



DEFENSE INFORMATION SYSTEMS AGENCY

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

15 Mar 13

SUBJECT: Extension of the Special Interoperability Test Certification of the Cisco Nexus 7000 series Switch Release from NX OS 6.0(1) to NX OS 6.1(3)

- 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 N7K-C7010 Switch Release NX OS 6.0(1) 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 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 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 N7K-C7018 and N7K-C7009 switches employ the same software and similar hardware as the SUT. JITC analysis determined these systems to be functionally identical to the SUT for interoperability 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

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limited to supporting calls that are originated at ROUTINE precedence only. Non-ASLANs do 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 JITC certification memorandum, 22 August 2012.

3. The extension of this certification is based on Desktop Review (DTR) 2. 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). DTR2 was requested to update the certified software release from NX OS 6.0(1) to NX OS 6.1(3) on the certification for the Nexus 7000. JITC determined there was minor risk in approving this DTR without further interoperability testing because this does not affect the interoperability results of this IO certification. DTR 2 has no impact on the approved IA posture, so the original CA approval date still applies. Therefore, JITC approves this DTR.

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.

Table 1. UC APL Product Summary

Component ¹	Release	Sub-Component ¹	Certification Applicability		
			Core	Distribution	Access
Cisco N7K-C7010	NX OS 6.0(1)	<u>N7K-SUP1, N7K-C7010-FAB-2, N7K-M148GT-11, N7K-M148GS-11, N7K-M148GS-11L, N7K-M108X2-12L, N7K-M132XP-12L^{2,3}, N7K-F132XP-15, N7K-F248XP-25, N7K-C7009-FAB-2, N7K-C7018-FAB-2, N7K-M148GT-11L, N7K-M132XP-12^{2,3,4}, N7K-C7010-FAB-1⁴, N7K-C7018-FAB-1⁴</u>	Yes	Yes	Yes
Cisco N7K-C7018					
Cisco N7K-C7009					

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Table 1. UC APL Product Summary (continued)

NOTE:	
<p>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.</p> <p>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 as an Access switch in all modes of operation for all modules listed in Table 1. However, the SUT only complies with this requirement for Core and Distribution in the “Performance Mode” (see deployment guide) with the following modules: N7K-M132XP-12L and N7K-M132XP-12. 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.</p> <p>3. The SUT complies with the QoS blocking factor features IAW the 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 this requirement for Core and Distribution in the “Performance Mode” (see deployment guide) with the following modules: N7K-M132-XP-12L and N7K-M132-XP-12. 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.</p> <p>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.</p>	
LEGEND:	
APL	Approved Products List
ASLAN	Assured Services Local Area Network
DISA	Defense Information Systems Agency
IAW	In Accordance With
IO	Interoperability
JITC	Joint Interoperability Test Command
NX	Nexus
OS	Operating System
QoS	Quality of Service
SUT	System Under Test
TIC	Technology Integration Center
UC	Unified Capabilities
UCR	Unified Capabilities Requirements
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

Table 2. SUT Interface Interoperability Status (continued)

NOTES:			
1. The SUT high-level CR and FR ID numbers depicted in the Threshold CRs/FRs column can be cross-referenced in Table 3.			
2. 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.			
3. 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.			
4. The SUT does not support this interface. This interface is not required for a Core, Distribution, or Access switch.			
LEGEND:			
802.3ab	1000BaseT Gbps Ethernet Over Twisted Pair at 1Gbps (125 Mbps)	A	Access
802.3ae	10 Gbps Ethernet	C	Conditional
802.3i	10BaseT Mbps Over Twisted Pair	Co	Core
802.3j	10 Mbps Over Fiber	CR	Capability Requirement
802.3u	Standard for Carrier Sense Multiple Access with Collision Detection at 100 Mbps	D	Distribution
802.3z	Gigabit Ethernet Standard	EIA	Electronic Industries Alliance
802.11/16	IEEE Wireless Standards	EIA-232	Standard for Defining the Mechanical and Electrical Characteristics for Connecting Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE)
10BaseF	10 Mbps Ethernet Over Fiber	FR	Functional Requirement
10BaseT	10 Mbps (Baseband Operation, Twisted Pair) Ethernet	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
100Base-X	100 Mbps Ethernet Over Fiber or Copper	LoC	Letter of Compliance
1000BaseF	1000 Mbps Ethernet Over Fiber	LR	Long Range Optics
1000Base-LX	1000 Mbps Ethernet Over Fiber	LX	Single-Mode Fiber Optics
1000Base-SX	1000 Mbps Ethernet Over Fiber	Mbps	Megabits Per Second
1000BaseT	1000 Mbps (Baseband Operation, Twisted Pair) Ethernet	N/A	Not Applicable
1000Base-X	1000 Mbps Ethernet Over Fiber or Copper	R	Required
10000Base-X	10000 Mbps Ethernet Over Fiber or Copper	SR	Short Range Optics
10GBase-LR	10000 Mbps Ethernet Over Fiber	SX	Multi-Mode Fiber Optics
10GBase-SR	10000 Mbps Ethernet Over Fiber	SUT	System Under Test
		TIC	Technology Integration Center
		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	Partially Met ³	
	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 ⁴	
	QoS Features	Required	5.3.1.3.6	Partially Met ⁵	
	Network Monitoring	Required	5.3.1.3.7	Met	
Security	Required	5.3.1.3.8	Met		
2	E2E Performance Requirements				
	Voice Services	Required	5.3.1.4.1	Met ⁶	
	Video Services	Required	5.3.1.4.2	Met ⁶	
	Data Services	Required	5.3.1.4.3	Met ⁶	
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	
Reporting	Required	5.3.1.6.5	Met		
4	Engineering Requirements				
	Physical Media	Required	5.3.1.7.1	Met ⁷	
	Wireless	Conditional	5.3.1.7.2	Not Tested ⁸	
	Traffic Engineering	Required	5.3.1.7.3	Met ⁷	
	Availability	Required	5.3.1.7.6	Met ⁷	
Redundancy	Required	5.3.1.7.7	Met ⁷		
5	MPLS				
	MPLS Requirements	Conditional	5.3.1.8.4.1	Partially Met ⁹	
	MPLS VPN Augmentation to VLANs	Conditional	5.3.1.8.4.2	Partially Met ⁹	
6	IPv6 Requirements				
	Product Requirements	Required	5.3.5.4	Partially Met ⁴	

