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1. Document Scope

This document summarizes the key features in the Fabric Services System Release 22.12.1 software.

Known usages limitations and issues are documented, as well as any issues that have been resolved since this document was last issued.

2. List of Features

The following features are available in Release 22.12.1.

For descriptions of features, see section 4 Feature Descriptions.

Fabric Design
Feature name/Description
Support for use of VLAN on ISL
Support for use of breakout on ISL
Support for EVPN MH port active LAG
Support for SR Linux 22.11
Manual topology import support for WBX devices

Workloads
Feature name/Description
Support for multiple routers within a workload intent
Allow disabling prepending global AS when neighbor based local-as override is enabled
Loopback interface support
Multi-hop support for BGP PE-CE
Support for workload intent on 210 WBX

Device Management
Feature name/Description
Support for SNMPv3 management profiles
Support for IXR-D5 (spine only)

Fabric Operations
Feature name/Description
LAG member down alarm
Network instance down alarm

Platform & API
Feature name/Description
Support for Rocky 8.6 as hypervisor
Manage Neo4J and MongoDB passwords
API Pagination support

Connect
Feature name/Description
ML2 Plugin – Untagged port support
VMware Plugin – vSphere 7.0 support
VMware Plugin – VMware Managed networks
VMware Plugin – Fabric Services Systems Managed networks
VMware Plugin – SR-IOV support
VMware Plugin – Regular VM NIC support
VMware Plugin – Audit & Auto-Correction support
K8s Operator – OpenShift 4.10 support
K8s Operator – OpenShift Managed networks
K8s Operator – IPVLAN CNI support
K8s Operator – SR-IOV CNI support
K8s Operator – Audit & Auto-Correction support

3. Limited support features

The following section describes Fabric Services System features that have limited support and are intended for demo/laboratory use only.

Feature name/Description	First introduced
Management profile of type gNMI	22.8.1
Support managing edge-link topology information through API	22.8.1
Contextual Configuration Overrides	22.12.1
Connect: Fabric Services System managed support with Layer 2 subnets	22.12.1

4. Feature Descriptions

4.1. Fabric Design

4.1.1. Support for use of VLAN on ISL

A VLAN can be specified when creating a fabric intent which will then be used on the sub-interface on the ISL within the fabric.

4.1.2. Support for use of breakout on ISL

Breakout interfaces were initially supported on the IXR-D5 only. This allows for the use of breakout interfaces and associated sub-interfaces on ISL within the fabric.

4.1.3. Support for EVPN MH port active LAG

When configuring a multihomed LAG, the port active mode is now supported. The primary difference between single active and port active is that in single active mode, the sub-interfaces selected as standby will be operationally down; however in port active mode, the interface selected as standby will be operationally down.

4.1.4. Support for SR Linux 22.11

SR Linux 22.11 is now supported on devices.

4.1.5. Manual topology import support for WBX devices

210 WBX devices are now supported as device that can be imported as part of the manual topology import process.

4.2. Workloads

4.2.1. Support for multiple routers within a workload intent

Multiple routers can be created with a workload intent. A default router is always created and present in the workload intent. When creating a subnet, an operator may now select a router on which to attach the subnet.

4.2.2. Allow disabling prepending global AS when neighbor based local-as override is enabled

A new configurable parameter is provided under the BGP PE-CE configuration context.

4.2.3. Loopback interface support

Loopback interfaces can now be created and attached to routers within a workload intent. An operator can create a subnet of type 'Loopback' and select an available loopback interface.

4.2.4. Multi-hop support for BGP PE-CE

In order to support eBGP PE-CE originating from a loopback interface, BGP multihop is required. This feature is a configurable parameter under the BGP PE-CE configuration context.

4.2.5. Support for workload intent on 210 WBX

Workload intents can now be created on 210 WBX devices.

4.3. Device Management

4.3.1. Support for SNMPv3 management profiles

In order to allow for the management of 210 WBX devices, SNMPv3 support is added to management profiles.

4.3.2. Support for IXR-D5 (spine only)

The 7220 IXR-D5 is now supported within fabric intents in the spine role only.

