Network Service Level Advisor (NSLA)

bintec -Dm 754-I

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Chapter 1 Introduction

1.1 Introduction

The **bintec Router** allows you to monitor the service level provided by the network (*Service Level*) and to generate a notification when certain normal thresholds are not met (*SLA* or *Service Level Agreement*). This notification can be used by client entities (static routing, TVRP, Policy Routing, IP Telephony, etc.) to modify router behavior and achieve a satisfactory service level.

This functionality is known as **Network Service Level Advisor** (*NSLA*) and uses information gathered by the *Network Service Monitor* (*NSM,* bintec Dm749-I), by *Level Indicators,* which are variables that maintain a value updated by other device entities (IP Telephony, etc.) or by *Generic Input*, which are different statistics updated by other entities (rate-kbps on Policy-map, for example).

This manual contains information on NSLA configuration and monitoring.

Graphically, the concept is as follows:
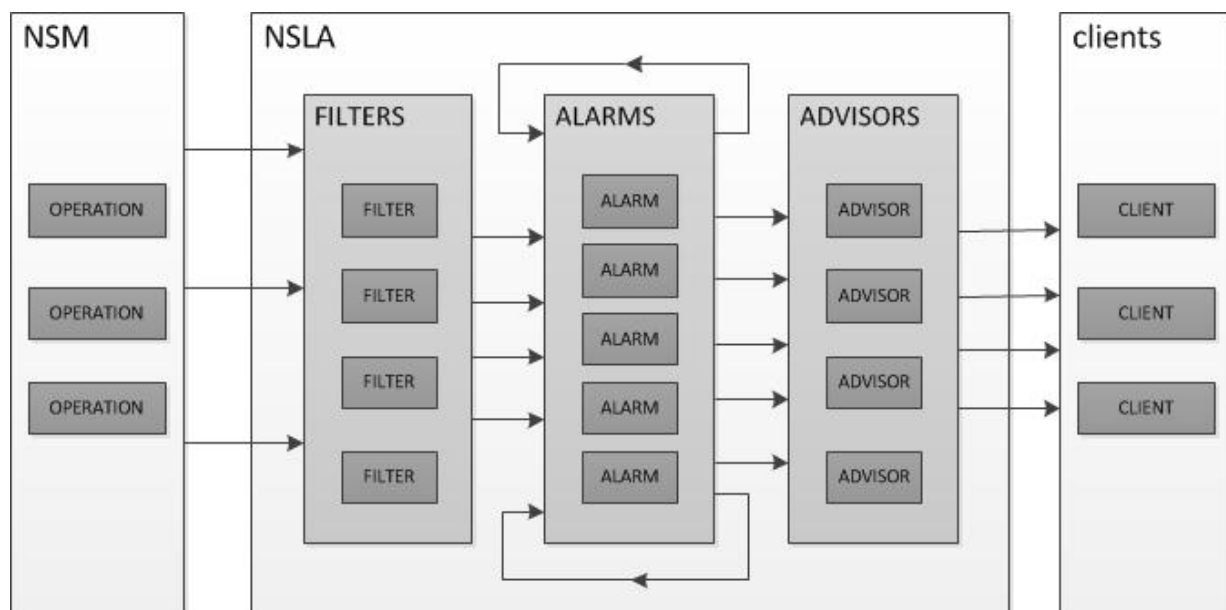
Fig. 1: **NSLA configuration**

(1)   **NSM operations** give **NSLA filters** information on parameters required for each filter: the same NSM operation can give several NSLA filters information on the same parameter (or on different ones). However, a filter can only receive information on a single parameter from one NSM operation.

(2)   When there is a change in the **level indicators**, **NSLA filters** receive information on the current level of the indicator. The same level indicator can send information to several NSLA filters, but a filter may only receive information from a single level indicator.

(3)   Once the interval established for **generic input** reporting is over, statistics associated with this item are sent to **NSLA filters**. Each generic-input can only be transmitted to one filter.

(4)   **NSLA alarms** combine the output of one or various filters and alarms. A sole filter/alarm can trigger several alarms and the alarms may depend on several filters/alarms (through AND, OR and NOT logical operations).

(5)   **NSLA advisors** use one alarm or more. An alarm can brief several advisors and the latter can depend on several alarms (through OR and NOT logical operations).

(6)   **NSLA clients** receive notifications from the advisors. An advisor can brief several clients, but a client may only receive notifications from a single advisor (through the "track nsla-advisor <advisor_id>" command).

NSM parameters have the following quality control NSLAs:

• Response time (RTT or Round Trip Time).

        Allows you to define the filters monitoring:

            - Delays (RTT directly).

            - Packet loss percentage (RTT>TIMEOUT).

• Source to destination instantaneous jitter.

- Destination to source instantaneous jitter.
- Averaged Jitter in absolute value from source to destination.
- Averaged Jitter in absolute value from destination to source.
- BFD session status.
- Total percentage of packet loss in round trip route.
- Packet loss percentage in source to destination direction.
- Packet loss percentage in destination to source direction.

Note

Configuring NSLA so it operates correctly can be complicated, even when the number of values to be configured is low. Typical configurations and default values do not exist. The configuration depends on multiple factors: the scenario, the applications forwarded by the router, the required service level (with the added difficulty of this being, in the majority of cases, somewhat subjective), etc.

Chapter 2 Configuration

2.1 Accessing the configuration menu

NSLA configuration commands must be entered in the configuration menu associated with NSLA (*NSLA config>* for static cases and *NSLA config$* for dynamic cases). To access said menu, use the **FEATURE NSLA** command in the general configuration menu (*Config>* for static cases and *Config$* for dynamic cases).

```
Config>FEATURE NSLA


-- Network Service Level Advisor configuration --
NSLA config>
```

2.2 Required configuration tasks

To configure NSLA, you must (at least) carry out the following tasks:

• Configuring a filter:

> - Configure the NSM operation identifier and the parameter for said operation (whose measurement is supervised), the level indicator to be supervised, or the generic input.

> - Configure the minimum values for the parameter that is considered significant (also referred to as *filtering window*). When filtering a level indicator, you do not need to configure this value, as this is 1 by default.

> - Configure the activation condition for the filter output.

> - Configure the deactivation condition for the filter output.

• Configuring an alarm:

> - Configure the combination of filter/alarm outputs that generate the alarm.

• Configuring an advisor:

> - Configure the combination of alarm outputs making up the advisor.

• Globally enabling the NSLA.