Table 3. SUT CRs and FRs Status (continued)

NOTES:

1. The annotation of 'required' refers to a high-level requirement category. 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 as an Access switch in all modes of operation for all modules listed in Table 1. However, the SUT only complies with this requirement for Core and Distribution in the "Performance Mode" (see deployment guide) with the following modules: N7K-M132XP-12L and N7K-M132XP-12. 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 support the following Port Parameter Requirements: Link Layer Discovery – Media Endpoint Discovery IAW ANSI/TIA-1057, and Power over Ethernet IAW 802.3af or 802.3at-2009. DISA has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor. The Power over Ethernet is not supported because the SUT is designed as a Data Center switch. In addition, DISA determined this requirement will change to "optional" in future UCR documents (e.g. UCR 2013).
4. The SUT does not support the following Protocols RFCs: 2560, 3273, 4552, and 5798. DISA has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor. DoD sites deploying OSPFv3 should use ACLs to secure OSPF until RFC 4552 is supported
5. The SUT complies with 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 this requirement for Core and Distribution in the "Performance Mode" (see deployment guide) with the following modules: N7K-M132-XP-12L and N7K-M132-XP-12. 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.
6. 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.
7. 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 and that it does not create a single point of failure which could impact more than 96 C2 users.
8. 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.
9. The SUT met all the critical MPLS interoperability requirements with the following minor exceptions:
 - a. Pre-sigaled LSP L2VPN VPLS failover was not tested because the SUT does not support L2VPN VPLS. However, it does support L3VPN VPLS. This was adjudicated by DISA on 23 October 2012 as having a minor operational impact in DoD networks. DISA NS has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor with the following conditional of fielding must be met: The SUT must be configured for L3VPN when used as a Provider Edge device or as a Provider device when used in DoD ASLAN MPLS networks.
 - 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 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 conditional of fielding must be met: The SUT must be deployed IAW RFC 3478 which is LDP with Graceful Restart enable in lieu of RFC 3479.
 - The SUT does support RFC 4182. However, it does support RFC 3032. DISA NS has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor.
 - The SUT does support RFCs 4447 and 4448. DISA NS has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor.
 - The SUT does support RFC 4762 for MPLS L2VPN capability. However, it does support L3VPN with BGP. DISA NS has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor with the following conditional of fielding must be met: The SUT must be configured in L3VPN when used as a Provider Edge device or as a Provider device when used in DoD ASLAN MPLS networks.
 - The SUT does not support RFCs 4420, 5420, and 4874. However, it does support RFC 3209 in lieu of these RFCs. DISA NS has accepted and approved the vendor's POA&M and adjudicated this discrepancy as minor.

Table 3. SUT CRs and FRs Status (continued)

LEGEND:			
802.3af	Power Over Ethernet	IPv6	Internet Protocol Version 6
802.3at-2009	Power Over Ethernet Plus	MPLS	Multiprotocol Label Switching
ACL	Access Control List	NM	Network Management
ANSI	American National Standards Institute	OSPF	Open Shortest Path First
BGP	Border Gateway Protocol	OSPFv3	Open Shortest Path First Version 3
C2	Command and Control	POA&M	Plan of Action and Milestones
CR	Capability Requirement	QoS	Quality of Service
DISA	Defense Information Systems Agency	RFC	Request For Comment
DoD	Department of Defense	RSVP-TE	Resource Reservation Protocol- Traffic Engineering
E2E	End-to-End	SUT	System Under Test
FR	Functional Requirement	TIA	Telecommunications Industry Association
IAW	In Accordance With	UCR	Unified Capabilities Requirements
ID	Identification	VLAN	Virtual Local Area Network
LDP	Label Distribution Protocol	VPLS	Virtual Private LAN Service
LSP	Label Switched Path	VPN	Virtual Private Network

