



PROFESSIONAL/CONSULTING SERVICES AGREEMENT

1. PARTIES

This Agreement is made and entered into as of April 3, 2018 ("Effective Date") by and between the City of Cupertino, a municipal corporation ("City"), and Savant Solutions, Inc. ("Contractor"), a corporation for the Wired Network Infrastructure Technology Refresh.

2. SERVICES

Contractor agrees to provide the services and perform the tasks ("Services") set forth in detail in Scope of Services, attached here and incorporated as **Exhibit A**.

3. TIME OF PERFORMANCE

3.1 This Agreement begins on the Effective Date and ends on December 31, 2018 ("Contract Time"), unless terminated earlier as provided herein. Contractor's Services shall begin on April 4, 2018 and shall be completed by December 31, 2018.

3.2 Schedule of Performance. Contractor must deliver the Services in accordance with the Schedule of Performance, attached and incorporated here **Exhibit B**.

3.3 Time is of the essence for the performance of all the Services. Contractor must have sufficient time, resources, and qualified staff to deliver the Services on time.

4. COMPENSATION

4.1 Maximum Compensation. City will pay Contractor for satisfactory performance of the Services an amount that will be based on actual costs but that will be capped so as not to exceed \$28,310.00 ("Contract Price"), based upon the scope of services in **Exhibit A** and the budget and rates included in **Exhibit C**, Compensation attached and incorporated here. The maximum compensation includes all expenses and reimbursements and will remain in place even if Contractor's actual costs exceed the capped amount. No extra work or payment is permitted without prior written approval of City.

4.2 Invoices and Payments. Monthly invoices must state a description of the deliverable completed and the amount due for the preceding month. Within thirty (30) days of completion of Services, Contractor must submit a requisition for final and complete payment of costs and pending claims for City approval. Failure to timely submit a complete and accurate payment requisition relieves City of any further payment or other obligations under the Agreement.

5. INDEPENDENT CONTRACTOR

5.1 Status. Contractor is an independent contractor and not an employee, partner, or joint venture of City. Contractor is solely responsible for the means and methods of performing the Services and for the persons hired to work under this Agreement. Contractor is not entitled to health benefits, worker's compensation or other benefits from the City.

5.2 Contractor's Qualifications. Contractor warrants on behalf of itself and its subcontractors that they have the qualifications and skills to perform the Services in a competent and professional manner and according to the highest standards and best practices in the industry.

5.3 Permits and Licenses. Contractor warrants on behalf of itself and its subcontractors that they are properly licensed, registered, and/or certified to perform the Services as required by law and have procured a City Business License.

5.4 Subcontractors. Only Contractor's employees are authorized to work under this Agreement. Prior written approval from City is required for any subcontractor, and the terms and conditions of this Agreement will apply to any approved subcontractor.

5.5 Tools, Materials and Equipment. Contractor will supply all tools, materials and equipment required to perform the Services under this Agreement.

5.6 Payment of Taxes. Contractor must pay income taxes on the money earned under this Agreement. Upon City's request, Contractor will provide proof of payment and will indemnify City for violations pursuant to the indemnification provision of this Agreement.

6. PROPRIETARY/CONFIDENTIAL INFORMATION

In performing this Agreement, Contractor may have access to private or confidential information owned or controlled by the City, which may contain proprietary or confidential details the disclosure of which to third parties may be damaging to City. Contractor shall hold in confidence all City information provided by City to Contractor and use it only to perform this Agreement. Contractor shall exercise the same standard of care to protect City information as a reasonably prudent contractor would use to protect its own proprietary data.

7. OWNERSHIP OF MATERIALS

7.1 Property Rights. Any interest (including copyright interests) of Contractor in any product, memoranda, study, report, map, plan, drawing, specification, data, record, document or other information or work, in any medium (collectively, "Work Product"), prepared by Contractor in connection with this Agreement will be the exclusive property of the City and shall not be shown to any third-party without prior written approval of City.

7.2 Copyright. To the extent permitted by Title 17 of U.S. Code, all Work Product arising out of this Agreement is considered "works for hire" and all copyrights to the Work Product will be the property of City. Alternatively, Contractor assigns to City all Work Product copyrights. Contractor may use copies of the Work Product for promotion only with City's written approval.

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7.3 Patents and Licenses. Contractor must pay royalties or license fees required for authorized use of any third party intellectual property, including but not limited to patented, trademarked, or copyrighted intellectual property if incorporated into the Services or Work Product of this Agreement.

7.4 Re-Use of Work Product. Unless prohibited by law and without waiving any rights, City may use or modify the Work Product of Contractor or its sub-contractors prepared or created under this Agreement, to execute or implement any of the following:

- (a) The original Services for which Contractor was hired;
- (b) Completion of the original Services by others;
- (c) Subsequent additions to the original Services; and/or
- (d) Other City projects.

7.5 Deliverables and Format. Contractor must provide electronic and hard copies of the Work Product, on recycled paper and copied on both sides, except for one single-sided original.

8. RECORDS

Contractor must maintain complete and accurate accounting records relating to its performance in accordance with generally accepted accounting principles. The records must include detailed information of Contractor's performance, benchmarks and deliverables, which must be available to City for review and audit. The records and supporting documents must be kept separate from other records and must be maintained for four years from the date of City's final payment.

9. ASSIGNMENT

Contractor shall not assign, sublease, hypothecate, or transfer this Agreement, or any interest therein, directly or indirectly, by operation of law or otherwise, without prior written consent of City. Any attempt to do so will be null and void. Any changes related to the financial control or business nature of Contractor as a legal entity is considered an assignment of the Agreement and subject to City approval, which shall not be unreasonably withheld. Control means fifty percent (50%) or more of the voting power of the business entity.

10. PUBLICITY / SIGNS

Any publicity generated by Contractor for the project under this Agreement, during the term of this Agreement and for one year thereafter, will reference the City's contributions in making the project possible. The words "City of Cupertino" will be displayed in all pieces of publicity, including flyers, press releases, posters, brochures, public service announcements, interviews and newspaper articles. No signs may be posted, exhibited or displayed on or about City property, except signage required by law or this Contract, without prior written approval from the City.

11. INDEMNIFICATION

11.1 To the fullest extent allowed by law, and except for losses caused by the sole and active negligence or willful misconduct of City personnel, Contractor shall indemnify, defend and hold

harmless City, its City Council, boards and commissions, officers, officials, employees, agents, servants, volunteers and consultants ("Indemnitees"), through legal counsel acceptable to City, from and against any and all liability, damages, claims, actions, causes of action, demands, charges, losses, costs and expenses (including attorney fees, legal costs and expenses related to litigation and dispute resolution proceedings) of every nature, arising directly or indirectly from this Agreement or in any manner relating to any of the following:

- (a) Breach of contract, obligations, representations or warranties;
- (b) Negligent or willful acts or omissions committed during performance of the Services;
- (c) Personal injury, property damage, or economic loss resulting from the work or performance of Contractor or its subcontractors or sub-subcontractors;
- (d) Unauthorized use or disclosure of City's confidential and proprietary Information;
- (e) Claim of infringement or violation of a U.S. patent or copyright, trade secret, trademark, or service mark or other proprietary or intellectual property rights of any third party.

11.2 Contractor must pay the costs City incurs in enforcing this provision. Contractor must accept a tender of defense upon receiving notice from City of a third-party claim, in accordance with California Public Contract Code Section 9201. At City's request, Contractor will assist City in the defense of a claim, dispute or lawsuit arising out of this Agreement.

11.3 Contractor's duties under this section are not limited to the Contract Price, workers' compensation payments, or the insurance or bond amounts required in the Agreement. Nothing in the Agreement shall be construed to give rise to an implied right of indemnity in favor of Contractor against City or any Indemnitee.

11.4. Contractor's payments may be deducted or offset to cover any money the City lost due to a claim or counterclaim arising out of this Agreement, a purchase order, or other transaction.

12. INSURANCE

Contractor shall comply with the Insurance Requirements, attached and incorporated here as **Exhibit D**, and must maintain the insurance for the duration of the Agreement, or longer as required by City. City will not execute the Agreement until City approves receipt of satisfactory certificates of insurance and endorsements evidencing the type, amount, class of operations covered, and the effective and expiration dates of coverage. Failure to comply with this provision may result in City, at its sole discretion and without notice, purchasing insurance for Contractor and deducting the costs from Contractor's compensation or terminating the Agreement.

13. COMPLIANCE WITH LAWS

13.1 General Laws. Contractor shall comply with all local, state and federal laws and regulations applicable to this Agreement. Contractor will promptly notify City of changes in the law or other conditions that may affect the Project or Contractor's ability to perform. Contractor is responsible for verifying the employment authorization of employees performing the Services, as required by the Immigration Reform and Control Act.

13.2 Labor Laws. Contractor shall comply with all labor laws applicable to this Agreement. If the Scope of Services includes a “public works” component, Contractor is required to comply with prevailing wage laws under Labor Code Section 1720 and other labor laws.

13.3 Discrimination Laws. Contractor shall not discriminate on the basis of race, religious creed, color, ancestry, national origin, ethnicity, handicap, disability, marital status, pregnancy, age, sex, gender, sexual orientation, gender identity, Acquired-Immune Deficiency Syndrome (AIDS) or any other protected classification. Contractor shall comply with all anti-discrimination laws, including Government Code Sections 12900 and 11135, and Labor Code Sections 1735, 1777 and 3077.5. Consistent with City policy prohibiting harassment and discrimination, Contractor understands that harassment and discrimination directed toward a job applicant, an employee, a City employee, or any other person, by Contractor or its employees or sub-contractors will not be tolerated.

13.4 Conflicts of Interest. Contractor shall comply with all conflict of interest laws applicable to this Agreement and must avoid any conflict of interest. Contractor warrants that no public official, employee, or member of a City board or commission who might have been involved in the making of this Agreement, has or will receive a direct or indirect financial interest in this Agreement, in violation of California Government Code Section 1090 et seq. Contractor may be required to file a conflict of interest form if Contractor makes certain governmental decisions or serves in a staff capacity, as defined in Section 18700 of the California Code of Regulations. Contractor agrees to abide by the City’s rules governing gifts to public officials and employees.

13.5 Remedies. Any violation of Section 13 constitutes a material breach and may result in City suspending payments, requiring reimbursements or terminating this Agreement. City reserves all other rights and remedies available under the law and this Agreement, including the right to seek indemnification under Section 11 of this Agreement.

14. PROJECT COORDINATION

City Project Manager. The City assigns Benny Hsieh, Infrastructure Manager as the City’s representative for all purposes under this Agreement, with authority to oversee the progress and performance of the Scope of Services. City reserves the right to substitute another Project manager at any time, and without prior notice to Contractor.

Contractor Project Manager. Subject to City approval, Contractor assigns Caleb Kwong as its single Representative for all purposes under this Agreement, with authority to oversee the progress and performance of the Scope of Services. Contractor’s Project manager is responsible for coordinating and scheduling the Services in accordance with the Scope of Services and the Schedule of Performance. Contractor must regularly update the City’s Project Manager about the progress with the work or any delays, as required under the Scope of Services. City written approval is required prior to substituting a new Representative.

15. ABANDONMENT OF PROJECT

City may abandon or postpone the Project or parts therefor at any time. Contractor will be compensated for satisfactory Services performed through the date of abandonment, and will be

given reasonable time to assemble the work and close out the Services. With City's pre-approval in writing, the time spent in closing out the Services will be compensated up to a maximum of ten percent (10%) of the total time expended to date in the performance of the Services.

16. TERMINATION

City may terminate this Agreement for cause or without cause at any time. Contractor will be paid for satisfactory Services rendered through the date of termination, but final payment will not be made until Contractor closes out the Services and delivers the Work Product.

17. GOVERNING LAW, VENUE AND DISPUTE RESOLUTION

This Agreement is governed by the laws of the State of California. Any lawsuits filed related to this Agreement must be filed with the Superior Court for the County of Santa Clara, State of California. Contractor must comply with the claims filing requirements under the Government Code prior to filing a civil action in court. If a dispute arises, Contractor must continue to provide the Services pending resolution of the dispute. If the Parties elect arbitration, the arbitrator's award must be supported by law and substantial evidence and include detailed written findings of law and fact.

18. ATTORNEY FEES

If City initiates legal action, files a complaint or cross-complaint, or pursues arbitration, appeal, or other proceedings to enforce its rights or a judgment in connection with this Agreement, the prevailing party will be entitled to reasonable attorney fees and costs.

19. THIRD PARTY BENEFICIARIES

There are no intended third party beneficiaries of this Agreement.

20. WAIVER

Neither acceptance of the Services nor payment thereof shall constitute a waiver of any contract provision. City's waiver of a breach shall not constitute waiver of another provision or breach.

21. ENTIRE AGREEMENT

This Agreement represents the full and complete understanding of every kind or nature between the Parties, and supersedes any other agreement(s) and understanding(s), either oral or written, between the Parties. Any modification of this Agreement will be effective only if in writing and signed by each Party's authorized representative. No verbal agreement or implied covenant will be valid to amend or abridge this Agreement. If there is any inconsistency between the main Agreement and the attachments or exhibits thereto, the text of the main Agreement shall prevail.

22. INSERTED PROVISIONS

Each provision and clause required by law for this Agreement is deemed to be included and will be inferred herein. Either party may request an amendment to cure mistaken insertions or omissions of required provisions. The Parties will collaborate to implement this Section, as appropriate.

23. HEADINGS

The headings in this Agreement are for convenience only, are not a part of the Agreement and in no way affect, limit or amplify the terms or provisions of this Agreement.

24. SEVERABILITY/PARTIAL INVALIDITY

If any term or provision of this Agreement, or their application to a particular situation, is found by the court to be void, invalid, illegal or unenforceable, such term or provision shall remain in force and effect to the extent allowed by such ruling. All other terms and provisions of this Agreement or their application to specific situations shall remain in full force and effect. The Parties agree to work in good faith to amend this Agreement to carry out its intent.

25. SURVIVAL

All provisions which by their nature must continue after the Agreement expires or is terminated, including the Indemnification, Ownership of Materials/Work Product, Records, Governing Law and Attorney Fees, shall survive the Agreement and remain in full force and effect.

26. NOTICES

All notices, requests and approvals must be sent in writing to the persons below, which will be considered effective on the date of personal delivery or the date confirmed by a reputable overnight delivery service, on the fifth calendar day after deposit in the United States Mail, postage prepaid, registered or certified, or the next business day following electronic submission:

To City of Cupertino 10300 Torre Ave., Cupertino CA 95014 Attention: Benny Hsieh Email: Bennyh@cupertino.org	To Contractor: Savant Solutions, Inc. 1007 7th St, 5th Floor Sacramento, CA 95814 Attention: Caleb Kwong Email: caleb@savantsolutions.com
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27. VALIDITY OF CONTRACT

This Agreement is valid and enforceable only if (a) it complies with the purchasing and contract provisions of Cupertino Municipal Code Chapters 3.22 and 3.23, as amended from time to time, (b) is signed by the City Manager or an authorized designee, and (c) is approved for form by the City Attorney's Office.

28. EXECUTION

The person executing this Agreement on behalf of Contractor represents and warrants that Contractor has full right, power, and authority to enter into and carry out all actions contemplated by this Agreement and that he or she is authorized to execute this Agreement, which constitutes a legally binding obligation of Contractor. This Agreement may be executed in counterparts, each one of which is deemed an original and all of which, taken together, constitute a single binding instrument.

IN WITNESS WHEREOF, the parties have caused the Agreement to be executed.

CONTRACTOR

Savant Solutions, Inc.
A Corporation

By Caleb Kwong

Name Caleb Kwong

Title CEO

Date 3/13/2018

Tax I.D. No.: 81-3451941

CITY OF CUPERTINO

A Municipal Corporation

By _____

Name _____

Title _____

Date _____

APPROVED AS TO FORM:

RANDOLPH STEVENSON HOM
Cupertino City Attorney

ATTEST:

GRACE SCHMIDT
City Clerk



SAVANT SOLUTIONS

Your Trusted IT Advisor

Scope of Work

All layer 1 connectivity is City of Cupertino's responsibility. Savant Solutions will need logins, credentials, etc. A list will be provided of what we need before we start the implementation process. Below is the hardware and cloud platform we will be implementing.

- Configure and Implement two (2) HPE Aruba 5406R core devices into DC Main & DR Network (Remote)
- Configure and Implement one (1) HPE Aruba 5412R core device into City Hall DC Network
- Configure and Implement twenty-six (26) HPE Aruba 2930 devices into the City of Cupertino's Network
 - Configure one (1) Aruba 2930M as spare
- Implement HPE Aruba AirWave for thirty (30) network devices

The upcoming provides an outlined Scope of Work for the City of Cupertino's Network Implementation:

- Implementation Kickoff with Checklist of what's needed from City of Cupertino
- Discovery and Understanding
- Physical and Logical Design Creation and Review
- Staging and Baseline Configuration of HPE Aruba Equipment and HPE Central Management Platform
- Production-ready Configuration and Staging for 5400 and 2930 devices
- Testing and Validation of the full buildout of Campus LAN, Cupertino IDF, DC Main and DR 5406R, City Hall DC 5412R cores in accordance with the City of Cupertino's Runbook Testing and Validation procedures
- Create, Modify, and Finalize Cutover Plan
- Final Preparation and Checklist for Cutover
- Execute Cutover Plan
- Perform Post-Cutover Testing, Validation, and Acceptance
- Provide Final Documentation (Visio Drawings, Configuration Snapshots, Port-Mapping)
- Provide Informal Training Throughout the Project and Formal Training After Cutover

Savant Solutions, Inc.

1007 7th St,

5th Floor

Sacramento, CA 95814

www.savantsolutions.net

Scope of Work

Phase 1 Seed Data and Install in Datacenter

Item	Onsite/Remote	Notes
Seed Data, test VM moves with dummy VM	Remote	Actual time dependant on file transfer rates. Currently 11.2tb on disk
Create dummy vm and test migration	Remote	
Move old simplivity to Service Center (DR)	On-site	Move, test setup

Phase 2 Migrate VM's to datacenter

Item	Onsite/Remote	Notes
Identify VMs, determine new IP's	Remote	We'll need to work with Quinton/Benny
Move one real VM to datacenter	Remote	Move to datacenter, test connectivity.
Move remaining identified VMs	Remote	Time dependant on initial tests.

Phase 3 Migrate VM's from Nimble and Re-task Nimble to be file storage

Item	Onsite/Remote	Notes
Migrate VMs from nimble	Remote	
Rebuild one of the old servers to be file server	Remote	Quinton/Benny to build base OS, and conenct cables.
Perform an in-place upgrade of cupe-fileserver to 2012.r2	Remote	Requires outage. Backup/snapshot will be done before.
Setup DFS and Shares	Remote	Will require baby sitting, initial seed will take a while, then we turn on DFS-R
Sync data between DFS	Remote	
Migrate users to DFS shares	Remote	Watch for still-open users on old shares. Work with Quinton/Benny to get users migrated.
Share Cleanup	Remote	

Exhibit B

Schedule of Performance

Wired Infrastructure Network Tech Refresh

Purchase and delivery of equipment by 4/6/2018

Discovery and design by 4/20/2018

Configuration and implementation hardware networking equipment by 5/18/2018

Implementation of HP Aruba Central and completion by 6/16/2018

Simplivity Scope of Work

Phase 1/New cluster installation by 4/20/2018

Phase 2/Colocation Phase I by 7/29/2018

Phase 3/Colocation Phase II by 11/26/2018

Exhibit C



SAVANT SOLUTIONS

Your Trusted IT Advisor

1007 7th St, 5th Floor
Sacramento, CA 95814
(916) 836-8182
sales@savantsolutions.net

Quote# BM-030718-1

Date: 3/7/18
Terms: NET30
FOB: Destination
Valid for: 4/9/18
Shipping: Ground

Bill To

City of Cupertino
Attn:
10300 Torre Avenue,
Cupertino, CA 95014
Phone:

Ship To

City of Cupertino
Attn: Bill Mitchell
10300 Torre Avenue,
Cupertino, CA 95014
Phone: 408.777.1333

Line#	Part No.	Description	Qty	Unit Price	Ext. Price
1	J9822A	Aruba 5412R zl2 Switch	1	\$2,800.00	\$2,800.00
2	J9827A	Aruba 5400R zl2 Management Module	1	\$1,300.00	\$1,300.00
3	J9828A#ABA	HP 5400R 700W PoE+ zl2 Power Supply US	4	\$430.00	\$1,720.00
4	J9829A	5400R 1100W PoE+ zl2 Power Supply	4	\$700.00	\$2,800.00
5	J9986A	Aruba 24p 1000BASE-T PoE+ v3 zl2 Mod	9	\$1,900.00	\$17,100.00
6	J9993A	Aruba 8p 1G/10GbE SFP+ v3 zl2 Mod	1	\$2,800.00	\$2,800.00
7	JL003A	Aruba 5406R 44GT PoE+ and 4-port SFP+ (No PSU) v3 zl2 Switch	2	\$4,700.00	\$9,400.00
8	JL073A	Aruba 2930M 24G PoE+ 1-slot Switch	2	\$2,901.00	\$5,802.00
9	JL083A	Aruba 3810M/2930M 4SFP+ MACsec Module	2	\$659.00	\$1,318.00
10	JL086A#ABA	HP X372 54VDC 680W 100-240VAC Power Supply	40	\$260.00	\$10,400.00
11	JL258A	Aruba 2930F 8G PoE+ 2SFP+ Swch Aruba 2930F 8G PoE+ 2SFP+ Swch	3	\$600.00	\$1,800.00
12	JL261A	Aruba 2930F 24G PoE+ 4SFP Switch	4	\$1,431.00	\$5,724.00
13	JL322A	Aruba 2930M 48G PoE+ 1-slot Switch	18	\$3,341.00	\$60,138.00
14	JL325A	Aruba 2930M 2-port Stacking Module	13	\$430.00	\$5,590.00
15	H1MX6E	HPE 5Y FC 24x7 Aruba 5406R zl2 Swtch SVC	2	\$5,700.00	\$11,400.00
16	H1NG7E	HPE 5Y FC 24x7 Aruba 5412R zl2 Swtch SVC	1	\$7,900.00	\$7,900.00
17	J4858D	Aruba 1G SFP LC SX 500m MMF XCVR	10	\$195.00	\$1,950.00
18	J4859D	Aruba 1G SFP LC LX 10km SMF XCVR	8	\$417.00	\$3,336.00
19	J9150D	Aruba 10G SFP+ LC SR 300m MMF XCVR	2	\$624.00	\$1,248.00
20	J9734A	Aruba 2920/2930M 0.5M Stacking Cable	7	\$89.00	\$623.00
21	J9735A	Aruba 2920/2930M 1m Stacking Cable	1	\$113.00	\$113.00
22	JW546AAE	Aruba LIC-AW Aruba Airwave with RAPIDS and VisualRF 1 Device License E-LTU	31	\$51.00	\$1,581.00
23	H2YW0E	Aruba 5 Year Foundation Care 24x7 Airwave 1 Dev E-LTU Service	31	\$44.00	\$1,364.00
24	Pro-Serv	Networking Professional Services Project Charge - Aruba Implementation	1	\$17,900.00	\$17,900.00
25	Pro-Serv-Sim	Professional Services Project Charge - Simplivity Implementation	1	\$10,410.00	\$10,410.00
				Subtotal:	\$186,517.00
				Tax: 9%	\$12,236.58
				Credit:	\$0.00
				Shipping:	\$0.00
				Total:	\$198,753.58

Notes:

Thank you for giving Savant Solutions the opportunity to support you!
Each order helps supports a non-profit in need.

www.SavantSolutions.net



All the fine print that's fit to print.

JUMP TO A PRODUCT WARRANTY:

Hardware Limited Warranty

Hardware Limited Lifetime Warranty (LLW)

Warranty Returns

Warranty Exclusions & Disclaimer

Software Limited Warranty

1. Hardware Limited Warranty

Aruba Networks ("Aruba") warrants to its end users that for a period of one year (unless otherwise stated) beginning on the hardware product shipment date, the Aruba hardware product purchased by such end user will substantially conform to Aruba's published technical documentation as provided by Aruba with the hardware product. This warranty is provided only to the original end user, and is not transferrable. The warranty ceases upon transfer of the hardware product to a new owner. Except as otherwise proscribed by applicable law, in the event of a breach of this warranty, the sole and exclusive remedy, and Aruba's sole and exclusive liability, shall be for Aruba to use its commercially reasonable efforts to repair or replace the hardware product that caused the breach of this warranty. If Aruba cannot, or determines that it is not practical to, repair or replace the returned hardware product, then the sole and exclusive remedy and the limit of Aruba's obligation under this warranty shall be to refund the amount received by Aruba for such hardware product. For warranty periods and additional information, please refer to the [Product Warranty Frequently Asked Questions \(PDF\) \(FAQ\)](#) document.

2. Hardware Limited Lifetime Warranty (LLW)

Aruba's Hardware Limited Lifetime Warranty is applicable to a subset of Aruba hardware products, detailed at www.arubanetworks.com/assets/faq/FAQ_product_warranty.pdf (PDF). "Lifetime" is defined as the period beginning on the Aruba shipment date and ending five years following Aruba's hardware end-of-sale date. Aruba warrants to its end users that for the Lifetime of the covered hardware product purchased by such end user, the hardware product will substantially conform to Aruba's published technical documentation as provided by Aruba with the hardware product. Except as otherwise proscribed by applicable law, in the event of a breach of this Hardware Limited Lifetime Warranty, the sole and exclusive remedy, and Aruba's sole and exclusive liability, will be for Aruba to use commercially reasonable efforts to repair or replace the hardware product that caused the breach of this warranty. If Aruba cannot, or determines that it is not practical to, repair or replace the returned hardware product, then the sole and exclusive remedy and the limit of Aruba's obligation will be to refund the amount received by Aruba for such

hardware product. The Hardware Limited Lifetime Warranty is provided to the original end user only and is not transferrable. For additional information, please refer to the Aruba Product Warranty Frequently Asked Questions (FAQ) document located at: www.arubanetworks.com/assets/faq/FAQ_product_warranty.pdf (PDF).

3. Warranty Returns

All hardware products must be returned to Aruba in accordance with Aruba's then-current Return Material Authorization (RMA) procedure. Hardware products obtained from Aruba that do not comply with the warranty and which are returned to Aruba during the applicable warranty period will be repaired or replaced at Aruba's option, provided the reseller or end user bears the cost of freight, insurance, duties and import and export fees to the point of repair or return. If the returned hardware product is covered by an Aruba warranty, Aruba will bear the cost of freight, insurance, duties and import and export fees for return of goods to reseller (if any) or end user. If the hardware product is purchased from an Aruba reseller, the reseller will handle and be responsible for the warranty return process for its end users. If the hardware product was purchased directly from Aruba, the end user will be responsible for the warranty return process. For the first 30 days of the warranty period, Aruba will provide advance replacement same day ship via standard overnight shipping (must meet shipment cutoff time) for the covered hardware product after confirming coverage and the warranty failure. The hardware product arrival date is subject to local transport conditions. End users may purchase an extension of advanced replacement next business day delivery protection through a separate support and service agreement.

For hardware products covered by Aruba's Hardware Limited Warranty, in the absence of a support and service agreement, after thirty (30) days from shipment until the expiration of the twelve (12) month warranty period, Aruba will replace or repair any non-compliant hardware product and return it in operable condition within ten (10) days (on a commercially reasonable basis) of receipt of the non-compliant hardware product via Aruba's RMA procedure.

For hardware products covered by Aruba's Hardware Limited Lifetime Warranty, in the absence of a support and service agreement, after thirty (30) days from shipment until five (5) years following announced hardware end-of-life, Aruba will replace or repair any non-compliant hardware product and return it in operable condition within ten (10) days of receipt (on a commercially reasonable basis) of receipt of the non-compliant hardware product via Aruba's RMA procedure.

Access to Aruba's Technical Assistance Center (TAC) for any and all questions, consultation, deployment assistance, or problem reports will be provided only pursuant to a separate support and service agreement.

4. Warranty Exclusions and Disclaimer

The warranties described in this document do not extend to any hardware that is repaired, modified or altered by anyone other than Aruba or an Aruba authorized company, is not maintained to Aruba's maintenance recommendations, is operated in a manner other than that specified by Aruba, has its serial number removed or altered, or is treated with abuse, negligence or other improper treatment (including, without limitation, use outside of the recommended environment).

EXCEPT AS EXPRESSLY SET FORTH ABOVE AND ANY OTHER WARRANTY REQUIRED BY APPLICABLE LAW, ALL HARDWARE PRODUCTS ARE PROVIDED ON AN "AS IS" BASIS WITHOUT ANY WARRANTY WHATSOEVER, AND ARUBA AND ITS LICENSORS AND SUPPLIERS EXPRESSLY DISCLAIM ALL WARRANTIES, EXPRESS, IMPLIED AND STATUTORY, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, NON-INFRINGEMENT OF THIRD PARTY RIGHTS AND FITNESS FOR A PARTICULAR PURPOSE. ARUBA ALSO MAKES NO WARRANTY REGARDING NONINTERRUPTION OF USE OR FREEDOM FROM BUGS.

5. Software Limited Warranty

Aruba provides the software warranty described in the Aruba End User License Agreement (EULA), available at <http://www.arubanetworks.com/assets/legal/EULA.pdf> (PDF).

© Copyright 2018 Hewlett Packard Enterprise Development LP

END USER LICENSE AGREEMENT

1. **Applicability.** This end user license agreement (the "Agreement") governs the use of accompanying software, unless it is subject to a separate agreement between you and Hewlett Packard Enterprise Company and its subsidiaries ("HPE"). By downloading, copying, or using the software you agree to this Agreement. HPE provides translations of this Agreement in certain languages other than English, which may be found at: <http://www.hpe.com/software/SW Licensing>.
2. **Terms.** This Agreement includes supporting material accompanying the software or referenced by HPE, which may be software license information, additional license authorizations, software specifications, published warranties, supplier terms, open source software licenses and similar content ("Supporting Material"). Additional license authorizations are at: <http://www.hpe.com/software/SW Licensing>.
3. **Authorization.** If you agree to this Agreement on behalf of another person or entity, you warrant you have authority to do so.
4. **Consumer Rights.** If you obtained software as a consumer, nothing in this Agreement affects your statutory rights.
5. **Electronic Delivery.** HPE may elect to deliver software and related software product or license information by electronic transmission or download.
6. **License Grant.** If you abide by this Agreement, HPE grants you a non-exclusive non-transferable license to use one copy of the version or release of the accompanying software for your internal purposes only, and is subject to any specific software licensing information that is in the software product or its Supporting Material.

Your use is subject to the following restrictions, unless specifically allowed in Supporting Material:

- o You may not use software to provide services to third parties.
 - o You may not make copies and distribute, resell or sublicense software to third parties.
 - o You may not download and use patches, enhancements, bug fixes, or similar updates unless you have a license to the underlying software. However, such license doesn't automatically give you a right to receive such updates and HPE reserves the right to make such updates only available to customers with support contracts.
 - o You may not copy software or make it available on a public or external distributed network.
 - o You may not allow access on an intranet unless it is restricted to authorized users.
 - o You may make one copy of the software for archival purposes or when it is an essential step in authorized use.
 - o You may not modify, reverse engineer, disassemble, decrypt, decompile or make derivative works of software. If you have a mandatory right to do so under statute, you must inform HPE in writing about such modifications.
7. **Remote Monitoring.** Some software may require keys or other technical protection measures and HPE may monitor your compliance with the Agreement, remotely or otherwise. If HPE makes a license management program for recording and reporting license usage information, you will use such program no later than 180 days from the date it's made available.
 8. **Ownership.** No transfer of ownership of any intellectual property will occur under this Agreement.
 9. **Copyright Notices.** You must reproduce copyright notices on software and documentation for authorized copies.
 10. **Operating Systems.** Operating system software may only be used on approved hardware and configurations.

11. 90-day Limited Warranty for HPE Software.
 - o HPE-branded software materially conforms to its specifications, if any, and is free of malware at the time of delivery; if you notify HPE within 90 days of delivery of non-conformance to this warranty, HPE will replace your copy. This Agreement states all remedies for warranty claims.
 - o HPE does not warrant that the operation of software will be uninterrupted or error free, or that software will operate in hardware and software combinations other than as authorized by HPE in Supporting Material. To the extent permitted by law, HPE disclaims all other warranties.
12. Intellectual Property Rights Infringement. HPE will defend and/or settle any claims against you that allege that HPE-branded software as supplied under this Agreement infringes the intellectual property rights of a third party. HPE will rely on your prompt notification of the claim and cooperation with our defense. HPE may modify the software so as to be non-infringing and materially equivalent, or we may procure a license. If these options are not available, we will refund to you the amount paid for the affected product in the first year or the depreciated value thereafter. HPE is not responsible for claims resulting from any unauthorized use of the software.
13. Limitation of Liability. HPE's liability to you under this Agreement is limited to the amount actually paid by you to HPE for the relevant software, except for amounts in Section 12 ("Intellectual Property Rights Infringement"). Neither you nor HPE will be liable for lost revenues or profits, downtime costs, loss or damage to data or indirect, special or consequential costs or damages. This provision does not limit either party's liability for: unauthorized use of intellectual property, death or bodily injury caused by their negligence; acts of fraud; willful repudiation of the Agreement; or any liability that may not be excluded or limited by applicable law.
14. Termination. This Agreement is effective until terminated or in the case of a limited-term license, upon expiration; however, your rights under this Agreement terminate if you fail to comply with it. Immediately upon termination or expiration, you will destroy the software and documentation and any copies, or return them to HPE. You may keep one copy of software and documentation for archival purposes. We may ask you to certify in writing you have complied with this section. Warranty disclaimers, the limitation of liability, this section on termination, and Section 15 ("General") will survive termination.
15. General.
 - a. Assignment. You may not assign this Agreement without prior written consent of HPE, payment of transfer fees and compliance with HPE's software license transfer policies. Authorized assignments will terminate your license to the software and you must deliver software and documentation and copies thereof to the assignee. The assignee will agree in writing to this Agreement. You may only transfer firmware if you transfer associated hardware.
 - b. U.S. Government. If the software is licensed to you for use in the performance of a U.S. Government prime contract or subcontract, you agree that, consistent with FAR 12.211 and 12.212, commercial computer software, computer software documentation and technical data for commercial items are licensed under HPE's standard commercial license.
 - c. Global Trade Compliance. You agree to comply with the trade-related laws and regulations of the U.S. and other national governments. If you export, import or otherwise transfer products provided under this Agreement, you will be responsible for obtaining any required export or import authorizations. You confirm that you are not located in a country that is subject to trade control sanctions (currently Cuba, Iran, N. Korea, N. Sudan, and Syria) and further agree that you will not retransfer the products to any such country. HPE may suspend its performance under this Agreement to the extent required by laws applicable to either party.

- d. Audit. HPE may audit you for compliance with the software license terms. Upon reasonable notice, HPE may conduct an audit during normal business hours (with the auditor's costs being at HPE's expense). If an audit reveals underpayments then you will pay to HPE such underpayments. If underpayments discovered exceed five (5) percent, you will reimburse HPE for the auditor costs.
 - e. Open Source Components. To the extent the Supporting Material includes open source licenses, such licenses shall control over this Agreement with respect to the particular open source component. To the extent Supporting Material includes the GNU General Public License or the GNU Lesser General Public License: (a) the software includes a copy of the source code; or (b) if you downloaded the software from a website, a copy of the source code is available on the same website; or (c) if you send HPE written notice, HPE will send you a copy of the source code for a reasonable fee.
 - f. Notices. Written notices under this Agreement may be provided to HPE via the method provided in the Supporting Material.
 - g. Governing Law. This Agreement will be governed by the laws of the state of California, U.S.A., excluding rules as to choice and conflict of law. You and HPE agree that the United Nations Convention on Contracts for the International Sale of Goods will not apply.
 - h. Force Majeure. Neither party will be liable for performance delays nor for non-performance due to causes beyond its reasonable control, except for payment obligations.
 - i. Entire Agreement. This Agreement represents our entire understanding with respect to its
 - j. subject matter and supersedes any previous communication or agreements that may exist. Modifications to the Agreement will be made only through a written amendment signed by both parties. If HPE doesn't exercise its rights under this Agreement, such delay is not a waiver of its rights.
16. **Australian Consumers**. If you acquired the software as a consumer within the meaning of the 'Australian Consumer Law' under the Australian Competition and Consumer Act 2010 (Cth) then despite any other provision of this Agreement, the terms at this URL apply: <http://www.hpe.com/software/SWLicensing>.
17. **Russian Consumers**. If you are based in the Russian Federation and the rights to use the software are provided to you under a separate license and/or sublicense agreement concluded between you and a duly authorized HPE partner, then this Agreement shall not be applicable.

EXHIBIT D
Insurance Requirements
Design Professionals & Consultants Contracts

Consultant shall procure prior to commencement of Services and maintain for the duration of the contract, at its own cost and expense, the following insurance policies and coverage with companies doing business in California and acceptable to City.

INSURANCE POLICIES AND MINIMUMS REQUIRED

1. ***Commercial General Liability*** (CGL) for bodily injury, property damage, personal injury liability for premises operations, products and completed operations, contractual liability, and personal and advertising injury with limits no less than **\$2,000,000** per occurrence (ISO Form CG 00 01). If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO Form CG 25 03 or 25 04) or it shall be twice the required occurrence limit.
 - a. It shall be a requirement that any available insurance proceeds broader than or in excess of the specified minimum insurance coverage requirements and/or limits shall be made available to the Additional Insured and shall be (i) the minimum coverage/limits specified in this agreement; or (ii) the broader coverage and maximum limits of coverage of any insurance policy, whichever is greater.
 - b. Additional Insured coverage under Consultant's policy shall be "primary and non-contributory," will not seek contribution from City's insurance/self-insurance, and shall be at least as broad as ISO Form CG 20 01 (04/13).
 - c. The limits of insurance required may be satisfied by a combination of primary and umbrella or excess insurance, provided each policy complies with the requirements set forth in this Contract. Any umbrella or excess insurance shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non-contributory basis for the benefit of City before the City's own insurance or self-insurance shall be called upon to protect City as a named insured.
2. ***Automobile Liability***: ISO CA 00 01 covering any auto (including owned, hired, and non-owned autos) with limits no less than **\$1,000,000** per accident for bodily injury and property damage.
3. ***Workers' Compensation***: As required by the State of California, with Statutory Limits and Employer's Liability Insurance of no less than **\$1,000,000** per occurrence for bodily injury or disease.
☐ *Not required. Consultant has provided written verification of no employees.*
4. ***Professional Liability*** for professional acts, errors and omissions, as appropriate to Consultant's profession, with limits no less than **\$2,000,000** per occurrence or **\$2,000,000** aggregate. If written on a claims made form:
 - a. The Retroactive Date must be shown and must be before the Effective Date of the Contract.
 - b. Insurance must be maintained for at least five (5) years after completion of the Services.
 - c. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the Contract Effective Date, the Consultant must purchase "extended reporting" coverage for a minimum of five (5) years after completion of the Services.

OTHER INSURANCE PROVISIONS

The aforementioned insurance shall be endorsed and have all the following conditions and provisions:

Additional Insured Status

The City of Cupertino, its City Council, officers, officials, employees, agents, servants and volunteers ("Additional Insureds") are to be covered as additional insureds on Consultant's CGL policy. General Liability coverage can be provided in the form of an endorsement to Consultant's insurance (at least as broad as ISO Form CG 20 10 (11/ 85) or both CG 20 10 and CG 20 37 forms, if later editions are used).

