Holo

RFC Compliance Test Report
OSPF Results

Testing done using Ixia IxANVL RFC Compliance Tester by netDEF
Network Device Education Foundation

	Holo 2025-12-23
Type	HOLO
Commit ID	01a2982
Commit Date	2025-12-23
ANVL-OSPF-1.1 **MUST**	ANVL Setup Validation Test
	`Test Setup` `Validate OSPF Hello packet from DUT.`
	Debian 12: pass
ANVL-OSPF-1.6 **MUST**	RFC 2328 Section 12

	`Test Setup`
	`The collection of LSAs forms the link-state database.`
	`Each separate type of LSA has a separate function.`
	`Router-LSAs and network-LSAs describe how an area"s routers`
	`and networks are interconnected.  Summary-LSAs provide a way`
	`of condensing an area"s routing information.  AS-external-LSAs`
	`provide a way of transparently advertising externally-derived`
	`routing information throughout the Autonomous System.`
	`Note: ANVL Setup Validation Test`

	Debian 12: pass
ANVL-OSPF-2.1 **MUST**	RFC 1583, s13.3 p132 Next step in the flooding procedure (see also sA.3.5 p179) RFC 2328, s13.3 p148 Next step in the flooding procedure (see also sA.3.5 p199)
	`OSPF Flooding` `Validate Link State Update packet format.`
	Debian 12: pass
ANVL-OSPF-2.2 **MUST**	RFC 1583, s13.3 p131 Next step in the flooding procedure (see also s4.2 p35 and s12.1.3 p103) RFC 2328, s13.3 p148 Next step in the flooding procedure (see also s4.2 p41 and s12.1.3 p117)

	`OSPF Flooding`
	`AS external link advertisements are not flooded into/throughout stub`
	`areas.`

	Debian 12: pass
ANVL-OSPF-2.3 **MUST**	RFC 1583, s13.3 p132 Next step in the flooding procedure RFC 2328, s13.3 p149 Next step in the flooding procedure

	`OSPF Flooding`
	`If a neighbor is in a lesser state than Exchange, it does not`
	`participate in flooding.`

	Debian 12: pass
ANVL-OSPF-2.4 **MUST**	RFC 1583, s13.3 p132 Next step in the flooding procedure RFC 2328, s13.3 p149 Next step in the flooding procedure

	`OSPF Flooding`
	`Verify that advertisements for neighbors in state Exchange`
	`who appear on the Link State Request list are processed correctly`

	Debian 12: pass

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ANVL-OSPF-2.5 **MUST**	RFC 1583, s13 p127 The Flooding Procedure RFC 2328, s13 p144 The Flooding Procedure
	`OSPF Flooding` `If a new advertisement was received from a neighbor such that the receiving interface is DR and sender is not BDR, then the advertisement must be flooded back out the receiving interface.`
	Debian 12: pass
ANVL-OSPF-2.6 **MUST**	RFC 1583, s13.3 p133 The Flooding Procedure RFC 2328, s13.3 p150 The Flooding Procedure
	`OSPF Flooding` `Do not flood an advertisement back to an interface if it was received from the Designated Router or the Backup Designated Router`
	Debian 12: pass
ANVL-OSPF-2.7 **MUST**	RFC 1583, s13.3 p133 Next step in the flooding procedure RFC 2328, s13.3 p150 Next step in the flooding procedure
	`OSPF Flooding` `Do not flood a new advertisement back onto the receiving interface if that interface is in state Backup`
	Debian 12: pass
ANVL-OSPF-2.8 **MUST**	RFC 1583, s13.3 p133 Next step in the flooding procedure (see also s12.1.1 p101 and s14 p139) RFC 2328, s13.3 p150 Next step in the flooding procedure (see also s12.1.1 p116 and s14 p156)
	`OSPF Flooding` `The LS age field must be incremented by InfTransDelay on every hop of the flooding procedure.`
	Debian 12: pass
ANVL-OSPF-2.9 **MUST**	RFC 1583, s13.3 p133-134 Next step in the flooding procedure (see also s7.3 p47 and s8.1 p51) RFC 2328, s13.3 p150-151 Next step in the flooding procedure (see also s7.3 p54 and s8.1 p58)
	`OSPF Flooding` `The Designated Router and its Backup send Link State Update packets to the multicast address AllSPFRouters.`
	Debian 12: pass
ANVL-OSPF-2.10 **MUST**	RFC 1583, s13.3 p134 Next step in the flooding procedure (see also s8.1 p51) RFC 2328, s13.3 p151 Next step in the flooding procedure (see also s8.1 p58)
	`OSPF Flooding` `All routers other than the Designated Router and its Backup send their Link State Update packets to the multicast address AllDRouters.`
	Debian 12: pass
ANVL-OSPF-2.11 **SHOULD**	NEGATIVE: RFC 1583, s13.3 p133 Next step in the flooding procedure NEGATIVE: RFC 2328, s13.3 p150 Next step in the flooding procedure
	`OSPF Flooding` `DUT should ignore unexpected Link State Ack during adjacency establishment.`
	Debian 12: pass

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ANVL-OSPF-2.12 **MUST**	RFC 2328, s13 p145 The flooding procedure
	OSPF Flooding When a received LSA instance is less recent than a router"s current database copy, the router will respond by flooding back its DB copy.
	Debian 12: FAIL
ANVL-OSPF-2.13 **MUST**	RFC 2328, s10.6 p100 Receiving Database Description Packets
	OSPF Flooding Duplicate Database Description packets are discarded by the master.
	Debian 12: pass
ANVL-OSPF-2.14 **MUST**	RFC 2328, s10.6 p100 Receiving Database Description Packets
	OSPF Flooding Duplicate Database Description packets cause the slave to retransmit the last Database Description packet that it had sent.
	Debian 12: pass
ANVL-OSPF-2.15 **MUST**	RFC 2328, s10.6 p99 Receiving Database Description Packets
	OSPF Flooding If the Interface MTU field in a Database Description packet is larger than the router can accept without framentation, then it is rejected.
	Debian 12: pass
ANVL-OSPF-3.1 **MUST**	RFC 1583, s11.1 p96 Routing table lookup RFC 2328, s11.1 p111 Routing table lookup
	OSPF Routing Table Lookups This routing table entry then provides the outgoing interface and next hop router to use in forwarding the packet. (NOTE: Here we are testing the DUT forwards IP packet to the correct interface and next hop based on an entry in the OSPF routing table.)
	Debian 12: pass
ANVL-OSPF-3.2 **MUST**	RFC 1583, s11.1 p96 Routing table lookup RFC 2328, s11.1 p111 Routing table lookup
	OSPF Routing Table Lookups In this case, the packet"s IP destination is considered unreachable. Instead of being forwarded, the packet should be dropped and an ICMP destination unreachable message should be returned to the packet"s source. (NOTE: Here we are testing the DUT sends an ICMP destination unreachable if there is no route to the destination.)
	Debian 12: pass
ANVL-OSPF-3.3 **SHOULD**	RFC 1583, s11.1 p96 Routing table lookup RFC 2328, s11.1 p111 Routing table lookup
	OSPF Routing Table Lookups If there is no matching routing table entry then the packet"s IP destination is considered unreachable. Instead of being forwarded, the packet should then be discarded and an ICMP destination unreachable message should be returned to the packet"s source. (NOTE: Here we are testing DUT sends an ICMP destination unreachable if there is no intra-area route for a packet destined for the router"s configured area.)
	Debian 12: pass

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ANVL-OSPF-3.4 **MUST**	RFC 1583, s11.1 p96 Routing table lookup RFC 2328, s11.1 p96 Routing table lookup
	`OSPF Routing Table Lookups` `DUT forwards IP packets based on the most preferential path type.`
	Debian 12: pass
ANVL-OSPF-3.5 **MUST**	RFC 1583, s11.1 p96 Routing table lookup RFC 2328, s11.1 p111 Routing table lookup

	`OSPF Routing Table Lookups`
	`In this case, the "best match" is the routing table entry that`
	`provides the most specific (longest) match.`
	`(NOTE: here we are testing DUT forwards IP packets based on`
	`the most specific address/mask match.)`

	Debian 12: pass
ANVL-OSPF-3.7 **MUST**	STRESS: RFC 1583, s11.1 p98 Routing table lookup STRESS: RFC 2328, s11.1 p112 Routing table lookup

	`OSPF Routing Table Lookups`
	`DUT stays up when receiving an excessive number of Link State`
	`Updates.`

	Debian 12: pass
ANVL-OSPF-3.8 **MAY**	RFC 2328, s16.2 p169 Calculating the Inter-area routes

	`OSPF Routing Table Lookups`
	`Range summaries of an area may contain subnets in different areas`
	`provided that subnets belonging to other areas are not summarized.`

	Debian 12: pass
ANVL-OSPF-3.9 **MUST**	RFC 2328, s16.4.1 p175 External Path Preferences

	`OSPF Routing Table Lookups`
	`Note that as a result of these rules, there may still be multiple paths of`
	`the highest preference. In this case, the path to use must be determined`
	`based on cost`
	`(NOTE: Here we are testing Intra-area backbone and inter-area paths are of`
	`equal preference. In this case, the path to use must be determined based`
	`on cost.)`

	Debian 12: pass
ANVL-OSPF-4.1 **MAY**	RFC 1583, s16.7 p157 Events generated as a result of routing table changes RFC 2328, s16.7 p177 Events generated as a result of routing table changes

	`OSPF Routing Table Changes`
	`New summary link advertisements are generated when the cost or path`
	`type of a routing table entry changes.`

	Debian 12: FAIL

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ANVL-OSPF-4.2 **MUST**	RFC 1583, s16.7 p157 Events generated as a result of routing table changes (see also s12.4.3 p120) RFC 2328, s16.7 p177 Events generated as a result of routing table changes (see also s12.4.3 p135)
	`OSPF Routing Table Changes` `New summary link advertisements are reflooded with LS Age = MaxAge when routing table entries are deleted or are no longer advertisable.`
	Debian 12: pass
ANVL-OSPF-4.3 **MUST**	RFC 1583, s16.7 p158 Events generated as a result of routing table changes (see also s15 p141) RFC 2328, s16.7 p178 Events generated as a result of routing table changes (see also s15 p159)

	`OSPF Routing Table Changes`
	`If the entry indicates that the area border router is newly reachable, the corresponding virtual link is now operational.  An InterfaceUp event should be generated for the virtual link, which will cause a virtual adjacency to begin to form.`
	`(NOTE: Here we are testing DUT attempts to bring up a virtual link when a changed routing table entry indicates that the endpoint of the virtual link is reachable.)`

	Debian 12: pass
ANVL-OSPF-4.4 **MUST**	RFC 1583, s16.7 p158 Events generated as a result of routing table changes RFC 2328, s16.7 p178 Events generated as a result of routing table changes

	`OSPF Routing Table Changes`
	`If the entry indicates that the area border router is no longer reachable,the virtual link and its associated adjacency should be destroyed. This means an InterfaceDown event should be generated for the associated virtual link.`
	`(NOTE: Here we are testing the DUT brings down a virtual link when a changed routing table entry indicates that the virtual link endpoint is no longer reachable.)`

	Debian 12: pass
ANVL-OSPF-4.5 **MUST**	RFC 1583, s16.7 p158 Events generated as a result of routing table changes RFC 2328, s16.7 p178 Events generated as a result of routing table changes

	`OSPF Routing Table Changes`
	`If the cost of the entry has changed, and there is a fully established virtual adjacency, a new router-LSA for the backbone must be originated.`
	`(NOTE: Here we are testing DUT generates new summary link advertisements when the cost of a path to a virtual link endpoint changes in the routing table.)`

	Debian 12: pass
ANVL-OSPF-5.1 **SHOULD**	RFC 1583, s16.1 p146 Calculating the shortest-path tree for an area RFC 2328, s16.1 p164 Calculating the shortest-path tree for an area
	`Intra-Area Shortest Path Calculation` `DUT should use the shortest of two or more paths (according to OSPF route distance metric) when forwarding packets.`
	Debian 12: pass