2.3 Configuration commands

2.3.1 Command list

```
[NO] ENABLE
[NO] MUTE
     EXIT
     LIST <ALL | NSLA | FILTERS <id> | ALARMS <id>| ADVISORS <id> >
     DESCRIPTION <text>
 NO  DESCRIPTION


 NO  FILTER <id>
[NO] FILTER <id> NSM-OP <nsm_operation_id> <RTT | RTT-AVG | JITTER-SD | JITTER-DS| JITTER-AVG-SD |
  JITTER-AVG-DS | BFD | LOSS | LOSS-SD | LOSS-DS >
[NO] FILTER <id> LEVEL-INDICATOR <level_indicator_id>
[NO] FILTER <id> GENERIC-INPUT
[NO] FILTER <id> SIGNIFICANT-SAMPLES <samples>
[NO] FILTER <id> ACTIVATION THRESHOLD <<value> | TIMEOUT>
[NO] FILTER <id> ACTIVATION SENSIBILITY <sens>
[NO] FILTER <id> ACTIVATION STABILIZATION-TIME <time>
[NO] FILTER <id> DEACTIVATION THRESHOLD <<value> | TIMEOUT>
[NO] FILTER <id> DEACTIVATION SENSIBILITY <sens>
[NO] FILTER <id> DEACTIVATION STABILIZATION-TIME <time>
[NO] FILTER <id> DISABLE
[NO] FILTER <id> MUTE
[NO] FILTER <id> INVERT
[NO] FILTER <id> INITIAL-STATE <active | inactive>
     FILTER <id> DESCRIPTION <desc>
 NO  FILTER <id> DESCRIPTION


 NO  ALARM <id>
[NO] ALARM <id> [NOT] {FILTER-ID | ALARM-ID} <id_1>
[NO] ALARM <id> {AND | OR} [NOT] {FILTER-ID | ALARM-ID} <id_n>    n=2,3,4,5,6,7,8,9
[NO] ALARM <id> DISABLE
[NO] ALARM <id> MUTE
[NO] ALARM <id> INVERT
     ALARM <id> DESCRIPTION <desc>
 NO  ALARM <id> DESCRIPTION


 NO  ADVISOR <id>
[NO] ADVISOR <id> [NOT] ALARM-ID <id_1>
[NO] ADVISOR <id> OR [NOT] ALARM-ID <id_n>    n=2,3,4,5,6,7,8,9
[NO] ADVISOR <id> DISABLE
[NO] ADVISOR <id> MUTE
[NO] ADVISOR <id> INVERT
     ADVISOR <id> DESCRIPTION <desc>
 NO  ADVISOR <id> DESCRIPTION
```

2.3.2 [NO] ENABLE

Allows you to globally enable or disable NSLA.

```
NSLA config>[NO] ENABLE
```

By default, NSLA is disabled.

> **Note**
>
> If NSLA is disabled, clients will not receive notifications from the advisors.

2.3.3 [NO] MUTE

Allows you to globally activate or deactivate notifications from NSLA advisors to NSLA clients. While this command stops notifications being sent to clients, it does not prevent filters, alarms or advisors from performing calculations.

```
NSLA config>[NO] MUTE
```

2.3.4 EXIT

Use this command to exit the NSLA configuration menu (*NSLA config>*) and move to the upper level menu (*Config>*).

```
NSLA config>EXIT
Config>
```

2.3.5 LIST

This command lists NSLA configuration.

2.3.5.1 ALL

Lists NSLA global configuration, the configuration of all filters, all alarms and all advisors.

2.3.5.2 NSLA

Dumps NSLA global configuration.

2.3.5.3 FILTERS <id>

Lists the configuration of filters, starting from the specified identifier.

2.3.5.4 ALARMS <id>

Lists the configuration of alarms, starting from the specified identifier.

2.3.5.5 ADVISORS <id>

Lists the configuration of advisors, starting from the specified identifier.

```
NSLA config>list all
                     Network Service Level Advisor V1.0
-------------------------------------------------------------------------------
Enabled:        TRUE
Mute:           FALSE

FILTERS
 ID   E M I NSMID Parameter Sample A.Threshold AS% A.Stab D.Threshold DS% D.Stab
----- - - - ----- --------- ------ ----------- --- ------ ----------- --- ------
    1 T F T     1 JITTER SD    100          30 100     20           1 100     90
    2 T F F     5 RTT           60         500  80     45         150  95    120
 ID   E M I Level-Indicator Sample A.Threshold AS% A.Stab D.Threshold DS% D.Stab
----- - - - --------------- ------ ----------- --- ------ ----------- --- ------
    3 T F T               1    100          30 100     20           1 100     90
 ID   E M I Sample A.Threshold AS% A.Stab D.Threshold DS% D.Stab
----- - - - ------ ----------- --- ------ ----------- --- ------
    4 T F F      2         100 100      0           1 100      0

ALARMS

  ID  E M                            Expression
----- - - ----------------------------------------------------------------------
    1 F F /(F1*/F2)

ADVISORS

  ID  E M                            Expression
----- - - ----------------------------------------------------------------------
    1 F F A1
```

Global Parameters

Enabled		Indicates whether or not NSLA is enabled.
	TRUE	NSLA is enabled.
	FALSE	NSLA is disabled.

Mute		Indicates whether or not NSLA is mute.
	TRUE	NSLA is mute.
	FALSE	NSLA is not mute.

Filter Parameters

ID		Filter identifier.
E		ENABLED, indicates whether or not the filter is enabled.
	T	TRUE, filter is enabled.
	F	FALSE, filter is disabled.
M		MUTE, indicates if the filter is mute.
	T	TRUE, filter is mute.
	F	FALSE, filter is not mute.
I		INVERT, indicates if the filter conditions invert the filter output.
	T	TRUE, the filter conditions invert the filter output (the activation condition sets the filter output to FALSE and the deactivation condition sets the filter output to TRUE).
	F	FALSE, the filter conditions do not invert the filter output (the activation condition sets the filter output to TRUE and the deactivation condition sets the filter output to FALSE).
NSMID		Identifier for NSM operation associated with the filter.
Parameter		Monitored parameter.
	RTT	Round trip time. Threshold units are in milliseconds.
	RTT AVG	Average of round trip time. Threshold units are in milliseconds.
	JITTER SD	Jitter in source to destination direction. Threshold units are in milliseconds.
	JITTER DS	Jitter in destination to source direction. Threshold units are in milliseconds.
	JT AVG SD	Average absolute jitter in source to destination direction. Threshold units are in milliseconds.
	JT AVG DS	Average absolute jitter in destination to source direction. Threshold units are in milliseconds.
	BFD	BFD protocol session status.
	LOSS	Packet loss in total round trip route. The threshold units are in percentages.
	LOSS SD	Packet loss in source to destination direction. The threshold units are in percentages.
	LOSS DS	Packet loss in destination to source direction. Threshold units are in percentages.
Level-In-dicator		Identifier for the input level indicator for the filter, in cases of level indicator filtering.
Sample		Number of samples required to execute the calculations; also known as *filtering window*.
A.Threshold		Activation threshold.
	Valor	Threshold value.
	TIMEOUT	Only those packets accepted as lost meet this condition (greater delay than that configured in NSM operation).
	X	Non-configured value.
AS%		Activation sensibility, given as a percentage.
A.Stab		Activation condition setup time (seconds).
D.Threshold		Deactivation threshold.
	Valor	Threshold value.
	TIMEOUT	Only those packets accepted as lost meet this condition (greater delay than that configured in NSM operation).
	X	Non-configured value.
DS%		Activation sensibility, given as a percentage.
D.Stab		Deactivation condition setup time (seconds).

