

## **Reference - Basic Monitoring and Advanced Monitoring Rules**

This section explains the following topics:

• Basic and Advanced Monitoring Rules, on page 1

## **Basic and Advanced Monitoring Rules**

Crosswork Service Health monitoring provides two options for monitoring: Basic Monitoring and Advanced Monitoring. The table below outlines the monitoring functions of each rule and sub-services, as well as the metric dependencies for both Basic and Advanced monitoring rules included in the system-defined Heuristic Package:

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
Rule-L2VPN-NM- Basic	Checks the health of the VPWS xconnect state.	subservice.device.health
	<ul> <li>Monitors the health of the device: CPU and memory utilization.</li> </ul>	subservice.vpws.ctrlplane.health
		metric.12vpn.xconnect.ac.state
		metric.l2vpn.xconnect.pw.state

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
Rule-L2VPN-NM (Advanced)		

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
	• Checks the health of the	subservice.bgp.nbr.health
	vPWS or EVPN xconnect state.	subservice.bgp.evpn.nexthop.health
	• Monitors the health of the	subservice.device.health
	device: CPU and memory	subservice.evpn.health (one for each endpoint)
	utilization.	subservice.fallback.path.health
	<ul> <li>Monitors the delta between received and transmitted packets between VPN</li> </ul>	subservice.interface.health (one for each interface)
	interfaces and Pseudo-wire.	subservice.l2vpn.y1731.health
	• Monitors Y.1731 probe stats for jitter, loss, and delay	subservice.path.reachability.to.peer (local to remote and remote to local)
	metrics, and compares against	subservice.path.sla
	Monitors the health status of	subservice.pcep.session.health (one for each endpoint device)
	health will be marked as	subservice.plain.lsp.path.health
	'degraded' in either of the below scenarios:	subservice.sr.policy.pce.health (one for each endpoint)
	• FRR is configured, but	subservice.vpws.ctrlplane.health (local, remote)
	backup is not ready.	subservice.path.reachability.to.peer
	• FRR backup is active (primary failed and traffic	subservice.fallback.path.health
	is flowing over FRR	subservice.mpls.rsvpte.tunnel.pm.health
	backup).	subservice.l2vpn.y1731.health
	Health check for interface	subservice.vpws.ctrlplane.health
	metrics: Oper status, interface	subservice.interface.health
	in/out packet discard.	subservice.device.health
	Checks BGP Neighbor session	subservice.interface.health.summary
	health.	subservice.path.sla.summary
	• Checks whether all BGP	metric.bgp.router.id
	L2VPN service are reachable	metric.cef.route.labeled.lsp
	over LSP.	metric.12vpn.xconnect.ac.state
	<ul> <li>Monitors PCEP session state to all the peers configured on this device</li> </ul>	metric.l2vpn.xconnect.pw.state
		metric.12vpn.xconnect.state
		metric.device.xconnect.ac.in.packets
	• Checks path reachability between two endpoints.	metric.device.xconnect.pw.out.packet
	• SR Policy (PCC initiated)	metric.l2vpn.y1731.connect.cross.check. status
		metric.interface.oper

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
	<ul> <li>health status. Admin should be up. Oper should be up. Oper should have stayed up since last polling.</li> <li>Checks whether LSP path exists (in default VRF) towards the given destination device.</li> </ul>	metric.interface.in.errors metric.device.cpu.load metric.device.memory.free
Rule-L2VPN-NM- P2P-Basic	<ul> <li>Checks the health of the VPWS xconnect state.</li> <li>Monitors the health of the device: CPU and memory utilization.</li> </ul>	subservice.device.health subservice.vpws.ctrlplane.health
Rule-L2VPN-NM- P2P (Advanced)	<ul> <li>Checks the health of the VPWS xconnect state.</li> <li>Monitors the health of the device: CPU and memory utilization.</li> <li>Checks the health for interface metrics: Oper status, interface in/out error packets, interface in/out packet discard.</li> <li>Monitors Y.1731 probe stats for jitter, loss, and delay metrics, and compares against SLA thresholds.</li> <li>Monitors the LSP path to the peer VPN node.</li> <li>Monitors LSP path (in default VRF) towards the given destination IP address.</li> <li>Monitors PCEP session state to all the peers configured on this device.</li> <li>Checks the SR Policy (PCC initiated) health status. Admin should be up. Oper should have stayed up since last polling.</li> </ul>	subservice.device.health subservice.interface.health (one for each interface) subservice.l2vpn.y1731.health subservice.p2p.fallback.path.health subservice.p2p.path.reachability.to.peer (path reachability between endpoints) subservice.p2p.plain.lsp.path.health subservice.p2p.plain.lsp.path.health subservice.peep.session.health (one for each endpoint device) subservice.sr.policy.pcc.health subservice.sr.policy.pcc.health (one for each endpoint) subservice.vpws.ctrlplane.health (local, remote) metric.cef.route.labeled.lsp metric.l2vpn.xconnect.ac.state metric.l2vpn.xconnect.state

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
Rule-L2VPN-MP-	• For all .summary subservices:	subservice.device.summary
Basic	Groups together all the device subservices as an aggregator	subservice.bridge.domain.summary
	node. It does not have its own	subservice.device.health
	health/metric. Its health depends on its child subservice health.	subservice.bridge.domain.state
	• Monitors the health of the device	
	• Monitors bridge domain state on a given endpoint.	