Primary Coverage

Coverage afforded to City/Additional Insureds shall be primary insurance. Any insurance or self-insurance maintained by City, its officers, officials, employees, or volunteers shall be excess of Consultant's insurance and shall not contribute to it.

Notice of Cancellation

Each insurance policy shall state that coverage shall not be canceled or allowed to expire, except with written notice to City 30 days in advance or 10 days in advance if due to non-payment of premiums.

Waiver of Subrogation

Consultant waives any right to subrogation against City/Additional Insureds for recovery of damages to the extent said losses are covered by the insurance policies required herein. Specifically, the Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of City for all work performed by Consultant, its employees, agents and subconsultants. This provision applies regardless of whether or not the City has received a waiver of subrogation endorsement from the insurer.

Deductibles and Self-Insured Retentions

Any deductible or self-insured retention must be declared to and approved by the City. At City's option, either: the insurer must reduce or eliminate the deductible or self-insured retentions as respects the City/Additional Insureds; or Consultant must show proof of ability to pay losses and costs related investigations, claim administration and defense expenses. The policy shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the insured or the City.

Acceptability of Insurers

Insurers must be licensed to do business in California with an A.M. Best Rating of A-VII, or better.

Verification of Coverage

Consultant must furnish acceptable insurance certificates and mandatory endorsements (or copies of the policies effecting the coverage required by this Contract), and a copy of the Declarations and Endorsement Page of the CGL policy listing all policy endorsements prior to commencement of the Contract. City retains the right to demand verification of compliance at any time during the Contract term.

Subconsultants

Consultant shall require and verify that all subconsultants maintain insurance that meet the requirements of this Contract, including naming the City as an additional insured on subconsultant's insurance policies.

Higher Insurance Limits

If Consultant maintains broader coverage and/or higher limits than the minimums shown above, City shall be entitled to coverage for the higher insurance limits maintained by Consultant.

Adequacy of Coverage

City reserves the right to modify these insurance requirements/coverage based on the nature of the risk, prior experience, insurer or other special circumstances, with not less than ninety (90) days prior written notice.



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
3/13/2018

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Insureon (BIN Insurance Holdings LLC.) 30 N. LaSalle, 25th Floor, Chicago, IL 60602	CONTACT NAME: PHONE (A/C, No, Ext): (800) 301-6256 FAX (A/C, No): 877-826-9067 E-MAIL ADDRESS: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;">INSURER(S) AFFORDING COVERAGE</th> <th style="width: 20%;">NAIC #</th> </tr> </thead> <tbody> <tr> <td>INSURER A : Sentinel Insurance Company, Limited</td> <td>11000</td> </tr> <tr> <td>INSURER B : Hartford Casualty Insurance Company</td> <td>29424</td> </tr> <tr> <td>INSURER C : Hartford Casualty Insurance Company</td> <td>29424</td> </tr> <tr> <td>INSURER D :</td> <td></td> </tr> <tr> <td>INSURER E :</td> <td></td> </tr> <tr> <td>INSURER F :</td> <td></td> </tr> </tbody> </table>	INSURER(S) AFFORDING COVERAGE	NAIC #	INSURER A : Sentinel Insurance Company, Limited	11000	INSURER B : Hartford Casualty Insurance Company	29424	INSURER C : Hartford Casualty Insurance Company	29424	INSURER D :		INSURER E :		INSURER F :	
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INSURER C : Hartford Casualty Insurance Company	29424														
INSURER D :															
INSURER E :															
INSURER F :															
INSURED Savant Solutions 1931 H St Sacramento, CA 95811															

COVERAGES**CERTIFICATE NUMBER:****REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC <input type="checkbox"/> OTHER:	Yes		46SBAVU2911	2/6/2018	2/6/2019	EACH OCCURRENCE \$ 2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 1,000,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ADV INJURY \$ 2,000,000 GENERAL AGGREGATE \$ 4,000,000 PRODUCTS - COMP/OP AGG \$ 4,000,000 \$
A	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input checked="" type="checkbox"/> NON-OWNED AUTOS	Yes		46SBAVU2911	2/6/2018	2/6/2019	COMBINED SINGLE LIMIT (Ea accident) \$ 2,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	UMBRELLA LIAB <input type="checkbox"/> OCCUR EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED \$ RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N No	N/A	46WECAS9039	3/20/2018	3/20/2019	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

The City of Cupertino, its City Council, officers, officials, employees, agents, servants and volunteers are named as Additional Insured as their interests may appear in regards to General Liability as required by written contract.
As per form SS 00 08 04 05. Section C. 6. page 11 of 24.

CERTIFICATE HOLDER**CANCELLATION**

City of Cupertino 10300 Torre Avenue Cupertino, CA 95014	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE
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CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

03/13/2018

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Hiscox Inc. d/b/a/ Hiscox Insurance Agency in CA 520 Madison Avenue 32nd Floor New York, NY 10022		CONTACT NAME: PHONE (A/C, No, Ext): (888) 202-3007 FAX (A/C, No): E-MAIL ADDRESS: contact@hiscox.com	
		INSURER(S) AFFORDING COVERAGE	
		INSURER A: Hiscox Insurance Company Inc	
		INSURER B:	
		INSURER C:	
		INSURER D:	
		INSURER E:	
		INSURER F:	

COVERAGES**CERTIFICATE NUMBER:****REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:						EACH OCCURRENCE \$ DAMAGE TO RENTED PREMISES (Ea occurrence) \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS - COM/OP AGG \$
	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS						COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
	UMBRELLA LIAB <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> DED <input type="checkbox"/> RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	<input type="checkbox"/> Y <input type="checkbox"/> N	N/A				PER STATUTE <input type="checkbox"/> OTH-ER <input type="checkbox"/> E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$
A	Professional Liability	Y		UDC-2199063-EO-18	03/12/2018	03/12/2019	Each Claim: \$ 2,000,000 Aggregate: \$ 2,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDERThe City of Cupertino
10300 Torre Ave
Cupertino, CA, 95014**CANCELLATION**

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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HISCOX INSURANCE COMPANY INC.



Endorsement 4

NAMED INSURED: Sevant Solutions, Inc.

E5000.1 Additional Insured

Page 1 of 1

In consideration of the premium charged, it is understood and agreed that the Policy is amended as follows:

1. In Clause VI. **DEFINITIONS**, paragraph V., "You' or 'Your'," is amended to include the following at the end thereof:

You or Your shall also include the below listed "ADDITIONAL INSURED(S)," but only for the **Wrongful Acts** of those contemplated in paragraphs 1., 2. or 3. of the definition of "You' or 'Your'":

ADDITIONAL INSURED(S)

The City of Cupertino 10300 Torre Ave Cupertino, CA 95014

All other terms and conditions remain unchanged.

Endorsement effective: March 12, 2018 Policy No.: UDC-2199063-EO-18
Endorsement No: 4

By : Brett Sadoff
(Appointed Representative)

DPL E5000 CW (01/10)

Endorsement 5

NAMED INSURED: Savant Solutions, Inc.

E5047.1 Change of Address Endorsement

Page 1 of 1

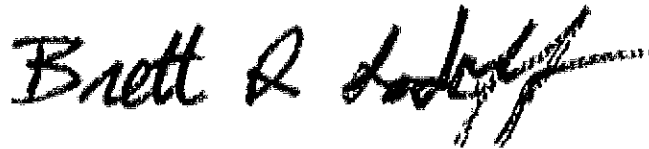
In consideration of the premium charged, it is understood and agreed that Item 2. of the Declarations, "Address," is deleted in its entirety and replaced with the following:

2. Address: Savant Solutions, Inc.

All other terms and conditions remain unchanged.

Endorsement effective: March 13, 2018
Endorsement No: 5

Policy No.: UDC-2199063-EO-18



By : Brett Sadoff
(Appointed Representative)

DPL E5047 CW (01/10)

DATA SHEET

ARUBA 2930F SWITCH SERIES

PRODUCT OVERVIEW

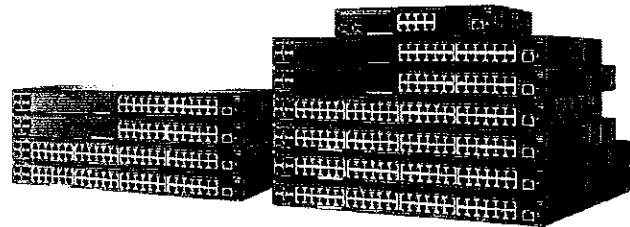
The Aruba 2930F Switch Series is designed for customers creating digital workplaces that are optimized for mobile users with an integrated wired and wireless approach. These Layer 3 access switches are easy to deploy and manage with advanced security and network management tools like Aruba ClearPass Policy Manager and Aruba AirWave. With support from Aruba Central, you can quickly set up remote branch sites with little or no IT support. A powerful Aruba ProVision ASIC delivers performance and flexibility to meet the needs of today and tomorrow's network programmability and automation requirements. Stacking with Virtual Switching Framework (VSF) provides simplicity and scalability. The 2930F supports built-in 1GbE or 10GbE uplinks, PoE+, Access OSPF routing, Tunnel Node, robust QoS, RIP routing, and IPv6 with no software licensing required.

The Aruba 2930F Switch Series provides a convenient and cost-effective access switch solution that can be quickly set up with Zero Touch Provisioning and built-in 10GbE uplinks. The robust Layer 3 feature set includes a limited lifetime warranty.

FEATURES AND BENEFITS

Unified Wired and Wireless

- Aruba ClearPass Policy Manager supports unified wired and wireless policies using Aruba ClearPass Policy Manager
- Switch auto-configuration automatically configures switch for different settings such as VLAN, CoS, PoE max. power, and PoE priority when an Aruba access point is detected
- User Role defines a set of switch-based policies in areas such as security, authentication, and QoS. A user role can be assigned to a group of users or devices, using switch-based local user role or download from ClearPass
- Tunnel Node provides a secure tunnel that transports network traffic on a per-port or per-user role basis to an Aruba Controller. In a per-user role Tunnel Node, users are authenticated by the ClearPass Policy Manager which directs traffic to be tunneled to an Aruba controller or switch locally
- HTTP redirect function supports HPE Intelligent Management Center (IMC) bring your own device (BYOD) solution
- Static IP visibility allows ClearPass to do accounting for clients with static IP address



KEY FEATURES

- Aruba Layer 3 switch series with VSF stacking, static, Rip and Access OSPF Routing, Tunnel Node, ACLs, and robust QoS
- Consistent wired/wireless experience with Aruba AirWave and Aruba ClearPass Policy Manager
- Convenient built-in 1GbE or 10GbE uplinks and up to 740 W PoE+
- Ready for the software defined network with REST APIs and OpenFlow support
- Simple deployment with Zero Touch Provisioning and cloud-based Aruba Central support

Software-defined networks

- Supports multiple programmatic interfaces, including REST APIs and Openflow 1.0 and 1.3, to enable automation of network operations, monitoring, and troubleshooting

Quality of Service (QoS)

- Traffic prioritization (IEEE 802.1p) Allows real-time traffic classification into eight priority levels mapped to eight queues
- Layer 4 prioritization enables prioritization based on TCP/UDP port numbers
- Class of Service (CoS) sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ
- Rate limiting sets per-port Ingress enforced maximums and per-port, per-queue minimums
- Large buffers provide graceful congestion management
- Unknown Unicast Rate Limiting throttles unicast packets with unknown destination addresses and limits flooding on the VLAN

Connectivity

- Flexible 10 Gb/s Ethernet connectivity four fixed 10 Gigabit ports (SFP+) available
- Auto-MDIX provides automatic adjustments for straight-through or crossover cables on all 10/100 and 10/100/1000 ports
- IEEE 802.3at Power over Ethernet (PoE+) provides up to 30 W per port that allows support of the latest PoE+-capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af-compliant end device; eliminates the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments
- Pre-standard PoE support detects and provides power to pre-standard PoE devices
- IPv6
 - IPv6 host enables switches to be managed in an IPv6 network
 - Dual stack (IPv4 and IPv6) transitions from IPv4 to IPv6, supporting connectivity for both protocols
 - MLD snooping forwards IPv6 multicast traffic to the appropriate interface
 - IPv6 ACL/QoS supports ACL and QoS for IPv6 network traffic
 - IPv6 routing supports static and RIPv6 protocols
 - Security provides RA guard, DHCPv6 protection, dynamic IPv6 lockdown, and ND snooping

Performance

- Energy-efficient design
 - 80 PLUS Silver Certified power supply increases power efficiency and savings
 - Energy-efficient Ethernet (EEE) support reduces power consumption in accordance with IEEE 802.3az
- Aruba Provision ASIC architecture is designed with the latest ProVision ASIC, providing very low latency, increased packet buffering, and adaptive power consumption
- Selectable queue configurations allows for increased performance by selecting the number of queues and associated memory buffering that best meet the requirements of the network applications

Convergence

- IP multicast snooping and data-driven IGMP automatically prevents flooding of IP multicast traffic
- LLDP-MED (Media Endpoint Discovery) defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP) facilitates easy mapping using network management applications with LLDP automated device discovery protocol
- PoE and PoE+ allocations support multiple methods (automatic, IEEE 802.3at dynamic, LLDP-MED fine grain, IEEE 802.3af device class, or user-specified) to allocate and manage PoE/PoE+ power for more efficient energy savings
- Local MAC Authentication assigns attributes such as VLAN and QoS using locally configured profile that can be a list of MAC prefixes
- IP multicast routing includes PIM Sparse and Dense modes to route IP multicast traffic (limited to 16 interfaces)
- Protocol Independent Multicast for IPv6 supports one-to-many and many-to-many media casting use cases such as IPTV over IPv6 networks

Resiliency and high availability

- Virtual Switching Framework (VSF) creates one virtual resilient switch from up to four switches; servers or switches can be attached using standard LACP for automatic load balancing and high availability; simplify network operation by reduce the need for complex protocols like Spanning Tree Protocol (STP), Equal-Cost Multipath (ECMP), and VRRP
- IEEE 802.1s Multiple Spanning Tree provides high link availability in multiple VLAN environments by allowing Multiple Spanning Trees; provides legacy support for IEEE 802.1d and IEEE 802.1w
- Virtual Router Redundancy Protocol (VRRP) allows groups of two routers to dynamically back each other up to create highly available routed environments for IPv4 and IPv6 networks (limited to 128 VRs)
- IEEE 802.3ad link aggregation control protocol (LACP) and port trunking support up to 128 static, dynamic, or distributed trunks active across a stack, with each trunk having up to eight links (ports) per static trunk; and offer support for trunking across stack members
- SmartLink provides easy-to-configure link redundancy of active and standby links

Management

- SNMPv1, v2, and v3 provide complete support of SNMP; provide full support of industry-standard Management Information Base (MIB) plus private extensions; SNMPv3 supports increased security using encryption
- Aruba Central cloud-based management platform offers a simple, secure and cost-effective way to manage switches

- Zero Touch Provisioning (ZTP) simplifies installation of the switch infrastructure using the Aruba Activate-based or a DHCP-based process with AirWave Network Management
- Supports multiple programmatic interfaces, including REST APIs and Openflow 1.0 and 1.3, to enable automation of network operations, monitoring, and troubleshooting.

Manageability

- Dual flash images provide independent primary and secondary operating system files for backup while upgrading
- Friendly port names allow assignment of descriptive names to ports
- Find-Fix-Inform finds and fixes common network problems automatically, then informs administrator
- Multiple configuration files allow multiple configuration files to be stored to a flash image
- Software updates free downloads from the Web
- RMON, XRMON, and sFlow® provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- Troubleshooting ingress and egress port monitoring enable network problem solving
- Unidirectional link detection (UDLD) monitors the link between two switches and blocks the ports on both ends of the link if the link goes down at any point between the two devices
- IP SLA for Voice monitors quality of voice traffic using the UDP Jitter and UDP Jitter for VoIP tests

Layer 2 switching

- VLAN support and tagging support IEEE 802.1Q (4,094 VLAN IDs) and 2K VLANs simultaneously
- Jumbo packet support improves the performance of large data transfers; supports frame size of up to 9,220 bytes
- IEEE 802.1v protocol VLANs isolate select non-IPv4 protocols automatically into their own VLANs
- Rapid Per-VLAN Spanning Tree (RPVST+) allows each VLAN to build a separate spanning tree to improve link bandwidth usage; is compatible with PVST+
- GVRP and MVRP allows automatic learning and dynamic assignment of VLANs
- VxLAN encapsulation (tunnelling) protocol for overlay network that enables a more scalable virtual network deployment

Layer 3 services

- DHCP server centralizes and reduces the cost of IPv4 address management

Layer 3 routing

- Static IP routing provides manually configured routing; includes ECMP capability
- 256 static and 10,000 RIP routes facilitate segregation of user data, without adding external hardware
- Routing Information Protocol (RIP) provides RIPv1, RIPv2, and RIPvng routing
- Access OSPF
 - Provide OSPFv2 and OSPFv3 protocols for routing between access and the next layer on the LAN. Only one OSPF area and up to 8 interfaces are supported.
- Policy-based routing uses a classifier to select traffic that can be forwarded based on policy set by the network administrator (limited to 16 next hop routes)

Security

- Control Plane Policing sets rate limit on control protocols to protect CPU overload from DOS attacks
- Multiple user authentication methods
 - IEEE 802.1X uses an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server to authenticate in accordance with industry standards
 - Web-based authentication provides a browser-based environment, similar to IEEE 802.1X, to authenticate clients that do not support the IEEE 802.1X supplicant
 - MAC-based authentication authenticates the client with the RADIUS server based on the client's MAC address
- Authentication flexibility
 - Multiple IEEE 802.1X users per port provides authentication of multiple IEEE 802.1X users per port; prevents a user from "piggybacking" on another user's IEEE 802.1X authentication
 - Concurrent IEEE 802.1X, Web, and MAC authentication schemes per port switch port will accept up to 32 sessions of IEEE 802.1X, Web, and MAC authentications
- Access control lists (ACLs) provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number
- Source-port filtering allows only specified ports to communicate with each other
- RADIUS/TACACS+ eases switch management security administration by using a password authentication server
- Secure shell encrypts all transmitted data for secure remote CLI access over IP networks
- Secure Sockets Layer (SSL) encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch

- Port security allows access only to specified MAC addresses, which can be learned or specified by the administrator
- MAC address lockout prevents particular configured MAC addresses from connecting to the network
- Secure FTP allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- Switch management logon security helps secure switch CLI logon by optionally requiring either RADIUS or TACACS+ authentication
- Custom banner displays security policy when users log in to the switch
- STP BPDU port protection blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- DHCP protection blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- Dynamic ARP protection blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- STP root guard protects the root bridge from malicious attacks or configuration mistakes
- Identity-driven ACL enables implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user
- Per-port broadcast throttling configures broadcast control selectively on heavy traffic port uplinks
- Private VLAN provides network security by restricting peer-to-peer communication to prevent a variety of malicious attacks; typically a switch port can only communicate with other ports in the same community and/or an uplink port, regardless of VLAN ID or destination MAC address
- Open Authentication Role simplifies first-time deployment of AAA in brownfield deployments by allowing full network access for failed clients and provides instant connectivity as soon as a client is plugged-in
- Critical Authentication Role ensures that important infrastructure devices such as IP phones are allowed network access even in the absence of a RADIUS server
- MAC Pinning allows non-chatty legacy devices to stay authenticated by pinning client MAC addresses to the port until the clients logoff or get disconnected

Monitor and diagnostics

- Digital optical monitoring of SFP+ and 1000BASE-T transceivers allows detailed monitoring of the transceiver settings and parameters

Warranty and support

- Limited Lifetime Warranty: See www.hpe.com/networking/warrantysummary for warranty and support information included with your product purchase.
- Software releases: To find software for your product, refer to www.hpe.com/networking/support; for details on the software releases available with your product purchase, refer to www.hpe.com/networking/warrantysummary

SPECIFICATIONS



Aruba 2930F 24G 4SFP+ Switch
(JL253A)



Aruba 2930F 48G 4SFP+ Switch
(JL254A)



Aruba 2930F 24G PoE+ 4SFP+ Switch
(JL255A)

I/O ports and slots

24 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only
4 SFP+ 1/10GbE ports; PHY-less

48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only
4 SFP+ 1/10GbE ports; PHY-less

24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only
4 SFP+ 1/10GbE ports; PHY-less

Additional ports and slots

1 dual-personality (RJ-45 or USB micro-B) serial console port

1 dual-personality (RJ-45 or USB micro-B) serial console port

1 dual-personality (RJ-45 or USB micro-B) serial console port

Physical characteristics

Dimensions

17.42 (w) x 7.88 (d) x 1.73 (h) in
(44.25 x 20.02 x 4.39 cm)
(1U height)

17.42 (w) x 9.7 (d) x 1.73 (h) in
(44.25 x 24.63 x 4.39 cm)
(1U height)

17.42 (w) x 11.98 (d) x 1.73 (h) in
(44.25 x 30.42 x 4.39 cm)
(1U height)

Weight

5.31 lb (2.41 kg)

6.83 lb (3.10 kg)

8.6 lb (3.9 kg)

Memory and processor

Dual Core ARM® Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC

Dual Core ARM Cortex @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC

Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC

Performance

IPv6 Ready Certified

IPv6 Ready Certified

IPv6 Ready Certified

1,000 Mb Latency

< 3.8 µs (64-byte packets)

< 3.8 µs (64-byte packets)

< 3.8 µs (64-byte packets)

10 Gbps Latency

< 1.6 µs (64-byte packets)

< 1.6 µs (64-byte packets)

< 1.6 µs (64-byte packets)

Throughput

up to 95.2 Mpps

up to 112.0 Mpps

up to 95.2 Mpps

Switching capacity

128 Gbps

176 Gbps

128 Gbps

Routing table size

2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP

2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP

2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP

MAC address table size

32,768 entries

32,768 entries

32,768 entries

Environment

Operating temperature

32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet

32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet

32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet

Operating relative humidity

15% to 95% @ 104°F (40°C), noncondensing

15% to 95% @ 104°F (40°C), noncondensing

15% to 95% @ 104°F (40°C), noncondensing

Non-operating/Storage temperature

-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet

-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet

-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet

Non-operating/Storage relative humidity

15% to 95% @ 149°F (65°C), noncondensing

15% to 95% @ 149°F (65°C), noncondensing

15% to 95% @ 149°F (65°C)

Acoustic

Power: 49.7 dB, Pressure: 37.1 dB

Power: 54.1 dB, Pressure: 40.2 dB

Power: 54.1 dB, Pressure: 40.6 dB

Airflow direction

Side-to-side

Side-to-side

Side-to-side

SPECIFICATIONS



Aruba 2930F 24G 4SFP+ Switch
(JL253A)



Aruba 2930F 48G 4SFP+ Switch
(JL254A)



Aruba 2930F 24G PoE+ 4SFP+
Switch (JL255A)

Electrical characteristics

Frequency	50/60 Hz	50/60 Hz	50/60 Hz
80plus.org Certification			Silver
Maximum heat dissipation	100 BTU/hr (105.5 kJ/hr)	157.2 BTU/hr (165.8 kJ/hr)	258.0 BTU/hr (272.2 kJ/hr)
Voltage	100 - 127 / 200 - 240 VAC, rated	100 - 127 / 200 - 240 VAC, rated	100 - 127 / 200 - 240 VAC, rated
Current	0.6/0.4 A	0.9/0.6 A	4.9/2.4 A
Maximum power rating	29.3 W	46.6 W	445 W
Idle power	19.5 W	32.7 W	36.8 W
PoE power			370 W PoE+
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

Safety

UL 69050-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825- 1:2014 Class 1	UL 69050-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825- 1:2014 Class 1	UL 69050-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825- 1:2014 Class 1
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Emissions

EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438
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Immunity

Generic	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and Interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	IEC/EN 61000-3-2	IEC/EN 61000-3-2	IEC/EN 61000-3-2
Flicker	IEC/EN 61000-3-3	IEC/EN 61000-3-3	IEC/EN 61000-3-3

SPECIFICATIONS

			
	Aruba 2930F 24G 4SFP+ Switch (JL253A)	Aruba 2930F 48G 4SFP+ Switch (JL254A)	Aruba 2930F 24G PoE+ 4SFP+ Switch (JL255A)
Management	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP; Out-of-band management (serial RS-232C or micro USB)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP; Out-of-band management (serial RS-232C or micro USB)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP; Out-of-band management (serial RS-232C or micro USB)
Services	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

SPECIFICATIONS



Aruba 2930F 48G PoE+ 4SFP+ Switch
(JL256A)



Aruba 2930F 8G PoE+ 2SFP+ Switch
(JL258A)



Aruba 2930F 24G 4SFP Switch
(JL259A)

I/O ports and slots

48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only
4 SFP+ 1/10GbE ports; PHY-less

8 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only
2 SFP+ 1/10GbE ports; PHY-less

24 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only
4 SFP

Additional ports and slots

1 dual-personality (RJ-45 or USB micro-B) serial console port

1 dual-personality (RJ-45 or USB micro-B) serial console port

1 dual-personality (RJ-45 or USB micro-B) serial console port

Physical characteristics

Dimensions

17.42 (w) x 11.98 (d) x 1.73 (h) in
(44.25 x 30.42 x 4.39 cm)
(1U height)

10 (w) x 10 (d) x 1.73 (h) in
(25.4 x 25.4 x 4.39 cm)
(1U height)

17.42 (w) x 7.88 (d) x 1.73 (h) in
(44.25 x 20.02 x 4.39 cm)
(1U height)

Weight

9.83 lb (4.46 kg)

4.41 lb (2.0 kg)

5.31 lb (2.41 kg)

Memory and processor

Dual Core ARM Cortex @ 1016 MHz, 1 GB DDR3 SDRAM;
Packet buffer size: 12.38 MB
4.5MB Ingress/7.875MB Egress,
4 GB eMMC

Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM;
Packet buffer size: 12.38 MB
4.5MB Ingress/7.875 Egress,
4 GB eMMC

Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM;
Packet buffer size: 12.38 MB
4.5MB Ingress/7.875MB Egress,
4 GB eMMC




Performance

	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
1,000 Mb Latency	< 3.8 μ s (64-byte packets)	< 3.8 μ s (64-byte packets)	< 3.8 μ s (64-byte packets)
10 Gbps Latency	< 1.6 μ s (64-byte packets)	< 1.6 μ s (64-byte packets)	
Throughput	up to 112.0 Mpps	up to 41.7 Mpps	up to 41.7 Mpps
Switching capacity	176 Gbps	56 Gbps	56 Gbps
Routing table size	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
MAC address table size	32,768 entries	32,768 entries	32,768 entries

Environment

Operating temperature	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet
Non-operating/Storage relative humidity	15% to 95% @ 149°F (65°C)	15% to 95% @ 149°F (65°C)	15% to 95% @ 149°F (65°C), noncondensing
Acoustic	Power: 55.7 dB, Pressure: 41.7 dB	Power: 0 dB, Pressure: 0 dB Fanless	Power: 49.7 dB, Pressure: 37.1 dB
Airflow direction	Side-to-side		Side-to-side

SPECIFICATIONS

			
	Aruba 2930F 48G PoE+ 45FP+ Switch (JL256A)	Aruba 2930F 8G PoE+ 25FP+ Switch (JL258A)	Aruba 2930F 24G 45FP Switch (JL259A)
Electrical characteristics			
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
80plus.org Certification	Silver		
Description		Power supply meets DoE VI certification.	
Maximum heat dissipation	293.0 BTU/hr (309.1 kJ/hr)	58.6 BTU/hr (61.8 kJ/hr)	100 BTU/hr (105.5 kJ/hr)
Voltage	100 - 127 / 200 - 240 VAC, rated	90 - 264 VAC, rated	100 - 127 / 200 - 240 VAC, rated
Current	5.1/2.5 A	2.6 A	0.6/0.4 A
Maximum power rating	459 W	155 W	29.3 W
Idle power	48.6 W		19.5 W
PoE power	370 W PoE+	125 W PoE+	
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.
Safety			
	UL 69050-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825-1:2014 Class 1	UL 69050-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825-1:2014 Class 1	UL 69050-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825-1:2014 Class 1
Emissions			
	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438
Immunity			
Generic	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and Interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	IEC/EN 61000-3-2	IEC/EN 61000-3-2	IEC/EN 61000-3-2
Flicker	IEC/EN 61000-3-3	IEC/EN 61000-3-3	IEC/EN 61000-3-3

SPECIFICATIONS



Aruba 2930F 48G PoE+ 4SFP+ Switch
(JL256A)



Aruba 2930F 8G PoE+ 2SFP+ Switch
(JL258A)



Aruba 2930F 24G 4SFP Switch
(JL259A)

Management

Aruba Central; Aruba AirWave
Network Management; IMC –
Intelligent Management Center;
Command-line interface; Web
browser; Configuration menu;
SNMP manager; Telnet; RMON1;
FTP; Out-of-band management
(serial RS-232C or micro USB)

Aruba Central; Aruba AirWave
Network Management; IMC –
Intelligent Management Center;
Command-line interface; Web
browser; Configuration menu;
SNMP manager; Telnet; RMON1;
FTP; Out-of-band management
(serial RS-232C or micro USB)

Aruba Central; Aruba AirWave
Network Management; IMC –
Intelligent Management Center;
Command-line interface; Web
browser; Configuration menu;
SNMP manager; Telnet; RMON1;
FTP; Out-of-band management
(serial RS-232C or micro USB)




Services

Refer to the Hewlett Packard
Enterprise website at
www.hpe.com/networking/services
for details on the service-level
descriptions and product numbers.
For details about services and
response times in your area, please
contact your local Hewlett Packard
Enterprise sales office.

Refer to the Hewlett Packard
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www.hpe.com/networking/services
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Refer to the Hewlett Packard
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for details on the service-level
descriptions and product numbers.
For details about services and
response times in your area, please
contact your local Hewlett Packard
Enterprise sales office.

SPECIFICATIONS

			
	Aruba 2930F 48G 4SFP Switch (JL260A)	Aruba 2930F 24G PoE+ 4SFP Switch (JL261A)	Aruba 2930F 48G PoE+ 4SFP Switch (JL262A)
I/O ports and slots	48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP	24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP	48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP
Additional ports and slots	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port	1 dual-personality (RJ-45 or USB micro-B) serial console port
Physical characteristics			
Dimensions	17.42 (w) x 9.7 (d) x 1.73 (h) in (44.25 x 24.63 x 4.39 cm) (1U height)	17.42 (w) x 11.98 (d) x 1.73 (h) in (44.25 x 30.42 x 4.39 cm) (1U height)	17.42 (w) x 11.98 (d) x 1.73 (h) in (44.25 x 30.42 x 4.39 cm) (1U height)
Weight	6.83 lb (3.10 kg)	8.6 lb (3.9 kg)	9.83 lb (4.46 kg)
Memory and processor	Dual Core ARM Cortex @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC	Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC	Dual Core ARM Cortex @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB 4.5MB Ingress/7.875MB Egress, 4 GB eMMC
Performance			
IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
1,000 Mb Latency	< 3.8 μ s (64-byte packets)	< 3.8 μ s (64-byte packets)	< 3.8 μ s (64-byte packets)
Throughput	up to 77.4 Mpps	up to 41.7 Mpps	up to 77.4 Mpps
Switching capacity	104 Gbps	56 Gbps	104 Gbps
Routing table size	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
MAC address table size	32,768 entries	32,768 entries	32,768 entries
Environment			
Operating temperature	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet	32°F to 113°F (0°C to 45°C); up to 5,000 Feet, 0°C to 40°C (32°F to 104°F) up to 10,000 Feet
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Non-operating/Storage temperature	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet	-40°F to 158°F (-40°C to 70°C); up to 15,000 Feet
Non-operating/Storage relative humidity	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C)	15% to 95% @ 149°F (65°C)
Acoustic	Power: 54.1 dB, Pressure: 40.2 dB	Power: 54.1 dB, Pressure: 40.6 dB	Power: 55.7 dB, Pressure: 41.7 dB
Airflow direction	Side-to-side	Side-to-side	Side-to-side

SPECIFICATIONS



Aruba 2930F 48G 4SFP Switch
(JL260A)



Aruba 2930F 24G PoE+ 4SFP Switch
(JL261A)



Aruba 2930F 48G PoE+ 4SFP Switch
(JL262A)

Electrical characteristics

Frequency	50/60 Hz	50/60 Hz	50/60 Hz
80plus.org Certification		Silver	Silver
Maximum heat dissipation	100.0 BTU/hr (105.5 kJ/hr)	258.0 BTU/hr (272.2 kJ/hr)	293.0 BTU/hr (309.1 kJ/hr)
Voltage	100 - 127 / 200 - 240 VAC, rated	100 - 127 / 200 - 240 VAC, rated	100 - 127 / 200 - 240 VAC, rated
Current	0.9/0.6 A	4.9/2.4 A	5.1/2.5 A
Maximum power rating	46.6 W	445 W	459 W
Idle power	32.7 W	36.8 W	48.6 W
PoE power		370 W PoE+	370 W PoE+
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

Safety

UL 69050-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825- 1:2014 Class 1	UL 69050-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825- 1:2014 Class 1	UL 69050-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950-1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825-1:2014 / IEC 60825- 1:2014 Class 1
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Emissions

EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438	EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438
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Immunity

Generic	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24	EN 55024:2010/CISPR 24
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3	IEC 61000-4-3	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4	IEC 61000-4-4	IEC 61000-4-4
Surge	IEC 61000-4-5	IEC 61000-4-5	IEC 61000-4-5
Conducted	IEC 61000-4-6	IEC 61000-4-6	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8	IEC 61000-4-8	IEC 61000-4-8
Voltage dips and Interruptions	IEC 61000-4-11	IEC 61000-4-11	IEC 61000-4-11
Harmonics	IEC/EN 61000-3-2	IEC/EN 61000-3-2	IEC/EN 61000-3-2
Flicker	IEC/EN 61000-3-3	IEC/EN 61000-3-3	IEC/EN 61000-3-3

SPECIFICATIONS

			
	Aruba 2930F 48G 4SFP Switch (JL260A)	Aruba 2930F 24G PoE+ 4SFP Switch (JL261A)	Aruba 2930F 48G PoE+ 4SFP Switch (JL262A)
Management	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP; Out-of-band management (serial RS-232C or micro USB)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP; Out-of-band management (serial RS-232C or micro USB)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; SNMP manager; Telnet; RMON1; FTP; Out-of-band management (serial RS-232C or micro USB)
Services	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

SPECIFICATIONS



Aruba 2930F 48G PoE+ 4SFP 740W Switch
(JL557A)



Aruba 2930F 48G PoE+ 4SFP+ 740W Switch
(JL558A)

I/O ports and slots

48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP 1/10GbE ports; PHY-less

48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 SFP+ 1/10GbE ports; PHY-less

Additional ports and slots

1 dual-personality (RJ-45 or USB micro-B) serial console port

1 dual-personality (RJ-45 or USB micro-B) serial console port

Physical characteristics

Dimensions 17.42 (w) x 12.77 (d) x 1.73 (h) in
(44.25 x 32.42 x 4.39 cm)
(1U height)

Dimensions 17.42 (w) x 12.77 (d) x 1.73 (h) in
(44.25 x 32.42 x 4.39 cm)
(1U height)

Weight 10.56 lb (4.79 kg)

Weight 10.56 lb (4.79 kg)

Memory and processor

Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB
4.5 MB Ingress/7.785 Egress, 4 GB eMMC

Dual Core ARM Cortex A9 @ 1016 MHz, 1 GB DDR3 SDRAM; Packet buffer size: 12.38 MB
4.5 MB Ingress/7.785 Egress, 4 GB eMMC

Performance

1,000 Mb Latency < 3.8 μ s (64-byte packets)
10 Gbps latency < 1.6 μ s (64-byte packets)
Throughput up to 112.0 Mpps
Switching capacity 176 Gbps
Routing table size 2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
MAC address table size 32,768 entries

< 3.8 μ s (64-byte packets)
< 1.6 μ s (64-byte packets)
up to 112.0 Mpps
176 Gbps
2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
32,768 entries

Environment

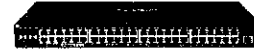
Operating temperature 32°F to 113°F (0°C to 45°C);
up to 5,000 Feet,
0°C to 40°C (32°F to 104°F)
up to 10,000 Feet
Operating relative humidity 15% to 95% @ 104°F (40°C),
noncondensing
Non-operating/Storage temperature -40°F to 158°F (-40°C to 70°C);
up to 15,000 Feet
Non-operating/Storage relative humidity 15% to 95% @ 149°F (65°C)
Acoustic Power: 55.1 dB, Pressure: 41.1 dB
Airflow direction Side-to-side

32°F to 113°F (0°C to 45°C);
up to 5,000 Feet,
0°C to 40°C (32°F to 104°F)
up to 10,000 Feet
15% to 95% @ 104°F (40°C),
noncondensing
-40°F to 158°F (-40°C to 70°C);
up to 15,000 Feet
15% to 95% @ 149°F (65°C)
Power: 55.1 dB, Pressure: 41.1 dB
Side-to-side

SPECIFICATIONS



Aruba 2930F 48G PoE+ 4SFP 740W Switch
(JL557A)



Aruba 2930F 48G PoE+ 4SFP+ 740W Switch
(JL558A)

Electrical characteristics

Frequency 50/60 Hz

80plus.org Certification Gold

Maximum heat dissipation 420.9 BTU/hr (444.1 kJ/hr)

Voltage 100 - 127/200 - 240 VAC, rated

Current 9.2/4.9 A

Maximum power rating 980 W

Idle power 49.9 W

PoE power 740 W PoE+

Notes Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

50/60 Hz

Gold

420.9 BTU/hr (444.1 kJ/hr)

100 - 127/200 - 240 VAC, rated

9.2/4.9 A

980 W

49.9 W

740 W PoE+

Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

Safety

UL 60950-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950- 1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825- 1:2014 / IEC 60825-1:2014 Class 1

UL 60950-1: 2nd Edition; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; IEC 60950- 1:2005 +A1:2009 +A2:2013; CSA 22.2 No. 60950-1-07 2nd; EN 60825- 1:2014 / IEC 60825-1:2014 Class 1

Emissions

EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438

EN 55032:2012/CISPR 32 Class A; FCC CFR 47 Part 15 Class A; VCCI Class A; ICES-003 Class A; CNS 13438

Immunity

Generic EN 55024:2010/CISPR 24

EN 55024:2010/CISPR 24

ESD IEC 61000-4-2

IEC 61000-4-2

Radiated IEC 61000-4-3

IEC 61000-4-3

EFT/Burst IEC 61000-4-4

IEC 61000-4-4

Surge IEC 61000-4-5

IEC 61000-4-5

Conducted IEC 61000-4-6

IEC 61000-4-6

Power frequency magnetic field IEC 61000-4-8

IEC 61000-4-8

Voltage dips and Interruptions IEC 61000-4-11

IEC 61000-4-11

Harmonics IEC/EN 61000-3-2

IEC/EN 61000-3-2

Flicker IEC/EN 61000-3-3

IEC/EN 61000-3-3

SPECIFICATIONS



Aruba 2930F 48G PoE+ 4SFP 740W Switch
(JL557A)



Aruba 2930F 48G PoE+ 4SFP+ 740W Switch
(JL558A)

Management

Aruba Central; Aruba AirWave Network Management;
IMC – Intelligent Management Center; Command-line
Interface; Web browser; Configuration menu;
SNMP manager; Telnet; RMON1; FTP; Out-of-band
management (serial RS-232C or micro USB)

Aruba Central; Aruba AirWave Network Management;
IMC – Intelligent Management Center; Command-line
Interface; Web browser; Configuration menu;
SNMP manager; Telnet; RMON1; FTP; Out-of-band
management (serial RS-232C or micro USB)

Services

Refer to the Hewlett Packard Enterprise website at
www.hpe.com/networking/services for details on the
service-level descriptions and product numbers. For
details about services and response times in your area,
please contact your local Hewlett Packard Enterprise
sales office.