Alarm parameters

ID		Alarm Identifier.
E		ENABLED, indicates whether or not the alarm is enabled.

	T	TRUE, alarm is enabled.
	F	FALSE, alarm is disabled.
M		MUTE, indicates if alarm is mute.
	T	TRUE, alarm is mute.
	F	FALSE, alarm is not mute.
Expression		Alarm output is the logical AND or OR for the filter/alarm outputs or their negations. All negated if the alarm is inverted.
	Fx	Filter <x>.
	/Fx	Negated filter <x>.
	Ax	Alarm <x>.
	/Ax	Negated alarm <x>.
	*	Logical AND.
	+	Logical OR.

Advisor parameters

ID		Advisor Identifier.
E		ENABLED, indicates whether or not the advisor is enabled.
	T	TRUE, advisor is enabled.
	F	FALSE, advisor is disabled.
M		MUTE, indicates if advisor is mute.
	T	TRUE, advisor is mute.
	F	FALSE, advisor is not mute.
Expression		The advisor output is the logical OR for the alarm outputs or their negations. All negated if the advisor is inverted.
	Ax	Alarm <x>.
	/Ax	Negated alarm <x>.
	+	Logical OR.

2.3.6 NO DESCRIPTION

Deletes a general description.

```
NSLA config>NO DESCRIPTION
```

2.3.7 DESCRIPTION <text>

Allows you to enter a general description. If you enter various commands, a multiline description is generated.

```
NSLA config>DESCRIPTION <text>
```

Command parameters are as follows:

Name:	<text>
Range:	Alphanumerical chain containing 1 to 64 characters.
Description:	Text containing a description.

2.3.8 NO FILTER <id>

This command deletes a filter.

```
NSLA config>NO FILTER <id>
```

2.3.9 [NO] FILTER <id> NSM-OP <nsm_op>

Use this command to configure the associated NSM operation and the required parameter.

```
NSLA config>[NO] FILTER <id> NSM-OP <nsm_op> <parameter>
```

Command parameters are as follows:

Name:	<id>
Range:	1..65535

Description:	Identifies an NSLA filter.
Name:	<nsm_operation_id>
Range:	1..65535
Description:	Identifies the associated NSM operation.
Name:	Parameter to be monitored.
Range:	RTT (Round Trip Time).
	RTT-AVG (Average of Round Trip Time).
	JITTER-SD (Jitter in source destination direction).
	JITTER-DS (Positive jitter in destination source direction).
	JITTER-AVG-SD (Average absolute jitter in source to destination direction).
	JITTER-AVG-DS (Average absolute jitter in destination to source direction).
	BFD (BFD protocol session status).
	LOSS (Percentage of packet loss in round trip route).
	LOSS SD (Percentage of egress packet loss).
	LOSS DS (Percentage of ingress packet loss).
Description:	Identifies the required parameter from NSM operation.

The RTT parameter can be obtained from the following NSM operations:

- echo icmp:

    - per packet measurement.

    - if the packet is considered lost (due to timeout configured in the NSM operation), measurement is indicated as *timeout*.

- jitter:

    - per packet measurement (one for each packet making up the jitter NSM operation, num-packets),

    - if a packet is considered lost (due to timeout configured in the NSM operation), the NSLA filter doesn't receive a report on NSM operation and, as a result, this is not counted as a sample. RTT filters collecting jitter operation data only calculate delays that have been confirmed (without taking packet loss into account). To select the number of significant filter samples, you need to consider large numbers of delays and packet losses. We suggest you combine the information given by this filter with that provided by the packet loss filter.

The RTT-AVG parameter can be obtained from the following NSM operations:

- jitter:

    - 1 measurement per operation, since the average RTT value is calculated for the whole operation.

    - To calculate this, add up all the RTT values for the operation and divide this by the number of packets in said operation.

    - if a packet is considered lost (due to timeout configured in the NSM operation), take the *rtt-lost-pkt* value configured in the operation.

JITTER-SD and JITTER-DS parameters can be obtained from the following NSM operations:

- jitter:

    - (num-packets – 1) measured per operation (jitter cannot be obtained from the first NSM operation packet).

    - if a packet from the operation is lost, no jitter measurement can be given from this or from the second packet in the NSM operation.

JITTER-AVG-SD and JITTER-AVG-DS parameters can be obtained from the following NSM operations:

- jitter:

- 1 measurement per operation as the average absolute jitter value is calculated for the whole operation.

- To calculate this, add up all jitter values in the corresponding direction (in absolute value) for the operation and divide this by the number of jitter values calculated in said operation.

- Equivalent to the absolute average detour if the average value of the jitter is considered as approximately 0.

- The higher the number of packets sent in each operation (num-packets), the greater the precision when measuring the average absolute jitter.

- The greater the number of packet loss in the corresponding direction, the lower the number of jitter values that will taken into account.

BFD parameter is obtained from the following type of NSM operations:

- bfd:

- BDF session status. This can be UP or DOWN depending on whether the state of the link monitoring BFD session is up or down.

LOSS, LOSS-SD and LOSS-DS parameters can be obtained from the following types of NSM operations:

- jitter:

- 1 measurement per operation as you obtain the number of lost packets between all those sent in each operation.

- The LOSS parameter considers the lost packets in both the source to destination and destination to source directions, plus the packets that were lost without knowing which direction they were lost in (MIA = Missing In Action).

- The LOSS-SD parameter obtains the percentage of lost packets in the source to destination direction, and the LOSS-DS parameter does the same for packets lost in the destination to source direction. Neither parameter takes MIA packets into consideration.

- The received percentage is rounded down.

- The minimum percentage that can be measured is 1%.

- Control messages protocol must be enabled.

- If the operation execution fails, then the percentage of lost packets is 100%.

Command history:

Release	Modification
11.01.09	The RTT-AVG parameter was introduced as of version 11.01.09.

2.3.10 [NO] FILTER <id> LEVEL-INDICATOR <level_ind_id>

Use this command to configure an associated level indicator.

```
NSLA config>[NO] FILTER <id> LEVEL-INDICATOR <level_ind_id>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	NSLA filter identifier.
Name:	<level_ind_id>
Range:	1..65535
Description:	Associated level indicator identifier.

Level indicators can be updated by other device entities when there are state changes by configuring commands such as **update level-indicator <id> value <val> <state>**. This increases, in the state it is applied at, the level indicator <id> one value <val>. Where a filter takes a level indicator as an input, you only need to configure **activation threshold** and **deactivation threshold**. By default, **stabilization-time** is 0, **sensibility** is 100% and **significant-samples** is 1.

2.3.11 [NO] FILTER <id> GENERIC-INPUT

Use this command to configure an associated generic input.

