN 61000-4-4 Electrical Fast Transient; EN 61000-4-5 Surge; EN 61000-4-6 Conducted Disturbances Induced by Radio-Frequency Fields; EN 61000-4-8 Power Frequency Magnetic Field; EN 61000-4-11 Voltage Dips and Sags
Environmental regulatory compliance	RoHS-compliant (6 of 6); WEEE-compliant
Vibration	IEC 68-2-36, IEC 68-2-6
Shock and drop	IEC 68-2-27, IEC 68-2-32

Brocade ICX 7250 Ordering Information

Part Number	Description
Brocade ICX 7250 Switches	
ICX7250-24G	Brocade ICX 7250 Switch 24-port, 4×1 GbE (basic, non-upgradable switch) with front-to-back airflow
ICX7250-24	Brocade ICX 7250 Switch 24-port, 8×1/10 GbE, no 10 GbE PoD license preloaded, with side-to-back airflow
ICX7250-24P	Brocade ICX 7250 Switch 24-port PoE, 8×1/10 GbE, no 10 GbE PoD license preloaded, with side-to-back airflow
ICX7250-48	Brocade ICX 7250 Switch 48-port, 8×1/10 GbE, no 10 GbE PoD license preloaded, with side-to-back airflow
ICX7250-48P	Brocade ICX 7250 Switch 48-port PoE, 8×1/10 GbE, no 10 GbE PoD license preloaded, with side-to-back airflow
Switches	**With 2×10 GbE PoD Licenses**
ICX7250-24-2X10G	Brocade ICX 7250 Switch 24-port, 8×1/10 GbE, 2×10 GbE PoD license preloaded
ICX7250-24P-2X10G	Brocade ICX 7250 Switch 24-port PoE, 8×1/10 GbE, 2×10 GbE PoD license preloaded
ICX7250-48-2X10G	Brocade ICX 7250 Switch 48-port, 8×1/10 GbE, 2×10 GbE PoD license preloaded
ICX7250-48P-2X10G	Brocade ICX 7250 Switch 48-port PoE, 8×1/10 GbE, 2×10 GbE PoD license preloaded

Brocade ICX-EPS 4000 External Power Supply Options for the Brocade ICX 7250 Switch
The Brocade ICX-EPS4000 supports up to four removable power supplies. Each power supply provides 920 W.

Part Number	Description
ICX-EPS4000-SHELF	1U EPS
RPS17	EPS power supply, 920 W
ICX-EPS4000-CBL-01	Brocade ICX-EPS4000 power cable 1:1
ICX-EPS4000-CBL-02	Brocade ICX-EPS4000 power cable 1:2
Feature License and Accessories	
ICX7250-PREM-LIC	Brocade ICX 7250 Layer 3 Premium software license (non-node lock)
ICX7250-2X10G-LIC-POD	2×10 GbE PoD license (node lock)—upgrade uplink/stacking ports from 8×1 GbE to 2×1 GbE/10 GbE + 6×1 GbE
ICX7250-8X10G-LIC-POD	Upgrade uplink/stacking ports from 2×1 GbE/10 GbE + 6×1 GbE to 8×1 GbE/10 GbE (node lock)
ICX7000-RMK	FRU, rack mount kit, two-post, Brocade ICX 7750/7450
XBR-R000295	FRU, rack mount kit, four-post, 24 in. to 32 in. depth rack
BR-NTWADV-IP-BASE	Brocade Network Advisor IP management software license for up to 50 devices; required for initial purchase of IP-only management; minimum of one year of support required
Optics	**For Brocade ICX 7250-24G Only**
E1MG-BXD	1000BASE-BXD SFP optic SMF, transmits at 1,490 nm and receives at 1,310 nm, LC connector, single strand SMF fiber. This optic should only be connected to an E1MG-BXU at the far end.
E1MG-BXU	1000BASE-BXU SFP optic SMF, transmits at 1,310 nm and receives at 1,490 nm, LC connector, single strand SMF fiber. This optic should only be connected to an E1MG-BXD at the far end.
E1MG-LHA-OM-T	1000BASE-LHA SFP optic, SMF, LC connector, optical monitoring capable (70 km), industrial temperature
E1MG-LX-OM	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring capable
E1MG-SX-OM	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring capable
E1MG-TX	1000BASE-TX SFP copper, RJ-45 connector

Brocade ICX 7250 Ordering Information (Continued)

Optics	For Brocade ICX 7250-24/24P/48/48P
10G-SFPP-ER	10GBASE-ER SFP+ optic (LC), for up to 40 km over SMF
10G-SFPP-LR	10GBASE-LR, SFP+ optic (LC), for up to 10 km over SMF
10G-SFPP-SR	10GBASE-SR, SFP+ optic (LC), target range 300 m over MMF
10G-SFPP-USR	10GE USR SFP+ optic (LC), target range 100 m over MMF, 1-pack
10G-SFPP-ZR	10GBASE-ZR SFP+ optic (LC), for up to 80 km over SMF
E1MG-BXD	1000BASE-BXD SFP optic SMF, transmits at 1,490 nm and receives at 1,310 nm, LC connector, single strand SMF fiber. This optic should only be connected to an E1MG-BXU at the far end.
E1MG-BXU	1000BASE-BXU SFP optic SMF, transmits at 1,310 nm and receives at 1,490 nm, LC connector, single strand SMF fiber. This optic should only be connected to an E1MG-BXD at the far end.
E1MG-LHA-OM-T	1000BASE-LHA SFP optic, SMF, LC connector, optical monitoring capable (70 km), industrial temperature
E1MG-LX-OM	1000BASE-LX SFP optic, SMF, LC connector, optical monitoring capable
E1MG-SX-OM	1000BASE-SX SFP optic, MMF, LC connector, optical monitoring capable
E1MG-TX	1000BASE-TX SFP Copper, RJ-45 connector

Direct-Attached Cables	For Brocade ICX 7250-24/24P/48/48P
10G-SFPP-TWX-0101	Direct-attached SFP+ copper cable, 1 m, 1-pack, active
10G-SFPP-TWX-0301	Direct-attached SFP+ copper cable, 3 m, 1-pack, active
10G-SFPP-TWX-0501	Direct-attached SFP+ copper cable, 5 m, 1-pack, active
10GE-SFPP-AOC-0701	10 GbE SFP+ direct-attached active optical cable, 7m, 1-pack
10GE-SFPP-AOC-1001	10 GbE SFP+ direct-attached active optical cable, 10 m, 1-pack
1G-SFP-TWX-0101	Direct-attached 1 GbE SFP copper cable, 1 m
1G-SFP-TWX-0501	Direct-attached 1 GbE SFP copper cable, 5 m

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

Ordering Instructions

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

The Brocade ICX 7250 (-24/-24P/-48/-48P) can be upgraded to 2×10 GbE uplink/stacking ports by purchasing a PoD license (ICX7250-2X10G-LIC-POD).

A Brocade ICX 7250 Switch with 2×10 GbE uplink/stacking ports can be upgraded to 8×10 GbE by purchasing an additional PoD license (ICX7250-8X10G-LIC-POD). Only switches that already have 2×10 GbE can be upgraded to 8×10 GbE.

Note that the Brocade ICX 7250-24G Switch is not upgradable and will support 4×1 GbE uplink ports only.

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

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