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
Rule-L2VPN-MP (Advanced)		

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
	• For all .summary subservices:	subservice.device.summary
	subservices as an aggregator node. It does not have its own	subservice.device.health
		subservice.pcep.session.health.summary
	health/metric. Its health depends on its child subservice	subservice.pcep.session.health
	health.	subservice.evpn.summary
	• Monitors the health of the	subservice.bgp.nbr.health
	device.	subservice.mac.learning
	• Groups together all the PCEP	subservice.bridge.domain.summary
	session health subservices.	subservice.bridge.domain.state
	• Monitors PCEP session state to all the peers configured on	subservice.interface.health
	this device.	subservice.transport.summary
	• Groups together all the device	subservice.sr.policy.pcc.pm.health
	subservices.	subservice.sr.policy.pce.pm.health
	• Checks BGP Neighbor health.	subservice.mpls.rsvpte.tunnel.pm.health
	• Monitors whether any routes	subservice.l2vpn.sr.odn.policy.dynamic
	Bridge Domain.	metric.device.memory.free (supports XR only)
	• Groups together all the bridge	metric.device.cpu.load (supports XR only)
	domain subservices.	metric.sr.te.pcc.peer.state (supports XR only)
	Monitors bridge domain state	metric.sr.te.pcc.peer.addrs (supports XR only)
	on a given endpoint.	metric.bgp.session.state (supports XR only)
	• Subservice to reflect interface health.	metric.bgp.neighbors.ipaddr.list (supports XR only)
	• Groups together all the transport subservices.	metric.mac.learning.nexthops (supports XR only)
	• SR Policy health status	metric.l2vpn.bridge.ac.state (supports XR only)
	configured). Admin and Oper	metric.l2vpn.bridge.ac.list (supports XR only)
	should be up. Oper should have stayed up since last polling. Delay and Variance should meet SLA if SR-PM is configured to measure delay.	metric.l2vpn.bridge.domain.state (supports XR only)
		metric.interface.oper (supports both XR and XE)
	Liveness should be up if SR-PM is configured for	metric.interface.in.errors (supports both XR and XE)
	Monitors the policies deployed	metric.interface.out.errors (supports both XR and XE)
	by the ODN.	metric.interface.in.discards (supports both XR and XE)

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
	SR Policy health status that include SR-PM. Admin and Oper should be up, and Oper chealed hear strengt up since	metric.interface.out.discards (supports both XR and XE) metric.sr.policy.pcc.admin.state (supports XR
	last polling. Delay and	only)
	Variance should meet SLA if SR-PM is configured to	metric.sr.policy.pcc.oper.state (supports XR only)
	should be up if SR-PM is configured for Liveness.	metric.sr.policy.pcc.oper.up.time (supports XR only)
	Monitors MPLS RSVP TE     Tunnel Health Admin Oper	metric.sr.policy.pm.delay.measurement (supports XR only)
	should both be up and if FRR	metric.sr.pm.delay (supports XR only)
	should be ready to pickup	metric.sr.pm.variance (supports XR only)
	traffic when primary fails. If failover already happened to	metric.sr.policy.pm.liveness.detection (supports XR only)
	backup then health will be shown as degraded as there is	metric.sr.pm.liveness.state (supports XR only)
	no more redundancy in play. Delay should be considered if	metric.sr.policy.pce.admin.state (supports XR only)
	SR-PM is enabled. If delay is enabled, then variance will be considered	metric.sr.policy.pce.oper.state (supports XR only)
	considered.	metric.sr.policy.pce.oper.up.time (supports XR only)
		metric.sr.policy.pce.ietf.policy.name (supports XR only)
		metric.sr.policy.pm.delay.measurement (supports XR only)
		metric.sr.pm.delay (supports XR only)
		metric.sr.pm.variance (supports XR only)
		metric.sr.policy.pm.liveness.detection (supports XR only)
		metric.sr.pm.liveness.state (supports XR only)
		metric.mpls.rsvpte.tunnel.oper.state (supports XR only)
		metric.mpls.rsvpte.tunnel.admin.state (supports XR only)
		metric.mpls.rsvpte.tunnel.frr.configured (supports XR only)
		metric.mpls.rsvpte.tunnel.frr.status (supports XR only)

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
		metric.mpls.te.pm.delay.measurement (supports XR only)
		metric.mpls.rsvp.te.delay (supports XR only)
		metric.mpls.rsvp.te.variance (supports XR only)
		metric.l2vpn.odn.sr.policies.list (supports XR only)
		metric.bgp.router.id (supports both XR and XE)
Rule-L3VPN-NM-	Reports the overall route	subservice.ce.pe.route.health
Basic	the current PE device and its connecting CE device.	subservice.device.health
	• Monitors the health of the device: CPU and memory utilization.	