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ANVL-OSPF-5.2 **MUST**	RFC 1583, s16.1 p145 Calculating the shortest-path tree for an area RFC 2328, s16.1 p163 Calculating the shortest-path tree for an area

	`Intra-Area Shortest Path Calculation`
	`If the LSA LS age is equal to MaxAge, examine the next link in V"s LSA.`
	`(NOTE: Here we are testing router links or network links advertisements`
	`with LS age = MaxAge are not used when building the shortest-path tree`
	`for an area.)`

	Debian 12: pass
ANVL-OSPF-5.3 **MUST**	RFC 1583, s16.1 p145 Calculating the shortest-path tree for an area RFC 2328, s16.1 p163 Calculating the shortest-path tree for an area

	`Intra-Area Shortest Path Calculation`
	`If the LSA does not have a link back to vertex V, examine the`
	`next link in V"s LSA.`
	`(NOTE: Here we are testing DUT does not calculate routes from an`
	`entry in the link state database if that entry has no path back`
	`to the DUT.)`

	Debian 12: pass
ANVL-OSPF-5.4 **MUST**	RFC 1583, s16.1 p146 Calculating the shortest-path tree for an area RFC 2328, s16.1 p164 Calculating the shortest-path tree for an area

	`Intra-Area Shortest Path Calculation`
	`Multiple sets of next hop values are calculated for intra-area routes`
	`when multiple equal-cost destinations to a network exist.`

	Debian 12: pass
ANVL-OSPF-5.5 **MUST**	RFC 1583, s16.1 p147 Calculating the shortest-path tree for an area RFC 2328, s16.1 p165 Calculating the shortest-path tree for an area

	`Intra-Area Shortest Path Calculation`
	`If intra-area routes exist to an AS boundary router in more than one`
	`area, the area providing the shortest path is always chosen.`

	Debian 12: pass
ANVL-OSPF-5.6 **MUST**	RFC 1583, s16.1 p147 Calculating the shortest-path tree for an area RFC 2328, s16.1 p165 Calculating the shortest-path tree for an area

	`Intra-Area Shortest Path Calculation`
	`If equal-cost intra-area routes exist to an AS boundary router in`
	`different areas, the area with largest OSPF Area ID is chosen.`

	Debian 12: pass
ANVL-OSPF-5.7 **SHOULD**	RFC 1583, s16.1 p147 Calculating the shortest-path tree for an area RFC 2328, s16.1 p165 Calculating the shortest-path tree for an area

	`Intra-Area Shortest Path Calculation`
	`In this case, the current routing table entry should be overwritten`
	`if and only if the newly found path is just as short and the current`
	`routing table entry"s Link State Origin has a smaller Link State ID`
	`than the newly added vertex" LSA.`

	Debian 12: pass
ANVL-OSPF-5.8 **MUST**	RFC 1583, s16.1 p148 Calculating the shortest-path tree for an area RFC 2328, s16.1 p166 Calculating the shortest-path tree for an area

	`Intra-Area Shortest Path Calculation`
	`Multiple sets of next hop values are calculated for intra-area routes`
	`to stub networks when multiple equal-cost paths exist.`

	Debian 12: pass

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ANVL-OSPF-5.9 **MUST**	RFC 1583, s16.1 p148-149 Calculating the shortest-path tree RFC 2328, s16.1 p166-167 Calculating the shortest-path tree

	`Intra-Area Shortest Path Calculation`
	`Otherwise D is smaller than the routing table cost. Overwrite the current routing table entry by setting the routing table entry"s cost to D, and by setting the entry"s list of next hops to the newly calculated set.`
	`(NOTE: Here we are testing stub network routing table entries are updated when a new path with smaller distance is calculated due to received routing information.`

	Debian 12: pass
ANVL-OSPF-6.1 **MUST**	RFC 1583, s16.2 p150 Calculating the inter-area routes RFC 2328, s16.2 p169 Calculating the inter-area routes

	`Use of Summaries`
	`For each summary-LSA: If the cost specified by the LSA is LSInfinity then examine the the next LSA.`
	`(NOTE: here we are testing summary link advertisements with cost LSInfinity are not used when calculating inter-area routes.)`

	Debian 12: pass
ANVL-OSPF-6.2 **MUST**	RFC 1583, s16.2 p150 Calculating the inter-area routes RFC 2328, s16.2 p169 Calculating the inter-area routes

	`Use of Summaries`
	`For each summary-LSA: if the LSA"s LS age is equal to MaxAge, then examine the the next LSA.`
	`(NOTE: here we are testing summary link advertisements with LS age of MaxAge are not used when calculating inter-area routes.)`

	Debian 12: pass
ANVL-OSPF-6.3 **MUST**	RFC 1583, s16.2 p150 Calculating the inter-area routes RFC 2328, s16.2 p169 Calculating the inter-area routes

	`Use of Summaries`
	`For each summary-LSA: If the LSA was originated by the calculating router itself, examine the next LSA.`
	`(NOTE: Here we are testing if a summary link advertisement was originated by the router itself, it is not used when calculating inter-area routes.)`

	Debian 12: pass
ANVL-OSPF-6.4 **MUST**	RFC 1583, s16.2 p151 Calculating the inter-area routes RFC 2328, s16.2 p169 Calculating the inter-area routes

	`Use of Summaries`
	`If it is a Type 3 summary-LSA, and the collection of destinations described by the summary-LSA equals one of the router"s configured area address ranges, and the particular area address range is active, then the summary-LSA should be ignored.`
	`(NOTE: Here we are testing a summary link advertisement is ignored if its destinations fall into one of the router"s active configured address ranges.`

	Debian 12: pass
ANVL-OSPF-6.5 **MUST**	RFC 1583, s16.2 p151 Calculating the inter-area routes RFC 2328, s16.2 p169 Calculating the inter-area routes
	`Use of Summaries` `Ignore summary links advertisements originated by an area border router if there is no entry for that ABR in the routing table.`
	Debian 12: pass

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ANVL-OSPF-6.6 **SHOULD**	RFC 1583, s16.2 p151 Calculating the inter-area routes RFC 2328, s16.2 p169 Calculating the inter-area routes
	`Use of Summaries` `Summary (inter-area) routes should be installed into the routing table in preference to existing external type 1 or type 2 routes.`
	Debian 12: pass
ANVL-OSPF-6.7 **MUST**	RFC 1583, s16.3 p152 Examining transit areas" summary links RFC 2328, s16.3 p170 Examining transit areas" summary links
	`Use of Summaries` `The purpose of the calculation below is to examine the transit areas to see whether they provide any better (shorter) paths than the paths previously calculated in Sections 16.1 and 16.2. Any paths found that are better than or equal to previously discovered paths are installed in the routing table. (NOTE: Here we are testing the DUT uses a summary link advertisement in a transit area if it has a better cost route to a backbone area network than the virtual link)`
	Debian 12: pass
ANVL-OSPF-7.1 **MUST**	RFC 1583, s16.4 p155 Calculating AS external routes RFC 2328, s16.4 p173 Calculating AS external routes
	`OSPF AS External Route Calculation` `If the cost specified by the LSA is LSInfinity, or if the LSA"s LS age is equal to MaxAge, then examine the next LSA. (NOTE: Here we are testing the DUT does not use AS external link advertisements with either a metric of LSInfinity or an LS age of MaxAge.)`
	Debian 12: pass
ANVL-OSPF-7.2 **MUST**	RFC 1583, s16.4 p155 Calculating AS external routes RFC 2328, s16.4 p173 Calculating AS external routes
	`OSPF AS External Route Calculation` `If the LSA was originated by the calculating router itself, examine the next LSA. (NOTE: He we are testing the DUT does not use AS external link advertisements originated by the device itself.)`
	Debian 12: pass
ANVL-OSPF-7.3 **MUST**	RFC 1583, s16.4 p155 Calculating AS external routes RFC 2328, s16.4 p173 Calculating AS external routes
	`OSPF AS External Route Calculation` `If no entries exist for router ASBR (i.e., ASBR is unreachable), do nothing with this LSA and consider the next in the list. (NOTE: Here we are testing the DUT does not use an AS external link advertisement if there is no routing table entry for the AS boundary router originating the advertisement.)`
	Debian 12: pass

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ANVL-OSPF-7.4 **MUST**	RFC 1583, s16.4 p155 Calculating AS external routes RFC 2328, s16.4 p173 Calculating AS external routes
	OSPF AS External Route Calculation If the forwarding address is non-zero, look up the forwarding address in the routing table. The matching routing table entry must specify an intra-area or inter-area path; if no such path exists, do nothing with the LSA and consider the next in the list. (NOTE: Here we are testing DUT ignores an AS external link advertisement if there is no intra-area or inter-area routing table entry for the forwarding address.)
	Debian 12: FAIL
ANVL-OSPF-7.5 **MUST**	RFC 1583, s16.4 p155 Calculating AS external routes RFC 2328, s16.4 p174 Calculating AS external routes
	OSPF AS External Route Calculation Type 1 external paths are always preferred over type 2 external paths. (NOTE: Here we are testing DUT always treats Type 1 external paths as shorter than type 2 external paths.)
	Debian 12: pass
ANVL-OSPF-7.6 **MUST**	RFC 1583, s16.4 p155 Calculating AS external routes RFC 2328, s16.4 p174 Calculating AS external routes
	OSPF AS External Route Calculation If the external metric type is 1, then the path-type is set to type 1 external and the cost is equal to X+Y. (NOTE: Here we are testing DUT compares Type 1 external paths by looking at the sum of the distance to the forwarding address and the advertised type 1 metric.)
	Debian 12: FAIL
ANVL-OSPF-7.7 **MUST**	RFC 1583, s16.4 p155 Calculating AS external routes RFC 2328, s16.4 p174 Calculating AS external routes
	OSPF AS External Route Calculation If the external metric type is 2, the path-type is set to type 2 external, the link state component of the route"s cost is X, and the type 2 cost is Y. (NOTE: Here we are testing DUT compares type 2 external paths by advertised type 2 metrics or by distance to the forwarding addresses if type 2 metrics are equal.)
	Debian 12: unpredict
ANVL-OSPF-11.1 **MUST**	RFC 2328, s2.3 p23 Use of external routing information
	External Routing Information Use External routing information is flooded unaltered throughout the AS.
	Debian 12: pass
ANVL-OSPF-12.1 **MUST**	RFC 2328, s4 p40 Functional Summary
	OSPF Operations The router sends Hello packets to its neighbors, and in turn receives their Hello packets.
	Debian 12: pass

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ANVL-OSPF-12.2
 	
MUST
	RFC 2328, s4 p40 Functional Summary
	
	`OSPF Operations`
	`On broadcast networks, the router dynamically detects its neighboring routers by sending its Hello packets to the multicast address AllSPFRouters.`
	
	Debian 12: pass

ANVL-OSPF-12.4
 	
MUST
	RFC 2328, s4 p40 Functional Summary
	
	`OSPF Operations`
	`A router periodically advertises its state, which is also called link state.`
	
	Debian 12: pass

ANVL-OSPF-12.5
 	
MUST
	RFC 2328, s4 p40 Functional Summary
	
	`OSPF Operations`
	`Link state is also advertised when a router"s state changes.`
	
	Debian 12: pass

ANVL-OSPF-12.6
 	
MUST
	RFC 2328, s4.3 p42 Routing protocol packets
	
	`OSPF Operations`
	`The OSPF protocol runs directly over IP, using IP protocol 89.`
	
	Debian 12: pass

ANVL-OSPF-12.7
 	
SHOULD
	RFC 2328, s4.3 p42 Routing protocol packets
	
	`OSPF Operations`
	`Routing protocol packets should always be sent with the IP TOS field set to 0.`
	
	Debian 12: pass

ANVL-OSPF-12.8
 	
SHOULD
	RFC 2328, s4.3 p42 Routing protocol packets
	
	`OSPF Operations`
	`OSPF protocol packets should have their IP precedence field set to the value Internetwork Control.`
	
	Debian 12: pass

ANVL-OSPF-12.9
 	
MUST
	RFC 2328, s4.3 p43 Routing protocol packets
	
	`OSPF Operations`
	`Each LSA is tagged with the ID of the originating router and a checksum of its link state contents. This test is for Router-LSA.`
	
	Debian 12: pass

ANVL-OSPF-12.10
 	
MUST
	RFC 2328, s4.3 p43 Routing protocol packets
	
	`OSPF Operations`
	`Each LSA is tagged with the ID of the originating router and a checksum of its link state contents. This test is for Network-LSA.`
	
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ANVL-OSPF-12.11 **MUST**	RFC 2328, s4.3 p43 Routing protocol packets
	OSPF Operations Each LSA is tagged with the ID of the originating router and a checksum of its link state contents. This test is for a Type-3 Summary LSA.
	Debian 12: pass
ANVL-OSPF-13.1 **MUST**	RFC 2328, s7.1 p52 The Hello Protocol
	Bringing up Adjacencies Bidirectional communication is indicated when the router sees itself listed in the neighbor"s Hello Packet.
	Debian 12: pass
ANVL-OSPF-13.2 **MUST**	RFC 2328, s7.1 p52 The Hello Protocol
	Bringing up Adjacencies On broadcast networks, each router advertises itself by multicasting Hello Packets.
	Debian 12: pass
ANVL-OSPF-13.3 **MUST**	RFC 2328, s7.1 p52 The Hello Protocol
	Bringing up Adjacencies On broadcast networks, each router advertises itself by periodically multicasting Hello Packets.
	Debian 12: pass
ANVL-OSPF-13.4 **MUST**	RFC 2328, s7.2 p53 The Synchronization of Databases
	Bringing up Adjacencies Each router describes its database by sending a sequence of Database Description packets to its neighbor. This is an indirect test which verifies that the DUT recognizes the LSA headers contained in the Database Description packets received from ANVL.
	Debian 12: pass
ANVL-OSPF-13.5 **SHOULD**	RFC 2328, s7.2 p53 The Synchronization of Databases
	Bringing up Adjacencies When the neighbor sees an LSA that is more recent than its own database copy, it makes a note that this newer LSA should be requested.
	Debian 12: pass
ANVL-OSPF-13.6 **SHOULD**	RFC 2328, s7.2 p53 The Synchronization of Databases
	Bringing up Adjacencies When the neighbor sees an LSA that is not more recent than its own database copy, it does not make a note that this LSA (which is not newer) should be requested.
	Debian 12: pass
ANVL-OSPF-13.7 **MUST**	RFC 2328, s7.2 p53 The Synchronization of Databases
	Bringing up Adjacencies Database Description Packets sent by the master (polls) are acknowledged by the slave through echoing of the sequence number.
	Debian 12: pass

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ANVL-OSPF-13.8 **MUST**	RFC 2328, s7.2 p54 The Synchronization of Databases
	`Bringing up Adjacencies` `The master is the only one allowed to retransmit Database Description Packets.`
	Debian 12: pass
ANVL-OSPF-13.9 **MUST**	RFC 2328, s7.2 p54 The Synchronization of Databases
	`Bringing up Adjacencies` `The slave is not allowed to retransmit Database Description packets.`
	Debian 12: pass
ANVL-OSPF-13.10 **MUST**	RFC 2328, s7.2 p54 The Synchronization of Databases
	`Bringing up Adjacencies` `Each Database Description contains an indication that there are more packets to follow --- the M-bit.`
	Debian 12: pass
ANVL-OSPF-13.11 **MUST**	RFC 2328, s7.2 p54 The Synchronization of Databases
	`Bringing up Adjacencies` `Database Exchange Process is over when a router has received and sent Database Description Packets with the M-bit off.`
	Debian 12: pass
ANVL-OSPF-13.12 **MUST**	RFC 2328, s7.3 p54 The Designated Router
	`Bringing up Adjacencies` `The Designated Router originates a network-LSA on behalf of the network.`
	Debian 12: pass
ANVL-OSPF-13.13 **MUST**	RFC 2328, s7.3 p54 The Designated Router
	`Bringing up Adjacencies` `If a router is not the DR, it does not generate a network-LSA for the network. This test is with DUT as BDR.`
	Debian 12: pass
ANVL-OSPF-13.14 **MUST**	RFC 2328, s7.3 p54 The Designated Router

	`Bringing up Adjacencies`
	`If a router is not the DR, it does not generate a network-LSA for the network.`
	`This test is with DUT as DR-Other`

	Debian 12: pass
ANVL-OSPF-13.15 **MUST**	RFC 2328, s7.3 p54 The Designated Router
	`Bringing up Adjacencies` `The Link State ID for network-LSA is the IP interface address of the Designated Router.`
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-13.16 **MUST**	RFC 2328, s7.4 p56 The Backup Designated Router
	`Bringing up Adjacencies` `Backup Designated Router becomes Designated Router when the previous Designated Router fails.`
	Debian 12: pass
ANVL-OSPF-13.17 **MUST**	RFC 2328, s7.4 p56 The Backup Designated Router
	`Bringing up Adjacencies` `Each Hello Packet has a field that specifies the Backup Designated Router for the network.`
	Debian 12: pass
ANVL-OSPF-14.1 **MUST**	RFC 2328, s8.1 p58 Sending protocol packets
	`Protocol Packet Processing` `In the OSPF protocol packet headers version Number is set to 2, the version number of the protocol as documented in this specification.`
	Debian 12: pass
ANVL-OSPF-14.2 **MUST**	RFC 2328, s8.1 p59 Sending protocol packets
	`Protocol Packet Processing` `In OSPF protocol packet headers Router ID is set to the identity of the router itself (who is originating the packet).`
	Debian 12: pass
ANVL-OSPF-14.3 **MUST**	RFC 2328, s8.1 p59 Sending protocol packets

	`Protocol Packet Processing`
	`Area ID in the OSPF packet header must be set to the ID of the area that the packet is being sent into.`
	`(This test checks Hello packet)`

	Debian 12: pass
ANVL-OSPF-14.4 **MUST**	RFC 2328, s8.1 p59 Sending protocol packets

	`Protocol Packet Processing`
	`The IP checksum of any OSPF packet is the standard IP 16-bit one"s complement checksum of the entire OSPF packet, excluding the 64-bit authentication field.`
	`(This test checks the case of sending a Hello packet)`

	Debian 12: pass
ANVL-OSPF-14.5 **MUST**	RFC 2328, s8.1 p59 Sending protocol packets s10.5 p96 Receiving Hello packets
	`Protocol Packet Processing` `A router discards any received Hello packet with an invalid IP checksum i.e. which is not the standard IP 16-bit one"s complement checksum of the entire OSPF packet, excluding the 64-bit authentication field.`
	Debian 12: pass
ANVL-OSPF-14.7 **MUST**	RFC 2328, s8.1 p60 Sending protocol packets
	`Protocol Packet Processing` `Retransmissions of Link State Update packets are ALWAYS sent directly to the neighbor.`
	Debian 12: pass

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ANVL-OSPF-14.8 **MUST**	RFC 2328, s8.2 p62 Receiving protocol packets
	Protocol Packet Processing The Received packet"s IP source address is required to be on the same network as the receiving interface.
	Debian 12: pass
ANVL-OSPF-14.9 **MUST**	NEGATIVE: RFC 2328, s8.2 p62 Receiving protocol packets
	Protocol Packet Processing The Received packet"s IP source address is required to be on the same network as the receiving interface.
	Debian 12: pass
ANVL-OSPF-14.10 **MUST**	NEGATIVE: RFC 2328, s8.2 p62 Receiving protocol packets
	Protocol Packet Processing The AuType specified in the packet must match the AuType specified for the associated area.
	Debian 12: pass
ANVL-OSPF-15.1 **MUST**	RFC 2328, s9.5 p78 Sending Hello packets
	Interface Data Structure The Hello Packet also indicates how often a neighbor must be heard from to remain active (RouterDeadInterval).
	Debian 12: pass
ANVL-OSPF-15.2 **MUST**	RFC 2328, s9 p66 The Interface Data Structure
	Interface Data Structure The Designated Router is initialized to 0.0.0.0, which indicates the lack of a Designated Router.
	Debian 12: FAIL
ANVL-OSPF-15.3 **MUST**	RFC 2328, s9 p66 The Interface Data Structure
	Interface Data Structure The Backup Designated Router is initialized to 0.0.0.0, indicating the lack of a Backup Designated Router
	Debian 12: pass
ANVL-OSPF-15.4 **MUST**	RFC 2328, s9 p66 The Interface Data Structure
	Interface Data Structure RxmtInterval is the number of seconds between Database Description packet retransmissions. This tests for Database Description packet retransmission in ExStart state.
	Debian 12: pass
ANVL-OSPF-15.5 **MUST**	RFC 2328, s9 p66 The Interface Data Structure
	Interface Data Structure RxmtInterval is the number of seconds between Link State Request packet retransmissions. This tests for Database Description packet retransmission in Loading state.
	Debian 12: pass

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ANVL-OSPF-15.6 **MUST**	RFC 2328, s9 p66 The Interface Data Structure
	Interface Data Structure RxmtInterval is the number of seconds between LSA retransmissions, for adjacencies belonging to this interface.
	Debian 12: pass
ANVL-OSPF-15.7 **MUST**	RFC 2328, s9.1 p67 The Interface Data Structure
	Interface Data Structure No protocol traffic at all will be sent or received on a down interface.
	Debian 12: pass
ANVL-OSPF-15.8 **MUST**	RFC 2328, s9.1 p69 Interface states
	Interface Data Structure In DR Other state, the router itself has not been selected Backup Designated Router either. The router forms adjacencies to both the Designated Router and the Backup Designated Router (if they exist).
	Debian 12: pass
ANVL-OSPF-15.9 **MUST**	RFC 2328, s9.1 p69 Interface states
	Interface Data Structure In Backup state the router establishes adjacencies to all other routers attached to the network.
	Debian 12: pass
ANVL-OSPF-15.10 **MUST**	RFC 2328, s9.1 p69 Interface states
	Interface Data Structure In DR state Adjacencies are established to all other routers attached to the network.
	Debian 12: pass
ANVL-OSPF-15.11 **MUST**	RFC 2328, s9.3 p73 The Interface state machine
	Interface Data Structure When router is in Waiting state, if BackupSeen event occurs then router calculates the attached network"s Backup Designated Router and Designated Router.
	Debian 12: pass
ANVL-OSPF-15.12 **MUST**	RFC 2328, s9.3 p73 The Interface state machine
	Interface Data Structure When router is in Waiting state, if WaitTimer event fires then router calculates the attached network"s Backup Designated Router and Designated Router.
	Debian 12: pass
ANVL-OSPF-15.13 **MUST**	RFC 2328, s9.3 p74 The Interface state machine
	Interface Data Structure When NbrChange event fires then router recalculates the attached network"s Backup Designated Router and Designated Router.
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-15.14 **MUST**	RFC 2328, s9.4 p75 Electing the Designated Router
	Interface Data Structure If more than one routers have declared themselves as Backup designated but not as Designated Router, the one having the highest Router Priority is declared to be Backup Designated Router.
	Debian 12: pass
ANVL-OSPF-15.15 **MUST**	RFC 2328, s9.4 p75 Electing the Designated Router
	Interface Data Structure When selecting a Backup Designated Router among more than one Routers declaring themselves as Backup Designated Router, if there is a tie in the Router Priority, the one having highest Router ID is chosen.
	Debian 12: pass
ANVL-OSPF-15.16 **MUST**	RFC 2328, s9.4 p76 Electing the Designated Router
	Interface Data Structure If no routers have declared themselves Backup Designated Router, choose the router having highest Router Priority as Backup Designated Router.
	Debian 12: pass
ANVL-OSPF-15.17 **MUST**	RFC 2328, s9.4 p76 Electing the Designated Router
	Interface Data Structure If no routers have declared themselves Backup Designated Router, choose the router having highest Router Priority, again use the Router ID to break ties.
	Debian 12: pass
ANVL-OSPF-15.18 **MUST**	RFC 2328, s9.4 p76 Electing the Designated Router
	Interface Data Structure If one or more of the routers have declared themselves Designated Router the one having highest Router Priority is declared to be Designated Router.
	Debian 12: pass
ANVL-OSPF-15.19 **MUST**	RFC 2328, s9.4 p76 Electing the Designated Router
	Interface Data Structure In case of a tie in the router priority among routers declaring themselves Designated Router, the one having the highest Router ID is chosen.
	Debian 12: pass
ANVL-OSPF-15.20 **MUST**	RFC 2328, s9.4 p76 Electing the Designated Router
	Interface Data Structure If no routers have declared themselves Designated Router, assign the Designated Router to be the same as the newly elected Backup Designated Router.
	Debian 12: pass
ANVL-OSPF-15.21 **SHOULD**	RFC 2328, s9.5 p78 Sending Hello packets
	Interface Data Structure While sending a Hello packet into a stub area the E-bit of the Options field should be clear.
	Debian 12: pass