Refer to the Hewlett Packard Enterprise website at
www.hpe.com/networking/services for details on the
service-level descriptions and product numbers. For
details about services and response times in your area,
please contact your local Hewlett Packard Enterprise
sales office.

STANDARDS AND PROTOCOLS
(APPLIES TO ALL PRODUCTS IN SERIES)

Denial of service protection

- CPU DoS Protection

Device management

- RFC 1155 Structure and Management Information (SMIv1)
- RFC 1157 SNMPv1/v2c
- RFC 1591 DNS (client)
- RFC 1901 (Community based SNMPv2)
- RFC 1901-1907 SNMPv2c, SMIv2 and Revised MIB-II
- RFC 1908 (SNMPv1/v2 Coexistence)
- RFC 2576 (Coexistence between SNMPv1, v2, v3)
- RFC 2578-2580 SMIv2
- RFC 2579 (SMIv2 Text Conventions)
- RFC 2580 (SMIv2 Conformance)
- RFC 2819 (RMON groups Alarm, Event, History, and Statistics only)
- RFC 3416 (SNMP Protocol Operations v2)
- RFC 3417 (SNMP Transport Mappings)
- HTML and Telnet management
- HTTP, SSHv1, and Telnet
- Multiple Configuration Files
- Multiple Software Images
- SNMPv3 and RMON RFC support
- SSHv1/SSHv2 Secure Shell
- TACACS/TACACS+
- Web UI

General protocols

- IEEE 802.1AX-2008 Link Aggregation
- IEEE 802.1d MAC Bridges
- IEEE 802.1p Priority
- IEEE 802.1Q VLANs
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3af Power over Ethernet
- IEEE 802.3at PoE+
- IEEE 802.3az Energy Efficient Ethernet
- IEEE 802.3x Flow Control
- RFC 768 UDP
- RFC 783 TFTP Protocol (revision 2)
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 854 TELNET
- RFC 868 Time Protocol
- RFC 951 BOOTP

- RFC 1058 RIPv1
- RFC 1256 ICMP Router Discovery Protocol (IRDP)
- RFC 1350 TFTP Protocol (revision 2)
- IEEE 802.1v VLAN classification by Protocol and Port
- RFC 1519 CIDR IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- RFC 1542 BOOTP Extensions IEEE 802.3ab 1000BASE-T
- RFC 1918 Address Allocation for Private Internet
- RFC 2030 Simple Network Time Protocol (SNTP) v4
- RFC 2131 DHCP
- RFC 2236 IGMP Snooping
- RFC 2453 RIPv2
- RFC 2865 Remote Authentication Dial In User Service (RADIUS)
- RFC 2866 RADIUS Accounting
- RFC 3046 DHCP Relay Agent Information Option
- RFC 3411 An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks
- RFC 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
- RFC 3413 Simple Network Management Protocol (SNMP) Applications
- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3416 Protocol Operations for SNMP
- RFC 3417 Transport Mappings for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 3575 IANA Considerations for RADIUS
- RFC 3576 Ext to RADIUS (CoA only)
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches
- RFC 4675 RADIUS VLAN & Priority
- RFC 4861 Neighbor Discovery for IP version 6 (IPv6)
- RFC 4862 IPv6 Stateless Address Autoconfiguration
- RFC 5905 Network Time Protocol Version 4: Protocol and Algorithms Specification
- UDLD (Uni-directional Link Detection)

IP multicast

- RFC 1112 IGMP
- RFC 2236 IGMPv2
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 3376 IGMPv3
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches

IPv6

- RFC 1981 IPv6 Path MTU Discovery
- RFC 2080 RIPng for IPv6
- Protocol Applicability Statement
- RFC 2082 RIP-2 MD5
- RFC 2460 IPv6 Specification
- RFC 2464 Transmission of IPv6 over Ethernet Networks
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only)
- RFC 2925 Remote Operations MIB (Ping only)
- RFC 3019 MLDv1 MIB
- RFC 3315 DHCPv6 (client and relay)
- RFC 3484 Default Address Selection for IPv6
- RFC 3513 IPv6 Addressing Architecture
- RFC 3596 DNS Extension for IPv6
- RFC 3810 MLDv2 for IPv6
- RFC 4022 MIB for TCP
- RFC 4113 MIB for UDP
- RFC 4251 SSHv6 Architecture
- RFC 4252 SSHv6 Authentication
- RFC 4253 SSHv6 Transport Layer
- RFC 4254 SSHv6 Connection
- RFC 4291 IP Version 6 Addressing Architecture
- RFC 4293 MIB for IP
- RFC 4419 Key Exchange for SSH
- RFC 4443 ICMPv6
- RFC 4541 IGMP & MLD Snooping Switch
- RFC 4861 IPv6 Neighbor Discovery
- RFC 4862 IPv6 Stateless Address Auto-configuration
- RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
- RFC 6620 FCFS SAVI
- draft-ietf-savi-mix

MIBs

- IEEE 802.1ap (MSTP and STP MIB's only)
- IEEE 8021-Bridge-MIB (2008)
- IEEE 8021-Q-Bridge-MIB (2008)
- RFC 1155 Structure & ID of Management Information for TCP/IP Internets
- RFC 1156 (TCP/IP MIB)
- RFC 1157 A Simple Network Management Protocol (SNMP)
- RFC 1213 MIB II
- RFC 1493 Bridge MIB
- RFC 1724 RIPv2 MIB
- RFC 2021 RMONv2 MIB
- RFC 2578 Structure of Management Information Version 2 (SMIv2)
- RFC 2579 Textual Conventions for SMIv2
- RFC 2580 Conformance Statements for SMIv2
- RFC 2613 SMON MIB
- RFC 2618 RADIUS Client MIB
- RFC 2620 RADIUS Accounting MIB
- RFC 2665 Ethernet-Like-MIB
- RFC 2668 802.3 MAU MIB
- RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
- RFC 2737 Entity MIB (version 2)
- RFC 2819 RMON MIB
- RFC 2863 The Interfaces Group MIB
- RFC 2925 Ping MIB
- RFC 2932 IP (Multicast Routing MIB)
- RFC 2933 IGMP MIB
- RFC 3414 SNMP-User based-SM MIB
- RFC 3415 SNMP-View based-ACM MIB
- RFC 3417 Simple Network Management Protocol (SNMP) over IEEE 802 Networks
- RFC 3418 MIB for SNMPv3
- RFC 4836 Managed Objects for 802.3 Medium Attachment Units (MAU)

Network management

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- RFC 1155 Structure of Management Information
- RFC 1157 SNMPv1
- RFC 2021 Remote Network Monitoring Management Information Base version 2 using SMIPv2
- RFC 2576 Coexistence between SNMP versions
- RFC 2578 Structure of Management Information Version 2 (SMIPv2)
- RFC 2579 Textual Conventions for SMIPv2
- RFC 2580 Conformance Statements for SMIPv2
- RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm), and 9 (events)
- RFC 2819 Remote Network Monitoring Management Information Base
- RFC 2856 Textual Conventions for Additional High Capacity Data Types
- RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations Applications
- RFC 3164 BSD syslog Protocol
- RFC 3176 sFlow
- RFC 3411 SNMP Management Frameworks
- RFC 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
- RFC 3413 Simple Network Management Protocol (SNMP) Applications
- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 5424 Syslog Protocol
- ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)
- SNMPv1/v2c/v3 XRMON

QoS/CoS

- IEEE 802.1p (CoS)
- RFC 2474 DiffServ Precedence, including 8 queues/port
- RFC 2475 DiffServ Architecture
- RFC 2597 DiffServ Assured Forwarding (AF)
- RFC 2598 DiffServ Expedited Forwarding (EF)
- Ingress Rate Limiting

Security

- IEEE 802.1X Port Based Network Access Control
- RFC 1321 The MD5 Message-Digest Algorithm
- RFC 1334 PPP Authentication Protocols (PAP)
- RFC 1492 An Access Control Protocol, Sometimes Called TACACS
- RFC 1492 TACACS+
- RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
- RFC 2082 RIP-2 MD5 Authentication
- RFC 2104 Keyed-Hashing for Message Authentication
- RFC 2138 RADIUS Authentication
- RFC 2139 RADIUS Accounting
- RFC 2246 Transport Layer Security (TLS)
- RFC 2548 Microsoft® Vendor-specific RADIUS Attributes
- RFC 2618 RADIUS Authentication Client MIB
- RFC 2620 RADIUS Accounting Client MIB
- RFC 2716 PPP EAP-TLS Authentication Protocol
- RFC 2818 HTTP Over TLS
- RFC 2865 RADIUS (client only)
- RFC 2865 RADIUS Authentication
- RFC 2866 RADIUS Accounting
- RFC 2867 RADIUS Accounting Modifications for Tunnel Protocol Support
- RFC 2868 RADIUS Attributes for Tunnel Protocol Support
- RFC 2869 RADIUS Extensions
- RFC 2882 NAS Requirements: Extended RADIUS Practices
- RFC 3162 RADIUS and IPv6
- RFC 3576 Dynamic Authorization Extensions to RADIUS
- RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)
- RFC 3580 IEEE 802.1X RADIUS
- RFC 3580 IEEE 802.1X Remote Authentication Dial In User Service (RADIUS) Usage Guidelines
- RFC 4576 RADIUS Attributes Access Control Lists (ACLs)
- draft-grant-tacacs-02 (TACACS)
- Guest VLAN for 802.1X
- MAC Authentication
- MAC Lockdown
- MAC Lockout
- Port Security
- RFC Secure Sockets Layer (SSL)
- SSHv2 Secure Shell
- Web Authentication

ARUBA 2930F SWITCH SERIES ACCESSORIES

Transceivers

- Aruba 100M SFP LC FX 2km MMF XCVR (J9054D)
- Aruba 1G SFP LC SX 500m MMF XCVR (J4858D)
- Aruba 1G SFP LC LX 10km SMF XCVR (J4859D)
- Aruba 1G SFP LC LH 70km SMF XCVR (J4860D)
- Aruba 1G SFP RJ45 T 100m Cat5e XCVR (J8177D)
- Aruba 10G SFP+ LC SR 300m MMF XCVR (J9150D)
- Aruba 10G SFP+ LC LR 10km SMF XCVR (J9151D)
- Aruba 10G SFP+ LC ER 40km SMF XCVR (J9153D)
- Aruba 10G SFP+ to SFP+ 1m DAC Cable (J9281D)
- Aruba 10G SFP+ to SFP+ 3m DAC Cable (J9283D)

Cables

- Aruba X2C2 RJ45 to DB9 Console Cable (JL448A)
- HPE 0.5 m Multimode OM3 LC/LC Optical Cable (AJ833A)
- HPE 1 m Multimode OM3 LC/LC Optical Cable (AJ834A)
- HPE 2 m Multimode OM3 LC/LC Optical Cable (AJ835A)
- HPE 5 m Multimode OM3 LC/LC Optical Cable (AJ836A)
- HPE 15 m Multimode OM3 LC/LC Optical Cable (AJ837A)
- HPE 30 m Multimode OM3 LC/LC Optical Cable (AJ838A)
- HPE 50 m Multimode OM3 LC/LC Optical Cable (AJ839A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable (QK732A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable (QK733A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable (QK734A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable (QK735A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable (QK736A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable (QK737A)

Aruba 2930F 24G 4SFP+ Switch (JL253A)

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)

Aruba 2930F 48G 4SFP+ Switch (JL254A)

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)

Aruba 2930F 24G PoE+ 4SFP+ Switch (JL255A)

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)

Aruba 2930F 48G PoE+ 4SFP+ Switch (JL256A)

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)

Aruba 2930F 8G PoE+ 2SFP+ Switch (JL258A)

- Aruba 2930F 8-port Cable Guard (JL311A)
- Aruba 2930F 8-port Power Shelf (JL312A)

Aruba 2930F 24G 4SFP Switch (JL259A)

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)

Aruba 2930F 48G 4SFP Switch (JL260A)

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)

Aruba 2930F 24G PoE+ 4SFP Switch (JL261A)

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)

Aruba 2930F 48G PoE+ 4SFP Switch (JL262A)

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)
- JL557A also uses the J9583A mounting kit
- JL558A also uses the J9583A mounting kit



3333 SCOTT BLVD | SANTA CLARA, CA 95054
1.844.473.2782 | T: 1.408.227.4500 | FAX: 1.408.227.4550 | INFO@ARUBANETWORKS.COM

DATA SHEET

ARUBA 2930M SWITCH SERIES

PRODUCT OVERVIEW

The Aruba 2930M Switch Series is designed for customers creating digital workplaces that are optimized for mobile users with an integrated wired and wireless approach. These Layer 3 access switches are easy to deploy and manage with advanced security and network management tools like Aruba ClearPass Policy Manager and Aruba AirWave. With support from cloud-based Aruba Central, you can quickly set up remote offices with little or no IT support.

A powerful Aruba ProVision ASIC delivers performance, robust feature support, and value with flexible programmability for future applications. High performance modular stacking for up to 10 switches provides pay as you grow scalability and simplicity. The 2930M supports 10GbE and 40GbE uplinks, Dual Modular Power Supplies, up to 1440 Watts of PoE+, models with 24 ports of HPE Smart Rate multi-gigabit Ethernet, robust QoS, RIP, Access OSPF routing, Tunnel Node, PIM, VRRP and IPv6 with no software licensing required.

The Aruba 2930M Switch Series provides a convenient and cost-effective access switch solution that can be quickly set up with Zero Touch Deployment. The switches include a Limited Lifetime Warranty.

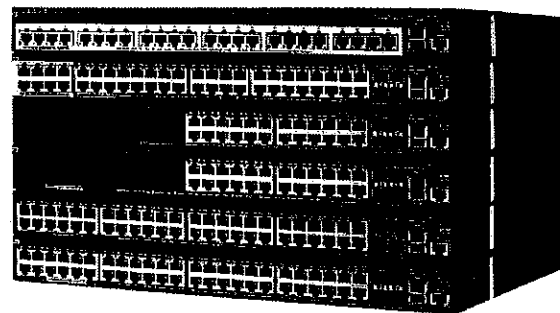
FEATURES AND BENEFITS

Software-defined networks

- Supports multiple programmatic Interfaces, including REST APIs and Openflow 1.0 and 1.3, to enable automation of network operations, monitoring, and troubleshooting

Unified Wired and Wireless

- ClearPass Policy Manager supports unified wired and wireless policies using Aruba ClearPass Policy Manager
- Switch auto-configuration automatically configures switch for different settings such as VLAN, CoS, PoE max power, and PoE priority when an Aruba access point is detected
- User role defines a set of switch-based policies in areas such as security, authentication, and QoS. A user role can be assigned to a group of users or devices, using switch-based local user role or download from ClearPass



KEY FEATURES

- Aruba Layer 3 Switch with 10 chassis backplane stacking, static, RIP and access OSPF routing, Tunnel Node, ACLs, SDN, and robust QoS
- Advanced security and network management tools like Aruba ClearPass Policy Manager, Aruba AirWave and Aruba Central
- Modular 10GbE or 40GbE uplinks and HPE Smart Rate (IEEE 802.3bz), up to 1440W PoE+
- Models with 24 ports of HPE Smart Rate with IEEE 802.3bz
- Ready for the software defined network with REST APIs and OpenFlow support
- Simple deployment with Zero Touch Provisioning

- Tunnel Node provides a secure tunnel that transports network traffic on a per-port or per-user role basis to an Aruba Controller. In a per-user role Tunnel Node, users are authenticated by the ClearPass Policy Manager which directs traffic to be tunneled to an Aruba controller or switch locally

Quality of Service (QoS)

- Traffic prioritization (IEEE 802.1p) allows real-time traffic classification into eight priority levels mapped to eight queues
- Layer 4 prioritization enables prioritization based on TCP/UDP port numbers
- Class of Service (CoS) sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ

- Rate limiting sets per-port ingress enforced maximums and per-port, per-queue minimums
- Large buffers Provide graceful congestion management
- Unknown Unicast Rate Limiting throttles unicast packets with unknown destination addresses and limits flooding on the VLAN

Connectivity

- -HPE Smart Rate multi-gigabit (IEEE 802.3bz) Ethernet to connect to high speed 802.11ac wireless access points. Flexible configurations Include:
 - Switch with 24 Smart Rate ports
 - Switch with 40 gigabit ports and 8 Smart Rate ports
 - All 2930M switches support optional 4 port Smart Rate module
- Flexible 10 Gbps Ethernet connectivity—Modular 4 port 10 Gigabit (SFP+) available
- 40 Gbps Uplink port connectivity—Modular 40 Gbps QSFP+ port available
- Auto-MDIX provides automatic adjustments for straight-through or crossover cables on all 10/100 and 10/100/1000 ports
- IEEE 802.3at Power over Ethernet (PoE+) provides up to 30 W per port that allows support of the latest PoE+-capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af-compliant end device; eliminates the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments
- Pre-standard PoE support detects and provides power to pre-standard PoE devices
- IPv6
 - IPv6 host enables switches to be managed in an IPv6 network
 - Dual stack (IPv4 and IPv6) transitions from IPv4 to IPv6, supporting connectivity for both protocols
 - MLD snooping forwards IPv6 multicast traffic to the appropriate interface
 - IPv6 ACL/QoS supports ACL and QoS for IPv6 network traffic
 - IPv6 Routing supports Static, RIPv6 and OSPFv3 protocols
 - Security provides RA guard, DHCPv6 protection, dynamic IPv6 lockdown, and ND snooping

Performance

- Energy-efficient design
 - 80 PLUS Gold and Platinum Certified power supplies increase power efficiency and savings

- Energy-efficient Ethernet (EEE) support reduces power consumption in accordance with IEEE 802.3az
- Designed with the latest Aruba Provision ASIC, providing very low latency, increased packet buffering, and adaptive power consumption
- Selectable queue configurations allows for increased performance by selecting the number of queues and associated memory buffering that best meet the requirements of the network applications
- Stacking Topology
 - High Performance stacking—up to 100 Gbps of stacking throughput per switch. Each 2-port stacking module can support up to 25 Gbps in each direction per port.
 - Ring topology—Supports up to 10 member stack
 - Virtualized Switching Provides simplified management as the switches act as a single chassis when stacked

Convergence

- IP multicast snooping and data-driven IGMP automatically prevent flooding of IP multicast traffic
- LLDP-MED (Media Endpoint Discovery) defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to configure automatically network devices such as IP phones
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP) facilitates easy mapping using network management applications with LLDP automated device discovery protocol
- PoE and PoE+ allocations support multiple methods (automatic, IEEE 802.3 at dynamic, LLDP-MED fine grain, IEEE 802.3af device class, or user-specified) to allocate and manage PoE/PoE+ power for more efficient energy savings
- Local MAC Authentication assigns attributes such as VLAN and QoS using locally configured profile that can be a list of MAC prefixes
- IP multicast routing includes PIM sparse and dense modes to route IP multicast traffic
- Protocol Independent Multicast for IPv6 supports one-to-many and many-to-many media casting use cases such as IPTV over IPv6 networks

Resiliency and high availability

- Virtual Router Redundancy Protocol (VRRP) allows groups of two routers to back each other up dynamically to create highly available routed environments in IPv4 and IPv6 networks

- IEEE 802.1s Multiple Spanning Tree provides high link availability in multiple VLAN environments by allowing multiple spanning trees; provides legacy support for IEEE 802.1d and IEEE 802.1w
- IEEE 802.3ad link-aggregation-control protocol (LACP) and port trunking Support up to 26 static, dynamic, or distributed trunks with each trunk having up to eight links (ports) per static trunk
- SmartLink provides easy-to-configure link redundancy of active and standby links
- Dual Hot Swappable Power Supplies
 - Increased Resiliency provides secondary power supply to enable complete switch power redundancy in case of power line or supply failure
 - Increased PoE+ Power provides secondary power supply to increase the total available PoE+ power

Management

- Aruba Central cloud-based management platform offers simple, secure and cost effective way to manage switches
- Zero-Touch-Provisioning (ZTP) simplifies installation of the switch infrastructure using Aruba Activate-based or DHCP-based process with AirWave Network Management
- Flexible management with same hardware – Supports both cloud-based Central and on-premise AirWave with the same hardware ensuring change management platform without ripping and replacing switching Infrastructure
- Built-in programmable and easy to use REST API interface provides configuration automation for Mobile-first campus networks
- Out-of-band Ethernet management port enables management a separate physical management network, and keeps management traffic segmented from network data traffic
- SNMPv1, v2, and v3 provide complete support of SNMP; provide full support of industry-standard Management Information Base (MIB) plus private extensions; SNMPv3 supports increased security using encryption

Manageability

- Dual flash Images provides independent primary and secondary operating system files for backup while upgrading
- Friendly port names allow assignment of descriptive names to ports
- Find-Fix-Inform finds and fixes common network problems automatically, then informs administrator

- Multiple configuration files allow multiple configuration files to be stored to a flash image
- Software updates free downloads from the Web
- RMON, XRMON, and sFlow provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- Troubleshooting ingress and egress port monitoring enable network problem solving
- Unidirectional link detection (UDLD) monitors the link between two switches and blocks the ports on both ends of the link if the link goes down at any point between the two devices
- Power down mode allows power savings while the switch is not in use by powering down most of the switch, except for a clock which will boot up the switch on a schedule

Layer 2 switching

- IEEE802.1ad QinQ—Increases the scalability of an Ethernet network by providing a hierarchical structure; connects multiple LANs on a high-speed campus or metro network
- VLAN Support and Tagging supports IEEE 802.1Q (4094 VLAN IDs) and 2K VLANs simultaneously
- Jumbo packet support improves the performance of large data transfers; supports frame size of up to 9220 bytes
- IEEE 802.1v protocol VLANs isolate select non-IPv4 protocols automatically into their own VLANs
- Rapid Per-VLAN Spanning Tree (RPVST+) allows each VLAN to build a separate spanning tree to improve link bandwidth usage; is compatible with PVST+
- GVRP and MVRP allows automatic learning and dynamic assignment of VLANs
- VxLAN encapsulation (tunneling) protocol for overlay network that enables a more scalable virtual network deployment
- IEEE 1588v2 Transparent Clock Mode 1-step and end to end delay mode support critical timing Applications

Layer 3 services

- DHCP server centralizes and reduces the cost of IPv4 address management

Layer 3 routing

- Static IP routing provides manually configured routing; includes ECMP capability
- Routing Information Protocol (RIP) provides RIPv1, RIPv2, and RIPv6 routing

- Access OSPF provides OSPFv2 and OSPFv3 protocols for routing between access and the next layer on the LAN. One OSPF area and up to eight interfaces are supported.
- Policy-based routing uses a classifier to select traffic that can be forwarded based on policy set by the network administrator (limited to 16 next-hop routes)

Security

- Multiple user authentication methods
 - IEEE 802.1X uses an IEEE 802.1X supplicant on the client in conjunction with a RADIUS server to authenticate in accordance with industry standards
 - Web-based authentication provides a browser-based environment, similar to IEEE 802.1X, to authenticate clients that do not support the IEEE 802.1X supplicant
 - MAC-based authentication authenticates the client with the RADIUS server based on the client's MAC address
- TPM-based Security
 - Includes a Trusted Platform Module (TPM) for secure hardware-based generation and storage of cryptographic keys that can be used for a variety of authentication purposes
- Authentication flexibility
 - Multiple IEEE 802.1X users per port provides authentication of multiple IEEE 802.1X users per port; prevents a user from "piggybacking" on another user's IEEE 802.1X authentication
 - Concurrent IEEE 802.1X, Web, and MAC authentication schemes per port switch port will accept up to 32 sessions of IEEE 802.1X, Web, and MAC authentications
- Open Authentication Role simplifies first-time deployment of AAA in brownfield deployments by allowing full network access for failed clients and provides instant connectivity as soon as a client is plugged-in
- Critical Authentication Role ensures that important infrastructure devices such as IP phones are allowed network access even in the absence of a RADIUS server
- MAC Pinning allows non-chatty legacy devices to stay authenticated by pinning client MAC addresses to the port until the clients logoff or get disconnected
- Access control lists (ACLs) provide IP Layer 3 filtering based on source/destination IP address/subnet and source/destination TCP/UDP port number
- Source-port filtering allows only specified ports to communicate with each other
- Control Plane Policing: Set rate limit on control protocols to protect CPU overload
- RADIUS/TACACS+ eases switch management security administration by using a password authentication server
- Secure shell encrypts all transmitted data for secure remote CLI access over IP networks
- Secure Sockets Layer (SSL) encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch
- Port security allows access only to specified MAC addresses, which can be learned or specified by the administrator
- MAC address lockout prevents particular configured MAC addresses from connecting to the network
- Secure FTP allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- Switch management logon security helps secure switch CLI logon by optionally requiring either RADIUS or TACACS+ authentication
- Custom banner displays security policy when users log in to the switch
- STP BPDU port protection blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- DHCP protection blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- Dynamic ARP protection blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- STP root guard protects the root bridge from malicious attacks or configuration mistakes
- Identity-driven ACL enables implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user
- Per-port broadcast throttling configures broadcast control selectively on heavy traffic port uplinks
- Private VLAN provides network security by restricting peer-to-peer communication to prevent a variety of malicious attacks; typically a switch port can only communicate with other ports in the same community and/or an uplink port, regardless of VLAN ID or destination MAC address
- IEEE 802.1AE MACsec provides security on a link between two switch ports (1Gbps or 10Gbps or HPE Smart Rate) using standard encryption and authentication

Monitor and diagnostics

- Digital optical monitoring of SFP+ and 1000BASE-T transceivers allows detailed monitoring of the transceiver settings and parameters

Warranty and support

- Limited Lifetime Warranty
See www.hpe.com/networking/warrantysummary for warranty and support information included with your product purchase.
- Software releases
To find software for your product, refer to www.hpe.com/networking/support; for details on the software releases available with your product purchase, refer to www.hpe.com/networking/warrantysummary

SPECIFICATIONS

JL319A Aruba 2930M 24G 1-slot Switch

JL320A Aruba 2930M 24G PoE+ 1-slot Switch

JL321A Aruba 2930M 48G 1-slot Switch

I/O ports and slots

20 Autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASETX, IEEE 802.3ab Type 1000Base-T); Duplex: 10BASE-T/100BASE-TX:half or full;1000BASE-T:full only

20 Autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASETX, IEEE 802.3ab Type 1000Base-T IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX:half or full;1000BASE-T:full only

44 Autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASETX, IEEE 802.3ab Type 1000Base-T); Duplex: 10BASE-T/100BASE-TX:half or full;1000BASE-T:full only

4 Combo 10/100/1000BASE-T or 100/1000Mbps SFP Ports

4 Combo 10/100/1000BASE-T PoE+ or 100/1000Mbps SFP Ports

4 Combo 10/100/1000BASE-T or 100/1000Mbps SFP Ports

Additional ports and slots

1 Dual Personality (RJ-45 or USB Micro-B) serial console port

1 Dual Personality (RJ-45 or USB Micro-B) serial console port

1 Dual Personality (RJ-45 or USB Micro-B) serial console port

1 USB B port for uploading/downloading files

1 USB B port for uploading/downloading files

1 USB B port for uploading/downloading files

1 100BASE-T Out of Band Management Port

1 100BASE-T Out of Band Management Port

1 100BASE-T Out of Band Management Port

1 Uplink Slot

1 Uplink Slot

1 Uplink Slot

1 Stacking Module Slot

1 Stacking Module Slot

1 Stacking Module Slot

2 Power Supply Slots (power supplies not Included)

2 Power Supply Slots (power supplies not Included)

2 Power Supply Slots (power supplies not Included)

Physical characteristics

Dimensions 1.73" (Height) x 17.42" (Width) x 12.77" (Depth)
(4.39cm x 44.25cm x 32.43cm)

Dimensions 1.73" (Height) x 17.42" (Width) x 12.77" (Depth)
(4.39cm x 44.25cm x 32.43cm)

Dimensions 1.73" (Height) x 17.42" (Width) x 12.77" (Depth)
(4.39cm x 44.25cm x 32.43cm)

Weight 9.81 lbs 4.45 kg

Weight 9.92 lbs 4.50 kg

Weight 10.14 lbs 4.60 kg

Memory and Processor

Dual Core ARM Cortex A9 @ 1016 MHz

Dual Core ARM Cortex A9 @ 1016 MHz

Dual Core ARM Cortex A9 @ 1016 MHz

1 GB DDR3 SDRAM

1 GB DDR3 SDRAM

1 GB DDR3 SDRAM

Packet Buffer Size: 12.38MB and 4.5MB Ingress/7.875MB Egress

Packet Buffer Size: 12.38MB and 4.5MB Ingress/7.875MB Egress

Packet Buffer Size: 12.38MB and 4.5MB Ingress/7.875MB Egress

4GB eMMC

4GB eMMC

4GB eMMC

SPECIFICATIONS

	JL319A Aruba 2930M 24G 1-slot Switch	JL320A Aruba 2930M 24G PoE+ 1-slot Switch	JL321A Aruba 2930M 48G 1-slot Switch
Performance			
	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
10 Mbps Latency	< 98.5µs (FIFO 64 byte packets)	< 98.5µs (FIFO 64 byte packets)	< 98.5µs (FIFO 64 byte packets)
100 Mbps Latency	< 11.8µs (FIFO 64-byte Packets)	< 11.8µs (FIFO 64-byte Packets)	< 11.8µs (FIFO 64-byte Packets)
1000 Mbps Latency	< 3.1µs (FIFO 64-byte packets)	< 3.1µs (FIFO 64-byte packets)	< 3.1µs (FIFO 64-byte packets)
10 Gbps Latency	< 3.4µs (FIFO 64-byte packets)	< 3.4µs (FIFO 64-byte packets)	< 3.4µs (FIFO 64-byte packets)
Throughput	95.2 Mpps	95.2 Mpps	112 Mpps
Stacking Performance	100 Gbps	100 Gbps	100 Gbps
Switching Capacity	128 Gbps	128 Gbps	176 Gbps
Switching Capacity (Including Stacking)	228 Gbps	228Gbps	276 Gbps
Routing Table Size	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
Mac Address Table Size	32768 entries	32768 entries	32768 entries
Environment			
Operating Temperature	32°F to 131°F (0°C to 55°C) up to 5000ft, 32°F to 122°F (0°C to 50°C). Derate -1 degree C for every 1000 ft from 5000 ft to 10000 ft	32°F to 131°F (0°C to 55°C) up to 5000ft, 32°F to 122°F (0°C to 50°C). Derate -1 degree C for every 1000 ft from 5000 ft to 10000 ft	32°F to 131°F (0°C to 55°C) up to 5000ft, 32°F to 122°F (0°C to 50°C). Derate -1 degree C for every 1000 ft from 5000 ft to 10000 ft
Operating Relative Humidity	15% to 95% (Non-condensing) 10,000 ft	15% to 95% (Non-condensing) 10,000 ft	15% to 95% (Non-condensing) 10,000 ft
Non-Operating/ Storage Temperature	-40°C to +70°C up to 15000 ft	-40°C to +70°C up to 15000 ft	-40°C to +70°C up to 15000 ft
Non-Operating/ Storage Relative Humidity	90% at 65C (non-condensing); 15,000 ft	90% at 65C (non-condensing); 15,000 ft	90% at 65C (non-condensing); 15,000 ft
Acoustic	Sound Power LWaD=4.0 Bel, Sound Pressure LpAm, Bystander = 22.8 dB	Sound Power LWaD=4.1 Bel, Sound Pressure LpAm, Bystander = 23.7 dB	Sound Power LWaD=4.6 Bel, Sound Pressure LpAm, Bystander = 28.8 dB
Primary Airflow Direction	Port to Power	Port to Power	Port to Power

SPECIFICATIONS

	JL319A Aruba 2930M 24G 1-slot Switch	JL320A Aruba 2930M 24G PoE+ 1-slot Switch	JL321A Aruba 2930M 48G 1-slot Switch
Electrical Characteristics			
Frequency	50/60Hz	50/60Hz	50/60Hz
Maximum Heat Dissipation	145 BTU/hr 150 kJ/hr	150 BTU/hr 162 kJ/hr	185 BTU/hr 194kJ/hr
Voltage	JL085A PSU: 100-127/200-240	JL086A PSU: 100-127/200-240 VAC JL087A PSU: 110-127/200-240 VAC	JL085A PSU: 100-127/200-240
Current	JL085A PSU: 1A/0.5A	JL086A PSU (each): 5A/2.5A JL087A PSU (each): 8.5A/5A	JL085A PSU: 1A/0.5A
Maximum Power Rating	93W	JL086A PSU (each): 470W JL087A PSU (each): 860W	111W
Idle Power	28W	30W	36W
PoE Power (Max Possible)	N/A	740 Watts	N/A
Hibernate Power	7W	7W	7W
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst case theoretical maximum numbers provide for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst case theoretical maximum numbers provide for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst case theoretical maximum numbers provide for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

SPECIFICATIONS

	JL322A Aruba 2930M 48G PoE+ 1-slot Switch	JL323A Aruba 2930M 40G 8 HPE Smart Rate PoE+ 1-slot Switch	JL324A Aruba 2930M 24 HPE Smart Rate PoE+ 1-slot Switch
I/O ports and slots	<p>44 Autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASETX, IEEE 802.3ab Type 1000Base-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX:half or full;1000BASE-T:full only</p> <p>4 Combo 10/100/1000BASE-T PoE+ or 100/1000Mbps SFP Ports</p>	<p>36 Autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASETX, IEEE 802.3ab Type 1000Base-T PoE+); Duplex: 10BASE-T/100BASE-TX:half or full;1000BASE-T:full only</p> <p>4 Combo 10/100/1000BASE-T PoE+ or 100/1000Mbps SFP Ports</p> <p>8 802.3bz 1/2.5/5 and 10GbaseT copper PoE+ ports</p>	<p>24 Autosensing 1/2.5/5GBaseT ports PoE+</p>
Additional ports and slots	<p>1 Dual Personality (RJ-45 or USB Micro-B) serial console port</p> <p>1 USB B port for uploading/downloading files</p> <p>1 100BASE-T Out of Band Management Port</p> <p>1 Uplink Slot</p> <p>1 Stacking Module Slot</p> <p>2 Power Supply Slots (power supplies not included)</p>	<p>1 Dual Personality (RJ-45 or USB Micro-B) serial console port</p> <p>1 USB B port for uploading/downloading files</p> <p>1 100BASE-T Out of Band Management Port</p> <p>1 Uplink Slot</p> <p>1 Stacking Module Slot</p> <p>2 Power Supply Slots (power supplies not included)</p>	<p>1 Dual Personality (RJ-45 or USB Micro-B) serial console port</p> <p>1 USB B port for uploading/downloading files</p> <p>1 100BASE-T Out of Band Management Port</p> <p>1 Uplink Slot</p> <p>1 Stacking Module Slot</p> <p>2 Power Supply Slots (power supplies not included)</p>
Physical characteristics			
Dimensions	1.73" (Height) x 17.42" (Width) x 12.77" (Depth) (4.39cm x 44.25cm x 32.43cm)	1.73" (Height) x 17.42" (Width) x 12.77" (Depth) (4.39cm x 44.25cm x 32.43cm)	1.73" (Height) x 17.42" (Width) x 12.77" (Depth) (4.39cm x 44.25cm x 32.43cm)
Weight	10.25 lbs 4.65 kg	9.81 lbs 4.45 kg	9.92 lbs 4.50 kg
Memory and Processor	<p>Dual Core ARM Cortex A9 @ 1016 MHz</p> <p>1 GB DDR3 SDRAM</p> <p>Packet Buffer Size: 12.38MB and 4.5MB Ingress/7.875MB Egress</p> <p>4GB eMMC</p>	<p>Dual Core ARM Cortex A9 @ 1016 MHz</p> <p>1 GB DDR3 SDRAM</p> <p>Packet Buffer Size: 12.38MB and 4.5MB Ingress/7.875MB Egress</p> <p>4GB eMMC</p>	<p>Dual Core ARM Cortex A9 @ 1016 MHz</p> <p>1 GB DDR3 SDRAM</p> <p>Packet Buffer Size: 12.38MB and 4.5MB Ingress/7.875MB Egress</p> <p>4GB eMMC</p>

SPECIFICATIONS

	JL322A Aruba 2930M 48G PoE+ 1-slot Switch	JL323A Aruba 2930M 40G 8 HPE Smart Rate PoE+ 1-slot Switch	JL324A Aruba 2930M 24 HPE Smart Rate PoE+ 1-slot Switch
Performance			
10 Mbps Latency	< 98.5µs (FIFO 64 byte packets)	< 98.5µs (FIFO 64 byte packets)	N/A
100 Mbps Latency	< 11.8µs (FIFO 64-byte Packets)	< 11.8µs (FIFO 64-byte Packets)	N/A
1000 Mbps Latency	< 3.1µs (FIFO 64-byte packets)	< 3.1µs (FIFO 64-byte packets)	< 3.1µs (FIFO 64-byte packets)
2.5 Gbps Latency	N/A	< 6.5µs (FIFO 64-byte packets)	< 6.5µs (FIFO 64-byte packets)
5 Gbps Latency	N/A	< 4.2µs (FIFO 64-byte packets)	4.2µs (FIFO 64-byte packets)
10 Gbps Latency	< 3.4µs (FIFO 64-byte packets)	< 3.4µs (FIFO 64-byte packets)	< 3.4µs (FIFO 64-byte packets)
Throughput	112 Mpps	112 Mpps	112 Mpps
Stacking Performance	100 Gbps	100 Gbps	100 Gbps
Switching Capacity	176 Gbps	320 Gbps	320 Gbps
Switching Capacity (Including Stacking)	276 Gbps	420 Gbps	420 Gbps
Routing Table Size	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP	2,000 IPv4, 1,000 IPv6 in hardware, 200 OSPF, 256 Static, 10,000 RIP
Mac Address Table Size	32768 entries	32768 entries	32768 entries
Environment			
Operating Temperature	32°F to 131°F (0°C to 55°C) up to 5000ft, 32°F to 122°F (0°C to 50°C). Derate -1 degree C for every 1000 ft from 5000 ft to 10000 ft	32°F to 131°F (0°C to 55°C) up to 5000ft, 32°F to 122°F (0°C to 50°C). Derate -1 degree C for every 1000 ft from 5000 ft to 10000 ft	32°F to 113°F (0°C to 45°C) up to 5000ft, 32°F to 122°F (0°C to 45°C). Derate -1 degree C for every 1000 ft from 5000 ft to 10000 ft
Operating Relative Humidity	15% to 95% (Non-condensing) 10,000 ft	15% to 95% (Non-condensing) 10,000 ft	15% to 95% (Non-condensing) 10,000 ft
Non-Operating/ Storage Temperature	-40°C to +70°C up to 15000 ft	-40°C to +70°C up to 15000 ft	-40°C to +70°C up to 15000 ft
Non-Operating/ Storage Relative Humidity	90% at 65C (non-condensing); 15,000 ft	90% at 65C (non-condensing); 15,000 ft	90% at 65C (non-condensing); 15,000 ft
Acoustic	Sound Power LWaD=4.6 Bel, Sound Pressure LpAm, Bystander = 28.9 dB	Sound Power LWaD=4.4 Bel, Sound Pressure LpAm, Bystander = 26.0 dB	Sound Power LWaD=4.8 Bel, Sound Pressure LpAm, Bystander = 31.2 dB
Primary Airflow Direction	Port to Power	Port to Power	Port to Power