```
NSLA config>[NO] FILTER <id> GENERIC-INPUT
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	NSLA filter identifier.

Generic input is associated with device statistics by configuring commands such as **report <statistic> nsla-filter <id>**. When this is configured on the Policy-Map feature, the parameter **<statistic>** should be **rate-kbps**.

Command history:

Release	Modification
11.00.05	This command was introduced as of version 11.00.05.
11.01.00	This command was introduced as of version 11.01.00.

2.3.12 [NO] FILTER <id> SIGNIFICANT-SAMPLES <samples>

Use this command to configure the number of samples required to initiate service level analysis. In other words, to determine the filtering window size.

```
NSLA config>[NO] FILTER <id> SIGNIFICANT-SAMPLES <samples>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA filter.
Name:	<samples>
Range:	1..65535

For a BFD parameter, the significant number of samples should be set to 1. This is because BFD only indicates whether the session is UP or DOWN.

2.3.13 [NO] FILTER <id> ACTIVATION THRESHOLD <thresh>

Use this command to configure the threshold over which a sample of the monitored parameter is considered to be above the required service level. A sample with a value equal to the threshold is considered acceptable for the required service level. These units depend on the parameter being monitored.

- RTT # milliseconds.
- RTT-AVG # milliseconds.
- JITTER-SD # milliseconds.
- JITTER-AVG-SD # milliseconds.
- JITTER-AVG-DS # milliseconds.
- JITTER-DS # milliseconds.
- BFD # this must be 0.
- LOSS # percentage in whole units.
- LOSS-SD # percentage in whole units.
- LOSS-DS # percentage in whole units.

```
NSLA config>[NO] FILTER <id> ACTIVATION THRESHOLD <thresh>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA filter.
Name:	<thresh>

Range: -999999999..999999999

Optionally, when the parameter being monitored is RTT, you can indicate a **timeout** value. This allows a filter to be defined based on lost packets, given that only packets the NSM operation considers lost will meet the activation condition (RTT greater than the timeout configured in the NSM operation).

The activation threshold must always be greater or equal to the deactivation threshold to prevent oscillations.

When dealing with a BFD parameter, the activation threshold should be set to 0. This is because BFD only indicates whether the session is UP or DOWN.

2.3.14 [NO] FILTER <id> ACTIVATION SENSIBILITY <sens>

Use this command to configure service sensibility (with respect to the parameter being monitored) as a percentage of the samples over the activation threshold present in a filtering window (the window size is defined by the SIGNIFICANT-SAMPLES parameter)

```
NSLA config>[NO] FILTER <id> ACTIVATION SENSIBILITY <sens>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA filter.
Name:	<sens>
Range:	1..100

When dealing with a BFD parameter, activation sensibility should be set to 100%. This is because BFD only indicates whether the session is UP or DOWN.

2.3.15 [NO] FILTER <id> ACTIVATION STABILIZATION-TIME <time>

Use this command to configure how long the *low quality* situation should be maintained in order to activate the filter output, i.e., filter output will activate if all filtering windows for the established period have had a percentage of samples above the activation threshold (exceeding or equal to the defined sensibility).

```
NSLA config>[NO] FILTER <id> ACTIVATION STABILIZATION-TIME <time>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA filter.
Name:	<time>
Range:	0..65535 seconds.

Command history:

Release	Modification
11.00.05	As of version 11.00.05, the minimum value is 0 seconds.
11.01.00	As of version 11.01.00, the minimum value is 0 seconds.

2.3.16 [NO] FILTER <id> DEACTIVATION THRESHOLD <thresh>

Use this command to configure the threshold where a sample from a monitored parameter is considered acceptable for the required service level. (Samples equal to, or lower than, the deactivation threshold are considered acceptable). These units depend on the monitored parameter.

- RTT # milliseconds.
- RTT-AVG # milliseconds.
- JITTER-SD # milliseconds.
- JITTER-DS # milliseconds.
- JITTER-AVG-SD # milliseconds.
- JITTER-AVG-DS # milliseconds.
- BFD # this must be 0.

- LOSS # percentage in whole units.
- LOSS-SD # percentage in whole units.
- LOSS-DS # percentage in whole units.

```
NSLA config>[NO] FILTER <id> DEACTIVATION THRESHOLD <thresh>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA filter.
Name:	<thresh>
Range:	-999999999..999999999

Optionally, when the parameter being monitored is RTT, you can indicate a **timeout** value. This allows a filter to be defined based on lost packets, given that only the packets the NSM operation considers not lost will meet the deactivation condition (RTT greater than the timeout configured in the NSM operation).

To prevent oscillations, the activation threshold must always be greater than, or equal to, the deactivation threshold.

When dealing with a BFD parameter, the deactivation threshold should be set to 0. This is because BFD only indicates whether the session is UP or DOWN.

2.3.17 [NO] FILTER <id> DEACTIVATION SENSIBILITY <sens>

Configures the sensibility of input deactivation as a percentage of the samples below, or equal to, the deactivation threshold present in the filtering window (the window size is defined by the <samples> parameter).

```
NSLA config>[NO] FILTER <id> DEACTIVATION SENSIBILITY <sens>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA filter.
Name:	<sens>
Range:	1..100

When dealing with a BFD parameter, deactivation sensibility should be set to 100%. This is because BFD only indicates whether the session is UP or DOWN.

2.3.18 [NO] FILTER <id> DEACTIVATION STABILIZATION-TIME <time>

Through this command, you can configure how long the *acceptable quality* situation should be maintained in order to deactivate the filter output, i.e., filter output will deactivate if all filtering windows for the established deactivation period have had a percentage of samples equal to, or below, the deactivation threshold.

```
NSLA config>[NO] FILTER <id> DEACTIVATION STABILIZATION-TIME <time>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA filter.
Name:	<time>
Range:	0..65535 seconds

Command history:

Release	Modification
11.00.05	As of version 11.00.05, the minimum value is 0 seconds.
11.01.00	As of version 11.01.00, the minimum value is 0 seconds.

> **Note**
>
> By default (not inverted), the output of a filter is TRUE when its activation condition is fulfilled and it is FALSE when the deactivation condition is met. This means the output is not set to FALSE when the activation condition is not met; the deactivation condition must be fulfilled.

> **Note**
>
> All filter parameters must be configured for a filter to operate. The system automatically disables a filter if the configuration is incomplete.

Examples:

Filter 2 depends on the NSM operation 1 RTT parameter. A filtering window of 60 samples is defined. The filter output activates if, during 90 seconds, the samples percentage with RTT > 700 ms in successive filtering windows is higher or equal to 60%. Deactivation takes place if, during 360 seconds, the samples percentage with RTT < 400 ms in successive filtering windows is 100%.