4.4. Fabric Operations

4.4.1. LAG member down alarm

An alarm is generated when one of the members of a LAG goes operationally down.

4.4.2. Network instance down alarm

An alarm is generated when a network instance goes operationally down.

4.5. Platform and API

4.5.1. Rocky 8.6 as hypervisor

As an evolution of supported hypervisors, Rocky 8.6 and RHEL 8.6 are now supported.

4.5.2. Neo4J and MongoDB password management

The different internal passwords of Neo4J and MongoDB can now be changed post-installation to secure the deployment.

4.5.3. API Pagination

The API now supports pagination for any GET request where a list is returned. This allows for a more optimal processing of content in larger lists.

4.6. Connect

4.6.1. ML2 Plugin – Untagged ports

The ML2 Plugin now supports the use of Untagged ports.

4.6.2. VMware vSphere Plugin

With this release the VMware vSphere Plugin is now generally available. This plugin provides fabric automation from within the VMware vCenter

environment. The plugin supports vSphere 7.0 and allows both the use of VMware Managed networking and Fabric Services System Managed networking. Additionally, both regular VM NICs and SR-IOV NICs are supported.

4.6.3. OpenShift Plugin

With this release the OpenShift Plugin is now generally available. This plugin provides fabric automation from OpenShift 4.10. The plugin supports OpenShift Managed networking when using the IPVLAN or SR-IOV CNI plugins with Multus.

4.6.4. Fabric Services System managed support with Layer 2 subnets

Fabric Services System managed support with Layer 2 subnets is available in this release and is a Beta-quality feature. Additionally, for IPVLAN CNI, only Layer 2 mode in a network-attachment-definition is supported when used for fabric connectivity with FSC-CNI.

5. Obsolete features and functionality

This section lists any features or functionality from previous releases that have been rendered obsolete.

5.1. Support for SR Linux 21.11 has been removed.

5.2. Support for bare metal deployment has been removed.

6. Changed or removed commands

This section lists any changed or removed commands.

Currently there are no changed or removed commands.

7. Non-backward-compatible changes

This section lists any changes that are not backward-compatible with previous releases.

Currently there are no non-backward-compatible changes.

8. Known limitations

The following defines the known usage limits that should be followed during system management activities. Where available, workarounds are provided.

8.1. System

- Global configurations to enable FTP and NTP are not saved. [411986]
- IXR 7220-H3 spine node links are by default set to a speed of 400G. Deviations are required to force the port speed to 100G, as the Fabric Services System does not support port-speed changes. [385399]
- Flannel routes are removed after performing “nmcli con reload” for the first time after the compute is started. Workaround the issue without "nmcli con reload all" and only apply changes to the intended interface. [422469]
- **[NEW]** When using optics that do not support FEC, a deviation is needed to remove FEC support as the default mode enables FEC on all interfaces. An issue is seen with breakout ports using DR/FR optics that do not support FEC. [426476]
- **[NEW]** An SR Linux node does not reset ZTP autoboot flag and as a result deviations are seen after rebooting the node as the node comes up with initial configuration. [426191]
- **[NEW]** FSS will display deviations for the entire configuration after restoring a backup in case of digital sandbox, or after a node reboot in case of real nodes.

You must reject all of these deviations in order for the configurations from the Fabric Services System to be pushed to the SR Linux nodes and intents to be restored to their normal state. If you instead accept these deviations, restart and restore the Fabric Services System. [426923]

- **[NEW]** In highly scaled workload configurations, during initial workload deployment or when deleting workload intents, the system may enter a state in which the workload and underlay intents can become stuck in a "DeploymentInProgress" state.

Workaround: re-install the Fabric Services System and restore from a prior backup. [426510, 426970]

8.2. ACL

- Errors may be seen at the time of deployment to the node due to delayed validations performed on ACL fields.

The system does not validate combinations of fields configured for an ACL entry. Such fields must be configured with values supported by the platform; if the configuration is not supported by the platform, the deployment will result in an error. An error message from the platform will indicate the conflicting configuration.