SPECIFICATIONS

	JL322A Aruba 2930M 48G PoE+ 1-slot Switch	JL323A Aruba 2930M 40G 8 HPE Smart Rate PoE+ 1-slot Switch	JL324A Aruba 2930M 24 HPE Smart Rate PoE+ 1-slot Switch
Electrical Characteristics			
Frequency	50/60Hz	50/60Hz	50/60Hz
Maximum Heat Dissipation	200 BTU/hr 216 kJ/hr	145 BTU/hr 150 kJ/hr	150 BTU/hr 162 kJ/hr
Voltage	JL086A PSU: 100-127/200-240 VAC JL087A PSU: 110-127/200-240 VAC	JL086A PSU: 100-127/200-240 VAC JL087A PSU: 110-127/200-240 VAC	JL086A PSU: 100-127/200-240 VAC JL087A PSU: 110-127/200-240 VAC
Current	JL086A PSU (each): 5A/2.5A JL087A PSU (each): 8.5A/5A	JL086A PSU (each): 5.7/3A JL087A PSU (each): 10A/5.1A	JL086A PSU (each): 5.9A/3A JL087A PSU (each): 10A/5.1A
Maximum Power Rating	JL086A PSU (each): 470W JL087A PSU (each): 860W	JL086A PSU (each): 538W JL087A PSU (each): 941W	JL086A PSU (each): 554W JL087A PSU (each): 957W
Idle Power	40W	75W	95W
PoE Power (Max Possible)	1440 Watts	1440 Watts	860 Watts
Hibernate Power	7W	7W	7W
Notes	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst case theoretical maximum numbers provide for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst case theoretical maximum numbers provide for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.	Idle power is the actual power consumption of the device with no ports connected. Maximum power rating and maximum heat dissipation are the worst case theoretical maximum numbers provide for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

The operating temperature range for an Aruba 2930M switch is 0°C to 50°C (32°F to 122°F) if any of the following transceivers are installed in the switch:

- J9150A HP X132 10G SFP+ LC SR Transceiver
- J9151A HP X132 10G SFP+ LC LR Transceiver
- J9152A HP X132 10G SFP+ LC LRM Transceiver
- J9153A HP X132 10G SFP+ LC ER Transceiver
- JL308A Aruba 40G QSFP+ LC BIDI 150m MMF XCVR
- JH231A HP X142 40G QSFP+ MPO SR4 Transceiver
- JH232A HP X142 40G QSFP+ LC LR4 SM Transceiver
- JH233A HP X142 40G QSFP+ MPO CSR4 Transceiver

SPECIFICATIONS

Safety

UL 60950-1, 2nd Edition
EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011 +A2:2013
IEC60950-1:2005 +A1:2009 +A2:2013
CSA 22.2 No. 60950-1-07 2nd
EN60825-1:2007 /IEC 60825-1:2007 Class 1

Emissions

VCCI Class A
CNS 13438
ICES-003 Class A
FCC CFR 47 Part 15, Class A
EN 55022: 2010/CISPR-22, Class A

Immunity

Generic	EN 55024:2010/CISPR 24
ESD	IEC 61000-4-2
Radiated	IEC 61000-4-3
EFT/Burst	IEC 61000-4-4
Surge	IEC 61000-4-5
Conducted	IEC 61000-4-6
Power frequency magnetic field	IEC 61000-4-8
Voltage dips and interruptions	IEC 61000-4-11
Harmonics	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3

Management

Aruba Central
Aruba AirWave Network Management
IMC—Intelligent Management Center
Command-line interface
Web browser
Configuration menu
REST interface
SNMP manager
Telnet
RMON1
FTP
Out-of-band management
Serial RS-232C
Micro USB Serial

STANDARDS AND PROTOCOLS
(APPLIES TO ALL PRODUCTS IN SERIES)

Denial of service protection

- CPU DoS Protection

Device management

- RFC 1155 Structure and Mgmt Information (SMIv1)
- RFC 1157 SNMPv1/v2c
- RFC 1591 DNS (client)
- RFC 1901 (Community based SNMPv2)
- RFC 1901-1907 SNMPv2c, SMIv2 and Revised MIB-II
- RFC 1908 (SNMP v1/2 Coexistence)
- RFC 2576 (Coexistence between SNMP V1, V2, V3)
- RFC 2578-2580 SMIv2
- RFC 2579 (SMIv2 Text Conventions)
- RFC 2580 (SMIv2 Conformance)
- RFC 2819 (RMON groups Alarm, Event, History and Statistics only)
- RFC 3416 (SNMP Protocol Operations v2)
- RFC 3417 (SNMP Transport Mappings)
- HTML and telnet management
- HTTP, SSHv1, and Telnet
- Multiple Configuration Files
- Multiple Software Images
- SNMP v3 and RMON RFC support
- SSHv1/SSHv2 Secure Shell
- TACACS/TACACS+
- Web UI

General protocols

- IEEE 802.1AX-2008 Link Aggregation
- IEEE 802.1D MAC Bridges
- IEEE 802.1p Priority
- IEEE 802.1Q VLANs
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.1v VLAN classification by Protocol and Port
- IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3af Power over Ethernet
- IEEE 802.3at PoE+
- IEEE 802.3az Energy Efficient Ethernet
- IEEE 802.3bz 2.5 Gbps and 5 Gbps interfaces
- IEEE 802.3x Flow Control
- RFC 768 UDP
- RFC 783 TFTP Protocol (revision 2)
- RFC 792 ICMP
- RFC 793 TCP

- RFC 826 ARP
- RFC 854 TELNET
- RFC 868 Time Protocol
- RFC 951 BOOTP
- RFC 1058 RIPv1
- RFC 1256 ICMP Router Discovery Protocol (IRDP)
- RFC 1350 TFTP Protocol (revision 2)
- RFC 1519 CIDR
- RFC 1542 BOOTP Extensions
- IEEE 1588v2 Precision Time Protocol (Transparent Clock Mode)
- RFC 1918 Address Allocation for Private Internet
- RFC 2030 Simple Network Time Protocol (SNTP) v4
- RFC 2131 DHCP
- RFC 2236 IGMP Snooping
- RFC 2453 RIPv2
- RFC 2865 Remote Authentication Dial In User Service (RADIUS)
- RFC 2866 RADIUS Accounting
- RFC 3046 DHCP Relay Agent Information Option
- RFC 3411 An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks
- RFC 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
- RFC 3413 Simple Network Management Protocol (SNMP) Applications
- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3416 Protocol Operations for SNMP
- RFC 3417 Transport Mappings for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 3575 IANA Considerations for RADIUS
- RFC 3576 Ext to RADIUS (CoA only)
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches
- RFC 4675 RADIUS VLAN & Priority
- RFC 4861 Neighbor Discovery for IP version 6 (IPv6)
- RFC 4862 IPv6 Stateless Address Autoconfiguration
- RFC 5905 Network Time Protocol Version 4: Protocol and Algorithms Specification
- UDLD (Uni-directional Link Detection)

IP Multicast

- RFC 1112 IGMP
- RFC 2236 IGMPv2
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 3376 IGMPv3
- RFC 3973 PIM Dense Mode
- RFC 4601 PIM Sparse Mode
- RFC 4541 Considerations for Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping Switches
- RFC 5059 Bootstrap Router—Except for scope zones
- RFC 7761 PIM Sparse Mode

IPv6

- RFC 1981 IPv6 Path MTU Discovery
- RFC 2080 RIPng for IPv6
- RFC 2081 RIPng Protocol Applicability Statement
- RFC 2082 RIP-2 MD5
- RFC 2460 IPv6 Specification
- RFC 2464 Transmission of IPv6 over Ethernet Networks
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only)
- RFC 2925 Remote Operations MIB (Ping only)
- RFC 3019 MLDv1 MIB
- RFC 3315 DHCPv6 (client and relay)
- RFC 3484 Default Address Selection for IPv6
- RFC 3513 IPv6 Addressing Architecture
- RFC 3596 DNS Extension for IPv6
- RFC 3810 MLDv2 for IPv6
- RFC 4022 MIB for TCP
- RFC 4113 MIB for UDP
- RFC 4251 SSHv6 Architecture
- RFC 4252 SSHv6 Authentication
- RFC 4253 SSHv6 Transport Layer
- RFC 4254 SSHv6 Connection
- RFC 4291 IP Version 6 Addressing Architecture
- RFC 4293 MIB for IP
- RFC 4419 Key Exchange for SSH
- RFC 4443 ICMPv6
- RFC 4541 IGMP & MLD Snooping Switch
- RFC 4861 IPv6 Neighbor Discovery
- RFC 4862 IPv6 Stateless Address Auto-configuration
- RFC 5095 Deprecation of Type 0 Routing Headers In IPv6
- RFC 6620 FCFS SAVI
- draft-ietf-savi-mix

MIBs

- IEEE 802.1ap (MSTP and STP MIB's only)
- IEEE 8021-Bridge-MIB (2008)
- IEEE 8021-Q-Bridge-MIB (2008)
- RFC 1155 Structure & ID of Mgmt Info for TCP/IP Internets
- RFC 1156 (TCP/IP MIB)
- RFC 1157 A Simple Network Management Protocol (SNMP)
- RFC 1213 MIB II
- RFC 1493 Bridge MIB
- RFC 1724 RIPv2 MIB
- RFC 2021 RMONv2 MIB
- RFC 2578 Structure of Management Information Version 2 (SMIv2)
- RFC 2579 Textual Conventions for SMIv2
- RFC 2580 Conformance Statements for SMIv2
- RFC 2613 SMON MIB
- RFC 2618 RADIUS Client MIB
- RFC 2620 RADIUS Accounting MIB
- RFC 2665 Ethernet-Like-MIB
- RFC 2668 802.3 MAU MIB
- RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
- RFC 2737 Entity MIB (Version 2)
- RFC 2819 RMON MIB
- RFC 2863 The Interfaces Group MIB
- RFC 2925 Ping MIB
- RFC 2932 IP (Multicast Routing MIB)
- RFC 2933 IGMP MIB
- RFC 3414 SNMP-User based-SM MIB
- RFC 3415 SNMP-View based-ACM MIB
- RFC 3417 Simple Network Management Protocol (SNMP) over IEEE 802 Networks
- RFC 3418 MIB for SNMPv3
- RFC 4836 Managed Objects for 802.3 Medium Attachment Units (MAU)

Network management

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- RFC 1155 Structure of Management Information
- RFC 1157 SNMPv1
- RFC 2021 Remote Network Monitoring Management Information Base Version 2 using SMIv2
- RFC 2576 Coexistence between SNMP versions
- RFC 2578 Structure of Management Information Version 2 (SMIv2)
- RFC 2579 Textual Conventions for SMIv2
- RFC 2580 Conformance Statements for SMIv2

- RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)
- RFC 2819 Remote Network Monitoring Management Information Base
- RFC 2856 Textual Conventions for Additional High Capacity Data Types
- RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations
- RFC 3164 BSD syslog Protocol
- RFC 3176 sFlow
- RFC 3411 SNMP Management Frameworks
- RFC 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
- RFC 3413 Simple Network Management Protocol (SNMP) Applications
- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 5424 Syslog Protocol
- ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)
- SNMPv1/v2c/v3
- XRMON

QoS/CoS

- IEEE 802.1p (CoS)
- RFC 2474 DiffServ Precedence, including 8 queues/port
- RFC 2475 DiffServ Architecture
- RFC 2597 DiffServ Assured Forwarding (AF)
- RFC 2598 DiffServ Expedited Forwarding (EF)
- Ingress Rate Limiting

Security

- IEEE 802.1X Port Based Network Access Control
- RFC 1321 The MD5 Message-Digest Algorithm
- RFC 1334 PPP Authentication Protocols (PAP)
- RFC 1492 An Access Control Protocol, Sometimes Called TACACS
- RFC 1492 TACACS+
- RFC 1994 PPP Challenge Handshake Authentication Protocol (CHAP)
- RFC 2082 RIP-2 MD5 Authentication
- RFC 2104 Keyed-Hashing for Message Authentication
- RFC 2138 RADIUS Authentication

- RFC 2139 RADIUS Accounting
- RFC 2246 Transport Layer Security (TLS)
- RFC 2548 Microsoft® Vendor-specific RADIUS Attributes
- RFC 2618 RADIUS Authentication Client MIB
- RFC 2620 RADIUS Accounting Client MIB
- RFC 2716 PPP EAP TLS Authentication Protocol
- RFC 2818 HTTP Over TLS
- RFC 2865 RADIUS (client only)
- RFC 2865 RADIUS Authentication
- RFC 2866 RADIUS Accounting
- RFC 2867 RADIUS Accounting Modifications for Tunnel Protocol Support
- RFC 2868 RADIUS Attributes for Tunnel Protocol Support
- RFC 2869 RADIUS Extensions
- RFC 2882 NAS Requirements: Extended RADIUS Practices
- RFC 3162 RADIUS and IPv6
- RFC 3576 Dynamic Authorization Extensions to RADIUS
- RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)
- RFC 3580 IEEE 802.1X RADIUS
- RFC 3580 IEEE 802.1X Remote Authentication Dial In User Service (RADIUS) Usage Guidelines
- RFC 4576 RADIUS Attributes
- Access Control Lists (ACLs)
- draft-grant-tacacs-02 (TACACS)
- Guest VLAN for 802.1X
- MAC Authentication
- MAC Lockdown
- MAC Lockout
- Port Security
- Secure Sockets Layer (SSL)
- SSHv2 Secure Shell
- Web Authentication

- Refer to Hewlett Packard Enterprise website www.hpe.com/networking/services for details on the service level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

ARUBA 2930M SWITCH SERIES ACCESSORIES

Modules

- Aruba 2930M 2-port Stacking Module (JL325A)
- Aruba 3810M/2930M 1QSFP+ 40GbE Module (JL078A)
- Aruba 3810M/2930M 4SFP+ MACsec Module (JL083A)
- Aruba 3810M/2930M 4 1/2.5/5/10 GbE HPE Smart Rate Module (JL081A)

Transceivers

- Aruba 100M SFP LC FX 2km MMF XCVR (J9054D)
- Aruba 1G SFP RJ45 T 100m Cat5e XCVR (J8177D)
- Aruba 1G SFP LC SX 500m MMF XCVR (J4858D)
- Aruba 1G SFP LC LX 10km SMF XCVR (J4859D)
- Aruba 1G SFP LC LH 70km SMF XCVR (J4860D)
- Aruba 10G SFP+ LC SR 300m MMF XCVR (J9150D)
- Aruba 10G SFP+ LC LR 10km SMF XCVR (J9151D)
- Aruba 10G SFP+ LC LRM 220m MMF XCVR (J9152D)
- Aruba 10G SFP+ LC ER 40km SMF XCVR (J9153D)
- Aruba 10G SFP+ to SFP+ 1m DAC Cable (J9281D)
- Aruba 10G SFP+ to SFP+ 3m DAC Cable (J9283D)
- Aruba 10G SFP+ to SFP+ 7m DAC Cable (J9285D)
- Aruba 40G QSFP+ LC BIDI 150m MMF XCVR (JL308A)
- HPE X142 40G QSFP+ MPO SR4 Transceiver (JH231A)
- HPE X142 40G QSFP+ LC LR4 SM Transceiver (JH232A)
- HPE X142 40G QSFP+ MPO eSR4 300M XCVR (JH233A)
- HPE X242 40G QSFP+ to QSFP+ 1m DAC Cable (JH234A)
- HPE X242 40G QSFP+ to QSFP+ 3m DAC Cable (JH235A)
- HPE X242 40G QSFP+ to QSFP+ 5m DAC Cable (JH236A)

Stacking cables

- Aruba 2920/2930M 0.5M Stacking Cable (J9734A)
- Aruba 2920/2930M 1m Stacking Cable (J9735A)
- Aruba 2920/2930M 3m Stacking Cable (J9736A)

Power supplies

- Aruba X371 12VDC 250W 100-240VAC Power Supply (JL085A)
- Aruba X372 54VDC 680W 100-240VAC Power Supply (JL086A)
- Aruba X372 54VDC 1050W 110-240VAC Power Supply (JL087A)

Mounting kit

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)

Cables

- Aruba X2C2 RJ45 to DB9 Console Cable (JL448A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable (QK732A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable (QK733A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable (QK734A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable (QK735A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable (QK736A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable (QK737A)

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www.arubanetworks.com

3333 SCOTT BLVD | SANTA CLARA, CA 95054
1.844.473.2782 | T: 1.408.227.4500 | FAX: 1.408.227.4550 | INFO@ARUBANETWORKS.COM

DS_2930MSwitchSeries_120617

DATA SHEET

ARUBA 3810 SWITCH SERIES

PRODUCT OVERVIEW

The Aruba 3810 Switch Series is an industry-leading mobile campus access solution for enterprises, SMBs, and branch office networks. With HPE Smart Rate multi-gigabit ports for high-speed IEEE 802.11ac devices, the Aruba 3810 will prepare your network for tomorrow. Right-size deployment and back haul capacity with modular 10GbE and 40GbE uplinks.

Full PoE+ provisioning available on 48-ports. Dual, redundant, hot-swappable power supplies and innovative backplane stacking technology delivers resiliency and scalability in a convenient 1U form factor. Advanced Layer 2 and 3 feature set with OSPF, IPv6, IPv4 BGP, Tunnel node, robust QoS, and policy-based routing are included with no software licensing.

With support for OpenFlow, the Aruba 3810 is ready to take advantage of SDN applications such as HPE Network Visualizer, HPE Network Optimizer, and HPE Network Protector applications. Easy to deploy and manage with advanced security and network management tools like Aruba ClearPass Policy Manager and Aruba AirWave. With support from Aruba Central, you can quickly set up remote branch sites with little or no IT support.

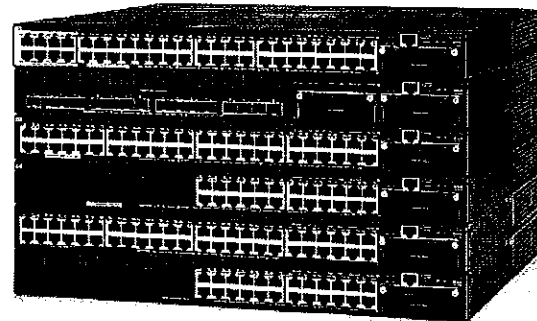
FEATURES AND BENEFITS

Software-defined networking

- OpenFlow is a key technology that enables SDN by allowing separation of the data (packet forwarding) and control (routing decision) paths

Unified wired and wireless

- Aruba ClearPass Policy Manager provides profiling, authentication, and policy management across multi-vendor wired and wireless networks
- HTTP redirect function supports HPE Intelligent Management Center (IMC) bring your own device (BYOD) solution
- Switch auto-configuration automatically configures switch for different settings such as VLAN, CoS, PoE max power, and PoE priority when Aruba AP is detected
- User Role defines a set of switch-based policies in areas such as security, authentication, and QoS. A user role can be assigned to a group of users or devices, using switch-based local user role or download from ClearPass



KEY FEATURES

- Advanced Layer 3 switch series with backplane stacking, Tunnel Node, low latency and resiliency
- Security and network management tools with Aruba ClearPass Policy Manager, AirWave and Central support
- Modular line rate 10GbE and 40GbE ports for wireless aggregation
- HPE Smart Rate for high-speed multi-gigabit bandwidth (IEEE 802.3bz) and PoE+ power
- Optimized for innovative SDN applications with OpenFlow support
- Tunnel Node provides a secure tunnel that transports network traffic on a per-port or per-user role basis to an Aruba Controller. In a per-user role Tunnel Node, users are authenticated by the ClearPass Policy Manager which directs traffic to be tunneled to an Aruba controller or switch locally
- Static IP Visibility allows ClearPass to do accounting for clients with static IP address

Quality of Service (QoS)

- Advanced classifier-based QoS classifies traffic using multiple match criteria based on Layer 2, 3, and 4 information; applies QoS policies such as setting priority level and rate limit to selected traffic on a per-port or per-VLAN basis
- Layer 4 prioritization enables prioritization based on TCP/UDP port numbers
- Class of Service (CoS) sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ

- Bandwidth shaping
 - Port-based rate limiting provides per-port ingress-/egress-enforced increased bandwidth
 - Classifier-based rate limiting uses an access control list (ACL) to enforce increased bandwidth for ingress traffic on each port
 - Reduced bandwidth provides per-port, per-queue egress-based reduced bandwidth
- Remote Intelligent mirroring mirrors selected ingress/egress traffic based on an ACL, port, MAC address, or VLAN to a local or remote HPE 8200 zl, 6600, 6200 yl, 5400 zl, 5400R, or 3500 Switch anywhere on the network
- Remote monitoring (RMON), Extended RMON (XRMON), and sFlow® v5 provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- Traffic prioritization allows real-time traffic classification into eight priority levels that are mapped to eight queues

Management

- Aruba Central cloud-based management platform offers simple, secure, and cost effective way to manage switches
- Friendly port names allows assignment of descriptive names to ports
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP) advertises and receives management information from adjacent devices on a network, facilitating easy mapping by network management applications
- Command authorization leverages RADIUS to link a custom list of CLI commands to an individual network administrator's login; an audit trail documents activity
- Multiple configuration files stores easily to the flash image
- Dual flash images provides independent primary and secondary operating system files for backup while upgrading
- Out-of-band Ethernet management port enables management over a separate physical management network; and keeps management traffic segmented from network data traffic
- Comware CLI
 - Comware-compatible CLI bridges the experience of Hewlett Packard Enterprise (HPE) Comware CLI users who are using the ArubaOS-Switch CLI
 - Display and fundamental Comware CLI commands are natively embedded in the switch CLI; display output is formatted as on Comware-based switches; fundamental commands provide Comware-familiar initial switch setup

- Configuration Comware CLI commands when Comware commands are entered, CLI help is elicited to formulate the correct ArubaOS-Switch software CLI command
- Zero-Touch Provisioning (ZTP) simplified installation of the switch infrastructure using Aruba Activate-based or DHCP-based process with AirWave Network Management
- Unidirectional Link Detection (UDLD) supports HPE UDLD and DLDLP protocols to monitor a cable between two switches and shut down the ports on both ends if a broken link is detected, preventing network problems such as loops
- IP SLA for Voice Monitor quality of voice traffic with UDP jitter and UDP jitter for VoIP tests

Connectivity

- Jumbo frames on Gigabit Ethernet and 10-Gigabit Ethernet ports, jumbo frames allow high-performance remote backup and disaster-recovery services
- IEEE 802.3at PoE+ provides up to 30 W per port to IEEE 802.3at-complaint PoE/PoE+-powered devices such as video IP phones, IEEE 802.11n wireless access points, and advanced pan/zoom/tilt security cameras
- Pre-standard PoE support detects and provides power to pre-standard PoE devices (refer to the list of supported devices in the product FAQs, which can be accessed at www.hpe.com/networking)
- Choice of uplinks
 - SFP+ uplink models provide fiber-optic (up to 70 km) or direct-attach-cable (DAC) connectivity
 - 10GBASE-T uplink models offer 10GbE speeds, using standard RJ-45 connectors and standard twisted-pair cabling up to 100 m
- Auto-MDIX provides automatic adjustments for straight-through or crossover cables on all RJ-45 ports
- IPv6
 - IPv6 host enables switch management in an IPv6 network
 - Dual stack (IPv4 and IPv6) transitions IPv4 to IPv6, supporting connectivity for both protocols
 - MLD snooping forwards IPv6 multicast traffic to the appropriate interface
 - IPv6 ACL/QoS supports ACL and QoS for IPv6 traffic
 - IPv6 routing supports static, RIPv6, OSPFv3 routing protocols
 - 6in4 tunneling supports encapsulation of IPv6 traffic in IPv4 packets
 - Security provides RA guard, DHCPv6 protection, dynamic IPv6 lockdown, and ND snooping

Performance

- Selectable queue configurations allows for increased performance by selecting the number of queues and associated memory buffering that best meet the requirements of the network applications
- Energy-efficient design
 - 80 PLUS Silver Certified Power Supply increases power efficiency and savings
 - Energy-efficient Ethernet (EEE) support reduces power consumption in accordance with IEEE 802.3az
- Meshed stacking technology
 - High-performance stacking provides up to 336 Gbps of stacking throughput; each 4-port stacking module can support up to 42 Gbps in each direction per stacking port
 - Ring, chain, and mesh topologies support up to a 10-member ring or chain and 5-member fully meshed stacks; meshed topologies offer increased resiliency vs. a standard ring
 - Virtualized switching provides simplified management as the switches appear as a single chassis when stacked
- Aruba Provision ASIC architecture is designed with the latest ProVision ASIC, providing very low latency, increased packet buffering, and adaptive power consumption

Resiliency and high availability

- Virtual Router Redundancy Protocol (VRRP) allows groups of two routers to back each other up dynamically to create highly available routed environments in IPv4 and IPv6 networks
- Nonstop switching and routing improves network availability to better support critical applications, such as unified communication and mobility; traffic will continue to be forwarded during failovers, when the backup member of the stack becomes the commander
- IEEE 802.3ad Link Aggregation Protocol (LACP) and Hewlett Packard Enterprise port trunking support up to 144 trunks, each with up to 8 links (ports) per trunk
- IEEE 802.1s Multiple Spanning Tree provides high link availability in multiple VLAN environments by allowing multiple spanning trees; provides legacy support for IEEE 802.1d and IEEE 802.1w
- Dual hot-swappable power supplies
 - Increased resiliency provides secondary power supply to enable complete switch power redundancy in case of power line or supply failure
 - Increased PoE+ power provides the secondary power supply to increase the total available PoE+ power

- Distributed trunking enables loop-free and redundant network topology without using Spanning Tree Protocol; allows a server or switch to connect to two switches using one logical trunk for redundancy and load sharing
- SmartLink provides easy-to-configure link redundancy of active and standby links

Layer 2 switching

- IEEE 802.1ad QinQ increases the scalability of an Ethernet network by providing a hierarchical structure; connects multiple LANs on a high-speed campus or metro network
- VLAN support and tagging supports the IEEE 802.1Q standard and 4096 VLANs simultaneously
- IEEE 802.1v protocol VLANs isolate select non-IPv4 protocols automatically into their own VLANs
- MAC-based VLAN provides granular control and security; uses RADIUS to map a MAC address/user to specific VLANs
- Rapid Per-VLAN Spanning Tree (RPVST+) allows each VLAN to build a separate spanning tree to improve link bandwidth usage; is compatible with PVST+
- HPE switch meshing dynamically load balances across multiple active redundant links to increase available aggregate bandwidth; allows concurrent Layer 3 routing
- GVRP and MVRP allows automatic learning and dynamic assignment of VLANs

Layer 3 services

- Loopback interface address defines an address in Routing Information Protocol (RIP) and Open Shortest Path First (OSPF), improving diagnostic capability
- Route maps provide more control during route redistribution; allow filtering and altering of route metrics
- User datagram protocol (UDP) helper function allows UDP broadcasts to be directed across router interfaces to specific IP unicast or subnet broadcast addresses; and helps prevent server spoofing for UDP services such as DHCP
- DHCP server centralizes and reduces the cost of IPv4 address management
- Bidirectional Forwarding Detection (BFD) enables link connectivity monitoring and reduces network convergence time for static route, OSPFv2, and VRRP

Layer 3 routing

- Static IP routing provides manually configured routing for both IPv4 and IPv6 networks
- OSPF provides OSPFv2 for IPv4 routing and OSPFv3 for IPv6 routing
- Policy-based routing makes routing decisions based on policies set by the network administrator

- Border Gateway Protocol (BGP) provides IPv4 Border Gateway Protocol routing, which is scalable, robust, and flexible
- Routing Information Protocol (RIP) provides RIPv1, RIPv2, and RIPng

Security

- Control Plane Policing sets rate limit on control protocols to protect CPU overload from DOS attacks
- Source-port filtering allows only specified ports to communicate with each other
- RADIUS/TACACS+ eases switch management security administration by using a password authentication server
- Secure shell encrypts all transmitted data for secure remote CLI access over IP networks
- Secure Sockets Layer (SSL) encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch
- Port security allows access only to specified MAC addresses, which can be learned or specified by the administrator
- MAC address lockout prevents particular configured MAC addresses from connecting to the network
- Detection of malicious attacks monitors 10 types of network traffic and sends a warning when an anomaly that potentially can be caused by malicious attacks is detected
- Secure FTP allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- Switch management logon security helps secure switch CLI logon by optionally requiring either RADIUS or TACACS+ authentication
- Secure management access delivers secure encryption of all access methods (CLI, GUI, or MIB) through SSHv2, SSL, and/or SNMPv3
- ICMP throttling defeats ICMP denial-of-service attacks by enabling any switch port to automatically throttle ICMP traffic automatically
- Identity-driven ACL enables implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user
- STP BPDU port protection blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- Dynamic IP lockdown works with DHCP protection to block traffic from unauthorized hosts, preventing IP source address spoofing
- DHCP protection blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- Dynamic ARP protection blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- STP root guard protects the root bridge from malicious attacks or configuration mistakes
- Management Interface Wizard helps secure management interfaces such as SNMP, telnet, SSH, SSL, Web, and USB at the desired level
- Security banner displays a customized security policy when users log in to the switch
- Switch CPU protection provides automatic protection against malicious network traffic trying to shut down the switch
- ACLs provide filtering based on the IP field, source/destination IP address/subnet and source/destination TCP/UDP port number on a per-VLAN or per-port basis
- Multiple authentication methods
 - IEEE 802.1X authenticates multiple IEEE 802.1X users per port; prevents a user from "piggybacking" on another user's authentication
 - Web-based authentication authenticates from Web browser for clients that do not support 802.1X supplicant
 - MAC-based authentication authenticates client with the RADIUS server based on client's MAC address
 - Concurrent authentication modes enables a switch port to accept up to 32 sessions of 802.1X, Web, and MAC authentication
- Private VLAN provides network security by restricting peer-to-peer communication to prevent a variety of malicious attacks; typically a switch port can only communicate with other ports in the same community and/or an uplink port, regardless of VLAN ID or destination MAC address
- IEEE 802.1AE MACsec provides security on a link between two switch ports (1Gbps or 10Gbps) using standard encryption and authentication

Convergence

- IP multicast snooping (data-driven IGMP) prevents flooding of IP multicast traffic
- LLDP-MED (Media Endpoint Discovery) defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to configure network devices such as IP phones automatically
- PoE allocations supports multiple methods (automatic, IEEE 802.3af class, LLDP-MED, or user-specified) to allocate PoE power for more efficient energy savings
- IP multicast routing includes PIM sparse and dense modes to route IP multicast traffic

- Auto VLAN configuration for voice
 - RADIUS VLAN uses a standard RADIUS attribute and LLDP-MED to configure a VLAN automatically for IP phones
 - CDPv2 uses CDPv2 to configure legacy IP phones
- Local MAC Authentication assigns attributes such as VLAN and QoS using locally configured profile that can be a list of MAC prefixes

Warranty and support

- Limited Lifetime Warranty
See www.hpe.com/networking/warrantysummary for warranty and support information included with your product purchase.
- Software releases to find software for your product, refer to www.hpe.com/networking/support; for details on the software releases available with your product purchase, refer to www.hpe.com/networking/warrantysummary

SPECIFICATIONS

	Aruba 3810M 24G 1-slot Switch (JL071A)	Aruba 3810M 48G 1-slot Switch (JL072A)	Aruba 3810M 24G PoE+ 1-slot Switch (JL073A)
Included accessories	1 Aruba 3810 Switch Fan Tray (JL088A)	1 Aruba 3810 Switch Fan Tray (JL088A)	1 Aruba 3810 Switch Fan Tray (JL088A)
I/O ports and slots	24 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only; Ports 1 – 24 support MACSec 1 open module slot Supports a maximum of 4 SFP+ ports or 1 40GbE ports, with optional module or 4 Smart Rate ports	48 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only; Ports 1 – 48 support MACSec 1 open module slot Supports a maximum of 4 SFP+ ports or 2 40GbE ports, with optional module or 4 Smart Rate ports	24 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only; Ports 1 – 24 support MACSec 1 open module slot Supports a maximum of 4 SFP+ ports or 1 40GbE ports, with optional module or 4 Smart Rate ports
Additional ports and slots	1 stacking module slot 1 RJ-45 serial console port 1 RJ-45 out-of-band management port 1 dual-personality (RJ-45 or USB micro-B)	1 stacking module slot 1 RJ-45 serial console port 1 RJ-45 out-of-band management port 1 dual-personality (RJ-45 or USB micro-B)	1 stacking module slot 1 RJ-45 serial console port 1 RJ-45 out-of-band management port 1 dual-personality (RJ-45 or USB micro-B)
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	2 power supply slots 1 minimum power supply required (ordered separately)	2 power supply slots 1 minimum power supply required (ordered separately)
Fan tray	Includes: 1 x JL088A 1 fan tray slot Switch ships with 1 JL088A fan tray installed. Spares ordered separately.	Includes: 1 x JL088A 1 fan tray slot Switch ships with 1 JL088A fan tray installed. Spares ordered separately.	Includes: 1 x JL088A 1 fan tray slot Switch ships with 1 JL088A fan tray installed. Spares ordered separately.

SPECIFICATIONS

	Aruba 3810M 24G 1-slot Switch (JL071A)	Aruba 3810M 48G 1-slot Switch (JL072A)	Aruba 3810M 24G PoE+ 1-slot Switch (JL073A)
Physical characteristics			
Dimensions	17.42(w) x 16.98(d) x 1.73(h) in (44.25 x 43.13 x 4.39 cm) (1U height)	17.42(w) x 16.98(d) x 1.73(h) in (44.25 x 43.13 x 4.39 cm) (1U height)	17.42(w) x 16.98(d) x 1.73(h) in (44.25 x 43.13 x 4.39 cm) (1U height)
Weight	12.76 lb (5.79 kg)	13.20 lb (5.99 kg)	13.02 lb (5.91 kg)
Memory and processor			
	P2020 Dual Core @ 1.2 GHz, 4 GB DDR3 SDRAM, 1 GB SD Card	P2020 Dual Core @ 1.2 GHz, 4 GB DDR3 SDRAM, 1 GB SD Card	P2020 Dual Core @ 1.2 GHz, 4 GB DDR3 SDRAM, 1 GB SD Card
	Dual ARM® Cortex A9 @ 1 GHz, 2 GB DDR3 SDRAM; Packet buffer size: 13.5 MB Internal	Dual ARM® Cortex A9 @ 1 GHz, 2 GB DDR3 SDRAM; Packet buffer size: 13.5 MB Internal	Dual ARM® Cortex A9 @ 1 GHz, 2 GB DDR3 SDRAM; Packet buffer size: 13.5 MB Internal
Mounting and enclosure			
	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); Horizontal surface mounting only
Performance			
	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
1000 Mb Latency	< 2.8 µs (FIFO 64-byte packets)	< 2.8 µs (FIFO 64-byte packets)	< 2.8 µs (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 µs (FIFO 64-byte packets)	< 1.8 µs (FIFO 64-byte packets)	< 1.8 µs (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 µs (FIFO 64-byte packets)	< 1.5 µs (FIFO 64-byte packets)	< 1.5 µs (FIFO 64-byte packets)
Throughput	up to 95.2 Mpps (64-byte packets)	up to 190.5 Mpps (64-byte packets)	up to 95.2 Mpps (64-byte packets)
Routing/Switching capacity	160 Gbps	320 Gbps	160 Gbps
Switch fabric speed	169 Gbps	338 Gbps	169 Gbps
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries	64000 entries
Environment			
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 39 dB, Pressure: 22.8 dB	Power: 38 dB, Pressure: 21.8 dB	Power: 48 dB, Pressure: 30.7 dB

SPECIFICATIONS

	Aruba 3810M 24G 1-slot Switch (JL071A)	Aruba 3810M 48G 1-slot Switch (JL072A)	Aruba 3810M 24G PoE+ 1-slot Switch (JL073A)
Safety	EN 60950/IEC 60950; UL 60950; UL 60950-1; CAN/CSA 22.2 No. 60950; EN 60825; CSA 22.2 60950-1; EN62479:2010; EN 60950-1:2006 +A11:2009 +A1: 2010 +A12:2011+A2:2013; EN 62368-1, Ed. 2; IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013; IEC 60825:2007; EN60850-1:2007 / IEC 60825-1: 2007 Class1 Class 1 Laser Products /Laser Klasse 1; UL 62368-1 Ed.2	EN 60950/IEC 60950; UL 60950; UL 60950-1; CAN/CSA 22.2 No. 60950; EN 60825; CSA 22.2 60950-1; EN62479:2010; EN 60950-1:2006 +A11:2009 +A1: 2010 +A12:2011+A2:2013; EN 62368-1, Ed. 2; IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013; IEC 60825:2007; EN60850-1:2007 / IEC 60825-1: 2007 Class1 Class 1 Laser Products / Laser Klasse 1; UL 62368-1 Ed.2	EN 60950/IEC 60950; UL 60950; UL 60950-1; CAN/CSA 22.2 No. 60950; EN 60825; CSA 22.2 60950-1; EN62479:2010; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1, Ed. 2; IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013; IEC 60825:2007; EN60850-1:2007 / IEC 60825-1: 2007 Class1 Class 1 Laser Products / Laser Klasse 1; UL 62368-1 Ed.2
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A; EN 60950- 1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A; EN 60950- 1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A; EN 60950- 1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013
Immunity			
Generic EN	EN55022: 2010	EN55022: 2010	EN55022: 2010
ESD	EN55024: 2010	EN55024: 2010	EN55024: 2010
Radiated	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
EFT/Burst	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
Surge	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC
Conducted	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V
Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Voltage dips and Interruptions	IEC 61000-4-11; >95% reductions, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reductions, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reductions, 0.5 period; 30% reduction, 25 periods
Harmonics	EN61000-3-2:2006 +A1:2009 +A2:2009 Class A	EN61000-3-2:2006 +A1:2009 +A2:2009 Class A	EN61000-3-2:2006 +A1:2009 +A2:2009 Class A
Flicker	EN61000-3-3:2008	EN61000-3-3:2008	EN61000-3-3:2008
Management	Aruba Central; Aruba AirWave Net- work Management; IMC - Intelligent Management Center; Command-line Interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of- band; Out-of-band management (serial RS-232c or micro usb)	Aruba Central; Aruba AirWave Net- work Management; IMC - Intelligent Management Center; Command-line Interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of- band; Out-of-band management (serial RS-232c or micro usb)	Aruba Central; Aruba AirWave Net- work Management; IMC - Intelligent Management Center; Command-line Interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of- band; Out-of-band management (serial RS-232c or micro usb)
Services	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewl- ett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewl- ett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewl- ett Packard Enterprise sales office.

