



Smart Plan Suite 20.6

SPS CNF: Installation Guide

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1 About this document

The *Smart Plan Suite (SPS) CNF Operation, Administration and Maintenance Guide* describes the operations and maintenance procedures, administrative tools and functional parts such as measurements, alarms or logging for image-based, distributed deployments of the SPS in containerized network functions (CNFs).

Intended audience

The intended audience of this document includes:

- **Service Provisioners** people who provision the SPS data.
- **Service Administrators** people who will monitor the SPS data.
- **Field Support Personnel** people who will install the SPS and upgrade it to later versions.

Used conventions

The following table describes the conventions.

Appearance	Description
<i>emphasis</i>	Text that is emphasized.
graphical user interface text	Text that is displayed in a graphical user interface:
<code>system input</code>	Text that the user types as input to a system
<code>system output</code>	A value or command-line parameter that the user provides.
<code>variable</code>	A value or command-line parameter that the user provides
[]	Text or a value that is optional.
{ value1 #value2 } { variable1 #8.7 variable2 }	A choice of values or variables from which one value or variable is used

Table 1: Conventions

Related information

The following table lists other documentation resources that may be of use when working with the SPS.

Title	Part number
Overview Guide	9YZ-08923-UG00-PCZZA
Installation Guide	9YZ-08923-IN00-RJZZA
Operation, Administration, and Maintenance (OAM) Guide	9YZ-08923-MT00-REZZA
Policy User Guide	9YZ-08923-UG03-PCZZA
Charging User Guide	9YZ-08923-UG01-PCZZA
Subscriber Manager Guide	9YZ-08923-UG05-PCZZA
Notification Service (NS) User Guide	9YZ-08923-UG06-PCZZA
Global Configuration Guide	9YZ-08923-CN02-TCZZA
Diameter Configuration Guide	9YZ-08923-CN01-TCZZA
Use Cases Guide	9YZ-08923-PL00-FPZZA
Service Manager API Reference	9YZ-08923-UG04-EFZZA
HLAPI Reference	9YZ-08923-CN06-PEZZA
Standards Compliance Reference	9YZ-08923-CN00-EFZZA
Error Messages Reference	9YZ-08923-AL00-QEZZA
CDR/EDR Reference	9YZ-08923-MT01-REZZA
Free and Open Source Software (FOSS) Guide	9YZ-08923-PL02-QEZZA
Privacy Consideration Guide	9YZ-08923-PL03-QEZZA
Data Model Specification for CDM (SPS)	9YZ-08923-CN03-PEZZA
One-NDS SPML Provisioning ISPEC	9YZ-08923-CN04-PEZZA
Provisioning Gateway Application Extension Package (ONENDS-WX-SPS) Release Note	9YZ-08923-PL04-FPZZA
VNF Artifacts Generator Tool User Guide	9YZ-08923-CN05-TCZZA
DevOps Guide	9YZ-08923-MT02-REZZA
Engineering Guidelines	9YZ-08923-CN08-PEZZA
Glossary	9YZ-08923-UG06-WDZZA

Table 2: Nokia SPS 20.6 documentation

Document support

- **Customer documentation welcome page** <https://documentation.nokia.com/>

- **Technical support** <https://customer.nokia.com/support/s>

How to comment

- **Documentaion feedback** documentation.feedback@nokia.com

2 Scaling

This chapter describes scaling in the SPS CNF.

Scaling options

Scaling means increasing or decreasing the number of pods based on the resources that are needed. Scale-in decreases the number of running pods of a particular pod type if the traffic is sufficiently low to recognize that fewer resources are required. Scale-out increases the number of pods of a particular pod type to provide additional capacity. Scale-in and scale-out can be done manually or using autoscaling operation in Kubernetes. The following table describes the availability of manual scaling and autoscaling in the SPS CNF.

Pod type	Is autoscaling available?	Is manual scaling available?
OAME	no	
DB	no	yes
DB layer	yes	
SM App	yes	
IOHD	no	
Charging	yes	
Notif	yes	
LDAP plugin	yes	
LDAP concentrator	yes	
ComSvc	yes	
Kafka	no	yes
CSDC		

Table 3: Autoscaling and manual scaling

2.1 Autoscaling

Autoscaling is a Kubernetes operation that automatically increases or decreases the number of pods based on the demands of your workloads. When demand is high, autoscaling adds pods to the pods pool. When demand is low, autoscaling scales down the number of pods giving back unused resources.

Autoscaling is handled by Horizontal Pod Autoscaler (HPA), a Kubernetes API resource and controller, and works independently for each pod type. HPA monitors workload and utilization of resources in a cluster, and based on the current need as well as specified utilization metrics and thresholds, dynamically adjusts the number of pods of a particular pod type. By default the utilization metric is set to CPU utilization.

**Note:**

Scaling down occurs gradually, smoothing out the impact of rapidly fluctuating metric values with a downscale stabilization timer of five minutes.

HPA definition

The HPA for each pod type is defined in `values.yaml` file as follows:

```
hpa:
```

```
  minReplicas: 1
```

```
  maxReplicas: 10
```

```
  averageCpuUtilization: 80
```

Where:

- `minReplicas` is the minimum number of pods running at any time.
- `maxReplicas` is the maximum number of pods running at any time regardless of the utilization calculation.
- `averageCpuUtilization` is the percentage of the target average used to determine whether a new pod should be instantiated or how many existing pods should be terminated.

**Note:**

Do not use the Kubernetes GUI to find out whether or not the current CPU utilization exceeds the target CPU utilization. Use **`kubectl -n sps get hpa`** command for this purpose.

Kubernetes GUI

The Kubernetes GUI allows to see events related to scaling. These events are visible in a number of microservices views such as **Deployment**, **Stateful Set** or **Replica Set**. For more information on the Kubernetes GUI, see Kubernetes documentation.

2.1.1 Updating HPA configuration

The HPA configuration can be updated post-installation using **`kubectl`** command. The following examples show how to update HPA configuration.

Updating minReplicas

To update *minReplicas* parameter, enter:

```
kubectl -n <namespace> patch hpa <hpa name> -p '{"spec": {"minReplicas":<val>}}'
```

For example:

```
kubectl -n sps patch hpa sps-comsvc -p '{"spec": {"minReplicas":3}}'
```

Updating maxReplicas

To update *maxReplicas* parameter, enter:

```
kubectl -n <namespace> patch hpa <hpa name> -p '{"spec": {"maxReplicas":<val>}}'
```

For example:

```
kubectl -n sps patch hpa sps-comsvc -p '{"spec": {"maxReplicas":3}}'
```

Updating CPU utilization

To update the CPU utilization parameter, do the following:

1. Find out the current CPU utilization by entering:

```
kubectl -n sps get hpa
```



Note:

Do not use the Kubernetes GUI to find out whether or not the current CPU utilization exceeds the target CPU utilization. Use **kubectl -n sps get hpa** command for this purpose.

2. Modify the CPU utilization parameter by entering:

```
kubectl -n sps patch hpa sps-comsvc -p '{"spec": {"targetCPUUtilizationPercentage":75}}'
```

For example:

1. Enter:

```
[root@sps103 /]# kubectl -n sps get hpa
```

Expected outcome

NAME	REFERENCE	TARGETS	MINPODS	MAXPODS	REPLICAS	AGE
sps-comsvc	Deployment/sps-comsvc	151%/80%	1	8	8	3d1h
sps-pc	Deployment/sps-pc	156%/80%	1	10	10	3d1h
sps-smapp	Deployment/sps-smapp	18%/80%	1	10	1	3d1h

2. Enter:

```
[root@sps103 /]# kubectl -n sps patch hpa sps-comsvc -p '{"spec": {"targetCPUUtilizationPercentage":75}}'
```

Expected outcome

NAME	REFERENCE	TARGETS	MINPODS	MAXPODS	REPLICAS	AGE
sps-comsvc	Deployment/sps-comsvc	155%/75%	1	10	10	3d1h
sps-pc	Deployment/sps-pc	157%/80%	1	10	10	3d1h
sps-smapp	Deployment/sps-smapp	18%/80%	1	10	1	3d1h

3 Reference material

This chapter describes the customization files, which are used in the SPS CNF installation.

3.1 Helm chart parameters

The Helm chart parameters are the parameters that allow to customize of the SPS CNF. The Helm chart parameters are defined in `values.yaml` and `README.md` files. This section describes Helm chart parameters.

The Helm chart parameters are arranged into the following sections:

- Global
- Tags
- Aerospike
- ComSvc
- IOHD
- Notification Service
- OAME
- Charging
- DB layer
- SM App
- LDAP concentrator
- LDAP plugin
- CSDC



Note:

There is a group of parameters in the Helm chart that can be defined with global or/and application specific scope. These parameters can be defined in the Global section or/and in any other pod-type section. These parameters are defined in table **Parameters with varying scope: Global or/and pod-type**.

The following table describes the parameters of the Global section. The Global section contains the parameters that apply to the entire SPS CNF.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
global.imagePullPolicy	<p>This parameter defines the Kubernetes container image pull policy which determines when images are pulled from the registry.</p> <p>The values are:</p> <ul style="list-style-type: none"> • <i>Always</i> • <i>IfNotPresent</i> • <i>Never</i> 	
global.registry	This parameter defines the host name and the port of the Docker registry to fetch images from.	
global.registry4		
global.debug	<p>This parameter defines whether or not to enable various debugging facilities including the exposure of app server JMX ports.</p> <p>The values are:</p> <ul style="list-style-type: none"> • <i>true</i> • <i>false</i> 	
global. maxAllowedFailedKafkaPods	This parameter defines the allowed maximum number of failed Kafka pods before starting the other SPS pods.	
global. maxAllowedFailedDBPods	<p>This parameter defines the allowed maximum number of failed DB pods before starting the other SPS pods.</p> <p><i>The following is the definition of maxAllowedFailedDB in the SPS VNF configuration file.</i></p> <p>The SPS is a 2*(N+K) Active/Active cluster of database VMs designed to process a full-traffic load with the maximum K number of VMs within any of the two groups that can fail before the resources drop below the designed levels. If this occurs, the SPS takes actions such as requesting traffic to shut off and then returning</p>	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
	<p>to service when the databases are back at the designed levels.</p> <p>The SPS divides the database cluster into two groups, rack1/zone1 and rack2/zone2, to facilitate a faster and more robust software upgrade. For this reason, each group has N+K database VMs.</p> <p>This parameter specifies the value of K. The value of N is $(M/2) - K$, where M number of VMs in the two groups.).</p> <p>If the value is not specified, then the value is the default, that is one. If the specified value is less than zero, it is reset to zero. If the specified value is greater than the number of database VMs in the group, it is reset to the number of VMs in that group minus one.</p> <p>For example, if this parameter is set to 3, this means that no more than three VMs within any of the two database groups can fail before the entire database cluster becomes out of service.</p>	
global.sitelocation	<p>This parameter defines the location of the SPS site.</p> <p><i>The following is the definition of sitelocation in the SPS VNF configuration file.</i></p> <p>Location must be unique per physical location. If multiple sites (SM, and/or ME, and/or IG) share a building complex, then these sites should have the same location. For example, if an ME and an SM share location Ottawa, then the ME's location is "Ottawa" and the SM's location is "Ottawa".</p> <p>The value is an arbitrary string. Choose a value that is meaningful and reasonable in length.</p> <p>For more information on location, see section Location and community in chapter Monitoring</p>	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
	and health check in SPS VNF Operation, Administration and Maintenance Guide.	
global.sitename	<p>The name of the SPS site.</p> <p><i>The following is the definition of sitename in the SPS VNF configuration file.</i></p> <p>This parameter is defined with the maximum of 25 alphanumeric and dash (-) characters.</p> <p>The dot ('.') and underscore ('_') characters cannot be used.</p>	
global.systemid	<p>The system ID required by Fluentd.</p> <p><i>The following is the definition of systemid in the SPS VNF configuration file.</i></p> <p>This parameter defines the ID for an SPS site. This parameter supports 32 values in the interval [0,31]. This parameter is used for all the SPS topology parameters and must be unique for each site across all the sites deployed.</p> <p>For example, if there are four MEs and two SMs in your SPS, then each site is assigned a unique integer in this group of six; the MEs are numbered 1, 2, 3 and 4; the SMs are numbered 5 and 6.</p>	
global.usePrometheus	<p>This parameter defines whether or not Prometheus is used for metrics.</p> <p>The values are:</p> <ul style="list-style-type: none"> • <i>true</i> • <i>false</i> <p>If this parameter is set to true, then <global.metricsmode> must be set to <i>prometheus</i>.</p>	
global.metricsmode	<p>This parameter defines the metrics mode for an application. This parameter correlates with <usePrometheus>.</p>	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
	<p>The values are:</p> <ul style="list-style-type: none"> • <i>csv</i> • <i>prometheus</i> <p>If this parameter is set to <i>prometheus</i>, the application metrics are exported to Prometheus tool.</p>	
global.csvmetricsinterval	<p>This parameter defines the interval in minutes to collect metrics.</p> <p><i>The following is the definition of csvmetricsinterval in the SPS VNF configuration file.</i></p> <p>This parameter defines the collection interval in minutes during which the metrics is fetched and written into the following location: /appdata/sps/meas/.</p> <p>The zero value disables counters and scheduling of the SPS application metrics collection.</p> <p>The value range is [0,1440].</p>	
global.csvmetricsintervaloffset	<p>This parameter defines the metrics collection interval offset in minutes.</p> <p><i>The following is the definition of csvmetricsintervaloffset in the SPS VNF configuration file.</i></p> <p>This parameter defines the collection interval offset, which is the offset (delay) amount in minutes for the collection interval.</p> <p>The SPS application metrics collection occurs at the beginning of an hour unless the offset is specified</p> <p>The value range is [0 ,csvmetrics/collection-interval].</p>	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
global.useIstio	<p>This parameter defines whether or not Istio is available and SPS is to use it as the Ingress gateway.</p> <p>The values are:</p> <ul style="list-style-type: none"> <i>true</i> <i>false</i> 	
global.istioHttpProto	<p>This parameter defines the Istio gateway protocol if Istio is used.</p> <p>The values are:</p> <ul style="list-style-type: none"> <i>http</i> <i>https</i> 	
global.istioHttpPort	<p>This parameter defines the Istio gateway port if Istio is used. Istio must have an Ingress gateway port mapping from an externally accessible port to this port.</p>	
global.ingressip	<p>This parameter defines the IP address for Ingress.</p>	
global.ingressport	<p>This parameter defines the port for Ingress.</p>	
global.ingressproto	<p>This parameter defines the protocol for Ingress.</p> <p>The values are:</p> <ul style="list-style-type: none"> <i>http</i> 	
global.storageClass	<p>This parameter defines the Kubernetes storage class used by CKAF-ZOOKEEPER, Kafka and Aerospike related components.</p> <p>This paramete correlates with <localPvSize>.</p>	
global.opentracing.jaeger	<p>This parameter is configured in <code>common-configmap.yaml</code> file.</p>	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
global.opentracing.jaeger.endpoint	This parameter defines the Jaeger endpoint to send OpenTracing data to.	
global.opentracing.headers	This parameter defines a comma separated list of HTTP headers' names that are propagated if present.	
global.enableExternalSPR	<p>This parameter defines whether or not to enable the external SPR.</p> <p>The values are:</p> <ul style="list-style-type: none"> <i>true</i> <i>false</i> <p>Set this parameter to <i>true</i> if the external SPR is used. Setting to <i>true</i> also enables deployment of LDAP concentrator and LDAP plugin.</p> <p>Otherwise, if this parameter is set to <i>false</i>, LDAP concentrator and LDAP plugin will not be deployed.</p>	
global.etcd.rewrite	<p>This parameter defines whether or not the SPS configuration values stored in ETCD are going to be overwritten with the current values.</p> <p>The values are:</p> <ul style="list-style-type: none"> <i>true</i> <i>false</i> <p>If the value is <i>true</i>, then the SPS configuration values will be overwritten.</p>	
global.diameter.originrealm	This parameter defines the Diameter origin realm to use.	
global.diameter.originhost	This parameter defines the Diameter origin host to use, without realm.	

Table 4: Global parameters

The following table describes the parameters that can be defined as Global parameters applicable to the entire SPS, or as parameters that also or only apply to particular types of pods. These

are the parameters with varying scope of application. The parameters defined with pod-type scope have higher precedence over the parameter defined with global scope. For example, if `<aerospike.jvmheap>` and `<global.jvmheap>` are both defined, then `<aerospike.jvmheap>` has higher precedence over `<global.jvmheap>` in relation to Aerospike pods.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
<code><scope>.jvmheap</code>	This parameter defines the default JVM heap configuration.	
<code><scope>. applicationLog4jMonitorInterval</code>	This parameter defines the monitoring interval in seconds for Log4j configuration of application logs.	
<code><scope>. applicationLog4jConfiguration</code>	This parameter defines the Log4j configuration of application logs.	
<code><scope>. alarmLog4j2Configuration</code>	This parameter defines the Log4j2 configuration of alarm logs.	
Resources parameters These parameters define how much resources are requested, and how much resources can be requested or what is the limit of requests. If any parameter in <code><ldapconcentrator>.resources</code> is set, then all four <code><ldapconcentrator>.resources</code> parameters must be set. If there are insufficient cluster resources, the pods might not be instantiated.		
<code><scope>.resources.requests. cpu</code>	This parameter defines how much CPU is requested initially.	
<code><scope>.resources.requests. memory</code>	This parameter defines how much memory is requested initially.	
<code><scope>.resources.limits.cpu</code>	This parameter defines the amount of CPU to request for the pod. This parameter must be greater or equal to <code><<scope>.resources.requests.cpu></code> .	
<code><scope>.resources.limits. memory</code>	This parameter defines the amount of memory to request for the pod.	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
	This parameter must be greater or equal to <<scope>.resources.requests.memory>.	
Horizontal Pod Autoscaler (HPA) parameters		
<scope>.hpa.minReplicas	This parameter defines the initial number of pods to start. If this parameter is zero, then the HPA is not created and zero instances of the pod are started.	
<scope>.hpa.maxReplicas	This parameter defines the maximum number of pods running at any time regardless of the utilization calculation.	
<scope>.hpa.averageUtilization	This parameter defines the CPU utilization. This parameter represents the percentage of CPU resource defined in <?>. This parameter is used to determine whether or not autoscaling is needed and how many pods have to be added or terminated. If the actual CPU usage is higher than this value, then new pods are added. If the actual CPU utilization is lower than this value, then a number of existing pods are terminated.	

Table 5: Parameters with varying scope: Global or/and pod-type

The following table describes the parameters of the Tags section.

Parameter	Description	Update notes
tags.notif	This parameter defines whether or not Notification Service is used. The values are: <ul style="list-style-type: none"> • <i>true</i> • <i>false</i> 	
tags.ldapconcentrator	This parameter defines whether or not LDAP concentrator is used.	

Parameter	Description	Update notes
	<p>The values are:</p> <ul style="list-style-type: none"> <i>true</i> <i>false</i> 	
tags.ldapplugin	<p>This parameter defines whether or not LDAP plugin is used.</p> <p>The values are:</p> <ul style="list-style-type: none"> <i>true</i> <i>false</i> 	

Table 6: Tags parameters

The following table describes the parameters of the ComSvc section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
comsvc.jvmheap	This parameter defines the size in MB to allocate for the ComSvc Java VM. This parameter is only applicable to containers which use Java.	
comsvc.imageTag	This parameter defines the tag version of the ComSvc container image.	
comsvc.replicas	This parameter defines the number of replicas in the ComSvc pod.	

Table 7: ComSvc parameters

The following table describes the parameters of the Aerospike section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
aerospike.claimSize	This parameter defines the size of the DB Gluster FS PVC. The value must be defined and cannot be empty, for example, <i>500Mi</i> or <i>5Gi</i> .	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
aerospike.imageTag	This parameter defines the tag version of the DB container image.	
aerospike.replicas	This parameter defines the number of replicas in the database pod.	
aerospike.localPvSize	This parameter defines the size of the DB local storage persistent volume. This parameter is valid only when <code><storageClass></code> is set to <code>localdb-storageclass</code> . The value must be greater than <code><aerospike.claimSize></code> .	
aerospike.network.heartbeat.interval	This parameter defines the time in milliseconds of a heartbeat interval. This is the frequency with which the leader notifies followers that it is still the leader. <i>The following is the definition of network.heartbeat.interval parameters in the SPS VNF configuration file.</i> The heartbeat interval value is recommended to be around the maximum of the average round-trip time (RTT) between members, normally around 0.5-1.5x of RRT. The heartbeat interval value should be the same for all the members in one cluster.	
aerospike.storageClass	This parameter defines the Kubernetes storage class to use for SPS database file storage.	
logClaim parameters		
aerospike.logClaim.enabled	This parameter defines whether or not logClaim is enabled. The values are: <ul style="list-style-type: none"> <code>true</code> <code>false</code> 	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
aerospike.logClaim. storageClassName	This parameter defines the Kubernetes storage class to use for SPS database logs storage.	
aerospike.logClaim.size	This parameter defines the size of the DB log GlusterFS PVC or local storage PVC, for example <i>200Mi</i> or <i>2Gi</i> . The value must be defined and cannot be empty.	
Database namespace's <filesize> and <memorysize> parameters <i>The following is the definition of <filesize> and <memorysize> parameters in the SPS VNF configuration file.</i> Each namespace's <filesize> and <memorysize> parameters correlate. The values must be defined and cannot be empty, You must update these parameters for live deployment. You must contact Nokia Professional Services to determine the correct values for these parameters. The default values are for the lab trial setups only.		
aerospike.dscNamespace. filesize	This parameter defines the file size of the dsc namespace, for example <i>343M</i> .	
aerospike. dscglobalNamespace.filesize	This parameter defines the file size of the dscglobal namespace.	
aerospike.dsclocalNamespace. filesize	This parameter defines the file size of the dsclocal namespace.	
aerospike.spspdNamespace. filesize	This parameter defines the file size of the spspd namespaces. This parameter applies to all partitions.	
aerospike.dscNamespace. memorysize	This parameter defines the memory size of the dsc namespace, for example <i>10M</i> .	
aerospike. dscglobalNamespace. memorysize	This parameter defines the memory size of the dscglobal namespace.	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
aerospike.dscllocalNamespace. memorysize	This parameter defines the memory size of the dscllocal namespace.	
aerospike.spspdNamespace. memorysize	This parameter defines the memory size of the spspd namespaces. This parameter applies to all partition.	
Resources parameters These parameters define the resources for the Aerospike types of pods. If there are insufficient cluster resources, the pods might not be instantiated. .		
aerospike.resources.requests. cpu	For definition, see table Parameters with varying scope: Global or/and pod-type.	
aerospike.resources.requests. memory		
aerospike.resources.limits.cpu		
aerospike.resources.limits. memory		

Table 8: Aerospike parameters

The following table describes the parameters of the IOHD section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
iohd.diameterFloatingIP	This parameter defines a YAML list of keepalived floating IPs to use for external Diameter traffic. These IPs are deployed from the Deployment container using `bcmt service keepalived`.	
iohd.httpFloatingIP	This parameter defines a YAML list of keepalived floating IPs to use for external HTTP network (5G) traffic. These IPs are deployed	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
	from the Deployment container using `bcmt service keepalived`.	
iohd.httpPort	This parameter defines the port to listen for HTTP network (5G) connections on. This parameter needs to be set to something other than 8443 if using the same floating IP that the IOHO uses in order to avoid a conflict.	
iohd.httpsPort	This parameter defines the port	
iohd.imageTag	This parameter defines the tag version of the IOHD container image to use.	
iohd.jvmheap	This parameter defines the size, in MB to allocate for the Diameter IOH Java VM.	
iohd.replicas	This parameter defines the number of replicas in the IOHD pod.	

Table 9: IOHD parameters

The following table describes the parameters of the Notification Service (NS) section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
notif.imageTag	This parameter defines the tag version of the NS container image to use.	
notif.jvmheap	This parameter defines the size, in MB, to allocate for the NS Java VM. Only applicable to containers which use Java.	
notif.replicas	This parameter defines the number of replicas in the NS pod.	
notif.enabled	This parameter defines whether or not NS is enabled.	

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
	The values are <ul style="list-style-type: none"> • <i>true</i> • <i>false</i> 	
Horizontal Pod Autoscaler (HPA) These parameters define the HPA configuration for the NS types of pods.		
notif.hpa.minReplicas	For definition, see table Parameters with varying scope: Global or/and pod-type.	
notif.hpa.maxReplicas		
notif.hpa. averageUtilization		

Table 10: NS parameters

The following table describes the parameters of the OAME section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
oame.imageTag	This parameter defines the tag version of the OAME container image to use.	
oame.jvmheap	This parameter defines the size, in MB, to allocate for the OAME Java VM.	
oame.replicas	This parameter defines the number of replicas in the OAME pod.	

Table 11: OAME parameters

The following table describes the parameters of the Charging section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
charging.imageTag	The tag version of the and Charging application container image to use.	
charging.jvmheap	The size, in MB, to allocate for the Charging application Java VM.	
charging.replicas	The number of replicas in the Charging application pod.	
Horizontal Pod Autoscaler (HPA) These parameters define the HPA configuration for the Charging types of pods.		
charging.hpa.minReplicas	For definition, see table Parameters with varying scope: Global or/and pod-type.	
charging.hpa.maxReplicas		
charging.hpa.averageUtilization		

Table 12: Charging parameters

The following table describes the parameters of the DB layer section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
dblayer.imageTag	The tag version of the DB layer container image to use.	
dblayer.jvmheap	The size, in MB, to allocate for the DB layer Java VM. Only applicable to containers which use Java.	
dblayer.replicas	The number of replicas in the DB layer pod.	
Horizontal Pod Autoscaler (HPA) These parameters define the HPA configuration for the DB layer types of pods.		

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
dblayer.hpa.minReplicas	For definition, see table Parameters with varying scope: Global or/and pod-type.	
dblayer.hpa. maxReplicas		
dblayer.hpa. averageUtilization		

Table 13: DB layer parameters

The following table describes the parameters of the SM App section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
smapp.imageTag	The tag version of the SM App container image to use.	
smapp.jvmheap	The size, in MB, to allocate for the SM App Java VM.	
smapp.replicas	The number of replicas in the SM App pod. This parameter can be set to zero if the SM is not to be co-located.	
Horizontal Pod Autoscaler (HPA) These parameters define the HPA configuration for the SM App types of pods.		
smapp.hpa.minReplicas	For definition, see table Parameters with varying scope: Global or/and pod-type.	
smapp.hpa. maxReplicas		
smapp.hpa. averageUtilization		

Table 14: SM App parameters

The following table describes the parameters of the LDAP concentrator section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
ldapconcentrator.jvmheap	The size, in MB, to allocate for the LDAP concentrator Java VM.	
Horizontal Pod Autoscaler (HPA) These parameters define the HPA configuration for the LDAP concentrator types of pods.		
ldapconcentrator.hpa.minReplicas	For definition, see table Parameters with varying scope: Global or/and pod-type.	
ldapconcentrator.hpa.maxReplicas		
ldapconcentrator.hpa.averageUtilization		

Table 15: LDAP concentrator parameters

The following table describes the parameters of the LDAP plugin section.

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
ldapplugin.jvmheap	The size, in MB, to allocate for the LDAP plugin Java VM.	
Horizontal Pod Autoscaler (HPA) These parameters define the HPA configuration for the LDAP plugin types of pods.		
ldapplugin.hpa.minReplicas	For definition, see table Parameters with varying scope: Global or/and pod-type.	
ldapplugin.hpa.maxReplicas		

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
ldapplugin.hpa. averageUtilization		

Table 16: LDAP plugin parameters

Parameter	Description	Update notes Must update / Modify default if needed / Do not modify
csdc.service.StorageClass		

Table 17: CSDC parameters