For example: assume an ipv4 ACL entry configuration of:

```
protocol = icmp
destination port = 80
```

Such an entry will be rejected by the SR Linux platform because port numbers can only be configured for protocols like UDP/TCP. [374804, 376623]

8.3. Fabric intents

- Reducing a Digital Sandbox fabric keeps all required nodes in a Ready state. This may mislead the operator into assuming that the fabric can be queued and deployed. [380392]

8.4. Maintenance intents

- Node replacement may sometimes fail to bootstrap the correct SR Linux image when an ongoing ZTP is aborted before completion.

Workaround: Triggering a manual ZTP restart with autoboot will enable the node to complete the ZTP to the intended SR Linux image. [411616]

8.5. Workload

- When a config generation is started and there are no changes, the workload intent might go to an error state. [414355]
- Sometimes workloads are generated with EVI/VNI values outside of pools configured for the region when updating the region's EVI/VNI ranges. [417100]

- VNI and RT are allocated for each workload intent by default though the workload is created for Layer 2 EVPN only. Customers are expected to plan the VNI and RT pool accordingly. [417186]
- When an outage occurs in the network while deploying an intent that prevents reachability of mongoDB primary and there is active election in place, some network elements can get stuck in a Ready state and never recover.

Workaround: After mongoDb has recovered, flap gNMI on the network element to recover from the situation. [419396]

8.6. WBX manual topology

- An IPv6 Anycast gateway configuration is not yet supported for WBX workloads. [416104]
- A WBX node does not move to VERSIONMISMATCH (when the node comes up with a different software images) or CHASSISMISMATCH (when a node comes up with a different chassis type) in the Fabric Services System. [416108]
- BFD configurations on the VPRN interface and PE-CE neighbor are not yet supported. [416112]
- Workload deployment using WBX host ports is not yet supported. [416979]
- Error message handling improvements are needed when a workload deployment fails on a WBX node. [416994]
- An operator must configure the System IP range, ISL IP Range, ASN range, and Control plane settings while creating region for WBX-only deployment even though this information is not consumed by WBX nodes. [417952]
- **[NEW]** When importing a LAG configuration as part of a manual topology file, the LAG name must be unique across all the LAGs in the topology file. Also, adding LAGs or edge links after the 1.0 version of fabric is not supported in this release [422681]
- **[NEW]** When configuring the EVI range in the region settings, limit the range to 1-46535. This is due to calculated backhaul EVI adding 19000 to the value provided by the Fabric Services System. [423470]

8.7. Global Configuration Overrides (GCO)

- GCO supports only user-defined labels. [417940]
- **[NEW]** When GCO is used to configure an object that is modeled as a list (such as a system IP address), the new configuration is generated by merging the item into the list rather than replacing the list. [425251]

8.8. Packaging

- Some of the editors add escape sequences and special characters while editing the Fabric Services System configmaps.

Workaround: Make a backup of the configmaps before you edit it. Use the following command to export the configmap as a yaml file:

```
kubectl get configmaps prod-fss-catalog-data -o yaml > prod-fss-catalog-data-original.yaml
```

[419194]

8.9. Fabric Services Controller (FSC)

- Sub-interfaces are not deleted from the Fabric Services System (and leaf nodes) when rebooting or power cycling a worker node that is running user pods in the following scenarios:
 - When user pods on a worker node that is rebooted gets moved to another worker node, but sub-interfaces on the node that is rebooted are not deleted
 - On deletion of user pods on the worker node that is rebooted, after they go in containerCreating state due to reboot and come back on the same node.

[417907, 417928, 418032, 419407]

- Sometimes Edgemaps of one or more ports are not created for Edgelinks on SR Linux Leaf nodes after LLDP stop-and-start on a Linux machine. This causes existing sub-interfaces to be removed from the Fabric Services System (and leaf nodes), and sub-interfaces for new user pods are not created till Edgemaps are created again.

Workaround: Stop LLDP on Node or server port, wait for 20 seconds or more, and then start LLDP again. [417912]

- For SRIOV - With dynamic VF resource allocation in pods, after rebooting, sub-interfaces configured in the Fabric Services System may not be on same port on which VFs is reprogrammed causing datapath connectivity issue to user pods.