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ANVL-OSPF-15.22 **SHOULD**	RFC 2328, s9.5 p78 Sending Hello packets
	Interface Data Structure While sending a Hello packet into a non-stub area the E-bit of the Options field should be set.
	Debian 12: pass
ANVL-OSPF-15.23 **MUST**	RFC 2328, s9.5 p78 Sending Hello packets
	Interface Data Structure In order to ensure two-way communication between adjacent routers, the Hello packet contains the list of all routers on the network from which Hello Packets have been seen recently.
	Debian 12: pass
ANVL-OSPF-15.24 **MUST**	RFC 2328, s9.5 p78 Sending Hello packets
	Interface Data Structure Hello packet also contains the router"s current choice for Designated Router and Backup Designated Router.
	Debian 12: pass
ANVL-OSPF-15.25 **MUST**	RFC 2328, s9.5 p78 Sending Hello packets
	Interface Data Structure On broadcast networks, Hello packets are sent to the IP multicast address AllSPFRouters.
	Debian 12: pass
ANVL-OSPF-15.26 **MUST**	RFC 2328, s9.5 p78 Sending Hello packets
	Interface Data Structure On broadcast networks, Hello packets are sent every HelloInterval seconds.
	Debian 12: pass
ANVL-OSPF-15.29 **MUST**	RFC 2328, s9.5 p78 Sending Hello packets
	Interface Data Structure On virtual links, Hello packets are sent as unicasts (addressed directly) to the other end of the virtual link)
	Debian 12: pass
ANVL-OSPF-15.30 **MUST**	RFC 2328, s9.5 p78 Sending Hello packets
	Interface Data Structure On virtual links, Hello packets are sent every HelloInterval seconds.
	Debian 12: pass
ANVL-OSPF-16.1 **MUST**	RFC 2328, s10 p80 The neighbor Data Structure
	Neighbor Data Structure The Database Description Packet sent by slave is not allowed to retransmit.
	Debian 12: pass

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ANVL-OSPF-16.2 **MUST**	RFC 2328, s10 p81 The neighbor Data Structure
	Neighbor Data Structure The initialize(I), more (M) and master(MS) bits, Options field, and DD sequence number contained in the last Database Description packet received from the neighbor are used to determine whether the next Database Description packet received from the neighbor is a duplicate.
	Debian 12: pass
ANVL-OSPF-17.1 **MUST**	RFC 2328, s10.1 p83 neighbor states
	Neighbor States After the two routers discover their master/slave status, the state transitions to Exchange. (This test checks the case when DUT eventually becomes master)
	Debian 12: pass
ANVL-OSPF-17.2 **MUST**	RFC 2328, s10.1 p83 neighbor states
	Neighbor States After the two routers discover their master/slave status, the state transitions to Exchange. (This test checks the case when DUT eventually becomes slave)
	Debian 12: pass
ANVL-OSPF-17.3 **MUST**	RFC 2328, s10.1 p86 neighbor states
	Neighbor States Only one Database Description Packet is allowed outstanding at any one time. So when a router is slave it will always send a Database Description packet with the DD sequence number same as that of the Database Description packet received from master.
	Debian 12: pass
ANVL-OSPF-17.4 **MUST**	RFC 2328, s10.1 p86 neighbor states
	Neighbor States Only one Database Description Packet is allowed outstanding at any one time. So when a router is master it will retransmit a Database Description packet unless slave sends a Database Description packet echoing the DD sequence number of the last sent Database Description packet.
	Debian 12: pass
ANVL-OSPF-17.5 **MAY**	RFC 2328, s10.1 p86 neighbor states
	Neighbor States In Exchange state Link State Request Packets may also be sent asking for the neighbor"s more recent LSAs.
	Debian 12: pass
ANVL-OSPF-18.1 **SHOULD**	RFC 2328, s10.3 p90-91 The neighbor state machine
	Neighbor State Machine In Init state if the neighbor event 2-WayReceived is triggered and if it is determined that adjacency should be established with the neighbor, the neighbor state transitions to ExStart. Upon entering this state, the router increments the DD sequence number in the neighbor data structure.
	Debian 12: pass

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ANVL-OSPF-18.2 **MUST**	RFC 2328, s10.3 p91 The neighbor state machine
	Neighbor State Machine The area link state database consists of the router-LSAs, network-LSAs and summary-LSAs contained in the area structure, along with the AS-external-LSAs contained in the global structure.
	Debian 12: pass
ANVL-OSPF-18.3 **MUST**	RFC 2328, s10.3 p91 The neighbor state machine
	Neighbor State Machine AS-external-LSAs are omitted from the Database summary list if the area has been configured as a stub area.
	Debian 12: pass
ANVL-OSPF-18.4 **MUST**	RFC 2328, s10.3 p92 The neighbor state machine
	Neighbor State Machine When in Exchange state if ExchangeDone event has fired then if the neighbor Link state request list is not empty, router transitions to Loading state and starts (or continues) sending Link State Request packets to the neighbor.
	Debian 12: pass
ANVL-OSPF-18.5 **MUST**	RFC 2328, s10.3 p93 The neighbor state machine
	Neighbor State Machine If the router is in Exchange or greater state and the neighbor event SeqNumberMismatch has occurred then the router increments the DD sequence number in the neighbor data structure. This test is for Exchange State.
	Debian 12: pass
ANVL-OSPF-18.6 **MUST**	RFC 2328, s10.3 p93 The neighbor state machine
	Neighbor State Machine If the router is in Exchange or greater state and the neighbor event SeqNumberMismatch has occurred then the router increments the DD sequence number in the neighbor data structure. This test is for Loading State.
	Debian 12: pass
ANVL-OSPF-18.7 **MUST**	RFC 2328, s10.3 p94 The neighbor state machine
	Neighbor State Machine The action for event BadLSReq is exactly the same as for the neighbor event SeqNumberMismatch. The (possibly partially formed) adjacency is torn down, and then an attempt is made at reestablishment. This test is for Exchange State.
	Debian 12: pass
ANVL-OSPF-18.8 **MUST**	RFC 2328, s10.3 p94 The neighbor state machine
	Neighbor State Machine The action for event BadLSReq is exactly the same as for the neighbor event SeqNumberMismatch. The (possibly partially formed) adjacency is torn down, and then an attempt is made at reestablishment. This test is for Loading State.
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-19.1 **MUST**	RFC 2328, s10.4 p95 Whether to become adjacent
	Adjacency Decision On broadcast, all routers become adjacent to both the Designated Router and the Backup Designated Router.
	Debian 12: pass
ANVL-OSPF-20.1 **MUST**	RFC 2328, s10.5 p96 Receiving Hello Packets
	Receiving Hello Packets The values of the Network Mask field in the received Hello packet must be checked against the values configured for the receiving interface. Any mismatch causes processing to stop and the packet to be dropped.
	Debian 12: pass
ANVL-OSPF-20.2 **MUST**	RFC 2328, s10.5 p96 Receiving Hello Packets
	Receiving Hello Packets The values of the HelloInterval field in the received Hello packet must be checked against the values configured for the receiving interface. Any mismatch causes processing to stop and the packet to be dropped.
	Debian 12: pass
ANVL-OSPF-20.3 **MUST**	RFC 2328, s10.5 p96 Receiving Hello Packets
	Receiving Hello Packets The values of the RouterDeadInterval fields in the received Hello packet must be checked against the values configured for the receiving interface. Any mismatch causes processing to stop and the packet to be dropped.
	Debian 12: pass
ANVL-OSPF-20.4 **MUST**	RFC 2328, s10.5 p96 Receiving Hello Packets
	Receiving Hello Packets If the receiving interface is attached to a stub area the E-bit must be clear in received Hello Packets and a mismatch causes processing to stop and the packet to be dropped.
	Debian 12: pass
ANVL-OSPF-20.5 **MUST**	RFC 2328, s10.5 p96 Receiving Hello Packets
	Receiving Hello Packets If the receiving interface is attached to a non-stub area the E-bit must be set in received Hello Packets and a mismatch causes processing to stop and the packet to be dropped.
	Debian 12: pass
ANVL-OSPF-21.1 **MUST**	RFC 2328, s10.6 p100 Receiving Database Description Packets
	Receiving DB Description Packets In ExStart state if the received Database Description packet has the I, M and MS bits set, the packet is empty, and the neighbor"s Router ID is larger than the router"s own then the router is slave, and it sets the neighbor data structure"s DD sequence number to that specified by master.
	Debian 12: pass

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ANVL-OSPF-21.2 **MUST**	RFC 2328, s10.6 p100 Receiving Database Description Packets
	`Receiving DB Description Packets` `In ExStart state if the received Database Description packet has the I and MS bits off, the packet"s DD sequence number equals the neighbor data structure"s DD sequence number and the neighbor"s Router ID is smaller than the router"s own then the router is Master.`
	Debian 12: pass
ANVL-OSPF-21.3 **SHOULD**	RFC 2328, s10.6 p102 Receiving Database Description Packets
	`Receiving DB Description Packets` `When the router accepts a received Database Description Packet as the next in sequence, if the router is master and the accepted packet has more bit (M) set to 1, it should send a new Database Description to the slave.`
	Debian 12: pass
ANVL-OSPF-21.4 **SHOULD**	RFC 2328, s10.6 p102 Receiving Database Description Packets
	`Receiving DB Description Packets` `When the router accepts a received Database Description Packet as the next in sequence, if the router is master and the router has not sent its entire sequence of Database Description packets, it should send a new Database Description to the slave.`
	Debian 12: pass
ANVL-OSPF-21.5 **MUST**	RFC 2328, s10.6 p102 Receiving Database Description Packets
	`Receiving DB Description Packets` `When the router accepts a received Database Description Packet as the next in sequence, if the router is master it increments the DD sequence number in the neighbor data structure.`
	Debian 12: pass
ANVL-OSPF-21.6 **MUST**	RFC 2328, s10.6 p102 Receiving Database Description Packets
	`Receiving DB Description Packets` `When the router accepts a received Database Description Packet as the next in sequence, if the router is slave, it sets the DD sequence number in the neighbor data structure to the DD sequence number appearing in the received packet and also it must send a Database Description packet in response.`
	Debian 12: pass
ANVL-OSPF-22.1 **SHOULD**	RFC 2328, s10.7 p102 Receiving Link State Request Packets
	`Receiving LS Request Packets` `Link State Request Packets should be accepted when the neighbor is in state Exchange.`
	Debian 12: pass
ANVL-OSPF-22.2 **SHOULD**	RFC 2328, s10.7 p102 Receiving Link State Request Packets
	`Receiving LS Request Packets` `Link State Request Packets should be accepted when the neighbor is in state Loading.`
	Debian 12: pass

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ANVL-OSPF-22.3 **SHOULD**	RFC 2328, s10.7 p102 Receiving Link State Request Packets
	`Receiving LS Request Packets` `Link State Request Packets should be accepted when the neighbor is in state Full.`
	Debian 12: pass
ANVL-OSPF-22.4 **SHOULD**	RFC 2328, s10.7 p102 Receiving Link State Request Packets
	`Receiving LS Request Packets` `Link State Request Packets should be ignored when neighbor is in ExStart state.`
	Debian 12: pass
ANVL-OSPF-22.5 **SHOULD**	RFC 2328, s10.7 p102 Receiving Link State Request Packets
	`Receiving LS Request Packets` `Link State Request Packets should be ignored when neighbor is in Init state.`
	Debian 12: pass
ANVL-OSPF-22.6 **SHOULD**	RFC 2328, s10.7 p102 Receiving Link State Request Packets
	`Receiving LS Request Packets` `Link State Request Packets should be ignored when neighbor is in Down state.`
	Debian 12: pass
ANVL-OSPF-22.7 **SHOULD**	RFC 2328, s10.7 p103 Receiving Link State Request Packets
	`Receiving LS Request Packets` `If an LSA specified in the Link State Request packet cannot be found in the database, something has gone wrong with the Database Exchange process, and neighbor event BadLSReq should be generated.`
	Debian 12: pass
ANVL-OSPF-23.1 **SHOULD**	RFC 2328, s10.8 p103 Sending Database Description Packets
	`Sending DB Description Packets` `Interface MTU should be set to 0 in Database Description packets sent over virtual links.`
	Debian 12: pass
ANVL-OSPF-23.2 **SHOULD**	RFC 2328, s10.8 p103 Sending Database Description Packets

	`Sending DB Description Packets`
	`In Database Description packet the unrecognized bits in the Options field should be set to zero.`
	`(Note: we are only checking the option-bit 1 since it is currently reserved and not recognized)`

	Debian 12: pass
ANVL-OSPF-23.3 **MUST**	RFC 2328, s10.8 p103 Sending Database Description Packets
	`Sending DB Description Packets` `In state ExStart the router sends empty Database Description packets, with the initialize (I), more (M) and master (MS) bits set.`
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-23.4 **MUST**	RFC 2328, s10.8 p103 Sending Database Description Packets
	Sending DB Description Packets In state ExStart Database Description packets are retransmitted every RxmtInterval seconds.
	Debian 12: pass
ANVL-OSPF-23.5 **MUST**	RFC 2328, s10.8 p104 Sending Database Description Packets
	Sending DB Description Packets In state Exchange, if the router is master, Database Description packets are sent when slave acknowledges the previous Database Description packet by echoing the DD sequence number.
	Debian 12: pass
ANVL-OSPF-23.6 **MUST**	RFC 2328, s10.8 p104 Sending Database Description Packets
	Sending DB Description Packets In state Exchange, if the router is slave, Database Description packets are sent only in response to Database Description packets received from the master.
	Debian 12: pass
ANVL-OSPF-23.7 **MUST**	RFC 2328, s10.8 p104 Sending Database Description Packets
	Sending DB Description Packets In state Exchange, if the router is slave, if the Database Description packet received from the master is new, a new Database Description packet is sent, otherwise the previous Database Description packet is resent.
	Debian 12: pass
ANVL-OSPF-23.8 **MUST**	RFC 2328, s10.8 p104 Sending Database Description Packets
	Sending DB Description Packets In state Loading the slave must resend its last Database Description packet in response to duplicate Database Description packets received from the master.
	Debian 12: pass
ANVL-OSPF-23.9 **MUST**	RFC 2328, s10.8 p104 Sending Database Description Packets
	Sending DB Description Packets In state Full the slave must resend its last Database Description packet in response to duplicate Database Description packets received from the master.
	Debian 12: pass
ANVL-OSPF-23.10 **MUST**	RFC 2328, s10.8 p104 Sending Database Description Packets
	Sending DB Description Packets In state Loading reception of a Database Description packet from the master after this interval (RouterDeadInterval) will generate a SeqNumberMismatch neighbor event.
	Debian 12: pass

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ANVL-OSPF-23.11 **MUST**	RFC 2328, s10.8 p104 Sending Database Description Packets
	`Sending DB Description Packets` `In state Full reception of a Database Description packet from the master after this interval (RouterDeadInterval) will generate a SeqNumberMismatch neighbor event.`
	Debian 12: pass
ANVL-OSPF-24.1 **MUST**	RFC 2328, s10.9 p105 Sending Link State Request Packets
	`Sending LS Request Packets` `When the neighbor responds to these requests (Link State Request) with the proper Link State Update packet(s), the Link state request list is truncated and a new Link State Request packet is sent. This process continues until the Link state request list becomes empty.`
	Debian 12: pass
ANVL-OSPF-24.2 **MUST**	RFC 2328, s10.9 p105 Sending Link State Request Packets
	`Sending LS Request Packets` `Link state request list that have been requested, but not yet received, are packaged into Link State Request packets for retransmission at intervals of RxmtInterval.`
	Debian 12: pass
ANVL-OSPF-24.3 **MUST**	RFC 2328, s12.1.1 p116 LS age
	`Sending LS Request Packets` `LSAs are also aged as they are held in each router"s database.`
	Debian 12: pass
ANVL-OSPF-24.4 **MUST**	RFC 2328, s12.1.1 p116 LS age
	`Sending LS Request Packets` `The age of an LSA is never incremented past MaxAge.`
	Debian 12: pass
ANVL-OSPF-24.5 **MUST**	RFC 2328, s12.1.1 p116 LS age
	`Sending LS Request Packets` `When an LSA"s age first reaches MaxAge, it is reflooded.`
	Debian 12: pass
ANVL-OSPF-24.6 **MUST**	RFC 2328, s12.1.1 p116 LS age
	`Sending LS Request Packets` `LSA of age MaxAge is finally flushed from the database when it is no longer needed to ensure database synchronization.`
	Debian 12: pass
ANVL-OSPF-24.7 **MUST**	RFC 2328, s12.1.1 p117 LS age
	`Sending LS Request Packets` `If the two instances of a LSA have identical LS sequence number and LS checksum, an instance of age MaxAge is then always accepted as most recent.`
	Debian 12: pass

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ANVL-OSPF-24.8
 	
MUST
	RFC 2328, s12.1.1 p117 LS age
	
	`Sending LS Request Packets`
	`If the two instances of a LSA have identical LS sequence number and LS Checksum and none of them is of age MaxAge then if their ages differ by more than MaxAgeDiff, the instance having the smaller age is accepted as most recent.`
	
	Debian 12: pass

ANVL-OSPF-25.1
 	
SHOULD
	RFC 2328, s12.1.2 p117 Options
	
	`LSA Header`
	`The E-bit represents OSPF"s ExternalRoutingCapability. This bit should be set in all LSAs associated with the backbone.`
	
	Debian 12: pass

ANVL-OSPF-25.2
 	
SHOULD
	RFC 2328, s12.1.2 p117 Options
	
	`LSA Header`
	`The E-bit represents OSPF"s ExternalRoutingCapability. This bit should be set in all LSAs associated with (non-backbone) non-stub areas. (This test checks for Router-LSA)`
	
	Debian 12: pass

ANVL-OSPF-25.3
 	
SHOULD
	RFC 2328, s12.1.2 p117 Options
	
	`LSA Header`
	`The E-bit represents OSPF"s ExternalRoutingCapability. This bit should be set in all LSAs associated with (non-backbone) non-stub areas. (This test checks for Network-LSA)`
	
	Debian 12: pass

ANVL-OSPF-25.4
 	
SHOULD
	RFC 2328, s12.1.2 p117 Options
	
	`LSA Header`
	`The E-bit represents OSPF"s ExternalRoutingCapability. This bit should be set in all LSAs associated with (non-backbone) non-stub areas. (This test checks for Type-3 Summary-LSA)`
	
	Debian 12: pass

ANVL-OSPF-25.5
 	
SHOULD
	RFC 2328, s12.1.2 p117 Options
	
	`LSA Header`
	`The E-bit represents OSPF"s ExternalRoutingCapability. This bit should be set in all LSAs associated with (non-backbone) non-stub areas. (This test checks for Type-4 Summary-LSA)`
	
	Debian 12: pass

ANVL-OSPF-25.6
 	
SHOULD
	RFC 2328, s12.1.2 p117 Options
	
	`LSA Header`
	`E-bit should be reset (set to 0) in all router-LSAs associated with a stub area.`
	
	Debian 12: pass

ANVL-OSPF-25.7
 	
SHOULD
	RFC 2328, s12.1.2 p117 Options
	
	`LSA Header`
	`E-bit should be reset (set to 0) in all network-LSAs associated with a stub area.`
	
	Debian 12: pass

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ANVL-OSPF-25.8
 	
SHOULD
	RFC 2328, s12.1.2 p117 Options
	
	`LSA Header`
	`E-bit should be reset (set to 0) in all summary-LSAs associated with a stub area.`
	
	Debian 12: pass

ANVL-OSPF-25.9
 	
MUST
	RFC 2328, s12.1.3 p117 LS type
	
	`LSA Header`
	`All LSA types defined by this memo, except the AS-external-LSAs (LS type = 5), are flooded throughout a single area only.`
	
	Debian 12: pass

ANVL-OSPF-25.10
 	
MUST
	RFC 2328, s12.1.4 p119 Link State ID
	
	`LSA Header`
	`When the LSA is describing a router (LS type = 1 or 4), the Link State ID is always the described router"s OSPF Router ID.`
	
	Debian 12: pass

ANVL-OSPF-25.11
 	
MUST
	RFC 2328, s12.1.5 p119 Advertising Router
	
	`LSA Header`
	`The Advertising Router field specifies the OSPF Router ID of the LSA"s originator.`
	
	Debian 12: pass

ANVL-OSPF-25.12
 	
MUST
	RFC 2328, s12.1.5 p119 Advertising Router
	
	`LSA Header`
	`For router-LSAs, the Advertising Router field is identical to the Link State ID field.`
	
	Debian 12: pass

ANVL-OSPF-25.13
 	
MUST
	RFC 2328, s12.1.5 p120 Advertising Router
	
	`LSA Header`
	`Summary-LSAs are originated by area border routers.`
	
	Debian 12: pass

ANVL-OSPF-25.14
 	
MUST
	RFC 2328, s12.1.6 p120 LS sequence number
	
	`LSA Header`
	`A router uses InitialSequenceNumber the first time it originates any LSA.`
	`(This test checks for Router-LSAs)`
	
	Debian 12: FAIL

ANVL-OSPF-25.15
 	
MUST
	RFC 2328, s12.1.6 p120 LS sequence number
	
	`LSA Header`
	`A router uses InitialSequenceNumber the first time it originates any LSA.`
	`(This test checks for Network-LSAs)`
	
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-25.16 **MUST**	RFC 2328, s12.1.6 p120 LS sequence number

	`LSA Header`
	`A router uses InitialSequenceNumber the first time it originates any LSA.`
	`(This test checks for Type-3 Summary-LSAs)`

	Debian 12: pass
ANVL-OSPF-25.17 **MUST**	RFC 2328, s12.1.6 p120 LS sequence number

	`LSA Header`
	`A router uses InitialSequenceNumber the first time it originates any LSA.`
	`(This test checks for Type-4 Summary-LSAs)`

	Debian 12: pass
ANVL-OSPF-25.18 **MUST**	RFC 2328, s12.1.6 p120 LS sequence number

	`LSA Header`
	`A router uses InitialSequenceNumber the first time it originates any LSA. Afterwards, the LSA"s sequence number is incremented each time the router originates a new instance of the LSA.`
	`(This test checks for Router-LSA)`

	Debian 12: FAIL
ANVL-OSPF-25.19 **MUST**	RFC 2328, s12.1.6 p120 LS sequence number

	`LSA Header`
	`A router uses InitialSequenceNumber the first time it originates any LSA. Afterwards, the LSA"s sequence number is incremented each time the router originates a new instance of the LSA.`
	`(This test checks for Network-LSA)`

	Debian 12: pass
ANVL-OSPF-25.20 **MUST**	RFC 2328, s12.1.6 p120 LS sequence number

	`LSA Header`
	`A router uses InitialSequenceNumber the first time it originates any LSA. Afterwards, the LSA"s sequence number is incremented each time the router originates a new instance of the LSA.`
	`(This test checks for Type-3 Summary-LSA)`

	Debian 12: pass
ANVL-OSPF-25.21 **MUST**	RFC 2328, s12.1.6 p120 LS sequence number

	`LSA Header`
	`A router uses InitialSequenceNumber the first time it originates any LSA. Afterwards, the LSA"s sequence number is incremented each time the router originates a new instance of the LSA.`
	`(This test checks for Type-4 Summary-LSA)`

	Debian 12: pass
ANVL-OSPF-25.22 **MUST**	RFC 2328, s12.1.6 p120 LS sequence number
	`LSA Header` `When an attempt is made to increment the sequence number past the maximum value of N - 1 (0x7fffffff; also referred to as MaxSequenceNumber), the current instance of the LSA must first be flushed from the routing domain.`
	Debian 12: pass

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ANVL-OSPF-25.23
 	
MUST
	RFC 2328, s12.1.6 p120 LS sequence number
	
	`LSA Header`
	`As soon as this flooding of a LSA with LS sequence number MaxSequenceNumber has been acknowledged by all adjacent neighbors, a new instance can be originated with sequence number of InitialSequenceNumber.`
	
	Debian 12: pass

ANVL-OSPF-25.24
 	
MUST
	RFC 2328, s12.1.7 p121 LS checksum
	
	`LSA Header`
	`The LSA header also contains the length of the LSA in bytes; subtracting the size of the LS age field (two bytes) yields the amount of data to checksum.`
	`(This test checks for Router-LSA)`
	
	Debian 12: pass

ANVL-OSPF-25.25
 	
MUST
	RFC 2328, s12.1.7 p121 LS checksum
	
	`LSA Header`
	`The LSA header also contains the length of the LSA in bytes; subtracting the size of the LS age field (two bytes) yields the amount of data to checksum.`
	`(This test checks for Network-LSA)`
	
	Debian 12: pass

ANVL-OSPF-25.26
 	
MUST
	RFC 2328, s12.1.7 p121 LS checksum
	
	`LSA Header`
	`The LSA header also contains the length of the LSA in bytes; subtracting the size of the LS age field (two bytes) yields the amount of data to checksum.`
	`(This test checks for Type-3 Summary-LSA)`
	
	Debian 12: pass

ANVL-OSPF-25.27
 	
MUST
	RFC 2328, s12.1.7 p121 LS checksum
	
	`LSA Header`
	`The LSA header also contains the length of the LSA in bytes; subtracting the size of the LS age field (two bytes) yields the amount of data to checksum.`
	`(This test checks for Type-4 Summary-LSA)`
	
	Debian 12: pass

ANVL-OSPF-25.28
 	
SHOULD
	RFC 2328, s12.1.7 p121 LS checksum
	
	`LSA Header`
	`The LS checksum field cannot take on the value of zero; the occurrence of such a value should be considered a checksum failure.`
	
	Debian 12: pass

ANVL-OSPF-26.1
 	
MUST
	RFC 2328, s12.2 p122 The link state database
	
	`LS Database`
	`An LSA is deleted from a router"s database when it has been overwritten by a newer instance during the flooding process.`
	`(This test checks for Router-LSA)`
	
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-26.2 **MUST**	RFC 2328, s12.2 p122 The link state database
	LS Database An LSA is deleted from a router"s database when it has been overwritten by a newer instance during the flooding process. (This test checks for Network-LSA)
	Debian 12: pass
ANVL-OSPF-26.3 **MUST**	RFC 2328, s12.2 p122 The link state database
	LS Database An LSA is deleted from a router"s database when it has been overwritten by a newer instance during the flooding process. (This test checks for Type-3 Summary-LSA)
	Debian 12: pass
ANVL-OSPF-26.4 **MUST**	RFC 2328, s12.2 p122 The link state database
	LS Database An LSA is deleted from a router"s database when it has been overwritten by a newer instance during the flooding process. (This test checks for Type-4 Summary-LSA)
	Debian 12: pass
ANVL-OSPF-26.5 **MUST**	RFC 2328, s12.2 p122 The link state database
	LS Database An LSA is deleted from a router"s database when it has been overwritten by a newer instance during the flooding process. (This test checks for Type-5 AS-External-LSA)
	Debian 12: pass
ANVL-OSPF-26.6 **MUST**	RFC 2328, s12.2 p122 The link state database
	LS Database An LSA is deleted from a router"s database when the router originates a newer instance of one of its self-originated LSAs. (This test checks for Router-LSA)
	Debian 12: pass
ANVL-OSPF-26.7 **MUST**	RFC 2328, s12.2 p122 The link state database
	LS Database An LSA is deleted from a router"s database when the router originates a newer instance of one of its self-originated LSAs. (This test checks for Network-LSA)
	Debian 12: pass
ANVL-OSPF-26.8 **MUST**	RFC 2328, s12.2 p122 The link state database
	LS Database An LSA is deleted from a router"s database when the router originates a newer instance of one of its self-originated LSAs. (This test checks for Type-3 Summary-LSA)
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-26.9 **MUST**	RFC 2328, s12.2 p122 The link state database

	`LS Database`
	`An LSA is deleted from a router"s database when the router originates a newer instance of one of its self-originated LSAs.`
	`(This test checks for Type-4 Summary-LSA)`

	Debian 12: pass
ANVL-OSPF-26.10 **MUST**	RFC 2328, s12.2 p122 The link state database

	`LS Database`
	`An LSA is deleted from a router"s database when the LSA ages out and is flushed from the routing domain.`
	`(This test is for Router-LSA)`

	Debian 12: pass
ANVL-OSPF-26.11 **MUST**	RFC 2328, s12.2 p122 The link state database

	`LS Database`
	`An LSA is deleted from a router"s database when the LSA ages out and is flushed from the routing domain.`
	`(This test is for Network-LSA)`

	Debian 12: pass
ANVL-OSPF-26.12 **MUST**	RFC 2328, s12.2 p122 The link state database

	`LS Database`
	`An LSA is deleted from a router"s database when the LSA ages out and is flushed from the routing domain.`
	`(This test is for Type-3 Summary-LSA)`

	Debian 12: pass
ANVL-OSPF-26.13 **MUST**	RFC 2328, s12.2 p122 The link state database

	`LS Database`
	`An LSA is deleted from a router"s database when the LSA ages out and is flushed from the routing domain.`
	`(This test is for Type-4 Summary-LSA)`

	Debian 12: pass
ANVL-OSPF-26.14 **MUST**	RFC 2328, s12.2 p122 The link state database

	`LS Database`
	`An LSA is deleted from a router"s database when the LSA ages out and is flushed from the routing domain.`
	`(This test is for Type-5 AS External-LSA)`

	Debian 12: pass
ANVL-OSPF-27.1 **MUST**	RFC 2328, s12.4 p123 Originating LSAs

	`LSA Origination`
	`Destinations are advertised one at a time so that the change in any single route can be flooded without reflooding the entire collection of routes.`
	`This test is for Type-3 Summary-LSA.`

	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-27.2 **MUST**	RFC 2328, s12.4 p123 Originating LSAs

	`LSA Origination`
	`During the flooding procedure, many LSAs can be carried by a single Link State Update packet.`
	`This test verifies whether the DUT recognizes multiple LSAs residing in a single Link State Update packet.`

	Debian 12: pass
ANVL-OSPF-27.3 **MUST**	RFC 2328, s12.4 p124 Originating LSAs
	`LSA Origination` `Whenever a new instance of an LSA is originated, its LS sequence number is incremented, its LS age is set to 0.`
	Debian 12: pass
ANVL-OSPF-27.4 **MAY**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `A change in an interface"s state may mean that it is necessary to produce a new instance of the router-LSA.`
	Debian 12: pass
ANVL-OSPF-27.5 **SHOULD**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `If an attached network"s Designated Router gets changed a new router-LSA should be originated.`
	Debian 12: pass
ANVL-OSPF-27.6 **SHOULD**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `When Designated Router changes and if the router itself is now the Designated Router, a new network-LSA should be produced.`
	Debian 12: pass
ANVL-OSPF-27.7 **SHOULD**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `If the router itself is no longer the Designated Router, any network-LSA that it might have originated for the network should be flushed from the routing domain.`
	Debian 12: pass
ANVL-OSPF-27.8 **MAY**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `If one of the neighboring routers changes to the FULL state then this may mean that it is necessary to produce a new instance of the router-LSA.`
	Debian 12: pass
ANVL-OSPF-27.9 **MAY**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `If one of the neighboring routers changes from the FULL state then this may mean that it is necessary to produce a new instance of the router-LSA.`
	Debian 12: pass

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ANVL-OSPF-27.10 **MAY**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `An intra-area route has been added in the routing table. This may cause a new instance of a summary-LSA (for this route) to be originated in each attached area.`
	Debian 12: pass
ANVL-OSPF-27.11 **MAY**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `An intra-area route has been modified in the routing table. This may cause a new instance of a summary-LSA (for this route) to be originated in each attached area.`
	Debian 12: pass
ANVL-OSPF-27.12 **MAY**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `An intra-area route has been deleted in the routing table. This may cause a new instance of a summary-LSA (for this route) to be originated in each attached area.`
	Debian 12: pass
ANVL-OSPF-27.13 **MAY**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `In case of an area border router an inter-area route has been added in the routing table. This may cause a new instance of a summary-LSA (for this route) to be originated in each attached non-backbone area.`
	Debian 12: pass
ANVL-OSPF-27.14 **MAY**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `In case of an area border router an inter-area route has been modified in the routing table. This may cause a new instance of a summary-LSA (for this route) to be originated in each attached non-backbone area.`
	Debian 12: pass
ANVL-OSPF-27.15 **MAY**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `In case of an area border router an inter-area route has been deleted in the routing table. This may cause a new instance of a summary-LSA (for this route) to be originated in each attached non-backbone area.`
	Debian 12: pass
ANVL-OSPF-27.16 **MUST**	RFC 2328, s12.4 p125 Originating LSAs
	`LSA Origination` `In case of an area border router an inter-area route has been added in the routing table. This never causes a new instance of a summary-LSA (for this route) to be originated in the attached backbone area.`
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-27.17 **MUST**	RFC 2328, s12.4 p125 Originating LSAs
	LSA Origination In case of an area border router an inter-area route has been modified in the routing table. This never causes a new instance of a summary-LSA (for this route) to be originated in the attached backbone area.
	Debian 12: pass
ANVL-OSPF-27.18 **MUST**	RFC 2328, s12.4 p125 Originating LSAs
	LSA Origination In case of an area border router an inter-area route has been deleted in the routing table. This never causes a new instance of a summary-LSA (for this route) to be originated in the attached backbone area.
	Debian 12: pass
ANVL-OSPF-27.19 **MUST**	RFC 2328, s12.4 p126 Originating LSAs,
	LSA Origination If the router becomes newly attached to an area it must then originate summary-LSAs into the newly attached area for all intra-area and inter-area routes in the router"s routing table.
	Debian 12: pass
ANVL-OSPF-27.20 **MAY**	RFC 2328, s12.4 p126 Originating LSAs
	LSA Origination When the state of one of the router"s configured virtual links changes, it may be necessary to originate a new router-LSA into the virtual link"s Transit area, as well as originating a new router-LSA into the backbone. This test is for DUT which is ABR between backbone and non-backbone areas.
	Debian 12: pass
ANVL-OSPF-27.21 **MUST**	RFC 2328, s12.4.1 p127 Router-LSAs
	LSA Origination A router also indicates whether it is an area border router, by setting the appropriate bits (bit B, respectively) in its router-LSAs.
	Debian 12: pass
ANVL-OSPF-27.22 **SHOULD**	RFC 2328, s12.4.1 p127 Router-LSAs
	LSA Origination Bit B should be set whenever the router is actively attached to two or more areas, even if the router is not currently attached to the OSPF backbone area.
	Debian 12: pass
ANVL-OSPF-27.23 **MUST**	RFC 2328, s12.4.1 p128 Router-LSAs
	LSA Origination The router sets bit V in its router-LSA for Area A if and only if the router is the endpoint of one or more fully adjacent virtual links having Area A as their Transit area.
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-27.24 **MUST**	RFC 2328, s12.4.1 p129 Router-LSAs,
	`LSA Origination` `If the router wishes to build a router-LSA for Area A then for each interface if the attached network does not belong to Area A, no links are added to the LSA.`
	Debian 12: pass
ANVL-OSPF-27.25 **MUST**	RFC 2328, s12.4.1.3 p131 Describing virtual links
	`LSA Origination` `For virtual links, a link description is added to the router-LSA only when the virtual neighbor is fully adjacent.`
	Debian 12: pass
ANVL-OSPF-27.26 **SHOULD**	RFC 2328, s12.4.2 p134 Network-LSAs
	`LSA Origination` `A router that has formerly been the Designated Router for a network, but is no longer, should flush the network-LSA that it had previously originated.`
	Debian 12: pass
ANVL-OSPF-27.28 **MUST**	RFC 2328, s12.4.3. p136 Summary-LSAs
	`LSA Origination` `If for a route the area associated with this set of paths is the Area A itself, do not generate a summary-LSA for the route for advertising into Area A.`
	Debian 12: pass
ANVL-OSPF-27.29 **MUST**	RFC 2328, s12.4.3. p136 Summary-LSAs
	`LSA Origination` `If for a route the area associated with the set of paths is not Area A but the next hops associated with this set of paths belong to Area A itself, do not generate a summary-LSA for the route for advertising into Area A.`
	Debian 12: pass
ANVL-OSPF-27.30 **SHOULD**	RFC 2328, s12.4.3. p136 Summary-LSAs
	`LSA Origination` `If the destination of a route is an AS boundary router, a summary-LSA should be originated if and only if the routing table entry describes the preferred path to the AS boundary router. If so, a Type 4 summary-LSA is originated for the  destination.`
	Debian 12: FAIL
ANVL-OSPF-27.31 **MUST**	RFC 2328, s12.4.3. p136 Summary-LSAs
	`LSA Origination` `While originating summary-LSAs for networks reachable by inter-area routes at most a single Type 3 summary-LSA is originated for each area address range.`
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-27.32 **MUST**	RFC 2328, s12.4.4 p139 AS-external-LSAs
	`LSA Origination` `A default route for the Autonomous System can be described in an AS-external-LSA by setting the LSA"s Link State ID to DefaultDestination (0.0.0.0).`
	Debian 12: pass
ANVL-OSPF-28.1 **MUST**	RFC 2328, s13 p143 The Flooding Procedure
	`Flooding Procedure` `To make the flooding procedure reliable, each LSA must be acknowledged separately. Acknowledgments are transmitted in Link State Acknowledgment packets.`
	Debian 12: pass
ANVL-OSPF-28.2 **MUST**	RFC 2328, s13 p143 The Flooding Procedure
	`Flooding Procedure` `For each LSA contained in a Link State Update packet, validate the LSA"s LS checksum.  If the checksum turns out to be invalid, discard the LSA.`
	Debian 12: pass
ANVL-OSPF-28.3 **MUST**	RFC 2328, s13 p143 The Flooding Procedure
	`Flooding Procedure` `For each LSA contained in a Link State Update packet, examine the LSA"s LS type.  If the LS type is unknown, discard the LSA.`
	Debian 12: pass
ANVL-OSPF-28.4 **MUST**	RFC 2328, s13 p143 The Flooding Procedure
	`Flooding Procedure` `For each LSA contained in a Link State Update packet, if this is an AS-external-LSA (LS type = 5) and the area has been configured as a stub area discard the LSA.`
	Debian 12: pass
ANVL-OSPF-28.5 **MUST**	RFC 2328, s13 p144 The Flooding Procedure,
	`Flooding Procedure` `If the LSA"s LS age is equal to MaxAge, and there is currently no instance of the LSA in router"s link state database, and none of router"s neighbors are in state Exchange or Loading send direct Acknowledgement packet to the sending neighbor and discard the LSA.`
	Debian 12: pass
ANVL-OSPF-28.6 **MUST**	RFC 2328, s13 p144 The Flooding Procedure
	`Flooding Procedure` `If there is already a database copy, and if the database copy was received via flooding and installed less than MinLSArrival seconds ago, discard the new LSA (without acknowledging it).`
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-28.7 **MUST**	RFC 2328, s13 p144 The Flooding Procedure
	Flooding Procedure If there is no database copy or the received LSA is more recent than the database copy and the database copy was installed more than MinLSArrival seconds ago, immediately flood the new LSA out some subset of the router"s interfaces.
	Debian 12: pass
ANVL-OSPF-28.8 **MUST**	RFC 2328, s13 p144 The Flooding Procedure
	Flooding Procedure When a new instance of a LSA is installed in database, a router possibly acknowledges the receipt of the LSA by sending a Link State Acknowledgment packet on the receiving interface.
	Debian 12: pass
ANVL-OSPF-28.9 **MUST**	RFC 2328, s13 p145 The Flooding Procedure,
	Flooding Procedure When the received LSA is at most as recent as the database copy of that LSA then if there is an instance of the LSA on the sending neighbor"s Link State Request list, generate the neighbor event BadLSReq.
	Debian 12: FAIL
ANVL-OSPF-28.10 **SHOULD**	RFC 2328, s13 p145 The Flooding Procedure
	Flooding Procedure If the received LSA is the same instance as the database copy and is listed in the Link state retransmission list for the receiving adjacency, the router itself is expecting an acknowledgment for this LSA. The router should remove the LSA from the Link state retransmission list.
	Debian 12: pass
ANVL-OSPF-28.11 **MUST**	RFC 2328, s13 p145 The Flooding Procedure
	Flooding Procedure If the database copy has LS age equal to MaxAge and LS sequence number equal to MaxSequenceNumber, simply discard the received LSA without acknowledging it.
	Debian 12: pass
ANVL-OSPF-29.1 **MUST**	RFC 2328, s13.1 p145 Determining which LSA is newer
	Newer LSA Determination The LSA having the newer LS sequence number is more recent.
	Debian 12: pass
ANVL-OSPF-30.1 **MUST**	RFC 2328, s13.3 p149 Next step in the Flooding Procedure
	Flooding Procedure Next Step If the adjacency is not yet full and there is an instance of new LSA in Link State request list and if the new LSA is more recent delete the LSA from the Link state request list.
	Debian 12: pass

	Holo 2025-12-23
ANVL-OSPF-30.2 **MUST**	RFC 2328, s13.3 p150 Sending protocol packets
	Flooding Procedure Next Step On broadcast network, the Link State Update packets are multicast but Link State Update packets carrying retransmissions are always sent directly to the neighbor.
	Debian 12: pass
ANVL-OSPF-31.1 **MUST**	RFC 2328, s13.4 p151 Receiving self-originated LSAs
	Self-Originated LSA Receipt A self-originated LSA is detected when the LSA"s Advertising Router is equal to the router"s own Router ID and in most cases (when the LS sequence number of the received LSA is greater than that of the current instance), the router must then advance the LSA"s LS sequence number one past the received LS sequence number, and originate a new instance of the LSA.
	Debian 12: pass
ANVL-OSPF-31.2 **MUST**	RFC 2328, s13.4 p151 Receiving self-originated LSAs
	Self-Originated LSA Receipt A self-originated LSA is detected when the LSA is a network-LSA and its Link State ID is equal to one of the router"s own IP interface addresses. In this case the LSA is flushed from the routing domain.
	Debian 12: pass
ANVL-OSPF-31.3 **SHOULD**	RFC 2328, s13.4 p151 Receiving self-originated LSAs
	Self-Originated LSA Receipt If the received self-originated LSA is a summary-LSA and the router no longer has an (advertisable) route to the destination instead of updating the LSA, the LSA should be flushed from the routing domain by incrementing the received LSA"s LS age to MaxAge and reflooding.
	Debian 12: FAIL
ANVL-OSPF-31.4 **SHOULD**	RFC 2328, s13.4 p151 Receiving self-originated LSAs
	Self-Originated LSA Receipt If the received self-originated LSA is an AS-external-LSA and the router no longer has an (advertisable) route to the destination instead of updating the LSA, the LSA should be flushed from the routing domain by incrementing the received LSA"s LS age to MaxAge and reflooding.
	Debian 12: pass
ANVL-OSPF-31.5 **SHOULD**	RFC 2328, s13.4 p151 Receiving self-originated LSAs
	Self-Originated LSA Receipt If the received self-originated LSA is a network-LSA but the router is no longer Designated Router for the network, instead of updating the LSA, the LSA should be flushed from the routing domain by incrementing the received LSA"s LS age to MaxAge and reflooding.
	Debian 12: pass
ANVL-OSPF-32.1 **MUST**	RFC 2328, s13.5 p152-153 Sending Link State Acknowledgment packets
	Sending LSA Packets If the new LSA has been flooded back out receiving interface no acknowledgement is sent.
	Debian 12: pass

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ANVL-OSPF-32.2 **MUST**	RFC 2328, s13.5 p152-153 Sending Link State Acknowledgment packets
	`Sending LSA Packets` `If the new LSA is more recent than database copy, but was not flooded back out receiving interface and if the router is in state Backup then delayed acknowledgement is sent if advertisement is received from Designated Router, otherwise nothing is done.`
	Debian 12: pass
ANVL-OSPF-32.3 **MUST**	RFC 2328, s13.5 p152-153 Sending Link State Acknowledgment packets

	`Sending LSA Packets`
	`If the new LSA is more recent than database copy, but was not flooded back out receiving interface and if the receiving router is not in state Backup then delayed acknowledgement is sent.`
	`(This test checks the case when router state is DR Other)`

	Debian 12: pass
ANVL-OSPF-32.4 **MUST**	RFC 2328, s13.5 p152-153 Sending Link State Acknowledgment packets

	`Sending LSA Packets`
	`If the new LSA is more recent than database copy, but was not flooded back out receiving interface and if the receiving router is not in state Backup then delayed acknowledgement is sent.`
	`(This test checks the case when router state is DR)`

	Debian 12: pass
ANVL-OSPF-32.5 **MUST**	RFC 2328, s13.5 p152-153 Sending Link State Acknowledgment packets
	`Sending LSA Packets` `If the new LSA is a duplicate, and was treated as implied acknowledgement and if the receiving router is in state Backup then delayed acknowledgement is sent if advertisement is received from Designated Router, otherwise nothing is done.`
	Debian 12: pass
ANVL-OSPF-32.6 **MUST**	RFC 2328, s13.5 p152-153 Sending Link State Acknowledgment packets

	`Sending LSA Packets`
	`If the new LSA is a duplicate, and was treated as implied acknowledgement and if the receiving router is not in state Backup then no acknowledgement is sent.`
	`(This test checks the case when router state is DR Other)`

	Debian 12: pass
ANVL-OSPF-32.7 **MUST**	RFC 2328, s13.5 p152-153 Sending Link State Acknowledgment packets

	`Sending LSA Packets`
	`If the new LSA is a duplicate, and was treated as implied acknowledgement and if the receiving router is not in state Backup then no acknowledgement is sent.`
	`(This test checks the case when router state is DR)`

	Debian 12: pass
ANVL-OSPF-32.8 **MUST**	RFC 2328, s13.5 p152-153 Sending Link State Acknowledgment packets
	`Sending LSA Packets` `If the new LSA is a duplicate, and was not treated as implied acknowledgement and if the receiving router is in state Backup then direct acknowledgement is sent.`
	Debian 12: pass

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ANVL-OSPF-32.9 **MUST**	RFC 2328, s13.5 p152-153 Sending Link State Acknowledgment packets
	Sending LSA Packets If the new LSA is a duplicate, and was not treated as implied acknowledgement and if the receiving router is not in state Backup then direct acknowledgement is sent.
	Debian 12: pass
ANVL-OSPF-33.1 **MUST**	RFC 2328, s13.7 p156 Receiving link state acknowledgments
	LSA Receipt If the acknowledgment is for the same instance that is contained on the Link state retransmission list, remove the item from the list.
	Debian 12: pass
ANVL-OSPF-34.1 **MUST**	RFC 2328, s15 p158 Virtual Links
	Virtual Links When an adjacency is established over a virtual link, the virtual link will be included in backbone router-LSAs.
	Debian 12: pass
ANVL-OSPF-34.2 **MUST**	RFC 2328, s15 p158 Virtual Links
	Virtual Links When an adjacency is established over a virtual link, then OSPF packets pertaining to the backbone area will flow over the adjacency.
	Debian 12: pass
ANVL-OSPF-34.3 **MUST**	RFC 2328, s15 p158 Virtual Links
	Virtual Links AS-external-LSAs are NEVER flooded over virtual adjacencies.
	Debian 12: pass
ANVL-OSPF-34.4 **MUST**	RFC 2328, s15 p159 Virtual Links
	Virtual Links The cost of a virtual link is NOT configured. It is defined to be the cost of the intra-area path between the two defining area border routers.
	Debian 12: pass
ANVL-OSPF-34.5 **SHOULD**	RFC 2328, s15 p159 Virtual Links
	Virtual Links When the cost of a virtual link changes, a new router-LSA should be originated for the backbone area.
	Debian 12: pass
ANVL-OSPF-34.6 **MUST**	RFC 2328, s15 p159 Virtual Links
	Virtual Links In each endpoint"s router-LSA for the backbone, the virtual link is represented as a Type 4 link whose Link ID is set to the virtual neighbor"s OSPF Router ID and whose Link Data is set to the virtual interface"s IP address.(This test checks the case of router between backbone area and a non-backbone area)
	Debian 12: pass

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ANVL-OSPF-34.7 **MUST**	RFC 2328, s15 p159 Virtual Links
	`Virtual Links` `In each endpoint"s router-LSA for the backbone, the virtual link is represented as a Type 4 link whose Link ID is set to the virtual neighbor"s OSPF Router ID and whose Link Data is set to the virtual interface"s IP address.(This test checks the case of router between two non-backbone areas)`
	Debian 12: pass
ANVL-OSPF-34.8 **MUST**	RFC 2328, s15 p159 Virtual Links
	`Virtual Links` `The time between link state retransmissions, RxmtInterval, is configured for a virtual link.`
	Debian 12: pass
ANVL-OSPF-35.1 **MUST**	RFC 2328, s16.2 p168 Calculating the inter-area routes
	`Interarea Route Calculation` `If the router has active attachments to multiple areas, only backbone summary-LSAs are examined.`
	Debian 12: pass
ANVL-OSPF-36.1 **MUST**	RFC 2328, sA.1 p185 Encapsulation of OSPF packets
	`OSPF Packet Encapsulation` `To ensure that the OSPF packets sent to multicast addresses will not travel multiple hops, their IP TTL must be set to 1.`
	Debian 12: pass
ANVL-OSPF-36.2 **SHOULD**	RFC 2328, sA.1 p186 Encapsulation of OSPF packets

	`OSPF Packet Encapsulation`
	`All routers running OSPF should be prepared to receive packets sent to the address 224.0.0.5. Hello packets are always sent to this destination.`
	`(This test checks the case when router is in state DR Other)`

	Debian 12: pass
ANVL-OSPF-36.3 **SHOULD**	RFC 2328, sA.1 p186 Encapsulation of OSPF packets

	`OSPF Packet Encapsulation`
	`All routers running OSPF should be prepared to receive packets sent to the address 224.0.0.5. Hello packets are always sent to this destination.`
	`(This test checks the case when router is in state DR)`

	Debian 12: pass
ANVL-OSPF-36.4 **SHOULD**	RFC 2328, sA.1 p186 Encapsulation of OSPF packets

	`OSPF Packet Encapsulation`
	`All routers running OSPF should be prepared to receive packets sent to the address 224.0.0.5. Hello packets are always sent to this destination.`
	`(This test checks the case when router is in state Backup)`

	Debian 12: pass

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ANVL-OSPF-36.5 **MUST**	RFC 2328, sA.1 p186 Encapsulation of OSPF packets
	OSPF Packet Encapsulation The Designated Router must be prepared to receive packets destined to the multicast address 224.0.0.6.
	Debian 12: pass
ANVL-OSPF-36.6 **MUST**	RFC 2328, sA.1 p186 Encapsulation of OSPF packets
	OSPF Packet Encapsulation The Backup Designated Router must be prepared to receive packets destined to the multicast address 224.0.0.6.
	Debian 12: pass
ANVL-OSPF-36.7 **MUST**	RFC 2328, sA.3.2 p194 The Hello packet
	OSPF Packet Encapsulation If Router Priority set to 0, the router will be ineligible to become Backup Designated Router. (This test checks the case when router itself has Router Priority 0)
	Debian 12: pass
ANVL-OSPF-36.8 **MUST**	RFC 2328, sA.3.2 p194 The Hello packeta
	OSPF Packet Encapsulation If Router Priority set to 0, the router will be ineligible to become Backup Designated Router (This test checks the case when a neighbor has Router Priority 0)
	Debian 12: pass
ANVL-OSPF-36.9 **MUST**	RFC 2328, sA.3.2 p194 The Hello packet
	OSPF Packet Encapsulation If Router Priority set to 0, the router will be ineligible to become Designated Router (This test checks the case when router itself has Router Priority 0)
	Debian 12: pass
ANVL-OSPF-36.10 **MUST**	RFC 2328, sA.3.2 p194 The Hello packet
	OSPF Packet Encapsulation If Router Priority set to 0, the router will be ineligible to become Designated Router. (This test checks the case when a neighbor has Router Priority 0)
	Debian 12: pass
ANVL-OSPF-36.11 **MUST**	RFC 2328, sA.3.6 p201 The Link State Acknowledgment packet
	OSPF Packet Encapsulation A Link State Acknowledgment packet is sent either to the multicast address AllSPFRouters, to the multicast address AllDRouters, or as a unicast
	Debian 12: pass
ANVL-OSPF-36.12 **MUST**	RFC 2328, sA.4.2 p206-207 Router-LSAs
	OSPF Packet Encapsulation When bit V is set, the router is an endpoint of one or more fully adjacent virtual links having the described area as Transit area.
	Debian 12: pass

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ANVL-OSPF-36.13 **MUST**	RFC 2328, sA.4.2 p208 Router-LSAs
	`OSPF Packet Encapsulation` `When connecting to an object that also originates an LSA (i.e., another router or a transit network) the Link ID is equal to the neighboring LSA"s Link State ID.`
	Debian 12: pass
ANVL-OSPF-36.14 **MUST**	RFC 2328, sA.4.2 p208 Router-LSAs
	`OSPF Packet Encapsulation` `For connections to stub networks, Link Data specifies the network"s IP address mask.`
	Debian 12: pass
ANVL-OSPF-36.16 **MUST**	RFC 2328, sA.4.2 p208 Router-LSAs
	`OSPF Packet Encapsulation` `For connections to transit network Link Data specifies the router interface"s IP address.`
	Debian 12: pass
ANVL-OSPF-36.17 **MUST**	RFC 2328, sA.4.4 p212 Summary-LSAs
	`OSPF Packet Encapsulation` `Type 3 summary-LSAs are used when the destination is an IP network.`
	Debian 12: pass
ANVL-OSPF-36.18 **MUST**	RFC 2328, sA.4.4 p212 Summary-LSAs
	`OSPF Packet Encapsulation` `When the destination is an AS boundary router, a Type 4 summary-LSA is used.`
	Debian 12: pass
ANVL-OSPF-37.1 **MUST**	RFC 2328, sB p217 Architectural Constants
	`Architectural Restraints` `MinLSInterval is the minimum time between distinct originations of any particular LSA. The value of MinLSInterval is set to 5 seconds.`
	Debian 12: pass
ANVL-OSPF-37.2 **MUST**	RFC 2328, sB p218 Architectural Constants
	`Architectural Restraints` `LSInfinity is the metric value indicating that the destination described by an LSA is unreachable. Used in summary-LSAs as an alternative to premature aging. It is defined to be the 24-bit binary value of all ones: 0xffffff.`
	Debian 12: pass
ANVL-OSPF-37.3 **MUST**	RFC 2328, sB p218 Architectural Constants
	`Architectural Restraints` `LSInfinity is the metric value indicating that the destination described by an LSA is unreachable. Used in AS-external-LSAs as an alternative to premature aging. It is defined to be the 24-bit binary value of all ones: 0xffffff.`
	Debian 12: pass

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ANVL-OSPF-37.4 **MUST**	RFC 2328, sB p218 Architectural Constants
	Architectural Restraints InitialSequenceNumber is the value used for LS Sequence Number when originating the first instance of any LSA. Its value is the signed 32-bit integer 0x80000001.
	Debian 12: FAIL
ANVL-OSPF-38.1 **MUST**	RFC 2328, sD.3 p229 Cryptographic Authentication
	Cryptographic Authentication When cryptographic authentication is used, the 64-bit Authentication field in the standard OSPF packet header is redefined as
	Debian 12: pass
ANVL-OSPF-38.2 **MUST**	RFC 2328, sD.3 p229 Cryptographic Authentication
	Cryptographic Authentication (6) The message digest is then calculated and appended to the OSPF packet. The authentication algorithm to be used in calculating the digest is indicated by the ke itself. Input to the authentication algorithm consists of the OSPF packet and the secret key. When using MD5 as the authentication algorithm, the message digest calculation proceeds as follows: (a) The 16 byte MD5 key is appended to the OSPF packet. (b) Trailing pad and length fields are added, as specified in [Ref17]. (c) The MD5 authentication algorithm is run over the concatenation of the OSPF packet, secret key, pad and length fields, producing a 16 byte message digest (see [Ref17]). (d) The MD5 digest is written over the OSPF key (i.e., appended to the original OSPF packet). The digest is not counted in the OSPF packet"s length field, but is included in the packet"s IP length field. Any trailing pad or length fields beyond the digest are not counted or transmitted.
	Debian 12: pass
ANVL-OSPF-38.3 **MUST**	RFC 2328, sD4.3 p233 Generating Cryptographic authentication
	Cryptographic Authentication (2) The checksum field in the standard OSPF header is not calculated, but is instead set to 0.
	Debian 12: pass

Packet diagram for ANVL-OSPF-38.1:

```
0                   1                   2                   3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|         0                     |    KeyID      | Auth Data Len |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                 Cryptographic sequence number                 |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

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ANVL-OSPF-38.4 **MUST**	RFC 2328, p243 Security Considerations
	`Cryptographic Authentication` `When using the Cryptographic authentication option, each router appends a "message digest" to its transmitted OSPF packets. Receivers then use the shared secret key and received digest to verify that each received OSPF packet is authentic.`
	Debian 12: pass