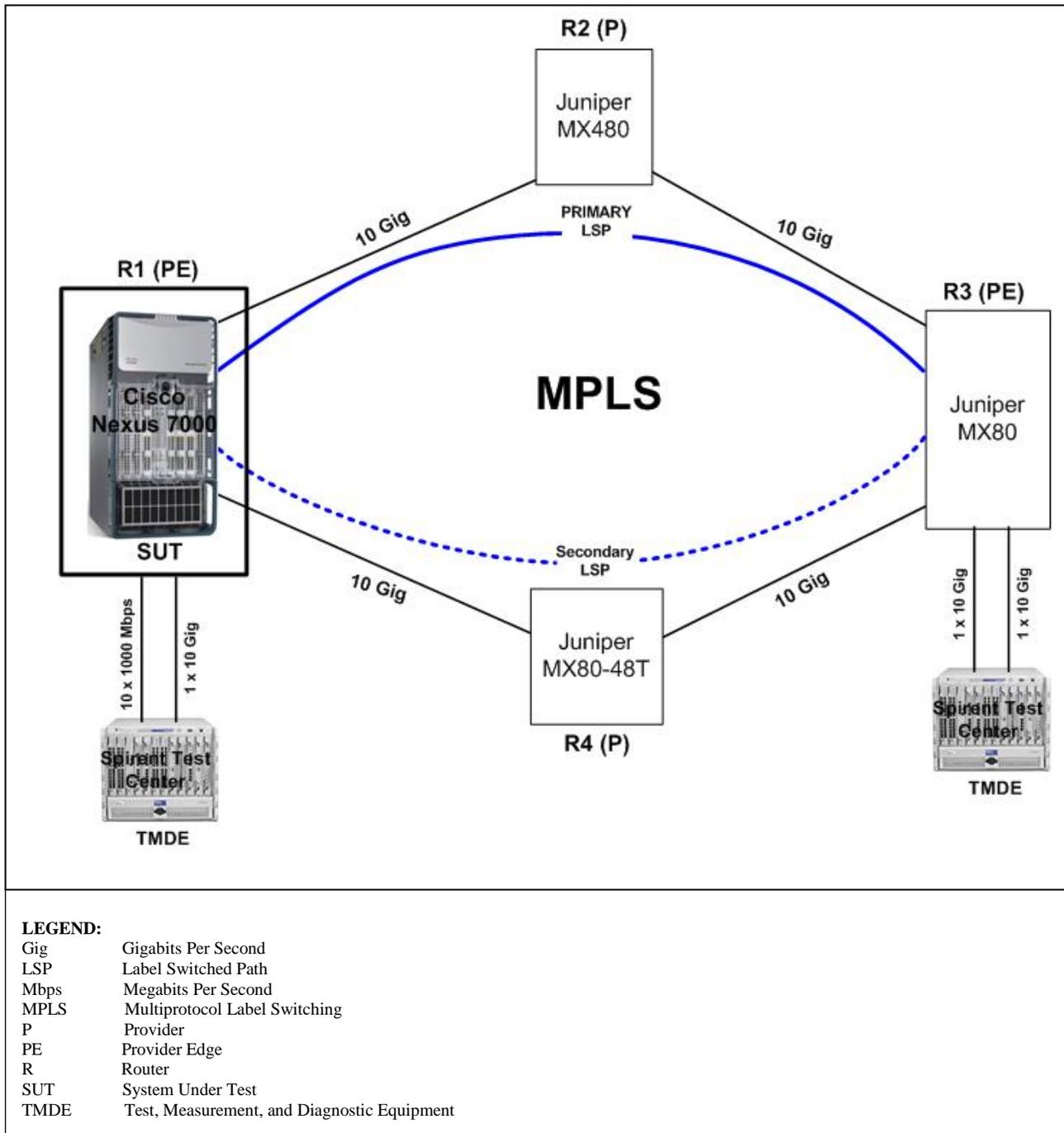


Figure 2-3. SUT Heterogeneous MPLS Test Configuration with Juniper

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 (STP), which 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

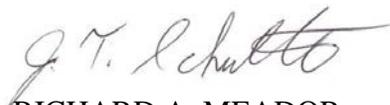
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Interoperability Tool (JIT) NIPRNet at <http://jit.fhu.disa.mil>. Information related to DISN testing is on the Telecom Switched Services Interoperability (TSSI) website at <http://jitc.fhu.disa.mil/tssi>. All associated data is available on the Defense Information Systems Agency 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-certificaion-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 Capt Jonathan Kim, DSN 879-5182, commercial (520) 538-5182, FAX DSN 879-4347, commercial (520) 538-4347, or e-mail to jonathan.s.kim.mil@mail.mil. JITC's mailing address is P.O. Box 12798, Fort Huachuca, AZ 85670-2798. The Tracking Number for the SUT is 1126905.

FOR THE COMMANDER:

Enclosure a/s


for RICHARD A. MEADOR
Chief
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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 Nexus 7000 (Tracking Number 1126905)," 8 June 2012

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