SPECIFICATIONS			
	Aruba 3810M 48G PoE+ 1-slot Switch (JL074A)	Aruba 3810M 16SFP+ 2-slot Switch (JL075A)	Aruba 3810M 40G 8 HPE Smart Rate PoE+ 1-slot Switch (JL076A)
Included accessories	1 Aruba 3810 Switch Fan Tray (JL088A)	1 Aruba 3810 Switch Fan Tray (JL088A)	1 Aruba 3810 Switch Fan Tray (JL088A)
I/O ports and slots	<p>48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only; Ports 1 – 48 support MACSec</p> <p>1 open module slot</p> <p>Supports a maximum of 4 SFP+ ports or 2 40GbE ports, with optional module or 4 Smart Rate ports</p>	<p>16 SFP+ fixed 1000/10000 SFP+ ports; Duplex: 100BASE-TX: half or full; 1000BASE-T: full only; Ports 1 – 16 support MACSec</p> <p>2 open module slots</p> <p>Supports a maximum of 8 SFP+ ports or 2 40GbE ports, with optional module or 4 Smart Rate ports</p>	<p>40 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only; Ports 1 – 40 support MACSec</p> <p>8 RJ-45 HPE Smart Rate Multi-Gigabit ports; Ports 1 – 8 support MACSec</p> <p>1 open module slot</p> <p>Supports a maximum of 4 SFP+ ports or 2 40GbE ports, with optional module or 4 Smart Rate ports</p>
Additional ports and slots	<p>1 stacking module slot</p> <p>1 RJ-45 serial console port</p> <p>1 RJ-45 out-of-band management port</p> <p>1 dual-personality (RJ-45 or USB micro-B)</p>	<p>1 stacking module slot</p> <p>1 RJ-45 serial console port</p> <p>1 RJ-45 out-of-band management port</p> <p>1 dual-personality (RJ-45 or USB micro-B)</p>	<p>1 stacking module slot</p> <p>1 RJ-45 serial console port</p> <p>1 RJ-45 out-of-band management port</p> <p>1 dual-personality (RJ-45 or USB micro-B)</p>
Power supplies	<p>2 power supply slots</p> <p>1 minimum power supply required (ordered separately)</p>	<p>2 power supply slots</p> <p>1 minimum power supply required (ordered separately)</p>	<p>2 power supply slots</p> <p>1 minimum power supply required (ordered separately)</p>
Fan tray	<p>Includes:</p> <p>1 x JL088A</p> <p>1 fan tray slot</p> <p>Switch ships with 1 JL088A fan tray installed. Spares ordered separately.</p>	<p>Includes:</p> <p>1 x JL088A</p> <p>1 fan tray slot</p> <p>Switch ships with 1 JL088A fan tray installed. Spares ordered separately.</p>	<p>Includes:</p> <p>1 x JL088A</p> <p>1 fan tray slot</p> <p>Switch ships with 1 JL088A fan tray installed. Spares ordered separately.</p>
Physical characteristics			
Dimensions	17.42(w) x 16.98(d) x 1.73(h) in (44.25 x 43.13 x 4.39 cm) (1U height)	17.42(w) x 16.98(d) x 1.73(h) in (44.25 x 43.13 x 4.39 cm) (1U height)	17.42(w) x 16.98(d) x 1.73(h) in (44.25 x 43.13 x 4.39 cm) (1U height)
Weight	13.62 lb (6.18 kg)	13.28 lb (6.02 kg)	13.61 lb (6.17 kg)
Memory and processor	<p>P2020 Dual Core @ 1.2 GHz, 4 GB DDR3 SDRAM, 1 GB SD Card</p> <p>Dual ARM Coretex A9 @ 1 GHz, 2 GB DDR3 SDRAM; Packet buffer size: 13.5 MB Internal</p>	<p>P2020 Dual Core @ 1.2 GHz, 4 GB DDR3 SDRAM, 1 GB SD Card</p> <p>Dual ARM Coretex A9 @ 1 GHz, 2 GB DDR3 SDRAM; Packet buffer size: 13.5 MB Internal</p>	<p>P2020 Dual Core @ 1.2 GHz, 4 GB DDR3 SDRAM, 1 GB SD Card</p> <p>Dual ARM Coretex A9 @ 1 GHz, 2 GB DDR3 SDRAM; Packet buffer size: 13.5 MB Internal</p>

SPECIFICATIONS

	Aruba 3810M 48G PoE+ 1-slot Switch (JL074A)	Aruba 3810M 16SFP+ 2-slot Switch (JL075A)	Aruba 3810M 40G 8 HPE Smart Rate PoE+ 1-slot Switch (JL076A)
Mounting and enclosure	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware Included); Horizontal surface mounting only	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware Included); Horizontal surface mounting only	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware Included); Horizontal surface mounting only
Performance			
	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
1000 Mb Latency	< 2.8 μ s (FIFO 64-byte packets)	< 2.8 μ s (FIFO 64-byte packets)	< 2.8 μ s (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 μ s (FIFO 64-byte packets)	< 1.8 μ s (FIFO 64-byte packets)	< 1.8 μ s (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 μ s (FIFO 64-byte packets)	< 1.5 μ s (FIFO 64-byte packets)	< 1.5 μ s (FIFO 64-byte packets)
Throughput	up to 190.5 Mpps (64-byte packets)	up to 285.7 Mpps (64-byte packets)	up to 273.8 Mpps (64-byte packets)
Routing/Switching capacity	320 Gbps	480 Gbps	480 Gbps
Switch fabric speed	338 Gbps	508 Gbps	508 Gbps
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries	64000 entries
Environment			
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 42 dB, Pressure: 26 dB	Power: 39 dB, Pressure: 22.3 dB	Power: 45 dB, Pressure: 27.9 dB
Safety	EN 60950/IEC 60950; UL 60950; UL 60950-1; CAN/CSA 22.2 No. 60950; EN 60825; CSA 22.2 60950-1; EN62479:2010; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1, Ed. 2; IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013; IEC 60825:2007; EN60850-1:2007 / IEC 60825-1: 2007 Class1 Class 1 Laser Products / Laser Klasse 1; UL 62368-1 Ed.2	EN 60950/IEC 60950; UL 60950; UL 60950-1; CAN/CSA 22.2 No. 60950; EN 60825; CSA 22.2 60950-1; EN62479:2010; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1, Ed. 2; IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013; IEC 60825:2007; EN60850-1:2007 / IEC 60825-1: 2007 Class1 Class 1 Laser Products / Laser Klasse 1; UL 62368-1 Ed.2	EN 60950/IEC 60950; UL 60950; UL 60950-1; CAN/CSA 22.2 No. 60950; EN 60825; CSA 22.2 60950-1; EN62479:2010; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1, Ed. 2; IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013; IEC 60825:2007; EN60850-1:2007 / IEC 60825-1: 2007 Class1 Class 1 Laser Products / Laser Klasse 1; UL 62368-1 Ed.2

SPECIFICATIONS			
	Aruba 3810M 48G PoE+ 1-slot Switch (JL074A)	Aruba 3810M 16SFP+ 2-slot Switch (JL075A)	Aruba 3810M 40G 8 HPE Smart Rate PoE+ 1-slot Switch (JL076A)
Emissions	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013
Immunity			
Generic	EN55022: 2010	EN55022: 2010	EN55022: 2010
EN	EN55024: 2010	EN55024: 2010	EN55024: 2010
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radlated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
Surge	IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-5; 1 kV/2 kV AC
Conducted	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V
Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Voltage dips and interruptions	IEC 61000-4-11; >95% reductions, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reductions, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reductions, 0.5 period; 30% reduction, 25 periods
Harmonics	EN61000-3-2:2006 +A1:2009 +A2:2009 Class A	EN61000-3-2:2006 +A1:2009 +A2:2009 Class A	EN61000-3-2:2006 +A1:2009 +A2:2009 Class A
Flicker	EN61000-3-3:2008	EN61000-3-3:2008	EN61000-3-3:2008
Management	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line Interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of-band; Out-of-band management (serial RS-232c or micro usb)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line Interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of-band; Out-of-band management (serial RS-232c or micro usb)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of-band; Out-of-band management (serial RS-232c or micro usb)
Services	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

SPECIFICATIONS

	Aruba 3810M 48G PoE+ 4SFP+ 680W Switch (JL428A)	Aruba 3810M 48G PoE+ 4SFP+ 1050W Switch (JL429A)	Aruba 3810M 24SFP+ 250W Switch (JL430A)
Included accessories	<p>1 Aruba 3810 Switch Fan Tray (JL088A)</p> <p>1 Aruba 3810M 4SFP+ Module (JL083A)</p> <p>1 Aruba Aruba X372 54VDC 680W 100-240VAC Power Supply (JL086A)</p>	<p>1 Aruba 3810 Switch Fan Tray (JL088A)</p> <p>1 Aruba 3810M 4SFP+ Module (JL083A)</p> <p>1 Aruba X372 54VDC 1050W 110-240VAC Power Supply (JL087A)</p>	<p>1 Aruba 3810 Switch Fan Tray (JL088A)</p> <p>2 Aruba 3810M 4SFP+ Module (JL083A)</p> <p>1 Aruba X371 12VDC 250W 100-240VAC Power Supply (JL085A)</p>
I/O ports and slots	<p>48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only; Ports 1-48 support MACSec</p> <p>Supports a maximum of 4 SFP+ ports or 2 40 GbE ports, with optional module or 4 Smart Rate ports</p>	<p>48 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only; Ports 1-48 support MACSec</p> <p>Supports a maximum of 4 SFP+ ports or 2 40 GbE ports, with optional module or 4 Smart Rate ports</p>	<p>24 SFP+ fixed 1000/10000 SFP+ ports; Duplex: 100BASE-TX: half or full; 1000BASE-T: full only; Ports 1-24 support MACSec</p> <p>Supports a maximum of 24 SFP+ ports or 2 40 GbE ports, with optional module(s) or 4 Smart Rate ports</p>
Additional ports and slots	<p>1 stacking module slot</p> <p>1 RJ-45 serial console port</p> <p>1 RJ-45 out-of-band management port</p> <p>1 dual-personality (RJ-45 or USB micro-B)</p>	<p>1 stacking module slot</p> <p>1 RJ-45 serial console port</p> <p>1 RJ-45 out-of-band management port</p> <p>1 dual-personality (RJ-45 or USB micro-B)</p>	<p>1 stacking module slot</p> <p>1 RJ-45 serial console port</p> <p>1 RJ-45 out-of-band management port</p> <p>1 dual-personality (RJ-45 or USB micro-B)</p>
Power supplies	<p>2 power supply slots</p> <p>1 power supply included</p> <p>1 minimum power supply required (ordered separately)</p>	<p>2 power supply slots</p> <p>1 power supply included</p> <p>1 minimum power supply required (ordered separately)</p>	<p>2 power supply slots</p> <p>1 power supply included</p> <p>1 minimum power supply required (ordered separately)</p>
Fan tray	<p>Includes:</p> <p>1 x JL088A</p> <p>1 fan tray slot</p> <p>Switch ships with 1 JL088A fan tray installed. Spares ordered separately..</p>	<p>Includes:</p> <p>1 x JL088A</p> <p>1 fan tray slot</p> <p>Switch ships with 1 JL088A fan tray installed. Spares ordered separately..</p>	<p>Includes:</p> <p>1 x JL088A</p> <p>1 fan tray slot</p> <p>Switch ships with 1 JL088A fan tray installed. Spares ordered separately.</p>
Physical characteristics			
Dimensions	17.42(w) x 16.98(d) x 1.73(h) in. (44.25 x 43.13 x 4.39 cm) (1U height)	17.42(w) x 16.98(d) x 1.73(h) in. (44.25 x 43.13 x 4.39 cm) (1U height)	17.42(w) x 16.98(d) x 1.73(h) in. (44.25 x 43.13 x 4.39 cm) (1U height)
Weight	15.82 lb (7.18 kg)	15.94 lb (7.23 kg)	15.56 lb (7.06 kg)
Memory and processor	<p>P2020 Dual Core @ 1.2 GHz, 4 GB DDR3 SDRAM, 1 GB SD Card</p> <p>Dual ARM Coretex A9 @ 1 GHz, 2 GB DDR3 SDRAM; Packet buffer size: 13.5 MB Internal</p>	<p>P2020 Dual Core @ 1.2 GHz, 4 GB DDR3 SDRAM, 1 GB SD Card</p> <p>Dual ARM Coretex A9 @ 1 GHz, 2 GB DDR3 SDRAM; Packet buffer size: 13.5 MB Internal</p>	<p>P2020 Dual Core @ 1.2 GHz, 4 GB DDR3 SDRAM, 1 GB SD Card</p> <p>Dual ARM Coretex A9 @ 1 GHz, 2 GB DDR3 SDRAM; Packet buffer size: 13.5 MB Internal</p>

SPECIFICATIONS

	Aruba 3810M 48G PoE+ 4SFP+ 680W Switch (JL428A)	Aruba 3810M 48G PoE+ 4SFP+ 1050W Switch (JL429A)	Aruba 3810M 24SFP+ 250W Switch (JL430A)
Mounting and enclosure	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA-standard 19 in. telco rack or equipment cabinet (hardware included); Horizontal surface mounting only
Performance			
	IPv6 Ready Certified	IPv6 Ready Certified	IPv6 Ready Certified
1000 Mb Latency	< 2.8 μ s (FIFO 64-byte packets)	< 2.8 μ s (FIFO 64-byte packets)	< 2.8 μ s (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 μ s (FIFO 64-byte packets)	< 1.8 μ s (FIFO 64-byte packets)	< 1.8 μ s (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 μ s (FIFO 64-byte packets)	< 1.5 μ s (FIFO 64-byte packets)	< 1.5 μ s (FIFO 64-byte packets)
Throughput	up to 190.5 Mpps (64-byte packets)	up to 190.5 Mpps (64-byte packets)	up to 285.7 Mpps (64-byte packets)
Routing/Switching capacity	320 Gbps	320 Gbps	480 Gbps
Switch fabric speed	338 Gbps	338 Gbps	508 Gbps
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries	64000 entries
Environment			
Operating temperature	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)	32°F to 113°F (0°C to 45°C)
Operating relative humidity	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing	15% to 95% @ 104°F (40°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing	15% to 90% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 47 dB, Pressure: 29.4 dB	Power: 47 dB, Pressure: 29.4 dB	Power: 39 dB, Pressure: 22.3 dB
Safety	EN 60950/IEC 60950; UL 60950; UL 60950-1; CAN/CSA 22.2 No. 60950; EN 60825; CSA 22.2 60950-1; EN62479:2010; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1, Ed. 2; IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013; IEC 60825:2007; EN60850-1:2007 / IEC 60825-1: 2007 Class1 Class 1 Laser Products / Laser Klasse 1; UL 62368-1 Ed.2	EN 60950/IEC 60950; UL 60950; UL 60950-1; CAN/CSA 22.2 No. 60950; EN 60825; CSA 22.2 60950-1; EN62479:2010; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1, Ed. 2; IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013; IEC 60825:2007; EN60850-1:2007 / IEC 60825-1: 2007 Class1 Class 1 Laser Products / Laser Klasse 1; UL 62368-1 Ed.2	EN 60950/IEC 60950; UL 60950; UL 60950-1; CAN/CSA 22.2 No. 60950; EN 60825; CSA 22.2 60950-1; EN62479:2010; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013; EN 62368-1, Ed. 2; IEC 60950-1:2005 Ed.2; Am 1:2009+A2:2013; IEC 60825:2007; EN60850-1:2007 / IEC 60825-1: 2007 Class1 Class 1 Laser Products / Laser Klasse 1; UL 62368-1 Ed.2

SPECIFICATIONS

	Aruba 3810M 48G PoE+ 4SFP+ 680W Switch (JL428A)	Aruba 3810M 48G PoE+ 4SFP+ 1050W Switch (JL429A)	Aruba 3810M 24SFP+ 250W Switch (JL430A)
Emissions			
	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013	FCC Class A; VCCI Class A; EN 55022/CISPR 22 Class A; EN 60950-1:2006 +A11:2009 +A1:2010 +A12:2011+A2:2013
Immunity			
Generic	EN55022: 2010	EN55022: 2010	EN55022: 2010
EN	EN55024: 2010	EN55024: 2010	EN55024: 2010
ESD	IEC 61000-4-2	IEC 61000-4-2	IEC 61000-4-2
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
Surge	IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-5; 1 kV/2 kV AC	IEC 61000-4-5; 1 kV/2 kV AC
Conducted	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V	IEC 61000-4-6; 3 V
Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Voltage dips and interruptions	IEC 61000-4-11; >95% reductions, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reductions, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reductions, 0.5 period; 30% reduction, 25 periods
Harmonics	EN61000-3-2:2006 +A1:2009 +A2:2009 Class A	EN61000-3-2:2006 +A1:2009 +A2:2009 Class A	EN61000-3-2:2006 +A1:2009 +A2:2009 Class A
Flicker	EN61000-3-3:2008	EN61000-3-3:2008	EN61000-3-3:2008
Management			
	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of-band; Out-of-band management (serial RS-232c or micro usb)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of-band; Out-of-band management (serial RS-232c or micro usb)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of-band; Out-of-band management (serial RS-232c or micro usb)
Services			
	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

STANDARDS AND PROTOCOLS (APPLIES TO ALL PRODUCTS IN SERIES)

BGP

- RFC 1997 BGP Communities Attribute
- RFC 2918 Route Refresh Capability
- RFC 4271 A Border Gateway Protocol 4 (BGP-4)
- RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)
- RFC 4724 Graceful Restart Mechanism for BGP
- RFC 5492 Capabilities Advertisement with BGP-4

Denial of service protection

- CPU DoS Protection

Device management

- RFC 1591 DNS (client)
- RFC 2576 (Coexistence between SNMP V1, V2, V3)
- RFC 2579 (SMIPv2 Text Conventions)
- RFC 2580 (SMIPv2 Conformance)
- RFC 3416 (SNMP Protocol Operations v2)
- RFC 3417 (SNMP Transport Mappings)
- HTML and telnet management

General protocols

- IEEE 802.1ad Q-in-Q
- IEEE 802.1AX-2008 Link Aggregation
- IEEE 802.1D MAC Bridges
- IEEE 802.1p Priority
- IEEE 802.1Q VLANs
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.1v VLAN classification by Protocol and Port
- IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3af Power over Ethernet
- IEEE 802.3x Flow Control
- IEEE 802.3bz 2.5 Gbps and 5 Gbps interfaces
- RFC 768 UDP
- RFC 783 TFTP Protocol (revision 2)
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 854 TELNET
- RFC 868 Time Protocol
- RFC 951 BOOTP
- RFC 1058 RIPv1
- RFC 1350 TFTP Protocol (revision 2)
- RFC 1519 CIDR
- RFC 1542 BOOTP Extensions

- RFC 1918 Address Allocation for Private Internet
- RFC 2030 Simple Network Time Protocol (SNTP) v4
- RFC 2131 DHCP
- RFC 2453 RIPv2
- RFC 2548 (MS-RAS-Vendor only)
- RFC 3046 DHCP Relay Agent Information Option
- RFC 3575 IANA Considerations for RADIUS
- RFC 3576 Ext to RADIUS (CoA only)
- RFC 3768 VRRP
- RFC 4675 RADIUS VLAN & Priority
- RFC 5798 VRRP (exclude Accept Mode and sub-sec timer)
- RFC 5880 Bidirectional Forwarding Detection
- RFC 5905 Network Time Protocol Version 4: Protocol and Algorithms Specification
- UDLD (Uni-directional Link Detection)

IP multicast

- RFC 3376 IGMPv3
- RFC 3973 PIM Dense Mode
- RFC 4601 PIM

IPv6

- RFC 1981 IPv6 Path MTU Discovery
- RFC 2080 RIPng for IPv6
- RFC 2081 RIPng Protocol Applicability Statement
- RFC 2082 RIP-2 MD5
- RFC 2375 IPv6 Multicast Address Assignments
- RFC 2460 IPv6 Specification
- RFC 2464 Transmission of IPv6 over Ethernet Networks
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only)
- RFC 3019 MLDv1 MIB
- RFC 3315 DHCPv6 (client only)
- RFC 3484 Default Address Selection for IPv6
- RFC 3587 IPv6 Global Unicast Address Format
- RFC 3596 DNS Extension for IPv6
- RFC 3810 MLDv2 (host joins only)
- RFC 4022 MIB for TCP
- RFC 4087 IP Tunnel MIB
- RFC 4113 MIB for UDP
- RFC 4213 Basic Transition Mechanisms for IPv6 Hosts and Routers
- RFC 4251 SSHv6 Architecture
- RFC 4252 SSHv6 Authentication
- RFC 4253 SSHv6 Transport Layer
- RFC 4254 SSHv6 Connection
- RFC 4291 IP Version 6 Addressing Architecture

- RFC 4293 MIB for IP
- RFC 4294 IPv6 Node Requirements
- RFC 4419 Key Exchange for SSH
- RFC 4443 ICMPv6
- RFC 4541 IGMP & MLD Snooping Switch
- RFC 4861 IPv6 Neighbor Discovery
- RFC 4862 IPv6 Stateless Address Auto-configuration
- RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
- RFC 5340 OSPFv3 for IPv6
- RFC 5453 Reserved IPv6 Interface Identifiers
- RFC 5519 Multicast Group Membership Discovery MIB (MLDv2 only)
- RFC 5722 Handling of Overlapping IPv6 Fragments
- RFC 6620 FCFS SAVI
- draft-ietf-savi-mix

MIBs

- IEEE 802.1ap (MSTP and STP MIB's only)
- IEEE 8021-Bridge-MIB (2008)
- IEEE 8021-Q-Bridge-MIB (2008)
- RFC 1155 Structure & ID of Mgmt Info for TCP/IP Internets
- RFC 1213 MIB II
- RFC 1493 Bridge MIB
- RFC 1724 RIPv2 MIB
- RFC 1850 OSPFv2 MIB
- RFC 2021 RMONv2 MIB
- RFC 2096 IP Forwarding Table MIB
- RFC 2578 Structure of Management Information Version 2 (SMIv2)
- RFC 2613 SMON MIB
- RFC 2618 RADIUS Client MIB
- RFC 2620 RADIUS Accounting MIB
- RFC 2665 Ethernet-Like-MIB
- RFC 2668 802.3 MAU MIB
- RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
- RFC 2737 Entity MIB (Version 2)
- RFC 2787 VRRP MIB
- RFC 2863 The Interfaces Group MIB
- RFC 2925 Ping MIB
- RFC 2932 IP (Multicast Routing MIB)
- RFC 2933 IGMP MIB
- RFC 3411 SNMP Management Frameworks
- RFC 3412 Message Processing and Dispatching for the Simple Network Management Protocol (SNMP)
- RFC 3413 Simple Network Management Protocol (SNMP) Applications

- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 4836 Managed Objects for 802.3 Medium Attachment Units (MAU)
- RFC 7331 BFD MIB

Network management

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)
- RFC 3176 sFlow
- RFC 5424 Syslog Protocol
- ANSI/TIA-1057 LLDP Media Endpoint Discovery (LLDP-MED)
- SNMPv1/v2c/v3
- XRMON

OSPF

- RFC 2328 OSPFv2
- RFC 3101 OSPF NSSA
- RFC 3623 Graceful OSPF Restart (Unplanned Outages only)
- RFC 5340 OSPFv3 for IPv6

QoS/CoS

- RFC 2474 DiffServ Precedence, Including 8 queues/port
- RFC 2475 DiffServ Architecture
- RFC 2597 DiffServ Assured Forwarding (AF)
- RFC 2598 DiffServ Expedited Forwarding (EF)

Security

- IEEE 802.1X Port Based Network Access Control
- RFC 1321 The MD5 Message-Digest Algorithm
- RFC 2818 HTTP Over TLS RFC 1492 TACACS+
- RFC 2865 RADIUS (client only)
- RFC 2866 RADIUS Accounting
- RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)
- Secure Sockets Layer (SSL)
- SSHv2 Secure Shell

ARUBA 3810 SWITCH SERIES ACCESSORIES

Modules

- Aruba 3810M/2930M 4 1/2.5/5/10 GbE HPE Smart Rate Module (JL081A)
- Aruba 3810M 4-port Stacking Module (JL084A)
- Aruba 3810M/2930M 1QSFP+ 40GbE Module (JL078A)
- Aruba 3810M/2930M 4SFP+ MACsec Module (JL083A)
- Aruba 3810M 2QSFP+ 40GbE Module (JL079A)

Transceivers

- HPE X111 100M SFP LC FX Transceiver (J9054C)
- HPE X121 1G SFP LC SX Transceiver (J4858C)
- HPE X121 1G SFP LC LX Transceiver (J4859C)
- HPE X121 1G SFP LC LH Transceiver (J4860C)
- HPE X121 1G SFP RJ45 T Transceiver (J8177C)
- HPE X122 1G SFP LC BX-D Transceiver (J9142B)
- HPE X122 1G SFP LC BX-U Transceiver (J9143B)
- HPE X132 10G SFP+ LC SR Transceiver (J9150A)
- HPE X132 10G SFP+ LC LR Transceiver (J9151A)
- HPE X132 10G SFP+ LC LRM Transceiver (J9152A)
- HPE X132 10G SFP+ LC ER Transceiver (J9153A)
- Aruba 40G QSFP+ LC BIDI 150m MMF XCVR (JL308A)
- HPE X142 40G QSFP+ MPO SR4 Transceiver (JH231A)
- HPE X142 40G QSFP+ MPO CSR4 300M Transceiver (JH233A)
- HPE X142 40G QSFP+ LC LR4 5M Transceiver (JH232A)
- HPE X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable (J9281B)
- HPE X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable (J9283B)
- HPE X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable (J9285B)
- HPE X244 10G XFP to SFP+ 1m Direct Attach Copper Cable (J9300A)
- HPE X244 10G XFP to SFP+ 3m Direct Attach Copper Cable (J9301A)
- HPE X244 10G XFP to SFP+ 3m Direct Attach Copper Cable (J9302A)

- HPE X242 40G QSFP+ to QSFP+ 1m Direct Attach Copper Cable (JH234A)
- HPE X242 40G QSFP+ to QSFP+ 3m DAC Cable (JH235A)
- HPE X242 40G QSFP+ to QSFP+ 5m DAC Cable (JH236A)

Cables

- Aruba X2C2 RJ45 to DB9 Console Cable (JL448A)
- HPE 3800 0.5m Stacking Cable (J9578A)
- HPE 3800 1m Stacking Cable (J9665A)
- HPE 3800 3m Stacking Cable (J9579A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable (QK732A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable (QK733A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable (QK734A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable (QK735A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable (QK736A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable (QK737A)

Power Supply

- Aruba X371 12VDC 250W 100-240VAC Power Supply (JL085A)
- Aruba X372 54VDC 680W 100-240VAC Power Supply (JL086A)
- Aruba X372 54VDC 1050W 110-240VAC Power Supply (JL087A)

Fan Tray

- Aruba 3810 Switch Fan Tray (JL088A)

Mounting Kit

- HPE X410 1U Universal 4-post Rack Mounting Kit (J9583A)



3333 SCOTT BLVD | SANTA CLARA, CA 95054
1.844.473.2782 | T: 1.408.227.4500 | FAX: 1.408.227.4550 | INFO@ARUBANETWORKS.COM

DATA SHEET

ARUBA 5400R ZL2 SWITCH SERIES

PRODUCT OVERVIEW

The Aruba 5400R zL2 Switch Series is an industry-leading mobile campus access solution with HPE Smart Rate multi-gigabit ports for high-speed 802.11ac devices. It delivers enterprise-class resiliency with innovative flexibility and scalability for customers creating digital workplaces that are optimized for mobile users with an integrated wired and wireless approach. This series brings scalable aggregation with Virtual Switching Framework (VSF) stacking technology, hitless failover, and Fast Software Upgrade for 5400R VSF stacks. The advanced Layer 2 and 3 feature set includes OSPF, IPv6, IPv4 BGP, Tunnel Node, robust QoS and policy-based routing with no software licensing required.

Based on a powerful ProVision ASIC, the Aruba 5400R zL2 Switch Series has a high-speed, high-capacity architecture with 2 Tbps crossbar switching fabric with low 2.1μ latency, robust feature support, and value with flexible programmability for future applications. This series offers flexible connectivity options with 6- or 12-slot compact chassis, line rate 40GbE, up to 96 line rate 10GbE ports and up to 288 ports of PoE+. The 5400R is easy to deploy and manage with advanced security and network management tools like Aruba ClearPass Policy Manager, Aruba AirWave and cloud-based Aruba Central.

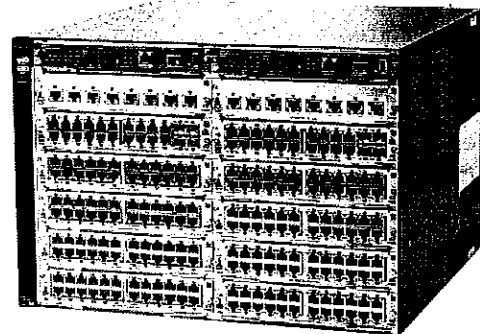
FEATURES AND BENEFITS

Software-defined networks

- Supports multiple programmatic interfaces, including REST APIs and Openflow 1.0 and 1.3, to enable automation of network operations, monitoring, and troubleshooting

Unified Wired and Wireless

- ClearPass Policy Manager supports unified wired and wireless policies using Aruba ClearPass Policy Manager
- Switch auto-configuration automatically configures switch for different settings such as VLAN, CoS, PoE max power, and PoE priority when Aruba AP is detected



KEY FEATURES

- Powerful Aruba Layer 3 modular switch series with VSF stacking, Tunnel Node, low latency and resiliency.
- HPE Smart Rate for high-speed multi-gigabit bandwidth (IEEE 802.3bz) and PoE+ power.
- Scalable line rate 40GbE for wireless traffic aggregation.
- Ready for the software defined network with REST APIs and OpenFlow support.
- Security and network management tools with ClearPass Policy Manager, AirWave and cloud-based Central
- User Role defines a set of switch-based policies in areas such as security, authentication, and QoS. A user role can be assigned to a group of users or devices, using switch-based local user role or download from ClearPass
- Tunnel Node provides a secure tunnel that transports network traffic on a per-port or per-user role basis to an Aruba Controller. In a per-user role Tunnel Node, users are authenticated by the ClearPass Policy Manager which directs traffic to be tunneled to an Aruba controller or switch locally
- Static IP Visibility allows ClearPass to do accounting for clients with static IP address

Quality of Service (QoS)

- Advanced classifier-based QoS classifies traffic using multiple match criteria based on Layer 2, 3, and 4 information; applies QoS policies such as setting priority level and rate limit to selected traffic on a per-port or per-VLAN basis
- Traffic prioritization allows real-time traffic classification into eight priority levels mapped to eight queues

- Bandwidth shaping
 - Port-based rate limiting provides per-port ingress-/ egress-enforced increased bandwidth
 - Classifier-based rate limiting uses an access control list (ACL) to enforce increased bandwidth for ingress traffic on each port
 - Reduced bandwidth provides per-port, per-queue egress-based reduced bandwidth
- Class of Service (CoS) sets the IEEE 802.1p priority tag based on IP address, IP Type of Service (ToS), Layer 3 protocol, TCP/UDP port number, source port, and DiffServ
- Unknown Unicast Rate Limiting throttles unicast packets with unknown destination addresses and limits flooding on the VLAN

Management

- Aruba Central cloud-based management platform offers simple, secure, and cost effective way to manage switches
- Zero-Touch Provisioning (ZTP) simplifies installation of the switch infrastructure using Aruba Activate-based or DHCP-based process with AirWave Network Management
- Flexible management with same hardware – Supports both cloud-based Central and on-premise AirWave with the same hardware ensuring change management platform without ripping and replacing switching infrastructure
- IP SLA for Voice monitors quality of voice traffic using the UDP Jitter and UDP Jitter for VoIP tests (requires v3 modules)
- Built-in programmable and easy to use REST API interface provides configuration automation for Mobile-first campus networks
- Remote intelligent mirroring mirrors selected ingress/egress traffic based on ACL, port, MAC address, or VLAN to a local or remote HPE 8200 zl, 6600, 6200 yl, 5400 zl, 5400R, 3500, or 3800 Switch located anywhere on the network
- RMON, XRMON, and sFlow® v5 provide advanced monitoring and reporting capabilities for statistics, history, alarms, and events
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP) advertises and receives management information from adjacent devices on a network, facilitating easy mapping by network management applications
- Uni-Directional Link Detection (UDLD) support Hewlett Packard Enterprise (HPE) UDLD and DLDLP protocols to monitor a cable between two switches and shut down the ports on both ends if the cable is broken

- Management simplicity provides common software features and CLI implementation across all HPE ProVision-based switches (including the zl and yl switches)
- Command authorization leverages RADIUS to link a custom list of CLI commands to an individual network administrator's login; an audit trail documents activity
- Friendly port names allows assignment of descriptive names to ports
- Dual flash images provides independent primary and secondary operating system files for backup while upgrading
- Multiple configuration files stores easily to the flash image
- Comware CLI
 - Comware-compatible CLI bridges the experience of HPE Comware CLI users who are using the ArubaOS-Switch software CLI
 - Display and fundamental Comware CLI commands are embedded in the switch CLI as native commands; display output is formatted as on Comware-based switches, and fundamental commands provide a Comware-familiar initial switch setup
 - Configuration Comware CLI commands when Comware commands are entered, CLI help is elicited to formulate the correct ArubaOS-Switch software CLI command

Connectivity

- IEEE 802.3az Energy Efficient Ethernet lowers power consumption in periods of low link usage (supported on v2 zl 10/100/1000 and 10/100 modules)
- IEEE 802.3at Power over Ethernet (PoE+) provides up to 30 W per port that allows support of the latest PoE+ capable devices such as IP phones, wireless access points, and security cameras, as well as any IEEE 802.3af-compliant end device; eliminates the cost of additional electrical cabling and circuits that would otherwise be necessary in IP phone and WLAN deployments
- Prestandard PoE support detects and provides power to prestandard PoE devices
- High-density port connectivity provides up to 12 interface module slots and up to 288 wire-speed 10/100/1000 PoE-enabled ports or 96 10GbE ports per system
- Jumbo frames on Gigabit Ethernet and 10-Gigabit Ethernet ports, jumbo frames allow high-performance remote backup and disaster-recovery services
- Auto-MDIX provides automatic adjustments for straight-through or crossover cables on all 10/100 and 10/100/1000 ports

- IPv6
 - IPv6 host enables switches to be managed in an IPv6 network
 - Dual stack (IPv4 and IPv6) transitions IPv4 to IPv6, supporting connectivity for both protocols
 - MLD snooping forwards IPv6 multicast traffic to the appropriate interface
 - IPv6 ACL/QoS supports ACL and QoS for IPv6 traffic
 - IPv6 routing supports static, RIPv6, OSPFv3 routing protocols
 - 6in4 tunneling supports encapsulation of IPv6 traffic in IPv4 packets
 - Security provides RA guard, DHCPv6 protection, dynamic IPv6 lockdown, and ND snooping

Performance

- High-speed, high-capacity architecture 2 Tbps crossbar switching fabric provides intra-module and inter-module switching with 785.7 million pps throughput on the purpose-built ProVision ASICs
- Selectable queue configurations allows for increased performance by selecting the number of queues and associated memory buffering that best meet the requirements of the network applications

Resiliency and high availability

- Virtual Switching Framework (VSF) creates one virtual resilient switch from two switches; servers or switches can be attached using standard LACP for automatic load balancing and high availability; simplify network operation by reduce the need for complex protocols like Spanning Tree Protocol (STP), Equal-Cost Multipath (ECMP), and VRRP (requires v3 modules)
- Fast Software Upgrade reduces downtime of the VSF stack during an upgrade by sequentially upgrading the members in the stack shrinking the downtime to a few seconds (requires v3 modules)
- Virtual Router Redundancy Protocol (VRRP) allows groups of two routers to dynamically back each other up to create highly available routed environments for IPv4 and IPv6 networks
- Nonstop switching improves network availability to better support critical applications such as unified communication and mobility; interface and fabric modules continue switching traffic during failover from active to standby management module
- Nonstop routing enhances Layer 3 high availability; OSPFv2/v3 and VRRP will continue to operate and route network traffic during failover from an active to a standby management module

- Redundant management and power provide enhanced system availability and continuity of operations
- IEEE 802.1s Multiple Spanning Tree Protocol provides high link availability in multiple VLAN environments by allowing multiple spanning trees; encompasses IEEE 802.1D Spanning Tree Protocol and IEEE 802.1w Rapid Spanning Tree Protocol
- IEEE 802.3ad Link Aggregation Control Protocol (LACP) and HPE port trunking support up to 144 trunks, each with up to eight links (ports) per trunk
- Distributed trunking enables loop-free and redundant network topology without using Spanning Tree Protocol; allows a server or switch to connect to two switches using one logical trunk for redundancy and load sharing
- Optional redundant power supply provides uninterrupted power and allows hot-swapping of the redundant power supplies when installed
- Hot-swappable modules allows dissimilar modules, and power supplies in a redundant power supply configuration to be added or swapped without interrupting the network
- Simplifying simplicity HPE ZL-common accessories (interface modules and power supplies)
- Uplink Failure Detection provides active-standby network path redundancy for servers that are configured for active-standby NIC teaming
- SmartLink provides easy-to-configure link redundancy of active and standby links

Layer 2 switching

- VLAN support and tagging supports the IEEE 802.1Q standard and 4,094 VLANs simultaneously
- IEEE 802.1v protocol VLANs isolate select non-IPv4 protocols automatically into their own VLANs
- VxLAN encapsulation (tunneling) protocol for overlay network that enables a more scalable virtual network deployment (requires v3 modules)
- GVRP and MVRP allows automatic learning and dynamic assignment of VLANs
- IEEE 802.1ad Q-in-Q increases the scalability of an Ethernet network by providing a hierarchical structure; connects multiple LANs on a high-speed campus or metro network
- MAC-based VLAN provides granular control and security; uses RADIUS to map a MAC address/user to specific VLANs (requires v2 or higher modules)

- Rapid Per-VLAN Spanning Tree (RPVST+) allows each VLAN to build a separate spanning tree to improve link bandwidth usage; is compatible with PVST+
- HPE switch meshing dynamically load balances across multiple active redundant links to increase available aggregate bandwidth; allows concurrent Layer 3 routing with v2 or higher modules

Layer 3 services

- Bidirectional Forwarding Detection (BFD) enables link connectivity monitoring and reduces network convergence time for static route, OSPFv2 and VRRP (requires v3 modules)
- User Datagram Protocol (UDP) helper function allows UDP broadcasts to be directed across router interfaces to specific IP unicast or subnet broadcast addresses and prevents server spoofing for UDP services such as DHCP
- Loopback Interface address defines an address in Routing Information Protocol (RIP) and Open Standard Path First (OSPF), improving diagnostic capability
- Route maps provide more control during route redistribution; allow filtering and altering of route metrics
- DHCP server centralizes and reduces the cost of IPv4 address management

Layer 3 routing

- Static IP routing provides manually configured routing for both IPv4 and IPv6 networks
- Routing Information Protocol (RIP) provides RIPv1, RIPv2, and RIPng routing
- OSPF provides OSPFv2 for IPv4 routing and OSPFv3 for IPv6 routing
- Policy-based routing uses a classifier to select traffic that can be forwarded based on policy set by the network administrator (requires v2 or higher modules)
- Border Gateway Protocol (BGP) provides IPv4 Border Gateway Protocol routing, which is scalable, robust, and flexible

Security

- Control Plane Policing sets rate limit on control protocols to protect CPU overload from DOS attacks
- Access control lists (ACLs) provide filtering based on the IP field, source/destination IP address/subnet, and source/destination TCP/UDP port number on a per-VLAN or per-port basis

- Multiple user authentication methods
 - IEEE 802.1X users per port provides authentication of multiple IEEE 802.1X users per port
 - Web-based authentication authenticates from a Web browser for clients that do not support IEEE 802.1X supplicant
 - MAC-based authentication client is authenticated with the RADIUS server based on the client's MAC address
 - Concurrent IEEE 802.1X, Web, and MAC authentication schemes per port switch port accepts up to 32 sessions of IEEE 802.1X, Web, and MAC authentications
- Private VLAN provides network security by restricting peer-to-peer communication to prevent a variety of malicious attacks; typically a switch port can only communicate with other ports in the same community and/or an uplink port, regardless of VLAN ID or destination MAC address
- DHCP protection blocks DHCP packets from unauthorized DHCP servers, preventing denial-of-service attacks
- Secure management access delivers secure encryption of all access methods (CLI, GUI, or MIB) through SSHv2, SSL, and/or SNMPv3
- Switch CPU protection provides automatic protection against malicious network traffic trying to shut down the switch
- ICMP throttling defeats ICMP denial-of-service attacks by enabling any switch port to automatically throttle ICMP traffic
- Identity-driven ACL enables implementation of a highly granular and flexible access security policy and VLAN assignment specific to each authenticated network user
- STP BPDU port protection blocks Bridge Protocol Data Units (BPDUs) on ports that do not require BPDUs, preventing forged BPDU attacks
- Dynamic IP lockdown works with DHCP protection to block traffic from unauthorized hosts, preventing IP source address spoofing
- Dynamic ARP protection blocks ARP broadcasts from unauthorized hosts, preventing eavesdropping or theft of network data
- STP root guard protects the root bridge from malicious attacks or configuration mistakes
- Detection of malicious attacks monitors 10 types of network traffic and sends a warning when an anomaly that potentially can be caused by malicious attacks is detected
- Port security allows access only to specified MAC addresses, which can be learned or specified by the administrator

- MAC address lockout prevents particular configured MAC addresses from connecting to the network
- Source-port filtering allows only specified ports to communicate with each other
- RADIUS/TACACS+ eases switch management security administration by using a password authentication server
- Secure shell encrypts all transmitted data for secure remote CLI access over IP networks
- Secure Sockets Layer (SSL) encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch
- Secure FTP allows secure file transfer to and from the switch; protects against unwanted file downloads or unauthorized copying of a switch configuration file
- Open Authentication Role simplifies first-time deployment of AAA in brownfield deployments by allowing full network access for failed clients and provides instant connectivity as soon as a client is plugged-in
- Critical Authentication Role ensures that important infrastructure devices such as IP phones are allowed network access even in the absence of a RADIUS server
- MAC Pinning allows non-chatty legacy devices to stay authenticated by pinning client MAC addresses to the port until the clients logoff or get disconnected
- Management Interface Wizard helps secure management interfaces such as SNMP, telnet, SSH, SSL, Web, and USB at the desired level
- Switch management logon security helps secure switch CLI logon by optionally requiring either RADIUS or TACACS+ authentication
- Security banner displays a customized security policy when users log in to the switch
- IEEE 802.1AE MACsec provides security on a link between two switch ports (1Gbps or 10Gbps) using standard encryption and authentication (requires v3 modules)
- PoE allocations supports multiple methods (automatic, IEEE 802.3af class, LLDP-MED, or user-specified) to allocate PoE power for more efficient energy savings
- Auto VLAN configuration for voice
 - RADIUS VLAN uses a standard RADIUS attribute and LLDP-MED to automatically configure a VLAN for IP phones
 - CDPv2 uses CDPv2 to configure legacy IP phones
- Local MAC Authentication assigns attributes such as VLAN and QoS using locally configured profile that can be a list of MAC prefixes

Warranty and support

- Limited Lifetime Warranty
See www.hpe.com/networking/warrantysummary for warranty and support information included with your product purchase.
- Software releases to find software for your product, refer to www.hpe.com/networking/support; for details on the software releases available with your product purchase, refer to www.hpe.com/networking/warrantysummary

Convergence

- IP multicast routing includes PIM Sparse and Dense modes to route IP multicast traffic
- IP multicast snooping (data-driven IGMP) prevents flooding of IP multicast traffic
- Protocol Independent Multicast for IPv6 supports one-to-many and many-to-many media casting use cases such as IPTV over IPv6 networks
- LLDP-MED (Media Endpoint Discovery) defines a standard extension of LLDP that stores values for parameters such as QoS and VLAN to automatically configure network devices such as IP phones

SPECIFICATIONS

	Aruba 5406R zL2 Switch (J9821A)	Aruba 5412R zL2 Switch (J9822A)
Included accessories	<ul style="list-style-type: none"> 1 Aruba 5400R zL2 Management Module (J9827A) 1 Aruba 5406R zL2 Switch Fan Tray (J9831A) 	<ul style="list-style-type: none"> 1 Aruba 5400R zL2 Management Module (J9827A) 1 Aruba 5412R zL2 Switch Fan Tray (J9832A)
I/O ports and slots	<ul style="list-style-type: none"> 6 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination 	<ul style="list-style-type: none"> 12 open module slots Supports a maximum of 288 autosensing 10/100/1000 ports or 288 SFP ports or 96 SFP+ ports or 96 HPE Smart Rate Multi-Gigabit or 24 40GbE ports, or a combination
Power supplies	<ul style="list-style-type: none"> 2 power supply slots 1 minimum power supply required (ordered separately) 	<ul style="list-style-type: none"> 4 power supply slots 2 minimum power supplies required (ordered separately)
Fan tray	Includes: 1 x J9831A 1 fan tray slot	Includes: 1 x J9832A 1 fan tray slot
Physical characteristics		
Dimensions	17.5 (w) x 17.75 (d) x 6.9 (h) in (44.45 x 45.09 x 17.53 cm) (4U height)	17.5 (w) x 17.75 (d) x 12.1 (h) in (44.45 x 45.09 x 30.73 cm) (7U height)
Weight	24.5 lb (11.11 kg)	38.1 lb (17.28 kg)
Memory and processor		
v3 Gigabit Module	Dual ARM® Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM11 @ 450 MHz; Packet buffer size: 18 MB internal	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM11 @ 450 MHz; Packet buffer size: 18 MB internal
v2 Gigabit Module		
v3 10G Module	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM11 @ 550 MHz; Packet buffer size: 18 MB internal	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal ARM11 @ 550 MHz; Packet buffer size: 18 MB internal
v2 10G Module		
v3 40G Module	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Dual ARM Cortex A9 @ 1 GHz; Packet buffer size: 13.5 MB internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM
Management Module		
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only
Performance		
	IPv6 Ready Certified	IPv6 Ready Certified
1000 Mb Latency	< 2.8 µs (FIFO 64-byte packets)	< 2.8 µs (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 µs (FIFO 64-byte packets)	< 1.8 µs (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 µs (FIFO 64-byte packets)	< 1.5 µs (FIFO 64-byte packets)
Throughput	up to 571.4 Mpps	up to 1142.8 Mpps
Routing/Switching capacity	960 Gbps	1920 Gbps
Switch fabric speed	1015 Gbps	2030 Gbps
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries

SPECIFICATIONS

	Aruba 5406R z12 Switch (J9821A)	Aruba 5412R z12 Switch (J9822A)
Environment		
Operating temperature	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed
Operating relative humidity	15% to 95% @ 113°F (45°C), noncondensing	15% to 95% @ 113°F (45°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296	Power: 49 dB, Pressure: 35.7 dB ISO 7779, ISO 9296
Electrical characteristics		
Frequency	50/60 Hz	50/60 Hz
80plus.org Certification	Gold	Gold
Description	Does not come with power supply. Two power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	Does not come with power supply. Four power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
Maximum heat dissipation	2450 BTU/hr (2584 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7,807 kJ/hr) (max. using PoE)
Voltage	100 - 127/200 - 240 VAC, rated (depending on power supply chosen)	100 - 127/200 - 240 VAC, rated (depending on power supply chosen)
Idle power		
Notes	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.	Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.
Safety		
	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
Emissions		
	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A

SPECIFICATIONS

	Aruba 5406R zL2 Switch (J9821A)	Aruba 5412R zL2 Switch (J9822A)
Immunity		
EN	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC
Surge	IEC 61000-4-6; 3 Vrms	IEC 61000-4-6; 3 Vrms
Conducted	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Power frequency magnetic field	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
Management	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of band; Out-of-band management (serial RS-232c or micro usb)	Aruba Central; Aruba AirWave Network Management; IMC – Intelligent Management Center; Command-line interface; Web browser; Configuration menu; Out-of-band management (RJ-45 Ethernet); In-line and out-of band; Out-of-band management (serial RS-232c or micro usb)
Notes	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; For example, J9142B, J8177C).	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; For example, J9142B, J8177C).
Services	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

SPECIFICATIONS

	Aruba 5412R 92GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL001A)	Aruba 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 z12 Switch (JL002A)
Included accessories	<ul style="list-style-type: none"> 1 Aruba 5400R z12 Management Module (J9827A) 1 Aruba 5412R z12 Switch Fan Tray (J9832A) 3 Aruba 24-port 10/100/1000BASE-T PoE+ MACsec v3 z12 Module (J9986A) 1 Aruba 20-port 10/100/1000BASE-T PoE+ / 4-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9990A) 	<ul style="list-style-type: none"> 1 Aruba 5400R z12 Management Module (J9827A) 1 Aruba 5406R z12 Switch Fan Tray (J9831A) 1 Aruba 8-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9993A) 1 Aruba 8-port 1/2.5/5/10GBASE-T PoE+ MACsec v3 z12 Module (J9995A)
I/O ports and slots	<ul style="list-style-type: none"> 92 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 open 10GbE SFP+ transceiver slots 8 open module slots Supports a maximum of 288 autosensing 10/100/1000 ports or 288 SFP ports or 96 SFP+ ports or 96 HPE Smart Rate Multi-Gigabit or 24 40GbE ports, or a combination 	<ul style="list-style-type: none"> 8 RJ-45 HPE Smart Rate Multi-Gigabit ports 8 open 10GbE SFP+ transceiver slots 4 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination
Power supplies	<ul style="list-style-type: none"> 4 power supply slots 2 minimum power supplies required (ordered separately) 	<ul style="list-style-type: none"> 2 power supply slots 1 minimum power supply required (ordered separately)
Fan tray	Includes: 1 x J9832A 1 fan tray slot	Includes: 1 x J9831A 1 fan tray slot
Physical characteristics		
Dimensions	17.5 (w) x 17.75 (d) x 12.1 (h) in (44.45 x 45.09 x 30.73 cm) (7U height)	17.5 (w) x 17.75 (d) x 6.9 (h) in (44.45 x 45.09 x 17.53 cm) (4U height)
Weight	45.19 lb (20.5 kg)	28.11 lb (12.75 kg)
Memory and processor		
v3 Gigabit Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 450 MHz; Packet buffer size: 18 MB internal
v2 Gigabit Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal
v3 10G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal
v2 10G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal
v3 40G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal
Management Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB internal
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only

SPECIFICATIONS

	Aruba 5412R 92GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL001A)	Aruba 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 z12 Switch (JL002A)
Performance		
1000 Mb Latency	< 2.8 μ s (FIFO 64-byte packets)	< 2.8 μ s (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 μ s (FIFO 64-byte packets)	< 1.8 μ s (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 μ s (FIFO 64-byte packets)	< 1.5 μ s (FIFO 64-byte packets)
Throughput	up to 1142.8 Mpps	up to 571.4 Mpps
Routing/Switching capacity	1920 Gbps	960 Gbps
Switch fabric speed	2030 Gbps	1015 Gbps
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries
Environment		
Operating temperature	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield Installed	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield Installed
Operating relative humidity	15% to 95% @ 113°F (45°C), noncondensing	15% to 95% @ 113°F (45°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 49 dB, Pressure: 35.7 dB ISO 7779, ISO 9296	Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296
Electrical characteristics		
Frequency	50/60 Hz	50/60 Hz
80plus.org Certification	Gold	Gold
Description	Does not come with power supply. Four open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	Does not come with power supply. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
Maximum heat dissipation	4900 BTU/hr (5169.5 kJ/hr), (max. non-PoE); 7400 BTU/hr (7807 kJ/hr) (max. using PoE)	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
Voltage	110 - 127/200 - 240 VAC, rated (depending on power supply chosen)	110 - 127/200 - 240 VAC, rated (depending on power supply chosen)
Idle power	312 W	215 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves. When more than four power cords are installed in a 5412R z12 switch chassis, additional installation requirements are needed. Refer to the HPE 5400R z12 Switches Quick Setup Guide and Safety/Regulatory Information manual for details.	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.

SPECIFICATIONS

	Aruba 5412R 92GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL001A)	Aruba 5406R 8-port 1/2.5/5/10GBASE-T PoE+/8-port SFP+ (No PSU) v3 z12 Switch (JL002A)
Safety	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
Emissions	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A
Immunity		
EN	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line) IEC 61000-4-5; 1 kV/2 kV AC, 1 kV signal, 0.5 kV DC
Surge	IEC 61000-4-6; 3 Vrms	IEC 61000-4-6; 3 Vrms
Conducted	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Power frequency magnetic field	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
Management	Aruba Central; Aruba AirWave Network Management; IMC—Intelligent Management Center; Command-line interface; Web browser; Configuration menu; REST interface; SNMP manager Telnet; RMON1; FTP; Out-of-band management (Serial RS-232C, Micro USB Serial)	Aruba Central; Aruba AirWave Network Management; IMC—Intelligent Management Center; Command-line interface; Web browser; Configuration menu; REST interface; SNMP manager Telnet; RMON1; FTP; Out-of-band management (Serial RS-232C, Micro USB Serial)
Notes	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; For example, J9142B, J8177C).	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; For example, J9142B, J8177C). HPE Smart Rate Multi-Gigabit Cabling: 1000BASE-T, 2.5 Gigabit, and 5 Gigabit Ethernet: Category 5e or better UTP or STP; 10GBASE-T: Category 6 or better (CAT6A recommended) UTP or STP
Services	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

SPECIFICATIONS

	Aruba 5406R 44GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL003A)	Aruba 5406R 16-port SFP+ (No PSU) v3 z12 Switch (JL095A)
Included accessories	1 Aruba 5400R z12 Management Module (J9827A) 1 Aruba 5406R z12 Switch Fan Tray (J9831A) 1 Aruba 24-port 10/100/1000BASE-T PoE+ MACsec v3 z12 Module (J9986A) 1 Aruba 20-port 10/100/1000BASE-T PoE+/4-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9990A)	1 Aruba 5400R z12 Management Module (J9827A) 1 Aruba 5406R z12 Switch Fan Tray (J9831A) 2 Aruba 8-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9993A)
I/O ports and slots	44 RJ-45 autosensing 10/100/1000 PoE+ ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T, IEEE 802.3at PoE+); Media Type: Auto-MDIX; Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only 4 open 10GbE SFP+ transceiver slots 4 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination	16 open 10GbE SFP+ transceiver slots 4 open module slots Supports a maximum of 144 autosensing 10/100/1000 ports or 144 SFP ports or 48 SFP+ ports or 48 HPE Smart Rate Multi-Gigabit or 12 40GbE ports, or a combination
Power supplies	2 power supply slots 1 minimum power supply required (ordered separately)	2 power supply slots 1 minimum power supply required (ordered separately)
Fan tray	Includes: 1 x J9831A 1 fan tray slot	Includes: 1 x J9831A 1 fan tray slot
Physical characteristics		
Dimensions	17.5 (w) x 17.75 (d) x 6.9 (h) in (44.45 x 45.09 x 17.53 cm) (4U height)	17.5 (w) x 17.75 (d) x 6.9 (h) in (44.45 x 45.09 x 17.53 cm) (4U height)
Weight	28.11 lb (12.75 kg)	28.11 lb (12.75 kg)
Memory and processor		
v3 Gigabit Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 450 MHz; Packet buffer size: 18 MB Internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 450 MHz; Packet buffer size: 18 MB Internal
v2 Gigabit Module		
v3 10G Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB Internal	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal ARM 11 @ 550 MHz; Packet buffer size: 18 MB Internal
v2 10G Module		
v3 40G Module		
Management Module	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM	Dual ARM Coretex A9 @ 1 GHz; Packet buffer size: 13.5 MB Internal Freescale P2020 dual core @ 1.2 GHz, 16 MB flash, 1 GB SD Card, 4 GB DDR3 SODIMM
Mounting and enclosure	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only	Mounts in an EIA standard 19-inch telco rack or equipment cabinet (hardware included); Horizontal surface mounting only

SPECIFICATIONS

	Aruba 5406R 44GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL003A)	Aruba 5406R 16-port SFP+ (No PSU) v3 z12 Switch (JL095A)
Performance		
1000 Mb Latency	< 2.8 μ s (FIFO 64-byte packets)	< 2.8 μ s (FIFO 64-byte packets)
10 Gbps Latency	< 1.8 μ s (FIFO 64-byte packets)	< 1.8 μ s (FIFO 64-byte packets)
40 Gbps Latency	< 1.5 μ s (FIFO 64-byte packets)	< 1.5 μ s (FIFO 64-byte packets)
Throughput	up to 571.4 Mpps	up to 571.4 Mpps
Routing/Switching capacity	960 Gbps	960 Gbps
Switch fabric speed	1015 Gbps	1015 Gbps
Routing table size	10000 entries (IPv4), 5000 entries (IPv6)	10000 entries (IPv4), 5000 entries (IPv6)
MAC address table size	64000 entries	64000 entries
Environment		
Operating temperature	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed	32°F to 113°F (0°C to 45°C); 0°C to 40°C with J8177C transceiver installed, 0°C to 35°C with FIPS Opacity Shield installed
Operating relative humidity	15% to 95% @ 113°F (45°C), noncondensing	15% to 95% @ 113°F (45°C), noncondensing
Nonoperating/Storage temperature	-40°F to 158°F (-40°C to 70°C)	-40°F to 158°F (-40°C to 70°C)
Nonoperating/Storage relative humidity	15% to 95% @ 149°F (65°C), noncondensing	15% to 95% @ 149°F (65°C), noncondensing
Altitude	up to 10,000 ft (3 km)	up to 10,000 ft (3 km)
Acoustic	Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296	Power: 44 dB, Pressure: 31.7 dB ISO 7779, ISO 9296
Electrical characteristics		
Frequency	50/60 Hz	50/60 Hz
80plus.org Certification	Gold	Gold
Description	Does not come with power supply. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.	Does not come with power supply. Two open power supply slots are available; three different power supplies are available. See power supply products for additional specifications.
Maximum heat dissipation	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)	2450 BTU/hr (2584.75 kJ/hr), (max. non-PoE); 3700 BTU/hr (3903 kJ/hr) (max. using PoE)
Voltage	110 - 127/200 - 240 VAC, rated (depending on power supply chosen)	110 - 127/200 - 240 VAC, rated (depending on power supply chosen)
Idle power	215 W	215 W
Notes	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.	Idle power is the actual power consumption of the device with no ports connected. Heat dissipation does not include heat dissipated by the PoE-powered devices themselves.
Safety		
	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950	CSA 22.2 No. 60950; UL 60950; IEC 60950; EN 60950
Emissions		
	FCC part 15 Class A; EN 55022/CISPR 22 Class A	FCC part 15 Class A; EN 55022/CISPR 22 Class A

SPECIFICATIONS

	Aruba 5406R 44GT PoE+/4SFP+ (No PSU) v3 z12 Switch (JL003A)	Aruba 5406R 16-port SFP+ (No PSU) v3 z12 Switch (JL095A)
Immunity		
EN	EN 55024, CISPR 24	EN 55024, CISPR 24
ESD	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002	IEC 61000-4-2; 4 kV CD, 8 kV AD; HPE ENV. 765.002
Radiated	IEC 61000-4-3; 3 V/m	IEC 61000-4-3; 3 V/m
EFT/Burst	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)	IEC 61000-4-4; 1.0 kV (power line), 0.5 kV (signal line)
Surge	IEC 61000-4-5; 1 kV/2 kV AC, 1kV signal, 0.5 kV DC	IEC 61000-4-5; 1 kV/2 kV AC, 1kV signal, 0.5 kV DC
Conducted	IEC 61000-4-6; 3 Vrms	IEC 61000-4-6; 3 Vrms
Power frequency magnetic field	IEC 61000-4-8; 1 A/m, 50 or 60 Hz	IEC 61000-4-8; 1 A/m, 50 or 60 Hz
Voltage dips and interruptions	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods	IEC 61000-4-11; >95% reduction, 0.5 period; 30% reduction, 25 periods
Harmonics	EN 61000-3-2, IEC 61000-3-2	EN 61000-3-2, IEC 61000-3-2
Flicker	EN 61000-3-3, IEC 61000-3-3	EN 61000-3-3, IEC 61000-3-3
Management	Aruba Central; Aruba AirWave Network Management; IMC—Intelligent Management Center; Command-line interface; Web browser; Configuration menu; REST interface; SNMP manager Telnet; RMON1; FTP; Out-of-band management (Serial RS-232C, Micro USB Serial)	Aruba Central; Aruba AirWave Network Management; IMC—Intelligent Management Center; Command-line interface; Web browser; Configuration menu; REST interface; SNMP manager Telnet; RMON1; FTP; Out-of-band management (Serial RS-232C, Micro USB Serial)
Notes	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; For example, J9142B, J8177C).	Supported 1G SFP transceivers are revision "B" or later (product number ends with the letter "B" or later; For example, J9142B, J8177C).
Services	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.	Refer to the Hewlett Packard Enterprise website at www.hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

STANDARDS AND PROTOCOLS
(APPLIES TO ALL PRODUCTS IN SERIES)

BGP

- RFC 1997 BGP Communities Attribute
- RFC 2918 Route Refresh Capability
- RFC 4271 A Border Gateway Protocol 4 (BGP-4)
- RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)
- RFC 5492 Capabilities Advertisement with BGP-4

Device management

- RFC 1591 DNS (client)
- HTML and telnet management
- RFC 2576 (Coexistence between SNMP V1, V2, V3)
- RFC 2579 (SMIv2 Text Conventions)
- RFC 2580 (SMIv2 Conformance)
- RFC 3416 (SNMP Protocol Operations v2)

General protocols

- IEEE 802.1ad Q-in-Q
- IEEE 802.1AX-2008 Link Aggregation
- IEEE 802.1D MAC Bridges
- IEEE 802.1p Priority
- IEEE 802.1Q VLANs
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.1v VLAN classification by Protocol and Port
- IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)
- IEEE 802.3af Power over Ethernet
- IEEE 802.3bz 2.5 Gbps and 5 Gbps interfaces
- IEEE 802.3x Flow Control
- RFC 768 UDP
- RFC 783 TFTP Protocol (revision 2)
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 854 TELNET
- RFC 868 Time Protocol
- RFC 951 BOOTP
- RFC 1058 RIPv1
- RFC 1350 TFTP Protocol (revision 2)
- RFC 1519 CIDR
- RFC 1542 BOOTP Extensions
- RFC 1918 Address Allocation for Private Internet
- RFC 2030 Simple Network Time Protocol (SNTP) v4
- RFC 2131 DHCP
- RFC 2453 RIPv2

- RFC 2548 (MS-RAS-Vendor only)
- RFC 3046 DHCP Relay Agent Information Option
- RFC 3575 IANA Considerations for RADIUS
- RFC 3576 Ext to RADIUS (CoA only)
- RFC 3768 VRRP
- RFC 4675 RADIUS VLAN & Priority UDLD (Uni-directional Link Detection)
- RFC 5880 BFD
- RFC 5905 NTP Client

IP multicast

- RFC 3376 IGMPv3
- RFC 3973 PIM Dense Mode
- RFC 4601 PIM Sparse Mode

IPv6

- RFC 1981 IPv6 Path MTU Discovery
- RFC 2375 IPv6 Multicast Address
- RFC 2080 RIPng for IPv6
- RFC 2081 RIPng Protocol Applicability
- RFC 2082 RIP-2 MD5 Assignments
- RFC 2460 IPv6 Specification
- RFC 2464 Transmission of IPv6 over Ethernet Networks
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2925 Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations (Ping only)
- RFC 3019 MLDv1 MIB
- RFC 3315 DHCPv6 (client and relay)
- RFC 3484 Default Address Selection for IPv6
- RFC 3587 IPv6 Global Unicast Address Format
- RFC 3596 DNS Extension for IPv6
- RFC 3810 MLDv2 for IPv6
- RFC 4022 MIB for TCP
- RFC 4087 IP Tunnel MIB
- RFC 4113 MIB for UDP
- RFC 4213 Basic Transition Mechanisms for IPv6 Hosts and Routers
- RFC 4251 SSHv6 Architecture
- RFC 4252 SSHv6 Authentication
- RFC 4253 SSHv6 Transport Layer
- RFC 4254 SSHv6 Connection
- RFC 4291 IP Version 6 Addressing Architecture
- RFC 4293 MIB for IP
- RFC 4294 IPv6 Node Requirements
- RFC 4419 Key Exchange for SSH
- RFC 4443 ICMPv6
- RFC 4541 IGMP & MLD Snooping Switch

- RFC 4861 IPv6 Neighbor Discovery
- RFC 4862 IPv6 Stateless Address Auto-configuration
- RFC 5095 Deprecation of Type 0 Routing Headers in IPv6
- RFC 5340 OSPFv3 for IPv6
- RFC 5453 Reserved IPv6 Interface Identifiers
- RFC 5519 Multicast Group Membership Discovery MIB (MLDv2 only)
- RFC 5722 Handling of Overlapping IPv6 Fragments
- RFC 6620 FCFS SAVI
- draft-ietf-savi-mix

MIBs

- IEEE 802.1ap (MSTP and STP MIB's only)
- IEEE 8021-Bridge-MIB (2008)
- IEEE 8021-Q-Bridge-MIB (2008)
- RFC 1155 Structure & ID of Mgmt Info for TCP/IP Internets
- RFC 1213 MIB II
- RFC 1493 Bridge MIB
- RFC 1724 RIPv2 MIB
- RFC 1850 OSPFv2 MIB
- RFC 2021 RMONv2 MIB
- RFC 2096 IP Forwarding Table MIB
- RFC 2578 Structure of Management Information Version 2 (SMIv2)
- RFC 2613 SMON MIB
- RFC 2618 RADIUS Client MIB
- RFC 2620 RADIUS Accounting MIB
- RFC 2665 Ethernet-Like-MIB
- RFC 2668 802.3 MAU MIB
- RFC 2674 802.1p and IEEE 802.1Q Bridge MIB
- RFC 2737 Entity MIB (Version 2)
- RFC 2787 VRRP MIB
- RFC 2863 The Interfaces Group MIB
- RFC 2925 Ping MIB
- RFC 2932 IP (Multicast Routing MIB)
- RFC 2933 IGMP MIB
- RFC 4292 IP Forwarding Table MIB
- RFC 4836 Managed Objects for 802.3 Medium Attachment Units (MAU)
- RFC 7331 BFD MIB

Network management

- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- RFC 2819 Four groups of RMON: 1 (statistics), 2 (history), 3 (alarm) and 9 (events)
- RFC 3176 sFlow
- RFC 3411 SNMP Management Frameworks
- RFC 3412 Message Processing and Dispatching for the

Simple Network Management Protocol (SNMP)

- RFC 3413 Simple Network Management Protocol (SNMP) Applications
- RFC 3414 User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3)
- RFC 3415 View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 5424 Syslog Protocol
- ANSI/TIA-1057 LLDP Media Endpoint
- Discovery (LLDP-MED)
- SNMPv1/v2c/v3 XRMON
- XRMON

OSPF

- RFC 2328 OSPFv2
- RFC 3101 OSPF NSSA
- RFC 5340 OSPFv3 for IPv6

QoS/CoS

- RFC 2474 DiffServ Precedence, including 8 queues/port
- RFC 2475 DiffServ Architecture
- RFC 2597 DiffServ Assured Forwarding (AF)
- RFC 2598 DiffServ Expedited Forwarding (EF)

Security

- IEEE 802.1AE MAC Security Standard (MACSec)
- IEEE 802.1X Port Based Network Access Control
- RFC 1492 TACACS+
- RFC 1321 The MD5 Message-Digest Algorithm
- RFC 2818 HTTP Over TLS
- RFC 2865 RADIUS (client only)
- RFC 2866 RADIUS Accounting
- RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)
- Secure Sockets Layer (SSL)
- SSHv2 Secure Shell

ARUBA 5400R ZL2 SWITCH SERIES ACCESSORIES

v2 Modules

- HPE 8-port 10GBASE-T v2 z1 Module (J9546A)
- HPE 8-port 10GbE SFP+ v2 z1 Module (J9538A)
- HPE 12-port Gig-T PoE+/12-port SFP v2 z1 Module (J9637A)
- HPE 20-port Gig-T/4-port SFP v2 z1 Module (J9549A)
- HPE 20-port Gig-T/2-port 10GbE SFP+ v2 z1 Module (J9548A)
- HPE 20-port Gig-T PoE+/2-port 10GbE SFP+ v2 z1 Module (J9536A)
- HPE 20-port Gig-T PoE+/4-port SFP v2 z1 Module (J9535A)
- HPE 24-port 10/100 PoE+ v2 z1 Module (J9547A)
- HPE 24-port Gig-T v2 z1 Module (J9550A)
- HPE 24-port Gig-T PoE+ v2 z1 Module (J9534A)
- HPE 24-port SFP v2 z1 Module (J9537A)
- HPE Advanced Services v2 z1 Module with HDD (J9857A)
- HPE Advanced Services v2 z1 Module with SSD (J9858A)

v3 Modules

- Aruba 8-port 1/2.5/5/10GBASE-T PoE+ MACsec v3 z12 Module (J9995A)
- Aruba 8-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9993A)
- Aruba 12-port 10/100/1000BASE-T PoE+/12-port 1GbE SFP MACsec v3 z12 Module (J9989A)
- Aruba 20-port 10/100/1000BASE-T PoE+/4-port 1G/10GbE SFP+ MACsec v3 z12 Module (J9990A)
- Aruba 20-port 10/100/1000BASE-T PoE+/4p 1/2.5/5/10GBASE-T PoE+ MACsec v3 z12 Module (J9991A)
- Aruba 20-port 10/100/1000BASE-T PoE+ MACsec/1-port 40GbE QSFP+ v3 z12 Module (J9992A)
- Aruba 24-port 10/100/1000BASE-T MACsec v3 z12 Module (J9987A)
- Aruba 24-port 10/100/1000BASE-T PoE+ MACsec v3 z12 Module (J9986A)
- Aruba 24-port 1GbE SFP MACsec v3 z12 Module (J9988A)
- Aruba 2-port 40GbE QSFP+ v3 z12 Module (J9996A)
- Aruba 5400R z12 Management Module (J9827A)

Management Module

- Aruba 5400R z12 Management Module (J9827A)

Transceivers

- Aruba 100M SFP LC FX 2km MMF XCVR (J9054D)
- Aruba 1G SFP RJ45 T 100m Cat5e XCVR (J8177D)
- Aruba 1G SFP LC SX 500m MMF XCVR (J4858D)
- Aruba 1G SFP LC LX 10km SMF XCVR (J4859D)
- Aruba 1G SFP LC LH 70km SMF XCVR (J4860D)
- Aruba 10G SFP+ LC SR 300m MMF XCVR (J9150D)
- Aruba 10G SFP+ LC LR 10km SMF XCVR (J9151D)
- Aruba 10G SFP+ LC LRM 220m MMF XCVR (J9152D)
- Aruba 10G SFP+ LC ER 40km SMF XCVR (J9153D)
- Aruba 10G SFP+ to SFP+ 1m DAC Cable (J9281D)
- Aruba 10G SFP+ to SFP+ 3m DAC Cable (J9283D)
- Aruba 10G SFP+ to SFP+ 7m DAC Cable (J9285D)
- Aruba 40G QSFP+ LC BiDi 150m MMF XCVR (JL308A)
- HPE X142 40G QSFP+ MPO SR4 Transceiver (JH231A)
- HPE X142 40G QSFP+ LC LR4 SM Transceiver (JH232A)
- HPE X142 40G QSFP+ MPO eSR4 300M XCVR (JH233A)
- HPE X242 40G QSFP+ to QSFP+ 1m DAC Cable (JH234A)
- HPE X242 40G QSFP+ to QSFP+ 3m DAC Cable (JH235A)
- HPE X242 40G QSFP+ to QSFP+ 5m DAC Cable (JH236A)

Cables

- Aruba X2C2 RJ45 to DB9 Console Cable (JL448A)
- HPE 0.5 m Multimode OM3 LC/LC Optical Cable (AJ833A)
- HPE 1 m Multimode OM3 LC/LC Optical Cable (AJ834A)
- HPE 2 m Multimode OM3 LC/LC Optical Cable (AJ835A)
- HPE 5 m Multimode OM3 LC/LC Optical Cable (AJ836A)
- HPE 15 m Multimode OM3 LC/LC Optical Cable (AJ837A)
- HPE 30 m Multimode OM3 LC/LC Optical Cable (AJ838A)
- HPE 50 m Multimode OM3 LC/LC Optical Cable (AJ839A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable (QK732A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable (QK733A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable (QK734A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable (QK735A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable (QK736A)
- HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable (QK737A)

Power Supply

- 5400R 700W PoE+ zL2 Power Supply (J9828A)
- 5400R 1100W PoE+ zL2 Power Supply (J9829A)
- 5400R 2750W PoE+ zL2 Power Supply (J9830B)

Mounting Kit

- HPE X450 4U/7U Universal 4-Post Rack Mounting Kit (J9852A)



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1.844.473.2782 | T: 1.408.227.4500 | FAX: 1.408.227.4550 | INFO@ARUBANETWORKS.COM

DS_5400RzL2SwitchSeries_121417



DATA SHEET

ARUBA AIRWAVE

Visibility and management for multi-vendor access networks.

Aruba AirWave is an easy-to-use network operations system that manages wired and wireless infrastructure from Aruba and a wide range of third-party manufacturers. It also includes visibility and controls that let you optimize how devices and apps perform on your network.

Through a centralized and intuitive user interface, AirWave provides real-time monitoring, proactive alerts, historical reporting, and fast, efficient troubleshooting. Dedicated dashboard views quickly help view potential RF coverage issues, unified communications and collaboration (UCC) traffic, application performance and network services health.

SINGLE PANE OF GLASS FOR LARGE ENVIRONMENTS

AirWave Glass, provides customers running multiple AirWave instances a single console that clearly displays network infrastructure data for visibility, reporting and troubleshooting. An advanced search engine enables IT administrators to efficiently get to the data they need without suffering through a "click" marathon. Built-in single sign-on (SSO) login security, lets IT staff safely go from Glass to individual AirWave consoles for efficient administration and privileges control. The same role-based access controls that are used in AirWave also manage who does what. Glass is available in physical and virtual appliance options.

CONNECTIVITY ANALYTICS

Available add-on module proactively analyzes end-users' quality of experience by providing monitoring capabilities for critical network services, such as time and response failures for a device to associate with a Wi-Fi radio, monitored authentication times, and responses from DHCP, and DNS services.

This gives IT organizations end-to-end visibility into problems before they escalate as metrics are monitored in real-time, and also captured through on-demand or scheduled testing for predictive insight.

REAL-TIME MONITORING AND VISIBILITY

- Automatically see every user and device – wireless and remote – on the network.
- Measure response times and failure rates for client association with Wi-Fi radio, authentication with a RADIUS server, gathering IP address through DHCP, and resolving names for DNS services.
- Monitor wired infrastructure that connects wireless controllers and APs.
- View radio errors, including noise floor and channel utilization information, frequent causes of connectivity problems.
- Drill down from network-wide to device-level monitoring views.
- Store and view RF performance, capacity and application-level statistics, web traffic and network deviations over a 40-week period.

APPRF

For deep visibility into common applications and web traffic, AppRF ensures mission-critical apps get priority, you can gauge overall app usage, and have visibility into the heaviest users. A dedicated UCC dashboard provides granular visibility into Unified Communications applications such as Skype for Business and all Wi-Fi calls traversing your network.

VISUALRF

Location and mapping offers network-wide views for your entire RF environment. Maps of Wi-Fi coverage and the underlying wired topology show a clear and accurate picture of who is on the network, their location and how the network is performing. Overlays show client health and application performance to quickly diagnose issues specific to a client, a floor plan or specific location.

RAPIDS

AirWave's rogue detection works with Aruba RFProtect wireless intrusion protection software to collect data and mitigate issues with rogue APs, rogue clients and wireless intrusion events across wired and wireless networks. The wireless data collected is correlated with wired network data to identify the most significant and relevant threats, while greatly reducing false-positives and strengthening network security.

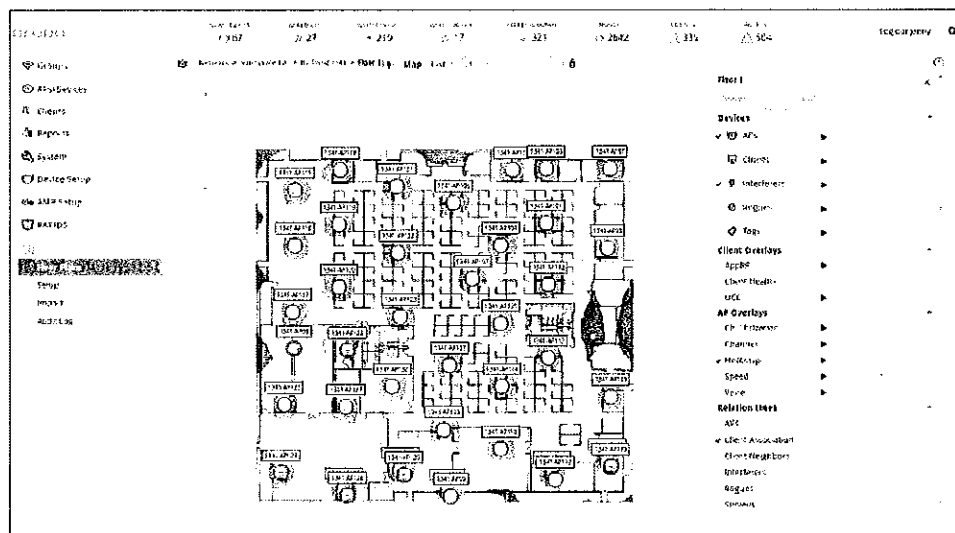


Figure 1: Network-wide visibility and location mapping.

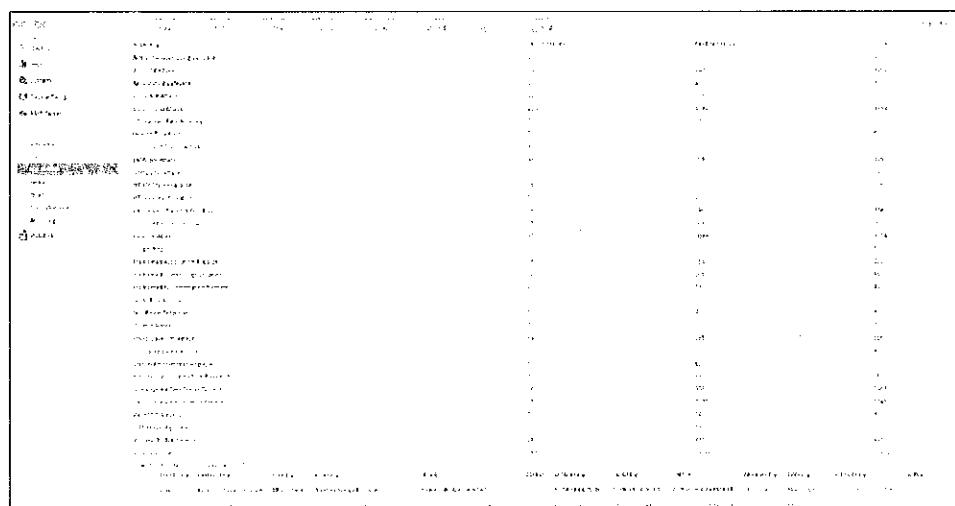


Figure 2: Detect more than 25 types of wireless attacks.

DEVICE DISCOVERY

- Automatically discover WLAN Infrastructure devices.
- Operate in any network environment, including large distributed networks with multiple locations.

TROUBLESHOOTING AND DIAGNOSTICS

- View client device data from ArubaOS, Aruba Instant and Aruba ClearPass Policy Manager including device type, operating system, operating system details, manufacturer and model.
- Search for clients by user name or MAC address for a diagnostic view of device and network statistics along with indicators to evaluate overall health and performance.
- Overlay client health on a floor plan to diagnose issues specific to the client or to an area on a floor plan.
- Easily diagnose RF issues in the network for advanced RF troubleshooting.

ROOT CAUSE ANALYSIS AND EVENT CORRELATION

- Map upstream relationships between APs, controllers and switches to identify the root cause of downtime and performance problems.
- Correlate performance and downtime issues to send only a single alert in the event of an upstream device failure.

CONFIGURATION MANAGEMENT

- Automatically configure APs, controllers, Aruba Instant, and Aruba Switches.
- Define configuration policies through a web user interface or by importing known-good configuration from an existing device.
- Configure Aruba Instant APs to provision a large number of branch locations with ease. Manage configurations across multiple locations with tools like adding notes, and overrides, as well as multi-edit and context-sensitivity support.
- Eliminate time-consuming and error-prone manual updates with efficient remote software distribution.
- Support advanced firmware image upgrades with features such as enforcing certified versions by group, splitting-up image downloads and reboot processes, as well as support for scheduling of firmware upgrades or change configurations to occur during off hours.
- Archive device configurations for auditing and version control. Additionally, archive device configurations and flash backups to restore previous state and configuration of Aruba controllers.
- Maintain detailed audit logs of changes made by all AirWave operators.

BETTER NETWORK PLANNING AND PROVISIONING

- VisualRF and the offline VisualRF Plan allow for quick planning of RF and wired coverage for new sites.

MANAGE LATEST TECHNOLOGIES, ARCHITECTURES AND PRODUCTS

- A single management interface for multiple generations of devices.
- Support autonomous, controller-managed and mesh APs, including outdoor Aruba AirMesh.
- Monitor wired edge devices using standard MIB data.
- Generate reports on wired port utilization for capacity planning.
- Support latest ArubaOS and ArubaOS-Switch management capabilities.

EASY-TO-USE WEB INTERFACE

- Role-based access, viewing rights and administrative privileges tailored to job responsibilities.
- Custom graphs of key information allow for pan and zoom for visibility into specific periods of time.
- Identify and search for users by user name.
- Client overview summarizes the types of clients attached to the network and provides visibility into watched or VIP clients.
- Multiple dashboard views provide visibility into every aspect of RF, clients, apps and network services.

SECURE COMMUNICATIONS

- Government-grade, agency-validated information assurance validations including FIPS 140-2 (Certificate #2577). For more information, read [detailed documentation](#).

HARDWARE AND VIRTUAL APPLIANCE OPTIONS

The following versions of AirWave are designed and tested to ensure compatibility and performance for different size requirements:

- Pro version supporting up to 1,500 managed devices.
- Enterprise version supporting up to 4,000 managed devices.

HARDWARE

- Glass and AirWave Enterprise will require the Enterprise Appliance
- Virtual Machines
- VMware and Hyper V supported

HARDWARE PLATFORMS

Category	Pro Appliance	Enterprise Appliance
Appliance Specifications		
CPU	8-core 2.6 Ghz HPE DL360 Gen9 E5-2640v3	2 8-core 2.6 Ghz HPE DL360 Gen9 E5-2640v3
Memory	48GB	96GB
Storage	6 300GB 12G SAS 15K 2.5in SC ENT HDD	8 300GB 12G SAS 15K 2.5in SC ENT HDD
Appliance Scalability		
Maximum Managed Devices	1,500	4,000
Power		
Power	500W FS Plat Hot Plug Power Supply	500W FS Plat Hot Plug Power Supply
Power Supply	Optional redundant power supply	Optional redundant power supply
AC Input Voltage	110/220 VAC Auto-Selecting	110/220 VAC Auto-Selecting
AC Input Frequency	50/60 Hz Auto-Selecting	50/60 Hz Auto-Selecting
Physical		
Rackmount	1U SFF Easy Install Rail 1U Cable Management Arm	1U SFF Easy Install Rail 1U Cable Management Arm
Dimensions (H x W x D)	1.7 x 17.1 x 27.5 inches (4.32 x 43.47 x 69.85 cm)	1.7 x 17.1 x 27.5 inches (4.32 x 43.47 x 69.85 cm)
Weight	33.3 lb. (15.31 kg) max	33.3 lb. (15.31 kg) max
HP SmartDrives	8 + 2 SFF/4 LFF max, HDD/SSD	8 + 2 SFF/4 LFF max, HDD/SSD
Networking	4 x 1GbE embedded + FlexibleLOM slot	4 x 1GbE embedded + FlexibleLOM slot
VGA/serial/USB ports	Front VGA opt, rear VGA standard, and serial opt., 5 USB 3.0	Front VGA opt, rear VGA standard, and serial opt., 5 USB 3.0
GPU support	Two single-wide and active to 9.5" in length, up to 150 W each	Two single-wide and active to 9.5" in length, up to 150 W each
Industry compliance	ASHRAE A3 and A4, lower idle power	ASHRAE A3 and A4, lower idle power
Warranty		
Hardware	1 year parts	1 year parts
Software	90 days	90 days

ORDERING INFORMATION

Part Number	Description
JW546AAE	Aruba LIC-AW Aruba Airwave with RAPIDS and VisualRF 1 Device License E-LTU
JW558AAE	Aruba AW-25-FR AirWave 25 Device Failover License E-LTU
JW559AAE	Aruba AW-50-FR AirWave 50 Device Failover License E-LTU
JW560AAE	Aruba AW-100-FR AirWave 100 Device Failover License E-LTU
JW561AAE	Aruba AW-200-FR AirWave 200 Device Failover License E-LTU
JW562AAE	Aruba AW-500-FR AirWave 500 Device Failover License E-LTU
JW563AAE	Aruba AW-1000-FR 1000 AirWave Device Failover License E-LTU
JW564AAE	Aruba AW-2500-FR 2500 AirWave Device Failover License E-LTU
JW565AAE	Aruba AW-EXF1-50 AirWave 50 Device Failover Expansion License E-LTU
JW566AAE	Aruba AW-EXF1-2500 AirWave 2500 Volume Failover Expansion License E-LTU
JW567AAE	Aruba AW-MASTER AirWave Master Console License E-LTU
JX918A	Aruba AirWave DL360 Professional Edition Hardware Appliance
JX919A	Aruba AirWave DL360 Enterprise Edition Hardware Appliance
JZ075A	Aruba AW-HW-GLASS AirWave Hardware Appliance for Centralized Monitoring
JZ076AAE	Aruba AW-VA-GLASS AirWave Virtual Appliance for Centralized Monitoring E-LTU



3333 SCOTT BLVD | SANTA CLARA, CA 95054
1.844.473.2782 | T: 1.408.227.4500 | FAX: 1.408.227.4550 | INFO@ARUBANETWORKS.COM

DATA SHEET

ARUBA FOUNDATION CARE

Aruba Foundation Care safeguards your networking investment by providing a wide range of technical support services that keep your network up and running.

With Aruba Foundation Care support, the highest level of technical expertise is always at your disposal anywhere in the world, day or night. Our technical support team is an invaluable addition to existing IT resources and enables your team to focus on more strategic business issues.

Features

- Unlimited access to Aruba TAC.
- Multiple levels of support via the web and telephone.
- Priority access to skilled engineers who work directly with the Aruba engineering team.
- Complete access to all feature and maintenance software releases.

Benefits

- Aruba Foundation Care ensures easy, predictable budgeting and better productivity.
- Industry-leading mobility experts to augment your in-house resources.
- Eliminate the time and expense of hiring and training additional staff.
- Keep up with the latest enhancements without increasing capital costs.

ARUBA FOUNDATION CARE OVERVIEW

Aruba Foundation Care is available in a variety of service levels to meet your specific needs – standard Aruba Foundation Care NBD Exchange, Aruba Foundation Care 4 Hour Exchange, Aruba Foundation Care 4 Hour Onsite, and others.

These support plans offer a wide range of features, including 24x7x365 access to the Aruba Technical Assistance Center (TAC) for immediate problem-resolution, access to the online Aruba support center for the latest feature and maintenance releases, and numerous hardware replacement options.



Aruba Foundation Care support plans are available for all Aruba products, including Mobility Controllers, chassis, line cards, power supplies, supervisor cards, software, wireless mesh routers, indoor and outdoor access points (APs), Aruba Instant APs, and campus switches.

All Aruba Foundation Care support contracts cover products for a minimum period of one year from the date of shipment, with discounted rates available for multiple-year terms.

ARUBA FOUNDATION CARE FEATURES

Aruba TAC

For mission-critical networks, the Aruba TAC is perhaps the most important asset in your support arsenal. Available 24 hours a day, 365 days a year, skilled Aruba TAC engineers are trained to aggressively resolve all hardware and software issues.

Aruba TAC engineers understand technical business challenges and use their comprehensive troubleshooting and network-design expertise to eliminate problems as quickly as possible. Aruba Foundation Care subscribers get priority response and unlimited access to TAC engineers.

Advanced Hardware Replacement

As an Aruba Foundation Care customer, we will ship any replacement part for next business-day delivery if your request was made before 2 p.m.* After an RMA number is issued, defective equipment and parts can be conveniently returned after the replacement part is received. Same day exchange service is also available.

Software Releases

Maintaining compatibility and coordinated software functionality is essential to sustaining peak network performance.

Only Aruba Foundation Care gives you complete access to all software releases, including major feature releases and minor updates. Software releases are available to download anytime from the Aruba support center.

Support Center

The online Aruba support center gives you anytime-access to vital technical information that enables you be proactive and take a preventive approach to network operations.

The Aruba support center includes FAQs, field alerts, release notes, product documentation, best practices documentation, as well as updates and upgrades to software and firmware.

WARRANTY VS. ARUBA FOUNDATION CARE SUPPORT

Aruba Foundation Care guarantees a significantly higher level of services during a specific period of time compared to Aruba's standard warranty. The table below compares Aruba Foundation Care support and Aruba's warranty offerings.

	Standard Software Warranty	Standard Hardware Warranty	Limited Lifetime Warranty	Aruba Foundation Care NBD Exchange	Aruba Foundation Care 4 Hour Exchange
24-x-7 TAC Support	-	-	-	✓	✓
Expedited Response	-	-	-	✓	✓
Software Maintenance and Feature Releases	-	-	-	✓	✓
Software Bug Fixes and Patch Releases	90 days	90 days	When released	✓	✓
Aruba Support Center Access	90 days	90 days	Lifetime	✓	✓
Advanced Replacement, Best Effort Shipment	-	✓	✓	-	-
Next Business-Day Advanced Hardware Replacement	-	-	-	✓	-
4-Hour Advanced Hardware Replacement	-	-	-	-	✓
Duration	90 days	1 year	Lifetime	1 year minimum – multiyear discounts apply	1 year minimum – multiyear discounts apply

Note: Technical support under warranty is for hardware or software conformance only. Other types of technical support are not included. Warranty support for Campus switches may vary.



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BUSINESS LIABILITY COVERAGE FORM

QUICK REFERENCE
BUSINESS LIABILITY COVERAGE FORM
READ YOUR POLICY CAREFULLY

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BUSINESS LIABILITY COVERAGE FORM

Various provisions in this policy restrict coverage. Read the entire policy carefully to determine rights, duties and what is and is not covered.

Throughout this policy the words "you" and "your" refer to the Named Insured shown in the Declarations. The words "we", "us" and "our" refer to the stock insurance company member of The Hartford providing this insurance.

The word "insured" means any person or organization qualifying as such under Section C. - Who Is An Insured.

Other words and phrases that appear in quotation marks have special meaning. Refer to Section G. - Liability And Medical Expenses Definitions.

A. COVERAGES

1. BUSINESS LIABILITY COVERAGE (BODILY INJURY, PROPERTY DAMAGE, PERSONAL AND ADVERTISING INJURY)

Insuring Agreement

- a. We will pay those sums that the insured becomes legally obligated to pay as damages because of "bodily injury", "property damage" or "personal and advertising injury" to which this insurance applies. We will have the right and duty to defend the insured against any "suit" seeking those damages. However, we will have no duty to defend the insured against any "suit" seeking damages for "bodily injury", "property damage" or "personal and advertising injury" to which this insurance does not apply.

We may, at our discretion, investigate any "occurrence" or offense and settle any claim or "suit" that may result. But:

- (1) The amount we will pay for damages is limited as described in Section D. - Liability And Medical Expenses Limits Of Insurance; and
- (2) Our right and duty to defend ends when we have used up the applicable limit of insurance in the payment of judgments, settlements or medical expenses to which this insurance applies.

No other obligation or liability to pay sums or perform acts or services is covered unless explicitly provided for under Coverage Extension - Supplementary Payments.

- b. This insurance applies:

- (1) To "bodily injury" and "property damage" only if:

- (a) The "bodily injury" or "property damage" is caused by an "occurrence" that takes place in the "coverage territory";

- (b) The "bodily injury" or "property damage" occurs during the policy period; and

- (c) Prior to the policy period, no insured listed under Paragraph 1. of Section C. - Who Is An Insured and no "employee" authorized by you to give or receive notice of an "occurrence" or claim, knew that the "bodily injury" or "property damage" had occurred, in whole or in part. If such a listed insured or authorized "employee" knew, prior to the policy period, that the "bodily injury" or "property damage" occurred, then any continuation, change or resumption of such "bodily injury" or "property damage" during or after the policy period will be deemed to have been known prior to the policy period.

- (2) To "personal and advertising injury" caused by an offense arising out of your business, but only if the offense was committed in the "coverage territory" during the policy period.

- c. "Bodily injury" or "property damage" will be deemed to have been known to have occurred at the earliest time when any insured listed under Paragraph 1. of Section C. - Who Is An Insured or any "employee" authorized by you to give or receive notice of an "occurrence" or claim:

- (1) Reports all, or any part, of the "bodily injury" or "property damage" to us or any other insurer;

BUSINESS LIABILITY COVERAGE FORM

- (2) Receives a written or verbal demand or claim for damages because of the "bodily injury" or "property damage"; or
- (3) Becomes aware by any other means that "bodily injury" or "property damage" has occurred or has begun to occur.
- d. Damages because of "bodily injury" include damages claimed by any person or organization for care, loss of services or death resulting at any time from the "bodily injury".
- e. **Incidental Medical Malpractice**
 - (1) "Bodily injury" arising out of the rendering of or failure to render professional health care services as a physician, dentist, nurse, emergency medical technician or paramedic shall be deemed to be caused by an "occurrence", but only if:
 - (a) The physician, dentist, nurse, emergency medical technician or paramedic is employed by you to provide such services; and
 - (b) You are not engaged in the business or occupation of providing such services.
 - (2) For the purpose of determining the limits of insurance for incidental medical malpractice, any act or omission together with all related acts or omissions in the furnishing of these services to any one person will be considered one "occurrence".

2. MEDICAL EXPENSES

Insuring Agreement

- a. We will pay medical expenses as described below for "bodily injury" caused by an accident:
 - (1) On premises you own or rent;
 - (2) On ways next to premises you own or rent; or
 - (3) Because of your operations;provided that:
 - (1) The accident takes place in the "coverage territory" and during the policy period;
 - (2) The expenses are incurred and reported to us within three years of the date of the accident; and
 - (3) The injured person submits to examination, at our expense, by physicians of our choice as often as we reasonably require.

- b. We will make these payments regardless of fault. These payments will not exceed the applicable limit of insurance. We will pay reasonable expenses for:

- (1) First aid administered at the time of an accident;
- (2) Necessary medical, surgical, x-ray and dental services, including prosthetic devices; and
- (3) Necessary ambulance, hospital, professional nursing and funeral services.

3. COVERAGE EXTENSION - SUPPLEMENTARY PAYMENTS

- a. We will pay, with respect to any claim or "suit" we investigate or settle, or any "suit" against an insured we defend:
 - (1) All expenses we incur.
 - (2) Up to \$1,000 for the cost of bail bonds required because of accidents or traffic law violations arising out of the use of any vehicle to which Business Liability Coverage for "bodily injury" applies. We do not have to furnish these bonds.
 - (3) The cost of appeal bonds or bonds to release attachments, but only for bond amounts within the applicable limit of insurance. We do not have to furnish these bonds.
 - (4) All reasonable expenses incurred by the insured at our request to assist us in the investigation or defense of the claim or "suit", including actual loss of earnings up to \$500 a day because of time off from work.
 - (5) All costs taxed against the insured in the "suit".
 - (6) Prejudgment interest awarded against the insured on that part of the judgment we pay. If we make an offer to pay the applicable limit of insurance, we will not pay any prejudgment interest based on that period of time after the offer.
 - (7) All interest on the full amount of any judgment that accrues after entry of the judgment and before we have paid, offered to pay, or deposited in court the part of the judgment that is within the applicable limit of insurance.

Any amounts paid under (1) through (7) above will not reduce the limits of insurance.

b. If we defend an insured against a "suit" and an indemnitee of the insured is also named as a party to the "suit", we will defend that indemnitee if all of the following conditions are met:

- (1) The "suit" against the indemnitee seeks damages for which the insured has assumed the liability of the indemnitee in a contract or agreement that is an "insured contract";
- (2) This insurance applies to such liability assumed by the insured;
- (3) The obligation to defend, or the cost of the defense of, that indemnitee, has also been assumed by the insured in the same "insured contract";
- (4) The allegations in the "suit" and the information we know about the "occurrence" are such that no conflict appears to exist between the interests of the insured and the interest of the indemnitee;
- (5) The indemnitee and the insured ask us to conduct and control the defense of that indemnitee against such "suit" and agree that we can assign the same counsel to defend the insured and the indemnitee; and
- (6) The indemnitee:
 - (a) Agrees in writing to:
 - (i) Cooperate with us in the investigation, settlement or defense of the "suit";
 - (ii) Immediately send us copies of any demands, notices, summonses or legal papers received in connection with the "suit";
 - (iii) Notify any other insurer whose coverage is available to the indemnitee; and
 - (iv) Cooperate with us with respect to coordinating other applicable insurance available to the indemnitee; and
 - (b) Provides us with written authorization to:
 - (i) Obtain records and other information related to the "suit"; and
 - (ii) Conduct and control the defense of the indemnitee in such "suit".

So long as the above conditions are met, attorneys' fees incurred by us in the defense of that indemnitee, necessary litigation expenses incurred by us and necessary litigation expenses incurred by the indemnitee at our request will be paid as Supplementary Payments.

Notwithstanding the provisions of Paragraph 1.b.(b) of Section B. – Exclusions, such payments will not be deemed to be damages for "bodily injury" and "property damage" and will not reduce the Limits of Insurance.

Our obligation to defend an insured's indemnitee and to pay for attorneys' fees and necessary litigation expenses as Supplementary Payments ends when:

- (1) We have used up the applicable limit of insurance in the payment of judgments or settlements; or
- (2) The conditions set forth above, or the terms of the agreement described in Paragraph (6) above, are no longer met.

B. EXCLUSIONS

1. Applicable To Business Liability Coverage

This insurance does not apply to:

a. Expected Or Intended Injury

- (1) "Bodily injury" or "property damage" expected or intended from the standpoint of the insured. This exclusion does not apply to "bodily injury" or "property damage" resulting from the use of reasonable force to protect persons or property; or
- (2) "Personal and advertising injury" arising out of an offense committed by, at the direction of or with the consent or acquiescence of the insured with the expectation of inflicting "personal and advertising injury".

b. Contractual Liability

- (1) "Bodily injury" or "property damage"; or
- (2) "Personal and advertising injury"

for which the insured is obligated to pay damages by reason of the assumption of liability in a contract or agreement.

This exclusion does not apply to liability for damages because of:

- (a) "Bodily injury", "property damage" or "personal and advertising injury" that the insured would have in the absence of the contract or agreement; or

BUSINESS LIABILITY COVERAGE FORM

(b) "Bodily injury" or "property damage" assumed in a contract or agreement that is an "insured contract", provided the "bodily injury" or "property damage" occurs subsequent to the execution of the contract or agreement. Solely for the purpose of liability assumed in an "insured contract", reasonable attorneys' fees and necessary litigation expenses incurred by or for a party other than an insured are deemed to be damages because of "bodily injury" or "property damage" provided:

- (i) Liability to such party for, or for the cost of, that party's defense has also been assumed in the same "insured contract", and
- (ii) Such attorneys' fees and litigation expenses are for defense of that party against a civil or alternative dispute resolution proceeding in which damages to which this insurance applies are alleged.

c. Liquor Liability

"Bodily injury" or "property damage" for which any insured may be held liable by reason of:

- (1) Causing or contributing to the intoxication of any person;
- (2) The furnishing of alcoholic beverages to a person under the legal drinking age or under the influence of alcohol; or
- (3) Any statute, ordinance or regulation relating to the sale, gift, distribution or use of alcoholic beverages.

This exclusion applies only if you are in the business of manufacturing, distributing, selling, serving or furnishing alcoholic beverages.

d. Workers' Compensation And Similar Laws

Any obligation of the insured under a workers' compensation, disability benefits or unemployment compensation law or any similar law.

e. Employer's Liability

"Bodily injury" to:

- (1) An "employee" of the insured arising out of and in the course of:
 - (a) Employment by the insured; or

(b) Performing duties related to the conduct of the insured's business, or

- (2) The spouse, child, parent, brother or sister of that "employee" as a consequence of (1) above.

This exclusion applies:

- (1) Whether the insured may be liable as an employer or in any other capacity; and
- (2) To any obligation to share damages with or repay someone else who must pay damages because of the injury.

This exclusion does not apply to liability assumed by the insured under an "insured contract".

f. Pollution

- (1) "Bodily injury", "property damage" or "personal and advertising injury" arising out of the actual, alleged or threatened discharge, dispersal, seepage, migration, release or escape of "pollutants":

(a) At or from any premises, site or location which is or was at any time owned or occupied by, or rented or loaned to any insured. However, this subparagraph does not apply to:

(i) "Bodily injury" if sustained within a building and caused by smoke, fumes, vapor or soot produced by or originating from equipment that is used to heat, cool or dehumidify the building, or equipment that is used to heat water for personal use, by the building's occupants or their guests;

(ii) "Bodily injury" or "property damage" for which you may be held liable, if you are a contractor and the owner or lessee of such premises, site or location has been added to your policy as an additional insured with respect to your ongoing operations performed for that additional insured at that premises, site or location and such premises, site or location is not and never was owned or occupied by, or rented or loaned to, any insured, other than that additional insured; or

- (iii) "Bodily injury" or "property damage" arising out of heat, smoke or fumes from a "hostile fire";
- (b) At or from any premises, site or location which is or was at any time used by or for any insured or others for the handling, storage, disposal, processing or treatment of waste;
- (c) Which are or were at any time transported, handled, stored, treated, disposed of, or processed as waste by or for:
 - (i) Any insured; or
 - (ii) Any person or organization for whom you may be legally responsible;
- (d) At or from any premises, site or location on which any insured or any contractors or subcontractors working directly or indirectly on any insured's behalf are performing operations if the "pollutants" are brought on or to the premises, site or location in connection with such operations by such insured, contractor or subcontractor. However, this subparagraph does not apply to:
 - (i) "Bodily injury" or "property damage" arising out of the escape of fuels, lubricants or other operating fluids which are needed to perform the normal electrical, hydraulic or mechanical functions necessary for the operation of "mobile equipment" or its parts, if such fuels, lubricants or other operating fluids escape from a vehicle part designed to hold, store or receive them. This exception does not apply if the "bodily injury" or "property damage" arises out of the intentional discharge, dispersal or release of the fuels, lubricants or other operating fluids, or if such fuels, lubricants or other operating fluids are brought on or to the premises, site or location with the intent that they be discharged, dispersed or

released as part of the operations being performed by such insured, contractor or subcontractor;

- (ii) "Bodily injury" or "property damage" sustained within a building and caused by the release of gases, fumes or vapors from materials brought into that building in connection with operations being performed by you or on your behalf by a contractor or subcontractor; or
- (iii) "Bodily injury" or "property damage" arising out of heat, smoke or fumes from a "hostile fire"; or
- (e) At or from any premises, site or location on which any insured or any contractors or subcontractors working directly or indirectly on any insured's behalf are performing operations if the operations are to test for, monitor, clean up, remove, contain, treat, detoxify or neutralize, or in any way respond to, or assess the effects of, "pollutants".
- (2) Any loss, cost or expense arising out of any:
 - (a) Request, demand, order or statutory or regulatory requirement that any insured or others test for, monitor, clean up, remove, contain, treat, detoxify or neutralize, or in any way respond to, or assess the effects of, "pollutants"; or
 - (b) Claim or suit by or on behalf of a governmental authority for damages because of testing for, monitoring, cleaning up, removing, containing, treating, detoxifying or neutralizing, or in any way responding to, or assessing the effects of, "pollutants".

However, this paragraph does not apply to liability for damages because of "property damage" that the insured would have in the absence of such request, demand, order or statutory or regulatory requirement, or such claim or "suit" by or on behalf of a governmental authority.

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g. Aircraft, Auto Or Watercraft

"Bodily injury" or "property damage" arising out of the ownership, maintenance, use or entrustment to others of any aircraft, "auto" or watercraft owned or operated by or rented or loaned to any insured. Use includes operation and "loading or unloading".

This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage" involved the ownership, maintenance, use or entrustment to others of any aircraft, "auto" or watercraft that is owned or operated by or rented or loaned to any insured.

This exclusion does not apply to:

- (1) A watercraft while ashore on premises you own or rent;
- (2) A watercraft you do not own that is:
 - (a) Less than 51 feet long; and
 - (b) Not being used to carry persons for a charge;
- (3) Parking an "auto" on, or on the ways next to, premises you own or rent, provided the "auto" is not owned by or rented or loaned to you or the insured;
- (4) Liability assumed under any "insured contract" for the ownership, maintenance or use of aircraft or watercraft;
- (5) "Bodily injury" or "property damage" arising out of the operation of any of the equipment listed in Paragraph f.(2) or f.(3) of the definition of "mobile equipment"; or
- (6) An aircraft that is not owned by any insured and is hired, chartered or loaned with a paid crew. However, this exception does not apply if the insured has any other insurance for such "bodily injury" or "property damage", whether the other insurance is primary, excess, contingent or on any other basis.

h. Mobile Equipment

"Bodily injury" or "property damage" arising out of:

- (1) The transportation of "mobile equipment" by an "auto" owned or operated by or rented or loaned to any insured; or

- (2) The use of "mobile equipment" in, or while in practice or preparation for, a prearranged racing, speed or demolition contest or in any stunting activity.

i. War

"Bodily injury", "property damage" or "personal and advertising injury", however caused, arising, directly or indirectly, out of:

- (1) War, including undeclared or civil war;
- (2) Warlike action by a military force, including action in hindering or defending against an actual or expected attack, by any government, sovereign or other authority using military personnel or other agents; or
- (3) Insurrection, rebellion, revolution, usurped power, or action taken by governmental authority in hindering or defending against any of these.

j. Professional Services

"Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of or failure to render any professional service. This includes but is not limited to:

- (1) Legal, accounting or advertising services;
- (2) Preparing, approving, or failing to prepare or approve maps, shop drawings, opinions, reports, surveys, field orders, change orders, designs or drawings and specifications;
- (3) Supervisory, inspection, architectural or engineering activities;
- (4) Medical, surgical, dental, x-ray or nursing services treatment, advice or instruction;
- (5) Any health or therapeutic service treatment, advice or instruction;
- (6) Any service, treatment, advice or instruction for the purpose of appearance or skin enhancement, hair removal or replacement or personal grooming;
- (7) Optical or hearing aid services including the prescribing, preparation, fitting, demonstration or distribution of ophthalmic lenses and similar products or hearing aid devices;

- (8) Optometry or optometric services including but not limited to examination of the eyes and the prescribing, preparation, fitting, demonstration or distribution of ophthalmic lenses and similar products;
- (9) Any:
 - (a) Body piercing (not including ear piercing);
 - (b) Tattooing, including but not limited to the insertion of pigments into or under the skin; and
 - (c) Similar services;
- (10) Services in the practice of pharmacy; and
- (11) Computer consulting, design or programming services, including web site design.

Paragraphs (4) and (5) of this exclusion do not apply to the Incidental Medical Malpractice coverage afforded under Paragraph 1.e. in Section A. - Coverages.

k. Damage To Property

"Property damage" to:

- (1) Property you own, rent or occupy, including any costs or expenses incurred by you, or any other person, organization or entity, for repair, replacement, enhancement, restoration or maintenance of such property for any reason, including prevention of injury to a person or damage to another's property;
- (2) Premises you sell, give away or abandon, if the "property damage" arises out of any part of those premises;
- (3) Property loaned to you;
- (4) Personal property in the care, custody or control of the insured;
- (5) That particular part of real property on which you or any contractors or subcontractors working directly or indirectly on your behalf are performing operations, if the "property damage" arises out of those operations; or
- (6) That particular part of any property that must be restored, repaired or replaced because "your work" was incorrectly performed on it.

Paragraphs (1), (3) and (4) of this exclusion do not apply to "property damage" (other than damage by fire) to premises, including the contents of such premises, rented to you for a period of 7 or fewer consecutive days. A separate Limit of Insurance applies to Damage To Premises Rented To You as described in Section D. - Limits Of Insurance.

Paragraph (2) of this exclusion does not apply if the premises are "your work" and were never occupied, rented or held for rental by you.

Paragraphs (3) and (4) of this exclusion do not apply to the use of elevators.

Paragraphs (3), (4), (5) and (6) of this exclusion do not apply to liability assumed under a sidetrack agreement.

Paragraphs (3) and (4) of this exclusion do not apply to "property damage" to borrowed equipment while not being used to perform operations at a job site.

Paragraph (6) of this exclusion does not apply to "property damage" included in the "products-completed operations hazard".

l. Damage To Your Product

"Property damage" to "your product" arising out of it or any part of it.

m. Damage To Your Work

"Property damage" to "your work" arising out of it or any part of it and included in the "products-completed operations hazard".

This exclusion does not apply if the damaged work or the work out of which the damage arises was performed on your behalf by a subcontractor.

n. Damage To Impaired Property Or Property Not Physically Injured

"Property damage" to "impaired property" or property that has not been physically injured, arising out of:

- (1) A defect, deficiency, inadequacy or dangerous condition in "your product" or "your work"; or
- (2) A delay or failure by you or anyone acting on your behalf to perform a contract or agreement in accordance with its terms.

This exclusion does not apply to the loss of use of other property arising out of sudden and accidental physical injury to "your product" or "your work" after it has been put to its intended use.

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o. Recall Of Products, Work Or Impaired Property

Damages claimed for any loss, cost or expense incurred by you or others for the loss of use, withdrawal, recall, inspection, repair, replacement, adjustment, removal or disposal of:

- (1) "Your product";
- (2) "Your work"; or
- (3) "Impaired property";

if such product, work or property is withdrawn or recalled from the market or from use by any person or organization because of a known or suspected defect, deficiency, inadequacy or dangerous condition in it.

p. Personal And Advertising Injury

"Personal and advertising injury":

- (1) Arising out of oral, written or electronic publication of material, if done by or at the direction of the insured with knowledge of its falsity;
- (2) Arising out of oral, written or electronic publication of material whose first publication took place before the beginning of the policy period;
- (3) Arising out of a criminal act committed by or at the direction of the insured;
- (4) Arising out of any breach of contract, except an implied contract to use another's "advertising idea" in your "advertisement";
- (5) Arising out of the failure of goods, products or services to conform with any statement of quality or performance made in your "advertisement";
- (6) Arising out of the wrong description of the price of goods, products or services;
- (7) Arising out of any violation of any intellectual property rights such as copyright, patent, trademark, trade name, trade secret, service mark or other designation of origin or authenticity.

However, this exclusion does not apply to infringement, in your "advertisement", of

- (a) Copyright;
- (b) Slogan, unless the slogan is also a trademark, trade name, service mark or other designation of origin or authenticity; or

(c) Title of any literary or artistic work;

(8) Arising out of an offense committed by an insured whose business is:

- (a) Advertising, broadcasting, publishing or telecasting;
- (b) Designing or determining content of web sites for others; or
- (c) An Internet search, access, content or service provider.

However, this exclusion does not apply to Paragraphs a., b. and c. under the definition of "personal and advertising injury" in Section G. – Liability And Medical Expenses Definitions.

For the purposes of this exclusion, placing an "advertisement" for or linking to others on your web site, by itself, is not considered the business of advertising, broadcasting, publishing or telecasting;

- (9) Arising out of an electronic chat room or bulletin board the insured hosts, owns, or over which the insured exercises control;
- (10) Arising out of the unauthorized use of another's name or product in your e-mail address, domain name or metatags, or any other similar tactics to mislead another's potential customers;
- (11) Arising out of the violation of a person's right of privacy created by any state or federal act.

However, this exclusion does not apply to liability for damages that the insured would have in the absence of such state or federal act;

(12) Arising out of:

- (a) An "advertisement" for others on your web site;
- (b) Placing a link to a web site of others on your web site;
- (c) Content from a web site of others displayed within a frame or border on your web site. Content includes information, code, sounds, text, graphics or images; or
- (d) Computer code, software or programming used to enable:
 - (i) Your web site; or
 - (ii) The presentation or functionality of an "advertisement" or other content on your web site;

- (13) Arising out of a violation of any anti-trust law;
- (14) Arising out of the fluctuation in price or value of any stocks, bonds or other securities; or
- (15) Arising out of discrimination or humiliation committed by or at the direction of any "executive officer", director, stockholder, partner or member of the insured.

q. Electronic Data

Damages arising out of the loss of, loss of use of, damage to, corruption of, inability to access, or inability to manipulate "electronic data".

r. Employment-Related Practices

"Bodily injury" or "personal and advertising injury" to:

- (1) A person arising out of any:
 - (a) Refusal to employ that person;
 - (b) Termination of that person's employment; or
 - (c) Employment-related practices, policies, acts or omissions, such as coercion, demotion, evaluation, reassignment, discipline, defamation, harassment, humiliation or discrimination directed at that person; or
- (2) The spouse, child, parent, brother or sister of that person as a consequence of "bodily injury" or "personal and advertising injury" to the person at whom any of the employment-related practices described in Paragraphs (a), (b), or (c) above is directed.

This exclusion applies:

- (1) Whether the insured may be liable as an employer or in any other capacity; and
- (2) To any obligation to share damages with or repay someone else who must pay damages because of the injury.

s. Asbestos

- (1) "Bodily injury", "property damage" or "personal and advertising injury" arising out of the "asbestos hazard".
- (2) Any damages, judgments, settlements, loss, costs or expenses that:

- (a) May be awarded or incurred by reason of any claim or suit alleging actual or threatened injury or damage of any nature or kind to persons or property which would not have occurred in whole or in part but for the "asbestos hazard";
- (b) Arise out of any request, demand, order or statutory or regulatory requirement that any insured or others test for, monitor, clean up, remove, encapsulate, contain, treat, detoxify or neutralize or in any way respond to or assess the effects of an "asbestos hazard"; or
- (c) Arise out of any claim or suit for damages because of testing for, monitoring, cleaning up, removing, encapsulating, containing, treating, detoxifying or neutralizing or in any way responding to or assessing the effects of an "asbestos hazard".

t. Violation Of Statutes That Govern E-Mails, Fax, Phone Calls Or Other Methods Of Sending Material Or Information

"Bodily injury", "property damage", or "personal and advertising injury" arising directly or indirectly out of any action or omission that violates or is alleged to violate:

- (1) The Telephone Consumer Protection Act (TCPA), including any amendment of or addition to such law;
- (2) The CAN-SPAM Act of 2003, including any amendment of or addition to such law; or
- (3) Any statute, ordinance or regulation, other than the TCPA or CAN-SPAM Act of 2003, that prohibits or limits the sending, transmitting, communicating or distribution of material or information.

Damage To Premises Rented To You – Exception For Damage By Fire, Lightning or Explosion

Exclusions c. through h. and k. through o. do not apply to damage by fire, lightning or explosion to premises rented to you or temporarily occupied by you with permission of the owner. A separate Limit of Insurance applies to this coverage as described in Section D. - Liability And Medical Expenses Limits Of Insurance.

BUSINESS LIABILITY COVERAGE FORM

2. Applicable To Medical Expenses Coverage

We will not pay expenses for "bodily injury":

a. Any Insured

To any insured, except "volunteer workers".

b. Hired Person

To a person hired to do work for or on behalf of any insured or a tenant of any insured.

c. Injury On Normally Occupied Premises

To a person injured on that part of premises you own or rent that the person normally occupies.

d. Workers' Compensation And Similar Laws

To a person, whether or not an "employee" of any insured, if benefits for the "bodily injury" are payable or must be provided under a workers' compensation or disability benefits law or a similar law.

e. Athletics Activities

To a person injured while practicing, instructing or participating in any physical exercises or games, sports or athletic contests.

f. Products-Completed Operations Hazard

Included with the "products-completed operations hazard".

g. Business Liability Exclusions

Excluded under Business Liability Coverage.

C. WHO IS AN INSURED

1. If you are designated in the Declarations as:

- a.** An individual, you and your spouse are insureds, but only with respect to the conduct of a business of which you are the sole owner.
- b.** A partnership or joint venture, you are an insured. Your members, your partners, and their spouses are also insureds, but only with respect to the conduct of your business.
- c.** A limited liability company, you are an insured. Your members are also insureds, but only with respect to the conduct of your business. Your managers are insureds, but only with respect to their duties as your managers.
- d.** An organization other than a partnership, joint venture or limited liability company, you are an insured. Your "executive officers" and directors are insureds, but only with respect to their duties as your officers or directors. Your stockholders are also insureds, but only with respect to their liability as stockholders.

- e.** A trust, you are an insured. Your trustees are also insureds, but only with respect to their duties as trustees.

2. Each of the following is also an insured:

a. Employees And Volunteer Workers

Your "volunteer workers" only while performing duties related to the conduct of your business, or your "employees", other than either your "executive officers" (if you are an organization other than a partnership, joint venture or limited liability company) or your managers (if you are a limited liability company), but only for acts within the scope of their employment by you or while performing duties related to the conduct of your business.

However, none of these "employees" or "volunteer workers" are insureds for:

- (1) "Bodily injury" or "personal and advertising injury":**

- (a)** To you, to your partners or members (if you are a partnership or joint venture), to your members (if you are a limited liability company), or to a co-"employee" while in the course of his or her employment or performing duties related to the conduct of your business, or to your other "volunteer workers" while performing duties related to the conduct of your business;
- (b)** To the spouse, child, parent, brother or sister of that co-"employee" or that "volunteer worker" as a consequence of Paragraph **(1)(a)** above;
- (c)** For which there is any obligation to share damages with or repay someone else who must pay damages because of the injury described in Paragraphs **(1)(a)** or **(b)** above; or
- (d)** Arising out of his or her providing or failing to provide professional health care services.

If you are not in the business of providing professional health care services, Paragraph **(d)** does not apply to any nurse, emergency medical technician or paramedic employed by you to provide such services.

- (2) "Property damage" to property:**

- (a)** Owned, occupied or used by,

- (b) Rented to, in the care, custody or control of, or over which physical control is being exercised for any purpose by you, any of your "employees", "volunteer workers", any partner or member (if you are a partnership or joint venture), or any member (if you are a limited liability company).

b. Real Estate Manager

Any person (other than your "employee" or "volunteer worker"), or any organization while acting as your real estate manager.

c. Temporary Custodians Of Your Property

Any person or organization having proper temporary custody of your property if you die, but only:

- (1) With respect to liability arising out of the maintenance or use of that property; and
- (2) Until your legal representative has been appointed.

d. Legal Representative If You Die

Your legal representative if you die, but only with respect to duties as such. That representative will have all your rights and duties under this insurance.

e. Unnamed Subsidiary

Any subsidiary and subsidiary thereof, of yours which is a legally incorporated entity of which you own a financial interest of more than 50% of the voting stock on the effective date of this Coverage Part.

The insurance afforded herein for any subsidiary not shown in the Declarations as a named insured does not apply to injury or damage with respect to which an insured under this insurance is also an insured under another policy or would be an insured under such policy but for its termination or upon the exhaustion of its limits of insurance.

3. Newly Acquired Or Formed Organization

Any organization you newly acquire or form, other than a partnership, joint venture or limited liability company, and over which you maintain financial interest of more than 50% of the voting stock, will qualify as a Named Insured if there is no other similar insurance available to that organization. However:

- a. Coverage under this provision is afforded only until the 180th day after you acquire or form the organization or the end of the policy period, whichever is earlier; and

- b. Coverage under this provision does not apply to:

- (1) "Bodily injury" or "property damage" that occurred; or
- (2) "Personal and advertising injury" arising out of an offense committed

before you acquired or formed the organization.

4. Operator Of Mobile Equipment

With respect to "mobile equipment" registered in your name under any motor vehicle registration law, any person is an insured while driving such equipment along a public highway with your permission. Any other person or organization responsible for the conduct of such person is also an insured, but only with respect to liability arising out of the operation of the equipment, and only if no other insurance of any kind is available to that person or organization for this liability. However, no person or organization is an insured with respect to:

- a. "Bodily injury" to a co-"employee" of the person driving the equipment; or
- b. "Property damage" to property owned by, rented to, in the charge of or occupied by you or the employer of any person who is an insured under this provision.

5. Operator of Nonowned Watercraft

With respect to watercraft you do not own that is less than 51 feet long and is not being used to carry persons for a charge, any person is an insured while operating such watercraft with your permission. Any other person or organization responsible for the conduct of such person is also an insured, but only with respect to liability arising out of the operation of the watercraft, and only if no other insurance of any kind is available to that person or organization for this liability.

However, no person or organization is an insured with respect to:

- a. "Bodily injury" to a co-"employee" of the person operating the watercraft; or
- b. "Property damage" to property owned by, rented to, in the charge of or occupied by you or the employer of any person who is an insured under this provision.

6. Additional Insureds When Required By Written Contract, Written Agreement Or Permit

The person(s) or organization(s) identified in Paragraphs a. through f. below are additional insureds when you have agreed, in a written

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contract, written agreement or because of a permit issued by a state or political subdivision, that such person or organization be added as an additional insured on your policy, provided the injury or damage occurs subsequent to the execution of the contract or agreement, or the issuance of the permit.

A person or organization is an additional insured under this provision only for that period of time required by the contract, agreement or permit.

However, no such person or organization is an additional insured under this provision if such person or organization is included as an additional insured by an endorsement issued by us and made a part of this Coverage Part, including all persons or organizations added as additional insureds under the specific additional insured coverage grants in Section F. – Optional Additional Insured Coverages.

a. Vendors

Any person(s) or organization(s) (referred to below as vendor), but only with respect to "bodily injury" or "property damage" arising out of "your products" which are distributed or sold in the regular course of the vendor's business and only if this Coverage Part provides coverage for "bodily injury" or "property damage" included within the "products-completed operations hazard".

- (1) The insurance afforded to the vendor is subject to the following additional exclusions:

This insurance does not apply to:

- (a) "Bodily injury" or "property damage" for which the vendor is obligated to pay damages by reason of the assumption of liability in a contract or agreement. This exclusion does not apply to liability for damages that the vendor would have in the absence of the contract or agreement;
- (b) Any express warranty unauthorized by you;
- (c) Any physical or chemical change in the product made intentionally by the vendor;
- (d) Repackaging, except when unpacked solely for the purpose of inspection, demonstration, testing, or the substitution of parts under instructions from the manufacturer, and then repackaged in the original container;

- (e) Any failure to make such inspections, adjustments, tests or servicing as the vendor has agreed to make or normally undertakes to make in the usual course of business, in connection with the distribution or sale of the products;

- (f) Demonstration, installation, servicing or repair operations, except such operations performed at the vendor's premises in connection with the sale of the product;

- (g) Products which, after distribution or sale by you, have been labeled or relabeled or used as a container, part or ingredient of any other thing or substance by or for the vendor; or

- (h) "Bodily injury" or "property damage" arising out of the sole negligence of the vendor for its own acts or omissions or those of its employees or anyone else acting on its behalf. However, this exclusion does not apply to:

- (i) The exceptions contained in Subparagraphs (d) or (f); or

- (ii) Such inspections, adjustments, tests or servicing as the vendor has agreed to make or normally undertakes to make in the usual course of business, in connection with the distribution or sale of the products.

- (2) This insurance does not apply to any insured person or organization from whom you have acquired such products, or any ingredient, part or container, entering into, accompanying or containing such products.

b. Lessors Of Equipment

- (1) Any person or organization from whom you lease equipment; but only with respect to their liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your maintenance, operation or use of equipment leased to you by such person or organization.

- (2) With respect to the insurance afforded to these additional insureds, this insurance does not apply to any "occurrence" which takes place after you cease to lease that equipment.

c. Lessors Of Land Or Premises

- (1) Any person or organization from whom you lease land or premises, but only with respect to liability arising out of the ownership, maintenance or use of that part of the land or premises leased to you.
- (2) With respect to the insurance afforded to these additional insureds, this insurance does not apply to:
 - (a) Any "occurrence" which takes place after you cease to lease that land or be a tenant in that premises; or
 - (b) Structural alterations, new construction or demolition operations performed by or on behalf of such person or organization.

d. Architects, Engineers Or Surveyors

- (1) Any architect, engineer, or surveyor, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your acts or omissions or the acts or omissions of those acting on your behalf:
 - (a) In connection with your premises; or
 - (b) In the performance of your ongoing operations performed by you or on your behalf.
- (2) With respect to the insurance afforded to these additional insureds, the following additional exclusion applies:
 This insurance does not apply to "bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of or the failure to render any professional services by or for you, including:
 - (a) The preparing, approving, or failure to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders, designs or drawings and specifications; or
 - (b) Supervisory, inspection, architectural or engineering activities.

e. Permits Issued By State Or Political Subdivisions

- (1) Any state or political subdivision, but only with respect to operations performed by you or on your behalf for which the state or political subdivision has issued a permit.
- (2) With respect to the insurance afforded to these additional insureds, this insurance does not apply to:
 - (a) "Bodily injury", "property damage" or "personal and advertising injury" arising out of operations performed for the state or municipality; or
 - (b) "Bodily injury" or "property damage" included within the "products-completed operations hazard".

f. Any Other Party

- (1) Any other person or organization who is not an insured under Paragraphs a. through e. above, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your acts or omissions or the acts or omissions of those acting on your behalf:
 - (a) In the performance of your ongoing operations;
 - (b) In connection with your premises owned by or rented to you; or
 - (c) In connection with "your work" and included within the "products-completed operations hazard", but only if
 - (i) The written contract or written agreement requires you to provide such coverage to such additional insured; and
 - (ii) This Coverage Part provides coverage for "bodily injury" or "property damage" included within the "products-completed operations hazard".
- (2) With respect to the insurance afforded to these additional insureds, this insurance does not apply to:
 - "Bodily injury", "property damage" or "personal and advertising injury" arising out of the rendering of, or the failure to render, any professional architectural, engineering or surveying services, including:

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- (a) The preparing, approving, or failure to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders, designs or drawings and specifications; or
- (b) Supervisory, inspection, architectural or engineering activities.

The limits of insurance that apply to additional insureds are described in Section D. – Limits Of Insurance.

How this insurance applies when other insurance is available to an additional insured is described in the Other Insurance Condition in Section E. – Liability And Medical Expenses General Conditions.

No person or organization is an insured with respect to the conduct of any current or past partnership, joint venture or limited liability company that is not shown as a Named Insured in the Declarations.

D. LIABILITY AND MEDICAL EXPENSES LIMITS OF INSURANCE

1. The Most We Will Pay

The Limits of Insurance shown in the Declarations and the rules below fix the most we will pay regardless of the number of:

- a. Insureds;
- b. Claims made or "suits" brought; or
- c. Persons or organizations making claims or bringing "suits".

2. Aggregate Limits

The most we will pay for:

- a. Damages because of "bodily injury" and "property damage" included in the "products-completed operations hazard" is the Products-Completed Operations Aggregate Limit shown in the Declarations.
- b. Damages because of all other "bodily injury", "property damage" or "personal and advertising injury", including medical expenses, is the General Aggregate Limit shown in the Declarations.

This General Aggregate Limit applies separately to each of your "locations" owned by or rented to you.

"Location" means premises involving the same or connecting lots, or premises whose connection is interrupted only by a street, roadway or right-of-way of a railroad.

This General Aggregate limit does not apply to "property damage" to premises while rented to you or temporarily occupied by you with permission of the owner, arising out of fire, lightning or explosion.

3. Each Occurrence Limit

Subject to 2.a. or 2.b. above, whichever applies, the most we will pay for the sum of all damages because of all "bodily injury", "property damage" and medical expenses arising out of any one "occurrence" is the Liability and Medical Expenses Limit shown in the Declarations.

The most we will pay for all medical expenses because of "bodily injury" sustained by any one person is the Medical Expenses Limit shown in the Declarations.

4. Personal And Advertising Injury Limit

Subject to 2.b. above, the most we will pay for the sum of all damages because of all "personal and advertising injury" sustained by any one person or organization is the Personal and Advertising Injury Limit shown in the Declarations.

5. Damage To Premises Rented To You Limit

The Damage To Premises Rented To You Limit is the most we will pay under Business Liability Coverage for damages because of "property damage" to any one premises, while rented to you, or in the case of damage by fire, lightning or explosion, while rented to you or temporarily occupied by you with permission of the owner.

In the case of damage by fire, lightning or explosion, the Damage to Premises Rented To You Limit applies to all damage proximately caused by the same event, whether such damage results from fire, lightning or explosion or any combination of these.

6. How Limits Apply To Additional Insureds

The most we will pay on behalf of a person or organization who is an additional insured under this Coverage Part is the lesser of:

- a. The limits of insurance specified in a written contract, written agreement or permit issued by a state or political subdivision; or
- b. The Limits of Insurance shown in the Declarations.

Such amount shall be a part of and not in addition to the Limits of Insurance shown in the Declarations and described in this Section.

If more than one limit of insurance under this policy and any endorsements attached thereto applies to any claim or "suit", the most we will pay under this policy and the endorsements is the single highest limit of liability of all coverages applicable to such claim or "suit". However, this paragraph does not apply to the Medical Expenses limit set forth in Paragraph 3. above.

The Limits of Insurance of this Coverage Part apply separately to each consecutive annual period and to any remaining period of less than 12 months, starting with the beginning of the policy period shown in the Declarations, unless the policy period is extended after issuance for an additional period of less than 12 months. In that case, the additional period will be deemed part of the last preceding period for purposes of determining the Limits of Insurance.

**E. LIABILITY AND MEDICAL EXPENSES
GENERAL CONDITIONS**

1. Bankruptcy

Bankruptcy or insolvency of the insured or of the insured's estate will not relieve us of our obligations under this Coverage Part.

2. Duties In The Event Of Occurrence, Offense, Claim Or Suit

a. Notice Of Occurrence Or Offense

You or any additional insured must see to it that we are notified as soon as practicable of an "occurrence" or an offense which may result in a claim. To the extent possible, notice should include:

- (1) How, when and where the "occurrence" or offense took place;
- (2) The names and addresses of any injured persons and witnesses; and
- (3) The nature and location of any injury or damage arising out of the "occurrence" or offense.

b. Notice Of Claim

If a claim is made or "suit" is brought against any insured, you or any additional insured must:

- (1) Immediately record the specifics of the claim or "suit" and the date received; and
- (2) Notify us as soon as practicable.

You or any additional insured must see to it that we receive a written notice of the claim or "suit" as soon as practicable.

c. Assistance And Cooperation Of The Insured

You and any other involved insured must:

- (1) Immediately send us copies of any demands, notices, summonses or legal papers received in connection with the claim or "suit";
- (2) Authorize us to obtain records and other information;
- (3) Cooperate with us in the investigation, settlement of the claim or defense against the "suit"; and
- (4) Assist us, upon our request, in the enforcement of any right against any person or organization that may be liable to the insured because of injury or damage to which this insurance may also apply.

d. Obligations At The Insured's Own Cost

No insured will, except at that insured's own cost, voluntarily make a payment, assume any obligation, or incur any expense, other than for first aid, without our consent.

e. Additional Insured's Other Insurance

If we cover a claim or "suit" under this Coverage Part that may also be covered by other insurance available to an additional insured, such additional insured must submit such claim or "suit" to the other insurer for defense and indemnity.

However, this provision does not apply to the extent that you have agreed in a written contract, written agreement or permit that this insurance is primary and non-contributory with the additional insured's own insurance.

f. Knowledge Of An Occurrence, Offense, Claim Or Suit

Paragraphs a. and b. apply to you or to any additional insured only when such "occurrence", offense, claim or "suit" is known to:

- (1) You or any additional insured that is an individual;
- (2) Any partner, if you or an additional insured is a partnership;
- (3) Any manager, if you or an additional insured is a limited liability company;
- (4) Any "executive officer" or insurance manager, if you or an additional insured is a corporation;
- (5) Any trustee, if you or an additional insured is a trust; or
- (6) Any elected or appointed official, if you or an additional insured is a political subdivision or public entity.

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This Paragraph f. applies separately to you and any additional insured.

3. Financial Responsibility Laws

- a. When this policy is certified as proof of financial responsibility for the future under the provisions of any motor vehicle financial responsibility law, the insurance provided by the policy for "bodily injury" liability and "property damage" liability will comply with the provisions of the law to the extent of the coverage and limits of insurance required by that law.
- b. With respect to "mobile equipment" to which this insurance applies, we will provide any liability, uninsured motorists, underinsured motorists, no-fault or other coverage required by any motor vehicle law. We will provide the required limits for those coverages.

4. Legal Action Against Us

No person or organization has a right under this Coverage Form:

- a. To join us as a party or otherwise bring us into a "suit" asking for damages from an insured; or
- b. To sue us on this Coverage Form unless all of its terms have been fully complied with.

A person or organization may sue us to recover on an agreed settlement or on a final judgment against an insured; but we will not be liable for damages that are not payable under the terms of this insurance or that are in excess of the applicable limit of insurance. An agreed settlement means a settlement and release of liability signed by us, the insured and the claimant or the claimant's legal representative.

5. Separation Of Insureds

Except with respect to the Limits of Insurance, and any rights or duties specifically assigned in this policy to the first Named Insured, this insurance applies:

- a. As if each Named Insured were the only Named Insured; and
- b. Separately to each insured against whom a claim is made or "suit" is brought.

6. Representations

a. When You Accept This Policy

By accepting this policy, you agree:

- (1) The statements in the Declarations are accurate and complete;
- (2) Those statements are based upon representations you made to us; and

- (3) We have issued this policy in reliance upon your representations.

b. Unintentional Failure To Disclose Hazards

If unintentionally you should fail to disclose all hazards relating to the conduct of your business at the inception date of this Coverage Part, we shall not deny any coverage under this Coverage Part because of such failure.

7. Other Insurance

If other valid and collectible insurance is available for a loss we cover under this Coverage Part, our obligations are limited as follows:

a. Primary Insurance

This insurance is primary except when **b.** below applies. If other insurance is also primary, we will share with all that other insurance by the method described in **c.** below.

b. Excess Insurance

This insurance is excess over any of the other insurance, whether primary, excess, contingent or on any other basis:

(1) Your Work

That is Fire, Extended Coverage, Builder's Risk, Installation Risk or similar coverage for "your work";

(2) Premises Rented To You

That is fire, lightning or explosion insurance for premises rented to you or temporarily occupied by you with permission of the owner;

(3) Tenant Liability

That is insurance purchased by you to cover your liability as a tenant for "property damage" to premises rented to you or temporarily occupied by you with permission of the owner;

(4) Aircraft, Auto Or Watercraft

If the loss arises out of the maintenance or use of aircraft, "autos" or watercraft to the extent not subject to Exclusion **g.** of Section **A.** – Coverages.

(5) Property Damage To Borrowed Equipment Or Use Of Elevators

If the loss arises out of "property damage" to borrowed equipment or the use of elevators to the extent not subject to Exclusion **k.** of Section **A.** – Coverages.

(6) When You Are Added As An Additional Insured To Other Insurance

That is other insurance available to you covering liability for damages arising out of the premises or operations, or products and completed operations, for which you have been added as an additional insured by that insurance; or

(7) When You Add Others As An Additional Insured To This Insurance

That is other insurance available to an additional insured.

However, the following provisions apply to other insurance available to any person or organization who is an additional insured under this Coverage Part:

(a) Primary Insurance When Required By Contract

This insurance is primary if you have agreed in a written contract, written agreement or permit that this insurance be primary. If other insurance is also primary, we will share with all that other insurance by the method described in c. below.

(b) Primary And Non-Contributory To Other Insurance When Required By Contract

If you have agreed in a written contract, written agreement or permit that this insurance is primary and non-contributory with the additional insured's own insurance, this insurance is primary and we will not seek contribution from that other insurance.

Paragraphs (a) and (b) do not apply to other insurance to which the additional insured has been added as an additional insured.

When this insurance is excess, we will have no duty under this Coverage Part to defend the insured against any "suit" if any other insurer has a duty to defend the insured against that "suit". If no other insurer defends, we will undertake to do so, but we will be entitled to the insured's rights against all those other insurers.

When this insurance is excess over other insurance, we will pay only our share of the amount of the loss, if any, that exceeds the sum of:

- (1) The total amount that all such other insurance would pay for the loss in the absence of this insurance; and
- (2) The total of all deductible and self-insured amounts under all that other insurance.

We will share the remaining loss, if any, with any other insurance that is not described in this Excess Insurance provision and was not bought specifically to apply in excess of the Limits of Insurance shown in the Declarations of this Coverage Part.

c. Method Of Sharing

If all the other insurance permits contribution by equal shares, we will follow this method also. Under this approach, each insurer contributes equal amounts until it has paid its applicable limit of insurance or none of the loss remains, whichever comes first.

If any of the other insurance does not permit contribution by equal shares, we will contribute by limits. Under this method, each insurer's share is based on the ratio of its applicable limit of insurance to the total applicable limits of insurance of all insurers.

8. Transfer Of Rights Of Recovery Against Others To Us**a. Transfer Of Rights Of Recovery**

If the insured has rights to recover all or part of any payment, including Supplementary Payments, we have made under this Coverage Part, those rights are transferred to us. The insured must do nothing after loss to impair them. At our request, the insured will bring "suit" or transfer those rights to us and help us enforce them. This condition does not apply to Medical Expenses Coverage.

b. Waiver Of Rights Of Recovery (Waiver Of Subrogation)

If the insured has waived any rights of recovery against any person or organization for all or part of any payment, including Supplementary Payments, we have made under this Coverage Part, we also waive that right, provided the insured waived their rights of recovery against such person or organization in a contract, agreement or permit that was executed prior to the injury or damage.

F. OPTIONAL ADDITIONAL INSURED COVERAGES

If listed or shown as applicable in the Declarations, one or more of the following Optional Additional Insured Coverages also apply. When any of these Optional Additional Insured Coverages apply, Paragraph 6. (Additional Insureds When Required by Written Contract, Written Agreement or Permit) of Section C., Who Is An Insured, does not apply to the person or organization shown in the Declarations. These coverages are subject to the terms and conditions applicable to Business Liability Coverage in this policy, except as provided below:

1. Additional Insured - Designated Person Or Organization

WHO IS AN INSURED under Section C. is amended to include as an additional insured the person(s) or organization(s) shown in the Declarations, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your acts or omissions or the acts or omissions of those acting on your behalf:

- a. In the performance of your ongoing operations; or
- b. In connection with your premises owned by or rented to you.

2. Additional Insured - Managers Or Lessors Of Premises

- a. WHO IS AN INSURED under Section C. is amended to include as an additional insured the person(s) or organization(s) shown in the Declarations as an Additional Insured - Designated Person Or Organization; but only with respect to liability arising out of the ownership, maintenance or use of that part of the premises leased to you and shown in the Declarations.

- b. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

- (1) Any "occurrence" which takes place after you cease to be a tenant in that premises; or
- (2) Structural alterations, new construction or demolition operations performed by or on behalf of such person or organization.

3. Additional Insured - Grantor Of Franchise

WHO IS AN INSURED under Section C. is amended to include as an additional insured the person(s) or organization(s) shown in the Declarations as an Additional Insured - Grantor Of Franchise, but only with respect to their liability as grantor of franchise to you.

4. Additional Insured - Lessor Of Leased Equipment

- a. WHO IS AN INSURED under Section C. is amended to include as an additional insured the person(s) or organization(s) shown in the Declarations as an Additional Insured - Lessor of Leased Equipment, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your maintenance, operation or use of equipment leased to you by such person(s) or organization(s).

- b. With respect to the insurance afforded to these additional insureds, this insurance does not apply to any "occurrence" which takes place after you cease to lease that equipment.

5. Additional Insured - Owners Or Other Interests From Whom Land Has Been Leased

- a. WHO IS AN INSURED under Section C. is amended to include as an additional insured the person(s) or organization(s) shown in the Declarations as an Additional Insured - Owners Or Other Interests From Whom Land Has Been Leased, but only with respect to liability arising out of the ownership, maintenance or use of that part of the land leased to you and shown in the Declarations.

- b. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

- (1) Any "occurrence" that takes place after you cease to lease that land; or
- (2) Structural alterations, new construction or demolition operations performed by or on behalf of such person or organization.

6. Additional Insured - State Or Political Subdivision - Permits

- a. WHO IS AN INSURED under Section C. is amended to include as an additional insured the state or political subdivision shown in the Declarations as an Additional

Insured – State Or Political Subdivision - Permits, but only with respect to operations performed by you or on your behalf for which the state or political subdivision has issued a permit.

- b. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

- (1) "Bodily injury", "property damage" or "personal and advertising injury" arising out of operations performed for the state or municipality; or
- (2) "Bodily injury" or "property damage" included in the "product-completed operations" hazard.

7. Additional Insured – Vendors

- a. WHO IS AN INSURED under Section C. is amended to include as an additional insured the person(s) or organization(s) (referred to below as vendor) shown in the Declarations as an Additional Insured - Vendor, but only with respect to "bodily injury" or "property damage" arising out of "your products" which are distributed or sold in the regular course of the vendor's business and only if this Coverage Part provides coverage for "bodily injury" or "property damage" included within the "products-completed operations hazard".
- b. The insurance afforded to the vendor is subject to the following additional exclusions:

- (1) This insurance does not apply to:
 - (a) "Bodily injury" or "property damage" for which the vendor is obligated to pay damages by reason of the assumption of liability in a contract or agreement. This exclusion does not apply to liability for damages that the vendor would have in the absence of the contract or agreement;
 - (b) Any express warranty unauthorized by you;
 - (c) Any physical or chemical change in the product made intentionally by the vendor;
 - (d) Repackaging, unless unpacked solely for the purpose of inspection, demonstration, testing, or the substitution of parts under instructions from the manufacturer, and then repackaged in the original container;

- (e) Any failure to make such inspections, adjustments, tests or servicing as the vendor has agreed to make or normally undertakes to make in the usual course of business, in connection with the distribution or sale of the products;

- (f) Demonstration, installation, servicing or repair operations, except such operations performed at the vendor's premises in connection with the sale of the product;

- (g) Products which, after distribution or sale by you, have been labeled or relabeled or used as a container, part or ingredient of any other thing or substance by or for the vendor; or

- (h) "Bodily injury" or "property damage" arising out of the sole negligence of the vendor for its own acts or omissions or those of its employees or anyone else acting on its behalf. However, this exclusion does not apply to:

- (i) The exceptions contained in Subparagraphs (d) or (f); or

- (ii) Such inspections, adjustments, tests or servicing as the vendor has agreed to make or normally undertakes to make in the usual course of business, in connection with the distribution or sale of the products.

- (2) This insurance does not apply to any insured person or organization from whom you have acquired such products, or any ingredient, part or container, entering into, accompanying or containing such products.

8. Additional Insured – Controlling Interest

WHO IS AN INSURED under Section C. is amended to include as an additional insured the person(s) or organization(s) shown in the Declarations as an Additional Insured – Controlling Interest, but only with respect to their liability arising out of:

- a. Their financial control of you; or
- b. Premises they own, maintain or control while you lease or occupy these premises.

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This insurance does not apply to structural alterations, new construction and demolition operations performed by or for that person or organization.

9. Additional Insured – Owners, Lessees Or Contractors – Scheduled Person Or Organization

a. WHO IS AN INSURED under Section C. is amended to include as an additional insured the person(s) or organization(s) shown in the Declarations as an Additional Insured – Owner, Lessees Or Contractors, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by your acts or omissions or the acts or omissions of those acting on your behalf:

- (1) In the performance of your ongoing operations for the additional insured(s); or
- (2) In connection with "your work" performed for that additional insured and included within the "products-completed operations hazard", but only if this Coverage Part provides coverage for "bodily injury" or "property damage" included within the "products-completed operations hazard".

b. With respect to the insurance afforded to these additional insureds, this insurance does not apply to "bodily injury", "property damage" or "personal an advertising injury" arising out of the rendering of, or the failure to render, any professional architectural, engineering or surveying services, including:

- (1) The preparing, approving, or failure to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders, designs or drawings and specifications; or
- (2) Supervisory, inspection, architectural or engineering activities.

10. Additional Insured – Co-Owner Of Insured Premises

WHO IS AN INSURED under Section C. is amended to include as an additional insured the person(s) or Organization(s) shown in the Declarations as an Additional Insured – Co-Owner Of Insured Premises, but only with respect to their liability as co-owner of the premises shown in the Declarations.

The limits of insurance that apply to additional insureds are described in Section D. – Limits Of Insurance.

How this insurance applies when other insurance is available to an additional insured is described in the Other Insurance Condition in Section E. – Liability And Medical Expenses General Conditions.

G. LIABILITY AND MEDICAL EXPENSES DEFINITIONS

1. "Advertisement" means the widespread public dissemination of information or images that has the purpose of inducing the sale of goods, products or services through:

- a. (1) Radio;
- (2) Television;
- (3) Billboard;
- (4) Magazine;
- (5) Newspaper;

b. The Internet, but only that part of a web site that is about goods, products or services for the purposes of inducing the sale of goods, products or services; or

c. Any other publication that is given widespread public distribution.

However, "advertisement" does not include:

- a. The design, printed material, information or images contained in, on or upon the packaging or labeling of any goods or products; or
- b. An interactive conversation between or among persons through a computer network.

2. "Advertising idea" means any idea for an "advertisement".

3. "Asbestos hazard" means an exposure or threat of exposure to the actual or alleged properties of asbestos and includes the mere presence of asbestos in any form.

4. "Auto" means a land motor vehicle, trailer or semi-trailer designed for travel on public roads, including any attached machinery or equipment. But "auto" does not include "mobile equipment".

5. "Bodily injury" means physical:

- a. Injury;
- b. Sickness; or
- c. Disease

sustained by a person and, if arising out of the above, mental anguish or death at any time.

6. "Coverage territory" means:

- a. The United States of America (including its territories and possessions), Puerto Rico and Canada;
- b. International waters or airspace, but only if the injury or damage occurs in the course of travel or transportation between any places included in a. above;
- c. All other parts of the world if the injury or damage arises out of:
 - (1) Goods or products made or sold by you in the territory described in a. above;
 - (2) The activities of a person whose home is in the territory described in a. above, but is away for a short time on your business; or
 - (3) "Personal and advertising injury" offenses that take place through the Internet or similar electronic means of communication

provided the insured's responsibility to pay damages is determined in the United States of America (including its territories and possessions), Puerto Rico or Canada, in a "suit" on the merits according to the substantive law in such territory, or in a settlement we agree to.

- 7. "Electronic data" means information, facts or programs:
 - a. Stored as or on;
 - b. Created or used on; or
 - c. Transmitted to or from computer software, including systems and applications software, hard or floppy disks, CD-ROMS, tapes, drives, cells, data processing devices or any other media which are used with electronically controlled equipment.
- 8. "Employee" includes a "leased worker". "Employee" does not include a "temporary worker".
- 9. "Executive officer" means a person holding any of the officer positions created by your charter, constitution, by-laws or any other similar governing document.
- 10. "Hostile fire" means one which becomes uncontrollable or breaks out from where it was intended to be.
- 11. "Impaired property" means tangible property, other than "your product" or "your work", that cannot be used or is less useful because:
 - a. It incorporates "your product" or "your work" that is known or thought to be defective, deficient, inadequate or dangerous; or

- b. You have failed to fulfill the terms of a contract or agreement;

if such property can be restored to use by:

- a. The repair, replacement, adjustment or removal of "your product" or "your work"; or
- b. Your fulfilling the terms of the contract or agreement.

12. "Insured contract" means:

- a. A contract for a lease of premises. However, that portion of the contract for a lease of premises that indemnifies any person or organization for damage by fire, lightning or explosion to premises while rented to you or temporarily occupied by you with permission of the owner is subject to the Damage To Premises Rented To You limit described in Section D. – Liability and Medical Expenses Limits of Insurance.
- b. A sidetrack agreement;
- c. Any easement or license agreement, including an easement or license agreement in connection with construction or demolition operations on or within 50 feet of a railroad;
- d. Any obligation, as required by ordinance, to indemnify a municipality, except in connection with work for a municipality;
- e. An elevator maintenance agreement; or
- f. That part of any other contract or agreement pertaining to your business (including an indemnification of a municipality in connection with work performed for a municipality) under which you assume the tort liability of another party to pay for "bodily injury" or "property damage" to a third person or organization, provided the "bodily injury" or "property damage" is caused, in whole or in part, by you or by those acting on your behalf. Tort liability means a liability that would be imposed by law in the absence of any contract or agreement.

Paragraph f. includes that part of any contract or agreement that indemnifies a railroad for "bodily injury" or "property damage" arising out of construction or demolition operations within 50 feet of any railroad property and affecting any railroad bridge or trestle, tracks, road-beds, tunnel, underpass or crossing.

However, Paragraph f. does not include that part of any contract or agreement:

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- (1) That indemnifies an architect, engineer or surveyor for injury or damage arising out of:
 - (a) Preparing, approving or failing to prepare or approve maps, shop drawings, opinions, reports, surveys, field orders, change orders, designs or drawings and specifications; or
 - (b) Giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage; or
 - (2) Under which the insured, if an architect, engineer or surveyor, assumes liability for an injury or damage arising out of the insured's rendering or failure to render professional services, including those listed in (1) above and supervisory, inspection, architectural or engineering activities.
13. "Leased worker" means a person leased to you by a labor leasing firm under an agreement between you and the labor leasing firm, to perform duties related to the conduct of your business. "Leased worker" does not include a "temporary worker".
14. "Loading or unloading" means the handling of property:
- a. After it is moved from the place where it is accepted for movement into or onto an aircraft, watercraft or "auto";
 - b. While it is in or on an aircraft, watercraft or "auto"; or
 - c. While it is being moved from an aircraft, watercraft or "auto" to the place where it is finally delivered;
- but "loading or unloading" does not include the movement of property by means of a mechanical device, other than a hand truck, that is not attached to the aircraft, watercraft or "auto".
15. "Mobile equipment" means any of the following types of land vehicles, including any attached machinery or equipment:
- a. Bulldozers, farm machinery, forklifts and other vehicles designed for use principally off public roads;
 - b. Vehicles maintained for use solely on or next to premises you own or rent;
 - c. Vehicles that travel on crawler treads;
 - d. Vehicles, whether self-propelled or not, on which are permanently mounted:
- (1) Power cranes, shovels, loaders, diggers or drills; or
 - (2) Road construction or resurfacing equipment such as graders, scrapers or rollers;
- e. Vehicles not described in a., b., c., or d. above that are not self-propelled and are maintained primarily to provide mobility to permanently attached equipment of the following types:
- (1) Air compressors, pumps and generators, including spraying, welding, building cleaning, geophysical exploration, lighting and well servicing equipment; or
 - (2) Cherry pickers and similar devices used to raise or lower workers;
- f. Vehicles not described in a., b., c., or d. above maintained primarily for purposes other than the transportation of persons or cargo.
- However, self-propelled vehicles with the following types of permanently attached equipment are not "mobile equipment" but will be considered "autos":
- (1) Equipment, of at least 1,000 pounds gross vehicle weight, designed primarily for:
 - (a) Snow removal;
 - (b) Road maintenance, but not construction or resurfacing; or
 - (c) Street cleaning;
 - (2) Cherry pickers and similar devices mounted on automobile or truck chassis and used to raise or lower workers; and
 - (3) Air compressors, pumps and generators, including spraying, welding, building cleaning, geophysical exploration, lighting and well servicing equipment.
16. "Occurrence" means an accident, including continuous or repeated exposure to substantially the same general harmful conditions.
17. "Personal and advertising injury" means injury, including consequential "bodily injury", arising out of one or more of the following offenses:
- a. False arrest, detention or imprisonment;
 - b. Malicious prosecution;

- c. The wrongful eviction from, wrongful entry into, or invasion of the right of private occupancy of a room, dwelling or premises that the person occupies, committed by or on behalf of its owner, landlord or lessor;
 - d. Oral, written or electronic publication of material that slanders or libels a person or organization or disparages a person's or organization's goods, products or services;
 - e. Oral, written or electronic publication of material that violates a person's right of privacy;
 - f. Copying, in your "advertisement", a person's or organization's "advertising idea" or style of "advertisement";
 - g. Infringement of copyright, slogan, or title of any literary or artistic work, in your "advertisement"; or
 - h. Discrimination or humiliation that results in injury to the feelings or reputation of a natural person.
18. "Pollutants" means any solid, liquid, gaseous or thermal irritant or contaminant, including smoke, vapor, soot, fumes, acids, alkalis, chemicals and waste. Waste includes materials to be recycled, reconditioned or reclaimed.
19. "Products-completed operations hazard";
- a. Includes all "bodily injury" and "property damage" occurring away from premises you own or rent and arising out of "your product" or "your work" except:
 - (1) Products that are still in your physical possession; or
 - (2) Work that has not yet been completed or abandoned. However, "your work" will be deemed to be completed at the earliest of the following times:
 - (a) When all of the work called for in your contract has been completed.
 - (b) When all of the work to be done at the job site has been completed if your contract calls for work at more than one job site.
 - (c) When that part of the work done at a job site has been put to its intended use by any person or organization other than another contractor or subcontractor working on the same project.

Work that may need service, maintenance, correction, repair or replacement, but which is otherwise complete, will be treated as completed.

The "bodily injury" or "property damage" must occur away from premises you own or rent, unless your business includes the selling, handling or distribution of "your product" for consumption on premises you own or rent.

- b. Does not include "bodily injury" or "property damage" arising out of:
 - (1) The transportation of property, unless the injury or damage arises out of a condition in or on a vehicle not owned or operated by you, and that condition was created by the "loading or unloading" of that vehicle by any insured; or
 - (2) The existence of tools, uninstalled equipment or abandoned or unused materials.
20. "Property damage" means:
- a. Physical injury to tangible property, including all resulting loss of use of that property. All such loss of use shall be deemed to occur at the time of the physical injury that caused it; or
 - b. Loss of use of tangible property that is not physically injured. All such loss of use shall be deemed to occur at the time of "occurrence" that caused it.
- As used in this definition, "electronic data" is not tangible property.
21. "Suit" means a civil proceeding in which damages because of "bodily injury", "property damage" or "personal and advertising injury" to which this insurance applies are alleged. "Suit" includes:
- a. An arbitration proceeding in which such damages are claimed and to which the insured must submit or does submit with our consent; or
 - b. Any other alternative dispute resolution proceeding in which such damages are claimed and to which the insured submits with our consent.
22. "Temporary worker" means a person who is furnished to you to substitute for a permanent "employee" on leave or to meet seasonal or short-term workload conditions.
23. "Volunteer worker" means a person who:
- a. Is not your "employee";

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- b. Donates his or her work;
- c. Acts at the direction of and within the scope of duties determined by you; and
- d. Is not paid a fee, salary or other compensation by you or anyone else for their work performed for you.

24. "Your product":

a. Means:

- (1) Any goods or products, other than real property, manufactured, sold, handled, distributed or disposed of by:
 - (a) You;
 - (b) Others trading under your name; or
 - (c) A person or organization whose business or assets you have acquired; and
- (2) Containers (other than vehicles), materials, parts or equipment furnished in connection with such goods or products.

b. Includes:

- (1) Warranties or representations made at any time with respect to the fitness, quality, durability, performance or use of "your product"; and

- (2) The providing of or failure to provide warnings or instructions.

- c. Does not include vending machines or other property rented to or located for the use of others but not sold.

25. "Your work":

a. Means:

- (1) Work or operations performed by you or on your behalf; and
- (2) Materials, parts or equipment furnished in connection with such work or operations.

b. Includes:

- (1) Warranties or representations made at any time with respect to the fitness, quality, durability, performance or use of "your work"; and
- (2) The providing of or failure to provide warnings or instructions.