```
NSLA config>filter 2 nsm-op 1 rtt
NSLA config>filter 2 significant-samples 60
NSLA config>filter 2 activation threshold 700
NSLA config>filter 2 activation sensibility 60
NSLA config>filter 2 activation stabilization-time 90
NSLA config>filter 2 deactivation threshold 400
NSLA config>filter 2 deactivation sensibility 100
NSLA config>filter 2 deactivation stabilization-time 360
```

The following example modifies the previous filter, changing activation sensibility to 65% and triggering deactivation when, for 500 seconds, the samples percentage with RTT < 500 ms in successive filtering windows is above or equal to 80%.

```
NSLA config>filter 2 activation sensibility 65
NSLA config>filter 2 deactivation threshold 500
NSLA config>filter 2 deactivation sensibility 80
NSLA config>filter 2 deactivation stabilization-time 500
```

Filter 3 controls the lost packet percentage: this depends on the NSM operation 3 RTT parameter. A filtering window of 60 samples is defined. The filter output activates if, during 90 seconds, the lost packet percentage (samples with RTT > TIMEOUT) in successive filtering windows is above or equal to 60%. Deactivation occurs if, during 360 seconds, the percentage of non-lost packets (samples with RTT £ TIMEOUT) in successive filtering windows is 100%. That is, this activates if, during 90 seconds, the lost packet percentage is equal to, or greater than, 60% and deactivates if, during 360 seconds, the percentage of lost packets is 0% (100% non-lost packets).

```
NSLA config>filter 3 nsm-op 3 rtt
NSLA config>filter 2 significant-samples 60
NSLA config>filter 2 activation threshold timeout
NSLA config>filter 2 activation sensibility 60
NSLA config>filter 2 activation stabilization-time 90
NSLA config>filter 2 deactivation threshold timeout
NSLA config>filter 2 deactivation sensibility 100
NSLA config>filter 2 deactivation stabilization-time 360
```

> **Note**
>
> Filter configuration must be carried out bearing in mind that an inadequate configuration may cause oscillations.
>
> Generally speaking, to set an activation condition, measurements are carried out when there is traffic circulating through the channel whose quality you wish to monitor. These differ from the measurements taken to set the deactivation condition, which are collected when there is no traffic circulating through the channel whose quality you wish to monitor.

> **Note**
>
> Maximum priority should be given to the measurement packets (through BRS, marking TOS) to guarantee, as far as possible, the channel loading level does not affect the measurements. (Measurement traffic is generally light, so giving it maximum priority will have very little effect).

> **Note**
>
> Activation and deactivation conditions are checked simultaneously, so overlapping situations for both conditions are automatically detected. Should this occur, the filter will be permanently disabled to prevent oscillations. Overlapping occurs when the activation threshold is lower than the deactivation threshold.

The filtering window function is sliding, as can be seen in the following diagrams:

Window n

Window n+1

Window n+2
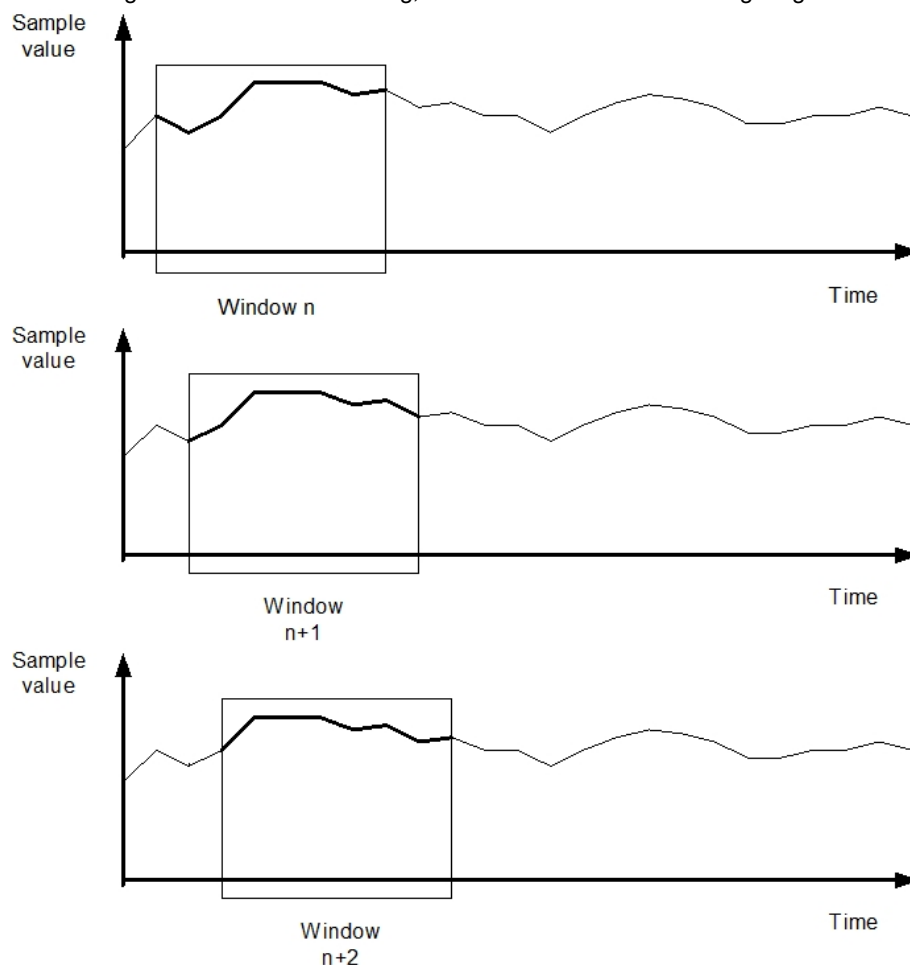
2.3.19 [NO] FILTER <id> DISABLE

Allows you to enable or disable a filter. If it is disabled, resources are not used (no CPU time or memory).

```
NSLA config>[NO] FILTER <id> DISABLE
```

By default, filters are enabled when created.

2.3.20 [NO] FILTER <id> MUTE

Allows you to activate or deactivate filter notifications sent to certain alarms. It is important to note that this command simply deactivates notifications sent to the alarms, but does not stop a filter from performing its calculations.

```
NSLA config>[NO] FILTER <id> MUTE
```

2.3.21 [NO] FILTER <id> INVERT

Allows you to invert the filter output notified to alarms: the activation condition becomes FALSE (when it is normally TRUE) and the deactivation condition becomes TRUE (when it is normally FALSE).

```
NSLA config>[NO] FILTER <id> INVERT
```

2.3.22 [NO] FILTER <id> INITIAL-STATE <active | inactive>

Allows you to set the initial state (activation condition detected or deactivation condition detected) of the filter before any sample is reported. Setting the initial state as "active" will set the output to TRUE if the filter is not inverted, and FALSE if it is inverted. Setting the initial state as "inactive" will set the output to FALSE if the filter is not inverted, and TRUE if it is inverted.

```
NSLA config$filter 1 initial-state <active | inactive>
```

Command history:

Release	Modification
11.00.05	The **initial-state** option was introduced as of version 11.00.05.
11.01.01	The **initial-state** option was introduced as of version 11.01.01

2.3.23 NO FILTER <id> DESCRIPTION

Deletes a description for the corresponding filter.

```
NSLA config>NO FILTER <id> DESCRIPTION
```

2.3.24 FILTER <id> DESCRIPTION <text>

Allows you to enter a description for the corresponding filter. If you enter several commands, a multiline description is created.

```
NSLA config>FILTER <id> DESCRIPTION <text>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA filter.
Name:	<text>
Range:	Alphanumerical chain made up of 1 to 64 characters.
Description:	Text containing a description.

2.3.25 NO ALARM <id>

This command deletes an alarm.

```
NSLA config>NO ALARM <id>
```

2.3.26 [NO] ALARM <id> [NOT] {FILTER-ID | ALARM-ID} <id_1>

Use this command to associate a filter/alarm (the first one) with an alarm.

```
NSLA config>[NO] ALARM <id> [NOT] {FILTER-ID|ALARM-ID} <id_1>
```

An alarm is activated (output set to TRUE) if the logical expression (NOT and AND/OR of all associated filter/alarm outputs, or their negations depending on the configuration) is TRUE. Otherwise, the alarm is deactivated (output set to FALSE).

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an alarm condition.
Name:	<id_1>
Range:	1..65535
Description:	Identifies the first filter/alarm associated to the alarm.
Name:	NOT.
Description:	Allows an alarm to use the negation value for a filter/alarm output.

Command history:

Release	Modification
11.00.06	**OR** and **ALARM-ID** command options have been added.
11.01.02	**OR** and **ALARM-ID** command options have been added.

2.3.27   [NO] ALARM <id> {AND | OR} [NOT] {FILTER-ID | ALARM-ID} <id_n>

Use this command to associate more filters/alarms with an alarm (up to a total of thirty-two).

```
NSLA config>[NO] ALARM <id> {AND | OR} [NOT] {FILTER-ID | ALARM-ID} <id_n>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an alarm condition.
Name:	<id_n>
Range:	1..65535
Description:	Identifies a filter/alarm associated to the alarm.
Name:	AND | OR
Description:	Allows an alarm to use AND or OR as boolean operation for the combination of its inputs. Only one type of operation (either AND or OR) is allowed in the definition of a given alarm (alarm A can use AND, but only AND; alarm B can use OR, but only OR) to avoid precedence issues.
Name:	NOT
Description:	Allows an alarm to use the negation value for a filter/alarm output.

> ✋ **Note**
>
> Since alarms can be inputs for other alarms, there's a risk of poisonous recursivity (an unstable closed loop of alarm dependencies). In this case, all alarms involved in the recursion will remain disabled and the value under the "Expression" column in monitoring will be "Recursivity detected".

Command history:

Release	Modification
11.00.06	**OR** and **ALARM-ID** command options have been added.
11.01.02	**OR** and **ALARM-ID** command options have been added.

Example:

Alarm 1 depends on filter 3 output, filter 5 negation output, and filter 6 output:

```
NLSA config>alarm 1 filter 3
NLSA config>alarm 1 and not filter 5
NLSA config>alarm 1 and filter 6
```

The alarm true table is as follows:

F3	F5	F6	ALARM 1
False	False	False	False
False	False	True	False
False	True	False	False
False	True	True	False
True	False	False	False
True	False	True	True
True	True	False	False
True	True	True	False

2.3.28 [NO] ALARM <id> DISABLE

Allows you to enable or disable an alarm. When disabled, it does not use resources (nor CPU time or memory).

```
NSLA config>[NO] ALARM <id> DISABLE
```

By default, alarms are enabled when created.

2.3.29 [NO] ALARM <id> MUTE

Allows you to activate or deactivate alarm notifications sent to certain advisors. It is important to note that this command deactivates notifications sent to the advisors but does not stop the alarm from performing its calculations.

```
NSLA config>[NO] ALARM <id> MUTE
```

2.3.30 [NO] ALARM <id> INVERT

Allows you to apply a logical NOT to the expression of its inputs.

```
NSLA config>[NO] ALARM <id> INVERT
```

2.3.31 NO ALARM <id> DESCRIPTION

Deletes a description for the corresponding alarm.

```
NSLA config>NO ALARM <id> DESCRIPTION
```

2.3.32 ALARM <id> DESCRIPTION <text>

Allows you to enter a description for the corresponding alarm. If you enter several commands, a multiline description is created.

```
NSLA config>ALARM <id> DESCRIPTION <text>
```

The command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA alarm.
Name:	<text>
Range:	Alphanumerical chain made up of 1 to 64 characters.
Description:	Text containing a description.

2.3.33 NO ADVISOR <id>

Deletes an advisor.

```
NSLA config>NO ADVISOR <id>
```

2.3.34 [NO] ADVISOR <id> [NOT] ALARM-ID <id_1>

Associates an alarm (the first one) with an advisor.

```
NSLA config>[NO] ADVISOR <id> [NOT] ALARM-ID <id_1>
```

An advisor is activated (output set to TRUE) if the logical expression (NOT and OR of the output of all associated alarms, or their negations depending on the configuration) is TRUE. Otherwise, the advisor is deactivated (output set to FALSE).

Command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an advisor.
Name:	<id_1>
Range:	1..65535
Description:	Identifies an alarm associated to the advisor.
Name:	NOT.
Description:	Allows an advisor to use the negation value for an alarm output.

2.3.35 [NO] ADVISOR <id> OR [NOT] ALARM-ID <id_n>

Associates more alarms with an advisor (up to a total of thirty-two).

> ☞ **Note**
>
> All boolean complexity should be kept inside the alarms. Advisors should be defined on the basis of single alarms so that their configuration is easier to understand.

```
NSLA config>[NO] ADVISOR <id> OR [NOT] ALARM-ID <id_n>
```

Command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an advisor.
Name:	<id_n>
Range:	1..65535
Description:	Identifies an alarm associated to the advisor.
Name:	NOT
Description:	Allows the advisor to use the negation value for an alarm output.

Example:

Advisor 8 depends on the negation output of alarm 2, on the negation output of alarm 3, and on the output of alarm 4:

```
NLSA config>advisor 8 not alarm 2
NLSA config>advisor 8 or not alarm 3
NLSA config>advisor 8 or alarm 4
```

The advisor true table is as follows:

ALARM2	ALARM3	ALARM4	ADVISOR1
False	False	False	True
False	False	True	True
False	True	False	True
False	True	True	True
True	False	False	True
True	False	True	True
True	True	False	False
True	True	True	True

The group of operations provided (negation of the filter outputs in its definition, the AND/OR expression associated with the alarms depending on the filter/alarm outputs or their negations, negation of alarm outputs in their definition, the OR expression associated with the advisors depending on the alarm outputs or their negations and the negation of an advisor output in its definition) make up an orthogonal set of Boolean operations that help define an advisor based on any possible combination of filter outputs.

On the other hand, the possibility of defining multiple alarms and advisors without these taking up a large amount of the resources (the filters make up the heaviest element, regarding both the memory and CPU time) means NSLA clients only need to depend on one advisor, centering all complexity in the NSLA.

2.3.36 [NO] ADVISOR <id> DISABLE

Allows you to enable or disable an advisor. If this is disabled, resources (CPU time and memory) are not consumed.

```
NSLA config>[NO] ADVISOR <id> DISABLE
```

By default, advisors are enabled when created.

2.3.37 [NO] ADVISOR <id> MUTE

Allows you to activate or deactivate advisor notifications sent to certain NSLA clients. It is important to note that this command deactivates notifications sent to the NSLA clients but does not stop the advisor from performing its calculations.

```
NSLA config>[NO] ADVISOR <id> MUTE
```

2.3.38 [NO] ADVISOR <id> INVERT

Allows you to apply a logical NOT to the expression.

```
NSLA config>[NO] ADVISOR <id> INVERT
```

2.3.39 NO ADVISOR <id> DESCRIPTION

Deletes a description for the corresponding advisor.

```
NSLA config>NO ADVISOR <id> DESCRIPTION
```

2.3.40 ADVISOR <id> DESCRIPTION <text>

Allows you to enter a description for the corresponding advisor. If you enter several commands, a multiline description is created.

```
NSLA config>ADVISOR <id> DESCRIPTION <text>
```

Command parameters are as follows:

Name:	<id>
Range:	1..65535
Description:	Identifies an NSLA advisor.
Name:	<text>
Range:	Alphanumerical chain made up of 1 to 64 characters.
Description:	Text containing a description.

2.4 Commands related to NSLA

2.4.1 IPv4/IPv6 static routes

IPv4 static routes (please see manual *bintec Dm702-I TCP/IP*):

```
IP config>ROUTE <address> <mask> <gateway> [<cost>] [TRACK NSLA-ADVISOR <advisor-id>]
         [mp-congestion <advisor-id>] [mp-disable <advisor-id>]
```

IPv6 static routes (see the following manual: *bintec Dm807-I Static Routing IPv6*):

```
IPv6 config>ROUTE <prefix> {<nhop-addr> [interface <ifc>]} |
{interface <ifc> [<nhop-addr>]} [<dist>] [TRACK NSLA-ADVISOR <advisor-id>]
```

Command history:

Release	Modification
11.00.05	**mp-congestion** and **mp-disable** command options have been added.
11.01.00	**mp-congestion** and **mp-disable** command options have been added.

The following sections detail how advisors behave in static routes.

2.4.1.1 track nsla-advisor

```
track nsla-advisor <advisor-id>
```

Allows you to link a static route to an advisor. When advisor output is activated (TRUE), the route behaves as a normal static route. However, when advisor output is deactivated (FALSE), the route is considered non-existent (as if it

wasn't configured).

2.4.1.2 mp-congestion

```
mp-congestion <advisor-id>
```

Allows you to link a static route to an advisor. When advisor output is activated (TRUE), the congestion flag in the route is marked.

In contrast to routes in the previous section (above), those with a marked congestion flag are still considered as existent.

2.4.1.3 mp-disable

```
mp-disable <advisor-id>
```

Allows you to link a static route to an advisor. When advisor output is activated (TRUE), the disabling flag in the route is marked.

Routes with disabling flag marked are still considered as existent.

2.4.2 Route-map entries

```
Route map 1>ENTRY <entry-id> TRACK NSLA-ADVISOR <advisor-id>
```

Allows you to link a route-map entry to an advisor. This way, when advisor output is activated (TRUE), the entry is analyzed as part of the route-map (traditional functionality). However, when advisor output is deactivated (FALSE), the entry is not analyzed as part of the route-map (as if it wasn't configured).

2.4.3 Telephony Dial-peers

```
Dial-peer 1 config>TRACK NSLA-ADVISOR <advisor-id>
```

Allows you to link a dial-peer from a telephony menu to an advisor. This way, when advisor output is activated (TRUE), the dial-peer is enabled and can be accepted when establishing a call. If advisor output is deactivated (FALSE), the dial-peer is not active (behaving as if it wasn't configured).

2.5 NSLA recommended configuration for BFD NSLA

We recommend the following configuration for the NSLA facility (Network Service Level Advisor) when using information received from a BFD NSM operation.

You need to bear in mind that the BFD session only reports two states (UP or DOWN). Consequently, we need to set the activation and deactivation threshold to 0 and the significant number of samples to 1. Activation and deactivation sensibility should be set at 100% , so an alarm is generated every time an event occurs. Establishment times can be freely selected.

Below, you can see how to access the NSLA facility menu:

```
*config

Config>feature nsla
-- Feature Network Service Level Advisor --
NSLA config>
```

Configuration example for the NSLA facility for a BFD NSM operation:

```
NSLA config>show config
; Showing Menu and Submenus Configuration for access-level 15 ...
; XXX Router 6 96 Version 10.7.4-Alfa
             enable
;
             filter 1 nsm-op 1 bfd
             filter 1 significant-samples 1
             filter 1 activation threshold 0
             filter 1 activation sensibility 100
             filter 1 activation stabilization-time 5
```

```
                filter 1 deactivation threshold 0
                filter 1 deactivation sensibility 100
                filter 1 deactivation stabilization-time 5
;
      alarm 1 filter-id 1
;
      advisor 1 alarm-id 1
;
NSLA config>
```

Chapter 3 Monitoring

3.1 Accessing the monitoring menu

NSLA monitoring commands must be entered in the monitoring menu associated with NSLA (*NSLA+*). To access this menu, use the **FEATURE NSLA** command found in the general monitoring menu (+).

```
+FEATURE NSLA


-- Network Service Level Advisor monitor console --
NSLA+
```

Once you have accessed the NSLA monitoring menu, enter the commands as described below:

Command	Function
ACTIVATE	Unconditionally activates a filter, alarm or advisor output.
DEACTIVATE	Unconditionally deactivates a filter, alarm or advisor.
RESTORE	Restores the real output of a filter, alarm or advisor.
MUTE	Mutes NSLA, a filter, alarm or advisor.
UNMUTE	Deactivates NSLA muting, a filter, alarm or advisor.
DISABLE	Disables the functionality of the NSLA, a filter, alarm or advisor.
ENABLE	Enables the functionality of the NSLA, a filter, alarm or advisor.
LIST	Displays NSLA status information.
CLEAR	Clears NSLA status history.
EXIT	Exits NSLA monitoring menu.

3.2 Monitoring commands

3.2.1 ACTIVATE

Unconditionally activates the entity (sets its output to TRUE), independently of its state/expression. This command allows you to simulate transitions to TRUE. Internally, the entity (advisor, alarm or filter) continues operating and carrying out calculations. This means the command is only applicable to entities that are not configured as disabled (DISABLE) or mute (MUTE).

Syntax:

```
NSLA+ACTIVATE <ADVISOR <advisor_id> | ALARM <alarm_id> | FILTER <filter_id>>
```

3.2.2 DEACTIVATE

Unconditionally deactivates the entity (sets its output to FALSE), independently of its state/expression. This command allows you to simulate transitions to FALSE. Internally, the entity (advisor, alarm or filter) continues operating and carrying out calculations. This means the command is only applicable to entities that are not configured as disabled (DISABLE) or mute (MUTE).

Syntax:

```
NSLA+DEACTIVATE <ADVISOR <advisor_id> | ALARM <alarm_id> | FILTER <filter_id>>
```

3.2.3 RESTORE

Restores the output of the entity to the value determined by its normal operating behavior (turns off any previous unconditional activation or deactivation). This means the command is only applicable to entities that are not configured as disabled (DISABLE) or mute (MUTE).

Syntax:

```
NSLA+RESTORE <ADVISOR <advisor_id> | ALARM <alarm_id> | FILTER <filter_id>>
```

3.2.4 ENABLE

Globally enables NSLA. (Use with entities has been deprecated)

Syntax:

```
NSLA+ENABLE NSLA
```

3.2.5 DISABLE

Globally disables NSLA. (Use with entities has been deprecated)

Syntax:

```
NSLA+DISABLE NSLA
```

3.2.6 MUTE

This command globally mutes the NSLA or an NSLA entity (advisor, alarm or filter), so that changes in the output signals are not notified. Internally, the entity (advisor, alarm or filter) continues to operate and execute calculations. This means the command is only applicable to entities which are not configured as disabled (DISABLE) or mute (MUTE).

If, after muting an NSLA, you execute an UNMUTE, all entities that were individually muted through monitoring automatically activate.

Syntax:

```
NSLA+MUTE <NSLA | ADVISOR <advisor_id> | ALARM <alarm_id> | FILTER <filter_id>>
```

3.2.7 UNMUTE

This command globally deactivates an NSLA mute of an NSLA entity (advisor, alarm or filter), so that changes in the output signals are notified again.

Syntax:

```
NSLA+UNMUTE <NSLA | ADVISOR <advisor_id> | ALARM <alarm_id> | FILTER <filter_id>>
```

3.2.8 LIST

Displays NSLA information. A verbose option is available for all commands to dump extra information.

3.2.8.1 ADVISOR <id_1> [<id_2>] [verbose]

Dumps the monitoring information for an advisor identified by its identifier <id_1>, as well as the monitoring information for the range of advisors from <id_1> to <id_2>.

Command history:

Release	Modification
11.00.05	As of version 11.00.05, a range of monitoring advisors has been added and the advisor <id> command lists the identified advisor (the one matching the identifier).
11.01.00	As of version 11.01.00, a range of monitoring advisors has been added and the advisor <id> command lists the identified advisor (the one matching the identifier).
11.01.08	The verbose option was added as of version 11.01.08.

3.2.8.2 ADVISOR all [verbose]

Dumps monitoring information for all of the configured advisors.

Command history:

Release	Modification
11.00.06	The "all" command was introduced as of version 11.00.06.
11.01.02	The "all" command was introduced as of version 11.01.02.

Release	Modification
11.01.08	The verbose option was added as of version 11.01.08.

Syntax:

```
NSLA+LIST
```

Example:

```
NSLA+list advisor all verbose
                        Network Service Level Advisor
-------------------------------------------------------------------------------
Enabled:    TRUE
Mute:       FALSE


ADVISORS


  ID  O A M E Toggl Before last change      Last change
----- - - - - ----- ------------------ ------------------
   3 F - - T     0                 -                  -
     => Description: EXAMPLE_ADVISOR_DESCRIPTION
     => Expression : A3 = 0
   4 T - - T     1                 - 2000-10-12 01:00:02
     => Expression : A4 = 1
```

3.2.8.3 ALARM <id_1> [<id_2>] [verbose]

Dumps the monitoring information for an alarm identified by its identifier <id_1>, as well as the monitoring information for the range of alarms from <id_1> to <id_2>.

Command history:

Release	Modification
11.00.05	As of version 11.00.05, a range of monitoring alarms has been added and the alarm <id> command lists the identified alarm (the one matching the identifier).
11.01.00	As of version 11.01.00, a range of monitoring alarms has been added and the alarm <id> command lists the identified alarm (the one matching the identifier).
11.01.08	The verbose option was added as of version 11.01.08.

3.2.8.4 ALARM all [verbose]

Dumps monitoring information for all of the configured alarms.

Command history:

Release	Modification
11.00.06	The "all" command was introduced as of version 11.00.06 .
11.01.02	The "all" command was introduced as of version 11.01.02.
11.01.08	The verbose option was added as of version 11.01.08.

Syntax:

```
NSLA+LIST
```

Example:

```
NSLA+list alarm all verbose
                        Network Service Level Advisor
-------------------------------------------------------------------------------
Enabled:    TRUE
Mute:       FALSE

ALARMS


  ID  O A M E Toggl Before last change      Last change
----- - - - - ----- ------------------ ------------------
   3 F - F T     0                 -                  -
```

```
     => Description: EXAMPLE_ALARM_DESCRIPTION
     => Expression : F3 = 0
   4 T - F T     1                  - 2000-10-12 01:00:02
     => Expression : /(F3*F4) = /(0*1)
   5 F - F T     0                  -                -
     => Expression : Recursivity detected
```

3.2.8.5 FILTER <id_1> [<id_2>] [verbose]

Dumps the monitoring information for a filter identified by its identifier <id_1>, as well as the monitoring information for the range of filters from <id_1> to <id_2>.

Command history:

Release	Modification
11.00.05	As of version 11.00.05, a range of monitoring filters has been added and the filter <id> command lists the identified filter (the one matching the identifier).
11.01.00	As of version 11.01.00, a range of monitoring filters has been added and the filter <id> command lists the identified filter (the one matching the identifier).
11.01.08	The verbose option was added as of version 11.01.08.

3.2.8.6 FILTER all [verbose]

Dumps monitoring information for all of the configured filters.

Command history:

Release	Modification
11.00.06	The "all" command was introduced as of version 11.00.06.
11.01.02	The "all" command was introduced as of version 11.01.02.
11.01.08	The verbose option was added as of version 11.01.08.

Syntax:

```
NSLA+LIST
```

Example:

```
NSLA+list filter all verbose
                        Network Service Level Advisor
-------------------------------------------------------------------------------
Enabled:    TRUE
Mute:       FALSE

FILTERS

FILTERS

  ID  O A M E I sample Toggl T. sample Over Ath Und. