



DEFENSE INFORMATION SYSTEMS AGENCY

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IN REPLY
REFER TO: Joint Interoperability Test Command (JTE)

20 Nov 12

SUBJECT: Extension of the Special Interoperability Test Certification of the Cisco Catalyst 6500E series Switch Release 15.0(1)SY1

- References:
- (a) Department of Defense Directive 4630.05, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 5 May 2004.
 - (b) Chairman, Joint Chiefs of Staff Instruction 6212.01E, "Interoperability and Supportability of Information Technology and National Security Systems," 15 December 2008.
 - (c) through (e), see Enclosure 1.

1. References (a) and (b) establish the Defense Information Systems Agency (DISA), Joint Interoperability Test Command (JITC), as the responsible organization for interoperability (IO) test certification.

2. The Cisco WS-C6509-E Switch Release 15.0(1)SY1 is hereinafter referred to as the system under test (SUT). The SUT meets all of its critical IO requirements and is certified for joint use within the Defense Information System Network (DISN) as an Assured Services Local Area Network (ASLAN) Core, Distribution, and Layer 2/Layer 3 Access switch. The SUT was also tested for Multiprotocol Label Switching (MPLS) and is certified for Layer 2 and Layer 3 Virtual Private Networks (VPNs). However, there are restrictions on the SUT functioning as a Core switch, Distribution switch, and MPLS router. These restrictions are discussed in the following tables within this memorandum. The SUT is certified as interoperable for joint use with other ASLAN components listed on the Unified Capabilities (UC) Approved Products List (APL) with the following interfaces: 10/100/1000BaseT and 100/1000BaseX for access, 1000BaseT and 1000/10000BaseX for uplink. All of these interfaces were tested with the exception of the 10BaseT interface. JITC analysis determined that the 10BaseT interface is a low risk for certification based on the vendor's Letter of Compliance (LoC) to comply with the Institute of Electrical and Electronics Engineers (IEEE) 802.3i standard and the testing data collected at all other data rates. The SUT meets the critical interoperability requirements set forth in Reference (c), using test procedures derived from Reference (d). The Cisco WS-C6503-E, WS-C6504-E, WS-C6506-E, and WS-C6513-E switches employ the same software and similar hardware as the SUT. JITC analysis determined these systems to be functionally identical to the SUT for IO certification purposes, and they are also certified for joint use.

The SUT is certified to support Assured Services within an ASLAN. If a component meets the minimum requirements for deployment in an ASLAN, it also meets the lesser requirements for deployment in a non-ASLAN. Non-ASLANs are "commercial grade" and provide support to Command and Control (C2) (ROUTINE only calls) (C2(R)) or non-C2 voice subscribers. When deployed in a non-ASLAN, the SUT may also be used to receive all levels of precedence, but is limited to supporting calls that are originated at ROUTINE precedence only. Non-ASLANs do

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not meet the availability or redundancy requirements for C2 or Special C2 users and therefore are not authorized to support precedence calls originated above ROUTINE.

Testing of the SUT did not include video services or data applications; however, simulated video traffic, preferred data, and best effort data were generated during testing to determine the SUT's ability to prioritize and properly queue voice media and signaling traffic. No other configurations, features, or functions, except those cited within this document, are certified by JITC. This certification expires upon changes that affect IO but no later than three years from the date of the UC APL memorandum.

3. The extension of this certification is based on Desktop Review (DTR) 1. The original certification is based on interoperability testing conducted by the United States Army Information Systems Engineering Command (USAISEC), Technology Integration Center's (TIC) review of the vendor's LoC, DISA adjudication of open test discrepancy reports (TDRs), and the DISA Certifying Authority (CA) Recommendation. The IO testing was conducted by the USAISEC TIC, Fort Huachuca, Arizona, from 13 February through 16 March 2012. Review of the vendor's LoC was completed on 8 May 2012. The DISA adjudication of outstanding TDRs was completed on 10 July 2012. The DISA CA provided a positive recommendation on 8 June 2012, based on the security testing completed by USAISEC TIC-led information assurance (IA) test teams. Those test results are published in a separate report, Reference (e). This DTR1 request included the addition of Multiprotocol Label Switching (MPLS). JITC determined Verification and Validation (V&V) testing of MPLS was required prior to approval. V&V interoperability testing of the changes associated with this DTR was successfully conducted from 30 July through 7 September 2012. The SUT met all critical requirements for MPLS. DISA adjudicated all open discrepancies as minor on 23 October 2012; therefore JITC approves this DTR. The IA posture of this DTR did not change; therefore, the DISA CA approval date of 8 June 2012 remains the same.

4. Table 1 provides a UC APL product summary. Table 2 provides the SUT interface IO status and Table 3 provides the Capability Requirements (CRs) and Functional Requirements (FRs) status. The threshold CRs/FRs for ASLAN components are established by Section 5.3.a of Reference (c) and were used to evaluate the IO of the SUT. Figure 2 depicts the MPLS heterogeneous test configuration of the SUT with Juniper.

Table 1. UC APL Product Summary

Component ¹	Release	Sub-Component ¹	Certification Applicability		
			Core	Distribution	Access
<u>WS-C6509-E</u>	IOS 15.0(1)SY1	<u>VS-S2T-10G-XL, WS-X6908-10G-2TXL, WS-X6848-SFP-2TXL, WS-X6848-TX-2TXL, WS-X6816-10G-2TXL², WS-X6704-10GE, WS-X6148A-GE-45AF³, VS-S2T-10G, WS-X6908-10G-2T, WS-X6848-SFP-2T, WS-X6824-SFP-2TXL, WS-X6824-SFP-2T, WS-X6848-TX-2T, WS-X6816-10G-2T², WS-X6816-10T-2TXL², WS-X6816-10T-2T², WS-X6148A-GE-TX³, WS-X6148A-RJ-45, WS-X6148E-GE-AT³, WS-X6148-FE-SFP⁴, WS-X6748-SFP⁴, WS-X6724-SFP⁴, WS-X6748-GE-TX⁴, WS-X6716-10G-3CXL^{2,4}, WS-X6716-10G-3C^{2,4}, WS-X6716-10T-3CXL^{2,4}, WS-X6716-10T-3C^{2,4}</u>	Yes	Yes	Yes
WS-C6503-E					
WS-C6504-E					
WS-C6506-E					
WS-C6513-E					

NOTES:

1. Components bolded and underlined were tested by the USAISEC TIC. The other components in the family series were not tested; however, they utilize the same OS software and similar hardware. JITC analysis determined them to be functionally identical for IO certification purposes and they are also certified for joint use.
2. The SUT complies with the Non-blocking requirement in the Performance Parameters IAW UCR 2008, Change 3, Section 5.3.1.3, Paragraph 1 and the QoS blocking factor features IAW UCR 2008, Change 3, Section 5.3.1.3.6, Paragraph 5b as an Access switch in all modes of operation for all modules listed in Table 1. However, the SUT only complies with these requirements for Core and Distribution in the "Performance Mode" (see deployment guide) with the following modules: WS-X6816-10G-2TXL, WS-X6816-10G-2T, WS-X6816-10T-2TXL, WS-X6816-10T-2T, WS-X6716-10G-3CXL, WS-X6716-10G-3C, WS-X6716-10T-3CXL, and WS-X6716-10T-3C. DISA adjudicated this limitation on use of these modules with the SUT as minor. Configuring the SUT as a Core or Distribution layer switch with these modules in the "Default Mode" or "Oversubscription Mode" would have a critical impact on operations and therefore the SUT is not certified for use on the DISN as a Core or Distribution switch with the above modules in either the "Default" or "Oversubscription" mode of operation.
3. The SUT does not comply with the Non-blocking requirement in the Performance Parameters IAW UCR 2008, Change 3, Section 5.3.1.3, Paragraph 1 and the QoS blocking factor features IAW UCR 2008, Change 3, Section 5.3.1.3.6, Paragraph 5b for the following modules: WS-X6148A-GE-45AF, WSX-6148A-GE-TX, and WS-X6148E-GE-AT. DISA adjudicated this discrepancy as critical and none of these modules are certified for use in the Core and Distribution layers. These modules are 8:1 Non-blocking when configured at 1 Gbps and 2:1 Non-blocking when configured at 100 Mbps for all 48 interfaces. These modules are approved for use in the Access layer only.
4. These modules are certified based upon test data collected during previous ASLAN certification test events, no changes to modules or hardware and no changes to the requirements since modules were last tested and certified.

LEGEND:

APL	Approved Products List	Mbps	Megabits Per Second
ASLAN	Assured Services Local Area Network	OS	Operating System
DISA	Defense Information Systems Agency	QoS	Quality of Service
Gbps	Gigabits Per Second	SUT	System Under Test
IAW	In Accordance With	TIC	Technology Integration Center
IO	Interoperability	UC	Unified Capabilities
IOS	Internetworking Operating System	UCR	Unified Capabilities Requirements
JITC	Joint Interoperability Test Command	USAISEC	U.S. Army Information Systems Engineering Command

Table 2. SUT Interface Interoperability Status

Interface	Applicability			UCR 2008, Change 3 Reference	Threshold CR/FR ¹	Status	Remarks
	Co	D	A				
Serial	C	C	C	5.3.1.3.9	1-4	Certified	The SUT met the CRs and FRs with the following standard: EIA-232.
10Base-X	C	C	C ²	5.3.1.3.1	1-6	Certified ³	The SUT met CRs and FRs with the following IEEE standard: 802.3i (10BaseT).
100Base-X	R	R	C ²	5.3.1.3.1	1-6	Certified	The SUT met CRs and FRs with the following IEEE standard: 802.3u (100BaseT).
1000Base-X	R	R	C ²	5.3.1.3.1	1-6	Certified	The SUT met CR and FRs with the following IEEE standards: 802.3ab (1000BaseT), 802.3z (1000Base-SX, 1000Base-LX).
10000Base-X	C	C	C	5.3.1.3.1	1-6	Certified	The SUT met CRs and FRs with the following IEEE standard: 802.3ae (10GBase-SR, 10GBase-LR).
802.11a	C	C	C	5.3.1.3.1/5.3.1.7.2	1-6	Not Supported ⁴	N/A
802.11b	C	C	C	5.3.1.3.1/5.3.1.7.2	1-6	Not Supported ⁴	N/A
802.11g	C	C	C	5.3.1.3.1/5.3.1.7.2	1-6	Not Supported ⁴	N/A
802.11n	C	C	C	5.3.1.3.1/5.3.1.7.2	1-6	Not Supported ⁴	N/A
802.16	C	C	C	5.3.1.3.1/5.3.1.7.2	1-6	Not Supported ⁴	N/A

NOTES:

- The SUT high-level CR and FR ID numbers depicted in the Threshold CRs/FRs column can be cross-referenced in Table 3. These high-level CR/FR requirements refer to a detailed list of requirements provided in Enclosure 3.
- Core and Distribution products must minimally support 100Base-X (802.3u) and 1000Base-X (802.3z). Access products must minimally support one of the following standards: 802.3i (10BaseT), 802.3j (10BaseF), 802.3u (100BaseT/F), 802.3z (1000BaseF), or 802.3ab (1000BaseT). Other rates and standards may be provided as conditional interfaces.
- The USAISEC TIC tested all these interfaces with the exception of the 10BaseT interface. JITC analysis determined that the 10BaseT interface is a low risk for certification based on the vendor's LoC to the IEEE 802.3i and the testing data collected at all other data rates.
- The SUT does not support this interface. This interface is not required for a Core, Distribution, or Access switch.

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Table 2. SUT Interface Interoperability Status (continued)

LEGEND:			
802.3ab	1000BaseT Gbps Ethernet Over Twisted Pair at 1Gbps (125 Mbps)	A	Access
		C	Conditional
802.3ae	10 Gbps Ethernet	Co	Core
802.3i	10BaseT Mbps Over Twisted Pair	CR	Capability Requirement
802.3j	10 Mbps Over Fiber	D	Distribution
802.3u	Standard for Carrier Sense Multiple Access with Collision Detection at 100 Mbps	EIA	Electronic Industries Alliance
		EIA-232	Standard for Defining the Mechanical and Electrical Characteristics for Connecting Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE)
802.3z	Gigabit Ethernet Standard		
802.11/16	IEEE Wireless Standards		
10BaseF	10 Mbps Ethernet Over Fiber		
10BaseT	10 Mbps (Baseband Operation, Twisted Pair) Ethernet	FR	Functional Requirement
		Gbps	Gigabits Per Second
10Base-X	10 Mbps Ethernet Over Fiber or Copper	ID	Identification
100BaseF	100 Mbps Ethernet Over Fiber	IEEE	Institute of Electrical and Electronics Engineers
100BaseT	100 Mbps (Baseband Operation, Twisted Pair) Ethernet	JITC	Joint Interoperability Test Command
		LoC	Letter of Compliance
100Base-X	100 Mbps Ethernet Over Fiber or Copper	LR	Long Range Optics
1000BaseF	1000 Mbps Ethernet Over Fiber	LX	Single-Mode Fiber Optics
1000Base-LX	1000 Mbps Ethernet Over Fiber	Mbps	Megabits Per Second
1000Base-SX	1000 Mbps Ethernet Over Fiber	N/A	Not Applicable
1000BaseT	1000 Mbps (Baseband Operation, Twisted Pair) Ethernet	R	Required
		SR	Short Range Optics
1000Base-X	1000 Mbps Ethernet Over Fiber or Copper	SX	Multi-Mode Fiber Optics
10000Base-X	10000 Mbps Ethernet Over Fiber or Copper	SUT	System Under Test
10GBase-LR	10000 Mbps Ethernet Over Fiber	TIC	Technology Integration Center
10GBase-SR	10000 Mbps Ethernet Over Fiber	UCR	Unified Capabilities Requirements
		USAISEC	U.S. Army Information Systems Engineering Command

Table 3. SUT CRs and FRs Status

CR/FR ID	Capability/Function	Applicability ¹	UCR 2008, Change 3 Reference	Status	Remarks
1	General Performance Parameters				
	Performance Parameters	Required	5.3.1.3	Partially Met ²	
	Port Interface Rates	Required	5.3.1.3.1	Met	
	Port Parameter Requirements	Required	5.3.1.3.2	Met	
	Class of Service Markings	Required	5.3.1.3.3	Met	
	VLAN Capabilities	Required	5.3.1.3.4	Met	
	Protocols	Required	5.3.1.3.5	Partially Met ³	
	QoS Features	Required	5.3.1.3.6	Partially Met ²	
2	E2E Performance Requirements				
	Voice Services	Required	5.3.1.4.1	Met ⁴	
	Video Services	Required	5.3.1.4.2	Met ⁴	
3	NM Requirements				
	Configuration Control	Required	5.3.1.6.1	Met	
	Operational Changes	Required	5.3.1.6.2	Met	
	Performance Monitoring	Required	5.3.1.6.3	Met	
	Alarms	Required	5.3.1.6.4	Met	
4	Engineering Requirements				
	Physical Media	Required	5.3.1.7.1	Met ⁵	
	Wireless	Conditional	5.3.1.7.2	Not Tested ⁶	
	Traffic Engineering	Required	5.3.1.7.3	Met ⁵	
	Availability	Required	5.3.1.7.6	Met ⁵	
	Redundancy	Required	5.3.1.7.7	Met ⁵	
5	MPLS				
	MPLS Requirements	Conditional	5.3.1.8.4.1	Partially Met ⁷	
6	IPv6 Requirements				
	Product Requirements	Required	5.3.5.4	Partially Met ³	

Table 3. SUT CRs and FRs Status (continued)

NOTES:

1. The annotation of 'required' refers to a high-level requirement category. The applicability of each sub-requirement is provided in Enclosure 3. The SUT does not need to provide conditional requirements. However, if a capability is provided, it must function according to the specified requirements.
2. The SUT complies with the Non-blocking requirement in the Performance Parameters IAW UCR 2008, Change 3, Section 5.3.1.3, Paragraph 1 and the QoS blocking factor features IAW UCR 2008, Change 3, Section 5.3.1.3.6, Paragraph 5b as an Access switch in all modes of operation for all modules listed in Table 1. However, the SUT only complies with these requirement for Core and Distribution in the "Performance Mode" (see deployment guide) with the following modules: WS-X6816-10G-2TXL, WS-X6816-10G-2T, WS-X6816-10T-2TXL, WS-X6816-10T-2T, WS-X6716-10G-3CXL, WS-X6716-10G-3C, WS-X6716-10T-3CXL, and WS-X6716-10T-3C. DISA adjudicated this limitation on use of these modules with the SUT as minor. Configuring the SUT as a Core or Distribution layer switch with these modules in the "Default Mode" or "Oversubscription Mode" would have a critical impact on operations and therefore the SUT is not certified for use on the DISN as a Core or Distribution switch with the above modules in either the "Default" or "Oversubscription" mode of operation. The modules WS-X6148A-GE-45AF, WSX-6148A-GE-TX, and WS-X6148E-GE-AT are approved for use in the Access layer only. These modules are 8:1 Non-blocking when configured at 1 Gbps and 2:1 Non-blocking when configured at 100 Mbps for all 48 interfaces.
3. The SUT does not comply with the IPv6 Protocol RFC 5798. DISA NS has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor.
4. This requirement was verified and met using simulated voice, video, and data traffic in an operational emulated environment to meet E2E requirements. The SUT must be deployed IAW deployment guide and engineering guidelines in UCR 2008, Change 3, Section 5.3.1.4.
5. This requirement was met with the following stipulations: It is the site's responsibility to configure the SUT in a manner which meets the engineering requirements listed in Section 11.2 d. of Enclosure 2, and that it does not create a single point of failure which could impact more than 96 C2 users.
6. Wireless was not tested and is not certified for joint use. Wireless is conditional and, therefore, not required for a Core, Distribution, or Access switch.
7. The SUT met all the critical MPLS interoperability requirements with the following minor exceptions:
 - a. Pre-signaled LSP failover exceeded 50 milliseconds. This was adjudicated by DISA on 23 October 2012 as having a minor operational impact in DoD networks and the LSP failover requirement will change to "5 seconds" in future UCR documents (e.g. UCR 2013). DISA NS has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor.
 - b. The following MPLS RFCs that were either not met or partially met by the SUT were adjudicated by DISA on 23 October 2012 with having a minor operational impact based on vendors POA&M and the fact that the SUT tested interoperable with other MPLS vendors with no discrepancies associated with these RFCs shortcomings.
 - The SUT does not support RFC 3479. However, it does support RFC 3478. DISA NS has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor with the following condition of fielding must be met: The SUT must be deployed IAW RFC 3478, which is LDP with Graceful Restart enabled, in lieu of RFC 3479.
 - The SUT does not support RFC 4684. DISA NS has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor.

LEGEND:

BGP	Border Gateway Protocol	LSP	Label Switched Path
C2	Command and Control	Mbps	Megabits Per Second
CR	Capability Requirement	MPLS	Multiprotocol Label Switching
DISA	Defense Information Systems Agency	NM	Network Management
E2E	End-to-End	POA&M	Plan of Action and Milestones
FR	Functional Requirement	QoS	Quality of Service
Gbps	Gigabits Per Second	RFC	Request For Comment
IAW	In Accordance With	SUT	System Under Test
ID	Identification	UCR	Unified Capabilities Requirements
IOS	Internetworking Operating System	VLAN	Virtual Local Area Network
IPv6	Internet Protocol Version 6	VPLS	Virtual Private LAN Service
LDP	Label Distribution Protocol	VPN	Virtual Private Network

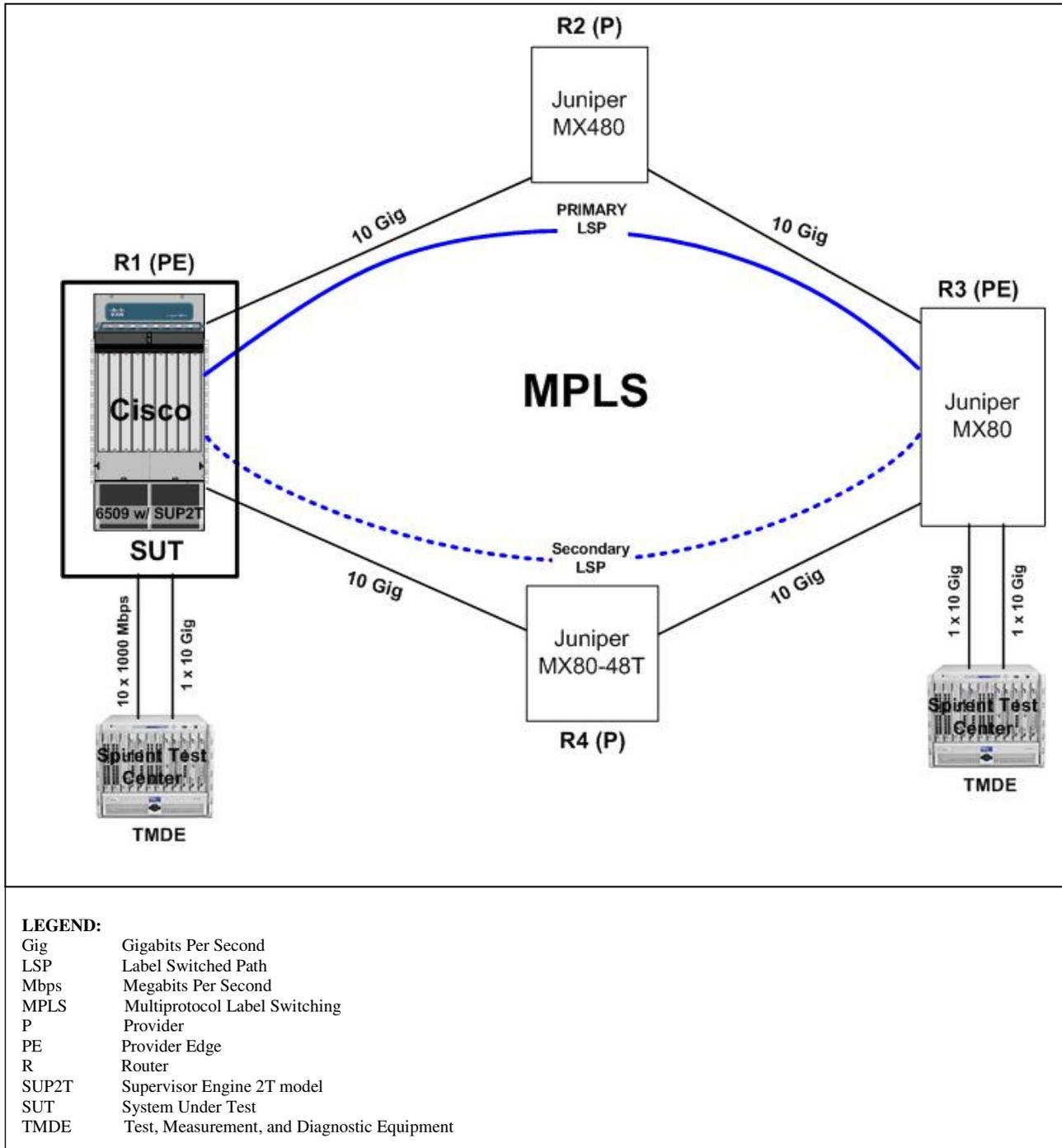


Figure 2-3. SUT Heterogeneous MPLS Test Configuration with Juniper

5. In accordance with the Program Manager’s request, no detailed test report was developed. JITC distributes IO information via the JITC Electronic Report Distribution (ERD) system, which uses Unclassified-But-Sensitive Internet Protocol Router Network (NIPRNet) e-mail. More comprehensive IO status information is available via the JITC System Tracking Program

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(STP), which STP is accessible by .mil/.gov users on the NIPRNet at <https://stp.fhu.disa.mil>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) NIPRNet at <http://jit.fhu.disa.mil>. Information related to DISN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>. All associated data is available on the DISA Unified Capability Coordination Office (UCCO) website located at <http://www.disa.mil/ucco/>. Due to the sensitivity of the information, the Information Assurance Accreditation Package (IAAP) that contains the approved configuration and deployment guide must be requested directly from U.S. Government civilian or uniformed military personnel at the UCCO; e-mail: disa.meade.ns.list.unified-capabilities-certification-office@mail.mil.

6. The testing point of contact Mr. James Hatch, DSN 821-2860, commercial (520) 533-2860, or email to james.d.hatch12.civ@mail.mil. The JITC point of contact is Ms. Anita Mananquil, DSN 879-5164, commercial (520) 538-5164, FAX DSN 879-4347, commercial (520) 538-4347, or e-mail to anita.l.mananquil.civ@mail.mil. JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The Tracking Number for the SUT is 1126904.

FOR THE COMMANDER:

Enclosure a/s


for BRADLEY A. CLARK
Acting Chief
Battlespace Communications Portfolio

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Defense Information Systems Agency, GS23

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ADDITIONAL REFERENCES

- (c) Office of the DoD Chief Information Officer, "Department of Defense Unified Capabilities Requirements 2008, Change 3," September 2011.
- (d) Joint Interoperability Test Command, "ASLAN Component Test Plan (UCTP)," February 2012.
- (e) U.S. Army Information Systems Engineering Command, Technology Integration Center (USAISEC TIC), "Information Assurance (IA) Assessment of Cisco 6509E (Tracking Number 1126904)," 1 June 2012.