Recommendation: Only use static-VF allocation where the device_id and VLAN are specified in network-attachment-definitions. Also, user pod/deployment should not have resources requirement configured for SRIOV under the specifications section. Only static allocation of VF resources using device_id is supported for SRIOV in this release. [418802]

- **[NEW]** For SRIOV, only a single user pod per virtual function can be configured. To modify an SRIOV CNI static VF network-attachment-definition parameters that is already used as an Annotation in existing pod, you must terminate the existing pod to release the SRIOV

VF resource in use, change the network-attachment-definition. and then deploy the newer pod for changes to take effect. [418342]

9. Known Issues

The following are known issues. Where available, workarounds are provided.

9.1. Platform

- The VMWare vCenter throws the error "Unable to retrieve manifest or certificate file" while importing the Fabric Services System OVA File. This is a known issue in VMWare vCenter 7.0. Refer to <https://kb.vmware.com/s/article/79986> [370551]
- A CEPH storage device entering an erroneous state can cause several Kafka and Zookeeper restarts. In situations like this, Nokia recommends cordoning the erroneous compute and moving all pods to an operational compute. Recreate the whole cluster using the restore functionality. [426697]

9.2. System

- **[NEW]** Sometimes after an upgrade, depending on the upgrade sequence, examining a pod's API version (/rest/about/version) may show old versions of services. Restart the pods that are associated with old service versions so that they register the new version in the system. [426668]

9.3. Fabric intents

- **[NEW]** Changes to global configuration are not reflected on A fabric intent candidate version. [410584]

9.4. Maintenance intents

- If all the nodes of a Digital Sandbox backbone intent are upgraded or downgrade at once using a maintenance intent, nodes might not come up with the correct software release. Workaround: Use a sequential upgrade for Digital Sandbox fabric intents. [419131]

9.5. Workload intents

- **[NEW]** It is possible to delete an underlay fabric intent while it is still associated to a workload intent that has no sub-interface in the underlay fabric intent. This can result in a workload intent that cannot be deleted.

Workaround: Before deleting an underlay fabric intent, disassociate it from all workload intents. [426816]

- **[NEW]** When a router object that has subnets associated with it is deleted, all associated subnets are also deleted. [426457]

9.6. Manual topology

- The Rack ID displayed for manual intents does not reflect the value passed during creation. [417933]
- Edge links of the fabric intent cannot be updated once the intent has been deployed. Before importing the manual topology file into the Fabric Services System, make sure edge link information is included. [417294]

9.7. Deviations

- Deviations are not updated correctly in the Fabric Services System after committing changes in an SR Linux node together for two paths, one of them changing an unsupported overlay deviation and the other changing a supported underlay deviation. [426930]

9.8. Management Profile

- An incorrect status code is returned when assigning a default label to management profile. [418182]

9.9. ACL

- **[NEW]** When sending objects with an externalID to `workloadmgr/api/v2/aclprofiles`, a 400 status is received with the error "parent container mgRule (type *fspmodel.SrINokiaFsp_Fsp_WorkloadAclProfile_MgRule): JSON contains unexpected field externalID". [421941]

9.10. QOS

- **[NEW]** The externalID field object should not be allowed to change via a PUT call. [422207]

9.11. Global Configuration Override (GCO)

- When intent is modified with GCO related parameters such as labels, the intent is marked stale even in the 1.0 version when it has not yet been deployed.

Workaround: No workaround is required and the stale flag will be cleared on first deployment. [419711]

- Pasting normalized configurations that include integers as quoted strings might fail.

For example, the following value configuration will fail:

```
"sequence-id": 60,
  "description": "Accept incoming SSH when the other host
initiates the TCP connection",
  "action": {
    "accept": {}
  },
  "match": {
    "protocol": "tcp",
    "destination-port": {
      "operator": "eq",
      "value": "22"
    }
  }
},
```

[423259]

9.12. Contextual Configuration Override (CCO)

- **[NEW]** The Stale flag is not set on a workload when applying CCO to all sub-interfaces. This issue is not observed when selecting one or more specific sub-interfaces.

Workaround: Create a new candidate version of the workload, modify a field such as description, then save and deploy the candidate version. [426734]

9.13. Connect

- OpenStack bonds (linuxbond/ovs bond) over a static A/S LAG on a single leaf are not supported.

Work around with any of the following options:

- multihoming to a pair of leaf nodes
- use an LACP-based LAG
- use an A/A LAG

[420194]

- If there are two Fabric-Services-System-managed dVS port groups with different VLANs in the same dVS, and these port groups use the same Fabric Services System subnet ID, then during an audit the VMware plugin can behave unpredictably.

Workaround: Place such dVS port groups in different dVS. [427111]

9.14. Fabric Services Controller (FSC)

- **[NEW]** If you change input parameters during a helm upgrade without performing a software image change, you must restart the controller for changes to take effect. [426938]

- **[NEW]** When simultaneously creating a large number of pods requiring fabric connectivity, sometimes workloadinterface and therefore sub-interface in the Fabric Services System is not deleted on termination of user pods. Nokia recommends not to simultaneously create pods that would collectively resulting in more than 150 interfaces.

Workaround: wait for pods to come up before applying newer pods for higher scaling of interfaces. [426506]

- **[NEW]** With SRIOV CNI, inter-VF connectivity for pods using different VLANs on the same physical port is not supported. If such connectivity is required, Nokia recommends using network-attachment-definition with VFs from different physical ports. [421596]
- **[NEW]** Sometime pods with SRIOV and/or IPVLAN annotations that are created when the Fabric Services System is unreachable remain in ContainerCreating state for an extended time before coming up due to IP Address unavailability. This results in the error message "Error at storage engine". [424989,421414]
- **[NEW]** Sometimes, when pods with SRIOV or IPVLAN NAD annotations that were created while the Fabric Services System was unreachable are deleted, they may leave workloadinterface and the related sub-interface in the Fabric Services System. [421418]

- **[NEW]** If you create pods with SRIOV or IPVLAN network-attachment-definition annotation (NAD) on a worker or master node when LLDP between the port used by NAD and the SR Linux node is down, workloadVPN shows the error message "Config generation failed" in the Fabric Services System. However, restoring LLDP creates the interfaces and moves the workload VPN back to the Deployed state. [422700]
- **[NEW]** If you create user pods with SRIOV or IPVLAN network-attach-definition annotations when the FSC controller pod is not reachable, sometimes pods takes longer to come up after the controller pod come up due to IP address unavailability. [424993]

9.15. Packaging

- **[NEW]** When performing a Fabric Services System helm upgrade, not all components of an active Digital Sandbox deployments are automatically upgraded to the latest available version.

This because of the dynamic nature of the Digital-Sandbox-owned Kubernetes deployments/pods. As the new Fabric Services System deployer does not retain the container images of the previous version, a pod that would restart would not be able to do so because the required images is missing.

Workaround: do the following to prevent future issues or to remedy the above issue:

1. Delete the active Digital Sandbox by doing the following:
 - a. Log into the DS-CLI pod.
 - b. In this pod, use 'dsctl list deployments' to obtain a list of active deployments (there should only be one).
 - c. Use 'dsctl intent delete -i <ID of deployment>' to delete the active deployment.
2. Trigger a Digital Sandbox update from the Fabric Services System.

[426642]

10. Resolved issues

This section lists any issues that have been resolved since the previous release.

10.1. Platform

- In a three-node configuration of the Fabric Services System, when one of the nodes goes down the Kafka broker on the node also goes down. The Fabric Services System version application still expects three Kafka brokers to be reachable and fails to bring any of the Fabric Services System applications up.

Workaround: Ensure that all three Kafka brokers are available. [422475]

10.2. Maintenance intents

- Node replacement may sometimes fail to bootstrap the correct SR Linux image when an ongoing ZTP is aborted before completion.

Workaround: Triggering a manual ZTP restart with autoboot will enable the node to complete the ZTP to the intended SR Linux image. [411616]

10.3. Workload intents

- Under load condition on a system where the client is deploying more than 500 workloads, sometimes all pods go into a crash loop as zookeeper becomes unavailable.

Workaround: Restart zookeeper pods to recover the services. [418529]

- Routed subnets do not support untagged interface in a workload intent. When deployed, the configurations will be caught as invalid.

Workaround: discard changes and deploy the workload intent again. [419506]

10.4. WBX Manual Topology

- Creating a workload using the default VPN template is not blocked. Use the "New VPN Template" for WBX workload deployments. [416106]
- PE-CE neighbors are not yet supported on WBX. [416456]

10.5. Manual Topology

- Configgen fails sometimes when creating candidate version after deleting the topology.
Workaround: Use a different or updated topology file to create a candidate version. [414987]
- Fabric deployment fails if an underscore is present in a spine node name. [418023]

10.6. Alarms

- The BGP BFD Neighbor Down alarm is not deleted even after the neighbor is removed in the candidate mode and the intent is re-deployed. [414212]
- When defining hostports referring to a LAG that does not actually exist on the fabric, an alarm is raised. The HostPortLabelHostPortAssociation will not go into the ERROR state. An Audit operation will fix the error, but due to a missing database entry the alarm will not be cleared. The alarm can be manually cleared in the UI. [419485]

10.7. ACL

- In scaled environments, using a single bulk REST API to configure multiple sub-interfaces along with ACLs in a workload results in ACL profile not being included in the generated configs. This leads to workload deployment failure.
Workaround: Configure one sub-interface with an ACL at a time using REST API.

- The Fabric Services System back end does not validate whether multiple ACL entries with the same priority are sent in a POST request. When such a POST request is made, only one such entry for a given priority will be configured (in most cases it will be the last one in the sequence). [377502]

10.8. System

- The postgresql pod is deployed on nodes that are not labeled for the Fabric Services System. [422782]

10.9. GCO

- Creating and activating new GCO version in a single workflow is not supported.
Workaround: Create new version in deactivated state, deactivate previously active version and then activate the new version. [420034]

10.10. FSS Connect

- The VMware Connect plugin cannot communicate with the Fabric Services System services over HTTPS. Only HTTP is supported in this release.
Workaround: Use HTTP. [419988]
- The Kubernetes Connect plugin is not able to communicate with the Fabric Services System services over HTTPS. Only HTTP is supported in this release.
Workaround: Use HTTP. [420082]
- The VMWare Connect plugin can error out when SRIOV is used in combination with Fabric Services System managed networking. As a result, when coming up again, the plugin code will perform an audit and this will correct any inconsistency that may have resulted. Eventually the system functions as expected.
Workaround: The system is self-healing so there is no workaround needed. Alternatively, deploy SRIOV with VMware managed networking only, or stick to VIRTIO if FSS managed networking is required. [420047]
- When a tenant/workload EVPN has not been deployed due to an error (for example, the fabric is in use by a candidate version), audit runs will succeed and deploy the tenant without reporting any errors. [419440]
- Audit does not resolve an issue when the operator removes a fabric from a workload Intent without knowledge of Connect. [421400]

10.11. Fabric Services Controller (FSC)

- If a user deletes a WCI, do not delete the network-attachment definitions that are included in the WCI until the deletion of the WCI is complete. This will prevent the deletion from becoming stuck because of webhook checks. If network-attachment-definitions are removed before WCI deletion, apply the missing network-attachment definition again for the deletion to be successful. [416469, 419343]
- Before applying fsc-operator, ensure that the Fabric Services System is reachable and that user credentials and HOST IP are correctly specified in fsc-operator. There is a possibility that workload interface may not be deleted in FSC; and in the Fabric Services System, sub-interfaces may not be deleted even after supplying the operator again with the correct password and restarting the controller pod. [418998]
- Fabric Services System managed support with L2 subnets is available in this release and is Beta Quality feature. Additionally, for IPVLAN CNI, only L2 mode in network-attachment-definition is supported while used for fabric connectivity with FSC-CNI.
- This release supports fsc-cni and user pods requiring fabric connectivity only on worker nodes. User pods on master node support is not available in this release.
- Support is validated only for leaf-spine topology. Manual topology support is not validated.
- This release supports fsc-cni and user pods requiring fabric connectivity only on worker nodes. User pods on master node support is not available in this release. From 22.12 release, fsc-cni and user pods requiring fabric Connectivity is supported for both worker and master nodes.