

Class A Router			
ID	Primary Attribute	Secondary Attribute	Specification
1	Chassis	Type (Modular vs. Static)	Required: Modular
		Throughput	>= 15 Millions packets per second
		Packet Processor Redundancy	Required
		Control Plane Redundancy	Required
		Cooling Redundancy	Required: May be internal to power supplies
		Power Supply Redundancy	Required
		Front-Back Airflow	Required
2	Packet Processor	Online Insertion & Removal	Required
		Type (upgradable)	Required (Field Replaceable)
		Packet Processor Redundancy	Required
		Layer 3 Routing Throughput (PPS)	>= 15 Million packets per second
		Memory (DRAM, Flash)	>= 2 GB – DRAM, 1 GB - Flash
3	Interface Cards	Interface Speed	Up to 10Gbps
		Interface Media Flexibility	Required (from T-1 to 10Gbps interfaces) T-1, channelized T-1, DS-3, channelized DS-3, OC-3 to OC12, OC-3 to OC-12 Packet over SONET, 10Mbps to 10Gbps Ethernet, at a minimum.
		Queuing Properties	Required: (see Operating System requirements)
		Online Insertion & Removal	Required
4	Operating System	Features Supported	Required: Routing, Bridging, Switching
		Routing Protocols	Required: BGPv4, OSPF
		OSPF Requirements	<ul style="list-style-type: none"> - IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRs, and ASBRs - Configurable area types: normal (LSAs 1-5), stubby (LSAs 1-4), totally stubby (LSAs 1-2), Not-So-Stubby Area (NSSA) (LSAs 1-4 & 7), and NSSA totally stubby (LSAs 1-2 & 7) - Configurable router ID - Configurable hello packet interval - Configurable router dead interval - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
		BGPv4 Requirements	<ul style="list-style-type: none"> - Multiprotocol Border Gateway Protocol (BGP) for IPv4 and IPv6 - MD5 authentication - Use all standard attributes - Ability to enable or disable synchronization - Configurable local preference per neighbor - Configurable multi-exit discriminator (MED) per neighbor - Configurable standard and extended communities

		Quality of Service	Required: >=8 Queues including Strict Priority Queue - Shaping and policing - DSCP & IP Precedence
		Protocols Supported	Required: MPLS, IPv4, IPv6, 802.1Q, GRE, IPSEC, GDOI, PIM v1 & v2
		Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
		SNMP Requirements	- Support for SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event. - Configurable source IP address or interface for traps. - Supports both read-only (RO) and read-write (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager -Support for multiple RO and RW community strings -Support for multiple SNMP profiles
		Network Management	Required: Technology to monitor continuous traffic on the network, SNMPv2c and v3, SSH, SSL, Syslog, SNMP Traps, Centralized AAA, Netflow Version 9
5	WAN Encryption	FIPS 140-2 Certification	Required: Complete, or in process. (The system must be either FIPS 140-2 NIST certified or at least in stage 3 testing.)
		Throughput	Required: >= 5Gbps
		Hardware vs Software	Required: Hardware
		Latency	Required: <=100usec
		Protocols	Required: GDOI
		Supported Connection Count	Required: >=2000 encrypted tunnels
		Interface Type	Required: Encryption Supported on all interface types

Class B Router			
ID	Primary Attribute	Secondary Attribute	Specification
1	Chassis	Type (Modular vs. Static)	Required: Modular
		Throughput	>= 2 Millions packets per second
		Packet Processor Redundancy	Required
		Control Plane Redundancy	Required
		Cooling Redundancy	Required
		Power Supply Redundancy	Required
		Front-Back Airflow	Not Required
		Online Insertion & Removal	Required
2	Packet Processor	Type (upgradable)	Required
		Packet Processor Redundancy	Required
		Layer 3 Routing Throughput (PPS)	>= 2 Million packets per second
		Online Insertion & Removal	Required
		Memory (DRAM, Flash)	>= 1 GB – DRAM, 256MB - Flash
3	Interface Cards	Interface Speed	Up to multiple OC-3
		Interface Media Flexibility	Required (from T-1 to OC-3 interfaces) T-1, channelized T-1, DS-3, channelized DS-3, OC-3, OC-3 Packet over SONET, 10 Mbps to 1 Gbps Ethernet, at a minimum.
		Queuing Properties	Required: (see Operating System requirements)
		Online Insertion & Removal	Required
		Features Supported	Required: Routing, Bridging, Switching
4	Operating System	Routing Protocols	Required: BGPv4, OSPF
		OSPF Requirements	<ul style="list-style-type: none"> - IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRs, and ASBRs - Configurable area types: normal (LSAs 1-5), stubby (LSAs 1-4), totally stubby (LSAs 1-2), Not-So-Stubby Area (NSSA) (LSAs 1-4 & 7), and NSSA totally stubby (LSAs 1-2 & 7) - Configurable router ID - Configurable hello packet interval - Configurable router dead interval - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
			BGPv4 Requirements

		Quality of Service	Required: >=8 Queues including Strict Priority Queue - Shaping and policing - DSCP & IP Precedence
		Protocols Supported	Required: MPLS, IPv4, IPv6, 802.1Q, GRE, IPSEC, GDOI, PIM v1 & v2
		Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
		SNMP Requirements	- Support for SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event. - Configurable source IP address or interface for traps. - Supports both read-only (RO) and read-write (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager -Support for multiple RO and RW community strings -Support for multiple SNMP profiles
		Network Management	Required: Technology to monitor continuous traffic on the network, SNMPv2c and v3, SSH, SSL, Syslog, SNMP Traps, Centralized AAA, Netflow Version 9
5	WAN Encryption	FIPS 140-2 Certification	Required: Complete, or in process. (The system must be either FIPS 140-2 NIST certified or at least in stage 3 testing.)
		Throughput	Required: >= 900Mbps
		Hardware vs Software	Required: Hardware
		Latency	Required: <=100usec
		Protocols	Required: GDOI
		Supported Connection Count	Required: >=2000 encrypted tunnels
		Interface Type	Required: Encryption Supported on all interface types

Class C Router			
ID	Primary Attribute	Secondary Attribute	Specification
1	Chassis	Type	Fixed or Modular
		Throughput	>= 500k packets per second
		Packet Processor Redundancy	Not Required
		Control Plane Redundancy	Not Required
		Cooling Redundancy	Not Required
		Power Supply Redundancy	Not Required
		Front-Back Airflow	Not Required
2	Packet Processor	Online Insertion & Removal	Not Required
		Type (upgradable)	Not Required
		Layer 3 Routing Throughput (PPS)	>= 500k packets per second
		Memory (DRAM, Flash)	>= 1 GB – DRAM, 256MB - Flash
3	Interface Cards	Interface Speed	Up to multiple DS3
		Interface Media Flexibility	Required (from T-1 to DS3 interfaces) T-1, channelized T-1, DS-3, channelized DS-3, 10 Mbps to 1 Gbps Ethernet, at a minimum.
		Queuing Properties	Required: => 8 queues including a Strict Priority Queue (see Operating System requirements)
		Online Insertion & Removal	Not Required
4	Operating System	Features Supported	Required: Routing, Bridging, Switching
		Routing Protocols	Required: BGPv4, OSPF
		OSPF Requirements	<ul style="list-style-type: none"> - IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRs, and ASBRs - Configurable area types: normal (LSAs 1-5), stubby (LSAs 1-4), totally stubby (LSAs 1-2), Not-So-Stubby Area (NSSA) (LSAs 1-4 & 7), and NSSA totally stubby (LSAs 1-2 & 7) - Configurable router ID - Configurable hello packet interval - Configurable router dead interval - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
		BGPv4 Requirements	<ul style="list-style-type: none"> - Multiprotocol Border Gateway Protocol (BGP) for IPv4 and IPv6 - MD5 authentication - use all standard attributes - ability to enable or disable synchronization - Configurable local preference per neighbor - Configurable multi-exit discriminator (MED) per neighbor - Configurable standard and extended communities

		Quality of Service	Required: >=8 Queues including Strict Priority Queue - Shaping and policing - DSCP & IP Precedence
		Protocols Supported	Required: MPLS, IPv4, IPv6, 802.1Q, GRE, IPSEC, GDOI, PIM v1 & v2
		Access Control Lists	-Access lists in hardware -support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
		SNMP Requirements	- Support for SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event. - Configurable source IP address or interface for traps. - Supports both read-only (RO) and read-write (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager - Support for multiple RO and RW community strings - Support for multiple SNMP profiles
		Network Management	Required: Technology to monitor continuous traffic on the network, SNMPv2c and v3, SSH, SSL, Syslog, SNMP Traps, Centralized AAA, Netflow Version 9
5	WAN Encryption	FIPS 140-2 Certification	Required: Complete, or in process. (The system must be either FIPS 140-2 NIST certified or at least in stage 3 testing.)
		Throughput	Required: >= 200Mbps
		Hardware vs Software	Required: Hardware
		Latency	Required: <=100usec
		Protocols	Required: GDOI
		Supported Connection Count	Required: >=1000 encrypted tunnels
		Interface Type	Required: Encryption Supported on all interface types

Configuration Item Addendum

Class A Router - Configuration			
ID	Primary Attribute	Secondary Attribute	Specification
1	Chassis	Type	Required: Modular
		Throughput	>= 15 Millions packets per second
		Packet Processor Redundancy	Required
		Control Plane Redundancy	Required
		Cooling Redundancy	Required
		Power Supply Redundancy	Required
		Front-Back Airflow	Required
		Online Insertion & Removal	Required
2	Packet Processor	Type (upgradable)	Required (Field Replaceable)
		Packet Processor Redundancy	Required
		Layer 3 Routing Throughput (PPS)	Non-Blocking
		Memory (DRAM, Flash)	Include maximum DRAM and Flash available
		Online Insertion & Removal	Required
3	Interface Cards	WAN Interfaces	Qty (2) 1 GbE (SX Optics) - individually Field Replaceable
		LAN Interfaces	Qty (2) 1 GbE fiber ports (SX Optics) - individually Field Replaceable
		Egress Queuing Properties	Required: => 8 queues including a Strict Priority Queue
		Online Insertion & Removal	Required
4	Operating System	Features Supported	Required: Routing, Bridging, Switching
		Routing Protocols	Required: BGPv4, OSPF
		OSPF Requirements	<ul style="list-style-type: none"> - IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRs, and ASBRs - Configurable area types: normal (LSAs 1-5), stubby (LSAs 1-4), totally stubby (LSAs 1-2), Not-So-Stubby Area (NSSA) (LSAs 1-4 & 7), and NSSA totally stubby (LSAs 1-2 & 7) - Configurable router ID - Configurable hello packet interval - Configurable router dead interval - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
		BGPv4 Requirements	<ul style="list-style-type: none"> - Multiprotocol Border Gateway Protocol (BGP) for IPv4 and IPv6 - MD5 authentication - Use all standard attributes - Ability to enable or disable synchronization - Configurable local preference per neighbor - Configurable multi-exit discriminator (MED) per neighbor - Configurable standard and extended communities

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		Quality of Service	Required: >=8 Queues including Strict Priority Queue - Shaping and policing - DSCP & IP Precedence
		Protocols Supported	Required: MPLS, IPv4, IPv6, 802.1Q, GRE, IPSEC, GDOI, PIM v1 & v2
		Network Management	Required: Technology to monitor continuous traffic on the network, SNMPv2c and v3, SSH, SSL, Syslog, SNMP Traps, Centralized AAA, Netflow Version 9
		SNMP Requirements	- Support for SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event. - Configurable source IP address or interface for traps. - Supports both read-only (RO) and read-write (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager - Support for multiple RO and RW community strings - Support for multiple SNMP profiles
		Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
5	WAN Encryption	FIPS 140-2 Certification	Required: Complete, or in process. (The system must be either FIPS 140-2 NIST certified or at least in stage 3 testing.)
		Throughput	Required: >= 5Gbps
		Hardware vs Software	Required: Hardware
		Latency	Required: <=100usec
		Protocols	Required: GDOI
		Supported Connection Count	Required: >=2000 encrypted tunnels
		Interface Type	Required: Encryption Supported on all interface types

Configuration Item Addendum

Class B Router - Configuration			
ID	Primary Attribute	Secondary Attribute	Specification
1	Chassis	Type	Required: Modular
		Throughput	>= 2 Millions packets per second
		Packet Processor Redundancy	Required
		Control Plane Redundancy	Required
		Cooling Redundancy	Required
		Power Supply Redundancy	Required
2	Packet Processor	Online Insertion & Removal	Required
		Type (upgradable)	Required
		Packet Processor Redundancy	Required
		Layer 3 Routing Throughput (PPS)	>= 2 Million packets per second
		Memory (DRAM, Flash)	Include maximum DRAM and Flash available
3	Interface Cards	Online Insertion & Removal	Required
		WAN Interface	Qty (2) OC3 POS (Short Range multimode optics)
		LAN Interfaces	Qty (2) 1 GbE fiber ports (SX Optics) - individually Field Replaceable
		Egress Queuing Properties	Required: => 8 queues including a Strict Priority Queue
4	Operating System	Online Insertion & Removal	Required
		Features Supported	Required: Routing, Bridging, Switching
		Routing Protocols	Required: BGPv4, OSPF
		OSPF Requirements	<ul style="list-style-type: none"> - IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRs, and ASBRs - Configurable area types: normal (LSAs 1-5), stubby (LSAs 1-4), totally stubby (LSAs 1-2), Not-So-Stubby Area (NSSA) (LSAs 1-4 & 7), and NSSA totally stubby (LSAs 1-2 & 7) - Configurable router ID - Configurable hello packet interval - Configurable router dead interval - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
		BGPv4 Requirements	<ul style="list-style-type: none"> - Multiprotocol Border Gateway Protocol (BGP) for IPv4 and IPv6 - MD5 authentication - Use all standard attributes - Ability to enable or disable synchronization - Configurable local preference per neighbor - Configurable multi-exit discriminator (MED) per neighbor - Configurable standard and extended communities

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		Quality of Service	Required: >=8 Egress Queues including Strict Priority Queue - Shaping and policing - DSCP & IP Precedence
		Protocols Supported	Required: MPLS, IPv4, IPv6, 802.1Q, GRE, IPSEC, GDOI, PIM v1 & v2
		Access Control Lists	- Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
		Network Management	Required: Technology to monitor continuous traffic on the network, SNMPv2c and v3, SSH, SSL, Syslog, SNMP Traps, Centralized AAA, Netflow Version 9
		SNMP Requirements	- Support for SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event. - Configurable source IP address or interface for traps. - Supports both read-only (RO) and read-write (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager - Support for multiple RO and RW community strings - Support for multiple SNMP profiles
5	WAN Encryption	FIPS 140-2 Certification	Required: Complete, or in process. (The system must be either FIPS 140-2 NIST certified or at least in stage 3 testing.)
		Throughput	Required: >= 900Mbps
		Hardware vs Software	Required: Hardware
		Latency	Required: <=100usec
		Protocols	Required: GDOI
		Supported Connection Count	Required: >=2000 encrypted tunnels
		Interface Type	Required: Encryption Supported on all interface types

Configuration Item Addendum

Class C Router - Configuration			
ID	Primary Attribute	Secondary Attribute	Specification
1	Chassis	Type	Fixed or Modular
		Throughput	>= 500k packets per second
		Packet Processor Redundancy	Not Required
		Control Plane Redundancy	Not Required
		Cooling Redundancy	Not Required
		Power Supply Redundancy	Not Required
2	Packet Processor	Online Insertion & Removal	Not Required
		Layer 3 Routing Throughput (PPS)	>= 500k packets per second
3	Interface Cards	Memory (DRAM, Flash)	Include maximum DRAM and Flash available
		WAN Interface	Qty (2) DS3
		LAN Interfaces	Qty (1) 1 GbE ports (SFP – Copper RJ45)
		Egress Queuing Properties	Required: => 8 queues including a Strict Priority Queue
4	Operating System	Online Insertion & Removal	Not Required
		Features Supported	Required: Routing, Bridging, Switching
		Routing Protocols	Required: BGPv4, OSPF
		OSPF Requirements	<ul style="list-style-type: none"> - IPv4 Open Shortest Path First (OSPF) versions 2 - IPv6 Open Shortest Path First (OSPF) versions 3 - MD5 authentication - Configurable areas, ABRS, and ASBRs - Configurable area types: normal (LSAs 1-5), stubby (LSAs 1-4), totally stubby (LSAs 1-2), Not-So-Stubby Area (NSSA) (LSAs 1-4 & 7), and NSSA totally stubby (LSAs 1-2 & 7) - Configurable router ID - Configurable hello packet interval - Configurable router dead interval - Configurable priority for DR and BDR - Configurable per interface network types (P2P, broadcast, NBMA, and virtual links) - Configurable cost per interface - Configurable cost multiplier - Ability to redistribute static routes and other protocol routes using access lists and route maps
			BGPv4 Requirements
		Quality of Service	<ul style="list-style-type: none"> Required: >=8 Queues including Strict Priority Queue - Shaping and policing - DSCP & IP Precedence
Protocols Supported	Required: MPLS, IPv4, IPv6, 802.1Q, GRE, IPSEC, GDOI, PIM v1 & v2		

Configuration Item Addendum

		<p>Access Control Lists</p>	<ul style="list-style-type: none"> - Access lists in hardware - Support for access lists source and destination L2 MAC address, Ethernet types, and SAPs - Support for access lists source and destination L3 addresses with masks and L4 port numbers - Support for prefix lists - Ability to apply L3 access list to L2 interfaces/ports - Ability to police (rate limit) per port, per port channel, per VLAN
		<p>SNMP Requirements</p>	<ul style="list-style-type: none"> - Support for SNMPv2C, & SNMPv3 - Support for traps that is an agent on the switch to send an unsolicited notifications to the SNMP manager for a configured event. - Configurable source IP address or interface for traps. - Supports both read-only (RO) and read-write (RW) community strings - Ability to restrict each community string to specific IP addresses independently - Ability to configure different SNMP versions for each SNMP manager - Support for multiple RO and RW community strings - Support for multiple SNMP profiles
		<p>Network Management</p>	<p>Required: Technology to monitor continuous traffic on the network, SNMPv2c and v3, SSH, SSL, Syslog, SNMP Traps, Centralized AAA, Netflow Version 9</p>
<p>5</p>	<p>WAN Encryption</p>	<p>FIPS 140-2 Certification</p>	<p>Required: Complete, or in process. (The system must be either FIPS 140-2 NIST certified or at least in stage 3 testing.)</p>
	<p>Throughput</p>	<p>Required: >= 200 Mbps</p>	
	<p>Hardware vs Software</p>	<p>Required: Hardware</p>	
	<p>Latency</p>	<p>Required: <=100usec</p>	
	<p>Protocols</p>	<p>Required: GDOI</p>	
	<p>Supported Connection Count</p>	<p>Required: >=1000 encrypted tunnels</p>	
	<p>Interface Type</p>	<p>Required: Encryption Supported on all interface types</p>	