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
Rule-L3VPN-NM (Advanced)	• For all .summary subservices: Groups together all the device subservices as an aggregator node. It does not have its own health/metric. Its health depends on its child subservice health.	
	• Subservice, together with child subservices in L3VPN Rule, reports the overall route health between current PE device and its connecting CE device.	
	• eBGP Session health	
	• Subservice to reflect interface health.	
	• Monitors the health of the device.	
	• L3VPN Aggregator Subservice that reflects path reachability from given device, for a given vrf, to peer VPN sites.	
	• Monitors both static and dynamically initiated policy.	
	• Checks whether plain LSP route exists within given VRF towards given vpn ip-addresses.	
	• Monitors PCEP session state to all the peers configured on this device.	
	Checks BGP Neighbor health.	

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
		subservice.ce.pe.route.health.summary
		subservice.ce.pe.route.health
		subservice.ebgp.nbr.health
		subservice.interface.health.summary
		subservice.interface.health
		subservice.device.summary
		subservice.device.health
		subservice.vrf.path.reachability.to.peer. summary
		subservice.vrf.path.reachability.to.peers
		subservice.transport.summary
		subservice.dynamic.l3vpn.sr.policy
		subservice.vrf.plain.lsp.reachability
		subservice.pcep.session.health.summary
		subservice.pcep.session.health
		subservice.bgp.nbr.health.summary
		subservice.bgp.nbr.health
		subservice.bgp.evpn.nexthop.health
		subservice.bgp.nbr.health
		subservice.ce.pe.route.health
		subservice.device.health
		subservice.ebgp.nbr.health
		subservice.evpn.health
		subservice.fallback.path.health
		subservice.interface.health
		subservice.l2vpn.y1731.health
		subservice.p2p.fallback.path.health
		subservice.p2p.path.reachability.to.peer
		subservice.p2p.plain.lsp.path.health
		subservice.path.reachability.to.peer
		subservice.path.sla
		subservice.pcep.session.health
		subservice.plain.lsp.path.health
		subservice.sr.policy.pcc.health

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
		subservice.sr.policy.pce.health
		subservice.vpws.ctrlplane.health
		subservice.vrf.path.reachability.to.peers
		subservice.vrf.plain.lsp.reachability
		subservice.bridge.domain.summary
		subservice.13vpn.sr.odn.policy.dynamic
		subservice.l2vpn.sr.odn.policy.dynamic
		subservice.mac.learning
		subservice.mpls.rsvpte.tunnel.pm.health
		subservice.vrf.path.reachability.to.peer. summary
		subservice.path.sla.summary
		subservice.pcep.session.health.summary
		subservice.transport.summary
		subservice.interface.health.summary
		subservice.vpws.ctrlplane.health.summary
		subservice.bridge.domain.state
		metric.route.vrf.connected (supports XR and XR IPv6)
		metric.route.vrf.local (supports XR and XR IPv6)
		metric.bgp.vrf.session.state (supports XR only)
		metric.interface.oper (supports both XR and XE)
		metric.interface.in.errors (supports both XR and XE)
		metric.interface.out.errors (supports both XR and XE)
		metric.interface.in.discards (supports both XR and XE)
		metric.interface.out.discards (supports both XR and XE)
		metric.device.memory.free (supports XR only)
		metric.device.cpu.load (supports XR only)
		metric.13vpn.sr.policies.list (supports XR and XR IPv6)

Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
		metric.cef.vrf.route.prefix (supports XR and XR IPv6)
		metric.sr.te.pcc.peer.state (supports XR only)
		metric.sr.te.pcc.peer.addrs (supports XR only)
		metric.bgp.session.state (supports XR only)
		metric.bgp.neighbors.ipaddr.list (supports XR only)
		metric.bgp.route.l2vpn.evpn.nexthops
		metric.bgp.router.id
		metric.cef.route.labeled.lsp
		metric.bgp.session.state
		metric.bgp.neighbors.ipaddr.list
		metric.route.vrf.connected
		metric.route.vrf.local
		metric.device.memory.free
		metric.device.cpu.load
		metric.bgp.vrf.session.state
		metric.l2vpn.xconnect.pw.state
		metric.cef.route.labeled.lsp
		metric.bgp.router.id
		metric.interface.oper
		metric.interface.in.errors
		metric.interface.out.errors
		metric.interface.in.discards
		metric.interface.out.discards
		metric.l2vpn.y1731.connect.cross.check. status
		metric.l2vpn.y1731.connect.peer.mep.status
		metric.l2vpn.y1731.latency.rt
		metric.l2vpn.y1731.jitter.rt
		metric.l2vpn.y1731.pktloss.1way.sd
		metric.l2vpn.y1731.pktloss.1way.ds
		metric.cef.route.labeled.lsp
		metric.cef.route.labeled.lsp
		metric.device.xconnect.ac.in.packets

metric.device.xconnect.pw.out.packets metric.device.xconnect.pw.in.packets metric.device.xconnect.ac.out packets metric.st.te.pcc.jpv4.peer.state metric.st.te.pcc.jpv4.peer.state metric.st.policy.pcc.oper.state metric.st.policy.pcc.oper.up.time metric.st.policy.pcc.oper.up.time metric.st.policy.pc.oper.up.time metric.st.policy.pc.admin.state metric.st.policy.pc.oper.up.time metric.st.policy.pc.oper.up.time metric.st.policy.pc.oper.up.time metric.st.policy.pc.oper.up.time metric.st.policy.pc.oper.up.time metric.st.policy.pc.oper.up.time metric.st.policy.pc.oper.up.time metric.st.policy.pc.oper.up.time metric.st.policy.pce.oper.up.time metric.st.policy.pce.oper.state metric.st.policy.pce.oper.state metric.st.policy.pce.oper.state metric.l2vpn.xconnect.state metric.l2vpn.xconnect.state metric.l2vpn.xconnect.state metric.l2vpn.connect.state metric.l2vpn.odn.st.policies.dynamic.list metric.l2vpn.odn.st.policies.list metric.l2vpn.timel.oper.state metric.mpls.rsvpte.tunnel.oper.state metric.mpls.rsvpte.tunnel.oper.state metric.mpls.rsvpte.tunnel.oper.state metric.mpls.rsvpte.tunnel.oper.state metric.mpls.rsvpte.tunnel.oper.state metric.mpls.rsvpte.tunnel.oper.state metric.mpls.rsvpte.tunnel.oper.state metric.mpls.rsvpte.tunnel.oper.state	Rule Name (Type)	<b>Monitoring Functionality</b>	Metrics and Subservices
metric.device.xconnect.pw.in.packets metric.device.xconnect.ac.out.packets metric.sr.te.pcc.ipv4.peer.state metric.sr.te.pcc.ipv4.peer.state metric.cef.route.labeled.lsp metric.bgp.router.id metric.sr.policy.pcc.oper.state metric.sr.policy.pcc.oper.up.time metric.sr.policy.pcc.admin.state metric.sr.policy.pm.delay.measurement metric.sr.policy.pm.delay.measurement metric.sr.policy.pc.oper.up.time metric.sr.policy.pc.oper.up.time metric.sr.policy.pc.oper.up.time metric.sr.policy.pc.oper.up.time metric.sr.policy.pc.oper.up.time metric.sr.policy.pc.oper.up.time metric.sr.policy.pc.oper.up.time metric.sr.policy.pc.oper.up.time metric.sr.policy.pc.oper.state metric.sr.policy.pc.oper.state metric.sr.policy.pc.admin.state metric.l2vpn.xconnect.state metric.l2vpn.xconnect.state metric.l2vpn.xconnect.state metric.l2vpn.don.sr.policies.dynamic.list metric.l2vpn.odn.sr.policies.dynamic.list metric.gp.router.id metric.mpls.rsvpte.tunnel.oper.state metric.mpls.rsvpte.tunnel.dmin.state metric.mpls.rsvpte.tunnel.fr.configured metric.mpls.rsvpte.tunnel.fr.configured metric.mpls.rsvpte.tunnel.fr.configured metric.mpls.rsvpte.tunnel.fr.configured metric.mpls.rsvpte.tunnel.fr.configured metric.mpls.rsvpte.tunnel.fr.status metric.l2vpn.bridge.ac.state			metric.device.xconnect.pw.out.packets
metric.device.xconnect.ac.out.packets         metric.sr.te.pcc.ipv4.peer.state         metric.sr.te.pcc.ipv4.peer.addrs         metric.cef.route.labeled.lsp         metric.sr.policy.pcc.oper.state         metric.sr.policy.pcc.oper.up.time         metric.sr.policy.pcc.oper.up.time         metric.sr.policy.pc.oper.up.time         metric.sr.policy.pc.admin.state         metric.sr.policy.pm.delay.measurement         metric.sr.policy.pm.liveness.detection         metric.sr.policy.pm.liveness.state         metric.sr.policy.pc.admin.state         metric.sr.policy.pc.oper.up.time         metric.sr.policy.pm.liveness.state         metric.sr.policy.pc.oper.up.time         metric.sr.policy.pc.admin.state         metric.sr.policy.pc.admin.state         metric.sr.policy.pc.admin.state         metric.sr.policy.pc.admin.state         metric.l2vpn.xconnect.state         metric.l2vpn.xconnect.state         metric.l2vpn.admin.state         metric.l2vpn.odn.sr.policies.list         metric.sr.policy.pc.tunel.demin.state         metric.sr.pol.cos.list         metric.mes.rsvpt.tunel.demin.state         metric.sr.ps.te.tunel.demin.state         metric.mpls.rsvpt.tunel.demin.state         metric.mpls.rsvpt.tunel.demin.state         metric.			metric.device.xconnect.pw.in.packets
metric.sr.te.pcc.ipv4.peer.state         metric.sr.te.pcc.ipv4.peer.addrs         metric.cf.route.labeled.lsp         metric.sr.policy.pcc.oper.state         metric.sr.policy.pcc.oper.up.time         metric.sr.policy.pcc.admin.state         metric.sr.policy.pm.delay.measurement         metric.sr.policy.pm.delay.measurement         metric.sr.policy.pm.liveness.detection         metric.sr.policy.pec.oper.up.time         metric.sr.policy.pm.liveness.detection         metric.sr.policy.pec.oper.up.time         metric.sr.policy.pec.oper.up.time         metric.sr.policy.pec.oper.up.time         metric.sr.policy.pec.oper.up.time         metric.sr.policy.pec.oper.up.time         metric.sr.policy.pec.oper.up.time         metric.sr.policy.pec.oper.up.time         metric.sr.policy.pec.oper.state         metric.sr.policy.pec.oper.state         metric.locy.proce.oper.state         metric.locy.proce.oper.state         metric.locy.proce.oper.state         metric.locy.proce.oper.state         metric.locy.produs.state         metric.locy.produs.state         metric.locy.produs.state         metric.locy.produs.state         metric.locy.produs.state         metric.locy.produs.state         metric.locy.produs.state <t< td=""><td></td><td></td><td>metric.device.xconnect.ac.out.packets</td></t<>			metric.device.xconnect.ac.out.packets
metric, sr.te.pcc.ipv4.peer.addrs         metric, cef.route.labeled.lsp         metric, bgp.router.id         metric, sr.policy.pcc.oper.state         metric, sr.policy.pcc.oper.up.time         metric, sr.policy.pcc.admin.state         metric, sr.policy.pcc.admin.state         metric, sr.policy.pcc.admin.state         metric, sr.policy.pm.delay.measurement         metric, sr.pm.delay         metric, sr.policy.pm.liveness.state         metric, sr.policy.pce.oper.up.time         metric, sr.policy.pce.oper.up.time         metric, sr.policy.pce.oper.up.time         metric, sr.policy.pce.oper.state         metric, sr.policy.pce.oper.state         metric.l2.vpn.xconnect.state         metric.l2.vpn.xconnect.state         metric.l2.vpn.xconnect.pw.state         metric.l2.vpn.xconnect.pw.state         metric.l2.vpn.odn.sr.policies.list         metric.l2.vpn.odn.sr.policies.list         metric.l2.vpn.odn.sr.policies.list         metric.mpls.rsvpte.tunnel.oper.state         metric.mpls.rsvpte.tunnel.admin.state         metric.mpls.rsvpte.tunnel.admin.state         metric.mpls.rsvpte.tunnel.afmi.state         metric.mpls.rsvpt.et.unel.afmi.state         metric.mpls.rsvpt.et.unel.afmi.state         metric.l2.vpn.bridge.ac.state			metric.sr.te.pcc.ipv4.peer.state
metric.cef.route.labeled.lsp         metric.bgp.router.id         metric.sr.policy.pcc.oper.state         metric.sr.policy.pcc.oper.up.time         metric.sr.policy.pcc.admin.state         metric.sr.policy.pcc.admin.state         metric.sr.policy.pc.admin.state         metric.sr.policy.pc.admin.state         metric.sr.policy.pc.admin.state         metric.sr.policy.pm.delay.measurement         metric.sr.policy.pm.liveness.detection         metric.sr.policy.pcc.oper.up.time         metric.sr.policy.pce.oper.up.time         metric.sr.policy.pce.oper.up.time         metric.sr.policy.pce.oper.state         metric.sr.policy.pce.oper.state         metric.l2vpn.xconnect.state         metric.l2vpn.xconnect.state         metric.l2vpn.xconnect.state         metric.l2vpn.xconnect.pw.state         metric.l2vpn.odn.sr.policies.dynamic.list         metric.l2vpn.odn.sr.policies.dynamic.list         metric.l2vpn.odn.sr.policies.list         metric.mpls.rsvpte.tunnel.oper.state         metric.mpls.rsvpte.tunnel.admin.state         metric.mpls.rsvpte.tunnel.admin.state         metric.mpls.rsvpte.tunnel.afmis.state         metric.mpls.rsvpt.et.alay         metric.mpls.rsvpt.et.alay         metric.l2vpn.bridge.a.state			metric.sr.te.pcc.ipv4.peer.addrs
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metric.sr.pm.variance         metric.sr.policy.pm.liveness.detection         metric.sr.policy.pen.oper.up.time         metric.sr.policy.pee.oper.up.time         metric.sr.policy.pee.oper.state         metric.sr.policy.pee.oper.state         metric.sr.policy.pee.oper.state         metric.l2vpn.xconnect.state         metric.l2vpn.xconnect.state         metric.l2vpn.xconnect.state         metric.l2vpn.xconnect.state         metric.l2vpn.state         metric.l2vpn.odn.sr.policies.dynamic.list         metric.l2vpn.odn.sr.policies.list         metric.sr.ps.router.id         metric.mac.learning.nexthops         metric.mpls.rsvpte.tunnel.oper.state         metric.mpls.rsvpte.tunnel.admin.state         metric.mpls.rsvpte.tunnel.fr.configured         metric.mpls.rsvpte.tunnel.fr.status         metric.mpls.rsvpt.et.unnel.fr.status         metric.mpls.rsvpt.et.unnel.fr.status         metric.mpls.rsvpt.et.delay         metric.l2vpn.bridge.ac.state			metric.sr.pm.delay
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metric.12vpn.bridge.ac.state			metric.mpls.rsvp.te.delay
			metric.l2vpn.bridge.ac.state

{

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Rule Name (Type)	Monitoring Functionality	Metrics and Subservices
		metric.l2vpn.bridge.ac.list
		metric.12vpn.bridge.domain.state

## Example

The given example explains the relationship between the 'Rule-L2VPN-NM-P2P-Basic' and its dependent sub-services, specifically 'subservice.vpws.ctrlplane.health' and 'subservice.device.health'. Additonally, the sub-service definitions are also listed below to highlight the metric dependencies and symptoms generated by these sub-services.

```
Rule-L2VPN-NM-P2P-Basic
{
  "name": "Rule-L2VPN-NM-P2P-Basic",
  "namespace": "system",
  "id": "Rule-L2VPN-NM-P2P-Basic system",
  "description": "Rule to generate Assurance Graph for Basic L2VPN NM P2P Services.",
  "matchCriteria": [
    {
      "configSource": "SOURCE TYPE NSO",
      "configSubSource": [
        "SUBSOURCE_SERVICE_CONFIG"
      1,
      "matchType": "MATCH TYPE XPATH",
      "matchExpression":
"//vpn-service[0xmlns='urn:ietf:params:xml:ns:yang:ietf-l2vpn-ntw']/vpn-svc-type[text()='vpn-common:t-ldp']",
      "matchPrefix": "",
      "matchParams": []
    },
    {
      "configSource": "SOURCE_TYPE_NSO",
      "configSubSource": [
        "SUBSOURCE SERVICE CONFIG"
      ],
      "matchType": "MATCH TYPE XPATH",
      "matchExpression": "//flat-L2vpn/service-type[text()='p2p']",
      "matchPrefix": "",
      "matchParams": []
    },
```

"configSource": "SOURCE TYPE NSO",

"SUBSOURCE SERVICE CONFIG"

"matchType": "MATCH TYPE XPATH",

"configSubSource": [

```
"matchExpression": "//vpn-service[not(//bridge-group)]/vpn-type[contains(text(),
':mpls-evpn')]",
      "matchPrefix": "",
      "matchParams": []
    },
    {
      "configSource": "SOURCE TYPE NSO",
      "configSubSource": [
        "SUBSOURCE SERVICE CONFIG"
      ],
      "matchType": "MATCH TYPE XPATH",
      "matchExpression":
"//vpn-service[@xmlns='urn:ietf:params:xml:ns:yang:ietf-l2vpn-ntw']/vpn-type[text()='x:vpws']",
      "matchPrefix": "",
      "matchParams": []
    },
    {
      "configSource": "SOURCE TYPE NSO",
      "configSubSource": [
        "SUBSOURCE SERVICE CONFIG"
      ],
      "matchType": "MATCH TYPE XPATH",
      "matchExpression":
"//vpn-service[0xmlns='urn:ietf:params:xml:ns:yang:ietf-l2vpn-ntw']/vpn-type[text()='ietf-vpn-common:vpws']",
      "matchPrefix": "",
      "matchParams": []
   }
 ],
 "dependencies": [
    {
      "name": "VPWS-ControlPlane-Health-Summary",
      "id": "subservice.vpws.ctrlplane.health.summary system",
      "ssClass": "subservice.vpws.ctrlplane.health.summary",
      "namespace": "system",
      "type": "DEP TYPE NON LIST",
      "optional": false,
      "paramExtractionMechanism": {
        "mode": "EXTRACT MODE XPATH",
        "name": "",
        "namespace": "",
        "version": "",
        "validationHash": "0",
        "pluginMethod": "",
        "extractedParams": [],
        "nativeMethod": ""
      },
      "parameters": [
        {
          "name": "vpnServiceId",
          "iterator": false,
          "defaultValue": "",
          "extractionMethod": "DEP PARAM XPATH",
          "extractionDetails": [
            {
              "description": "",
              "extractValue": "//vpn-service/vpn-id"
            },
            {
              "description": "Flat Model",
              "extractValue": "//flat-L2vpn[/flat-L2vpn-p2p]/key"
            }
          ]
```

```
}
 1,
  "subDependencies": [
   "VPWS-ControlPlane-Health-Local-Site",
   "VPWS-ControlPlane-Health-Remote-Site"
  ],
  "softSubDependencies": []
},
{
  "name": "VPWS-ControlPlane-Health-Local-Site",
 "id": "subservice.vpws.ctrlplane.health system",
  "ssClass": "subservice.vpws.ctrlplane.health",
 "namespace": "system",
 "type": "DEP TYPE NON LIST",
  "optional": false,
  "paramExtractionMechanism": {
    "mode": "EXTRACT MODE XPATH",
    "name": "",
   "namespace": "",
   "version": "",
    "validationHash": "0",
    "pluginMethod": "",
    "extractedParams": [],
    "nativeMethod": ""
  },
  "parameters": [
    {
      "name": "device",
      "iterator": false,
      "defaultValue": "",
      "extractionMethod": "DEP PARAM XPATH",
      "extractionDetails": [
       {
          "description": "",
          "extractValue": "//vpn-nodes/vpn-node[1]/vpn-node-id"
        }
      ]
   },
    {
      "name": "groupName",
      "iterator": false,
      "defaultValue": "",
      "extractionMethod": "DEP PARAM XPATH",
      "extractionDetails": [
       {
          "description": "",
          "extractValue": "//vpn-service/vpn-id"
        },
        {
          "description": "Flat Model",
          "extractValue": "//flat-L2vpn/flat-L2vpn-p2p/local-site/xconnect-group-name"
       }
      ]
    },
    {
      "name": "xconnectName",
      "iterator": false,
      "defaultValue": "",
      "extractionMethod": "DEP PARAM XPATH",
      "extractionDetails": [
        {
          "description": "",
          "extractValue": "//vpn-service/vpn-id"
        },
```

```
{
          "description": "Flat Model",
          "extractValue": "//flat-L2vpn/flat-L2vpn-p2p/local-site/xconnect-group-name"
       }
     ]
   }
 ],
  "subDependencies": [],
 "softSubDependencies": [
    "device1"
 1
},
{
 "name": "VPWS-ControlPlane-Health-Remote-Site",
 "id": "subservice.vpws.ctrlplane.health system",
  "ssClass": "subservice.vpws.ctrlplane.health",
  "namespace": "system",
  "type": "DEP TYPE NON LIST",
 "optional": false,
  "paramExtractionMechanism": {
    "mode": "EXTRACT_MODE_XPATH",
    "name": "",
    "namespace": ""
    "version": "",
   "validationHash": "0",
   "pluginMethod": "",
    "extractedParams": [],
    "nativeMethod": ""
  },
  "parameters": [
   {
      "name": "device",
      "iterator": false,
      "defaultValue": "",
      "extractionMethod": "DEP PARAM XPATH",
      "extractionDetails": [
          "description": "",
          "extractValue": "//vpn-nodes/vpn-node[2]/vpn-node-id"
       }
      ]
    },
    {
      "name": "groupName",
      "iterator": false,
      "defaultValue": "",
      "extractionMethod": "DEP PARAM XPATH",
      "extractionDetails": [
       {
          "description": "",
          "extractValue": "//vpn-service/vpn-id"
        },
        {
          "description": "Flat Model",
         "extractValue": "//flat-L2vpn/flat-L2vpn-p2p/remote-site/xconnect-group-name"
       }
      ]
    },
    {
      "name": "xconnectName",
      "iterator": false,
      "defaultValue": "",
      "extractionMethod": "DEP PARAM XPATH",
```

```
"extractionDetails": [
        {
          "description": "",
          "extractValue": "//vpn-service/vpn-id"
        },
        {
          "description": "Flat Model",
         "extractValue": "//flat-L2vpn/flat-L2vpn-p2p/remote-site/xconnect-group-name"
       }
      1
    }
 1,
  "subDependencies": [],
  "softSubDependencies": [
   "device2"
 ]
},
{
 "name": "device1",
 "id": "subservice.device.health system",
  "ssClass": "subservice.device.health",
  "namespace": "system",
  "type": "DEP TYPE NON LIST",
  "optional": false,
  "paramExtractionMechanism": {
    "mode": "EXTRACT MODE_XPATH",
    "name": "",
    "namespace": "",
   "version": "",
   "validationHash": "0",
   "pluginMethod": "",
    "extractedParams": [],
    "nativeMethod": ""
  }.
  "parameters": [
    {
      "name": "device",
      "iterator": false,
      "defaultValue": "",
      "extractionMethod": "DEP PARAM XPATH",
      "extractionDetails": [
       {
          "description": "",
          "extractValue": "//vpn-nodes/vpn-node[1]/vpn-node-id"
        }
     ]
   }
  ],
  "subDependencies": [],
  "softSubDependencies": []
},
{
  "name": "device2",
  "id": "subservice.device.health system",
  "ssClass": "subservice.device.health",
  "namespace": "system",
 "type": "DEP TYPE NON LIST",
  "optional": false,
  "paramExtractionMechanism": {
    "mode": "EXTRACT MODE XPATH",
    "name": "",
    "namespace": "",
    "version": "",
```

}

}

{

```
"validationHash": "0",
        "pluginMethod": "",
        "extractedParams": [],
        "nativeMethod": ""
      }.
      "parameters": [
        {
          "name": "device",
          "iterator": false,
          "defaultValue": "",
          "extractionMethod": "DEP PARAM XPATH",
          "extractionDetails": [
            {
              "description": "",
              "extractValue": "//vpn-nodes/vpn-node[2]/vpn-node-id"
            }
          ]
        }
      ],
      "subDependencies": [],
      "softSubDependencies": []
    }
  ],
  "softRootDependencies": [],
  "createTimestamp": "1697841637567500247",
  "updateTimestamp": "0",
  "monitoringType": "BASIC",
  "version": "1.1"
Sub service: 'subservice.vpws.ctrlplane.health'
  "id": "subservice.vpws.ctrlplane.health.summary system",
  "name": "subservice.vpws.ctrlplane.health.summary",
  "namespace": "system",
  "description": "Groups together all the VPWS Ctrlplane health subservices.",
  "params": [
    {
      "name": "vpnServiceId",
      "description": "",
      "type": "PARAM_TYPE NON LIST"
    }
  ],
  "liveMetrics": {},
  "rootExpressions": [],
  "dynamicConfig": null,
  "symptom": null,
  "dependencies": [],
  "exprCid": "",
  "createTimestamp": "1697841637373426164",
  "updateTimestamp": "0",
  "tags": [],
  "version": "1.0"
  "id": "subservice.vpws.ctrlplane.health system",
  "name": "subservice.vpws.ctrlplane.health",
  "namespace": "system",
  "description": "check the health of the VPWS state",
  "params": [
    {
      "name": "device",
      "description": "",
```

```
"type": "PARAM_TYPE_NON_LIST"
    },
    {
      "name": "groupName",
      "description": "",
      "type": "PARAM TYPE NON LIST"
    },
    {
      "name": "xconnectName",
      "description": "",
      "type": "PARAM TYPE NON LIST"
    }
 ],
  "liveMetrics": {},
  "rootExpressions": [
   {
     "evalExpression": "xconnect state == 'up' && ac state == 'up' && evpn state == 'up'",
      "activateCondition": ""
    }
  ],
  "dynamicConfig": null,
  "symptom": {
   "formatString": "VPWS State degraded. Device: {device}, XConnectGroup: {groupName},
XconnectName: {xconnectName}",
   "level": "DEGRADED",
    "priority": 15,
    "condition": false
  },
  "dependencies": [
    {
      "type": "DEP TYPE METRIC",
      "label": "xconnect_state",
      "evalExpression": "metric.l2vpn.xconnect.state",
      "namespace": "",
      "symptom": null,
      "paramMap": {
        "device": "device",
        "groupName": "groupName",
        "xconnectName": "xconnectName"
      },
      "id": ""
    },
    {
      "type": "DEP TYPE METRIC",
      "label": "ac state",
      "evalExpression": "metric.l2vpn.xconnect.ac.state",
      "namespace": "",
      "symptom": null,
      "paramMap": {
        "device": "device",
        "groupName": "groupName",
        "xconnectName": "xconnectName"
      },
      "id": ""
    },
    {
      "type": "DEP TYPE METRIC",
      "label": "evpn_state",
      "evalExpression": "metric.l2vpn.xconnect.pw.state",
      "namespace": "",
      "symptom": null,
      "paramMap": {
        "device": "device",
```

}

{

```
Sub service: 'subservice.device.health'
```

```
"id": "subservice.device.health system",
"name": "subservice.device.health",
"namespace": "system",
"description": "Monitor the health of the device.",
"params": [
 {
    "name": "device",
    "description": "",
    "type": "PARAM TYPE NON LIST"
 }
],
"liveMetrics": {},
"rootExpressions": [
 {
   "evalExpression": "cpu_healthy && memory_healthy",
    "activateCondition": ""
 }
],
"dynamicConfig": null,
"symptom": {
  "formatString": "Heavier than expected resource consumption on the Device: {device}",
 "level": "DEGRADED",
 "priority": 100,
  "condition": false
},
"dependencies": [
  {
    "type": "DEP TYPE EXPRESSION",
    "label": "cpu healthy",
    "evalExpression": "ListElemsAverage(cpu load) <= CPU THRESHOLD MAX",
    "namespace": "",
    "symptom": null,
    "paramMap": {},
    "id": ""
  },
  {
    "type": "DEP TYPE EXPRESSION",
    "label": "memory healthy",
    "evalExpression": "ListElemsSum(memory_free) > MEMFREE_THRESHOLD_MIN",
    "namespace": "",
    "symptom": null,
    "paramMap": {},
    "id": ""
  },
  {
    "type": "DEP TYPE METRIC",
    "label": "cpu load",
    "evalExpression": "metric.device.cpu.load",
    "namespace": "",
```

}

}

L

```
"symptom": null,
    "paramMap": {
      "device": "device"
    },
    "id": ""
  },
  {
    "type": "DEP TYPE METRIC",
    "label": "memory_free",
    "evalExpression": "metric.device.memory.free",
    "namespace": "",
    "symptom": null,
    "paramMap": {
      "device": "device"
    },
    "id": ""
  }
],
"exprCid": "",
"createTimestamp": "1697841637256704609",
"updateTimestamp": "0",
"tags": [
 "DEVICE_SUBSERVICES"
],
"version": "1.1"
"id": "subservice.device.summary system",
"name": "subservice.device.summary",
"namespace": "system",
"description": "Groups together all the Device subservices",
"params": [
  {
    "name": "vpnServiceId",
    "description": "",
    "type": "PARAM_TYPE_NON_LIST"
 }
1,
"liveMetrics": {},
"rootExpressions": [],
"dynamicConfig": null,
"symptom": null,
"dependencies": [],
"exprCid": "",
"createTimestamp": "1697841637260108075",
"updateTimestamp": "0",
"tags": [],
"version": "1.0"
```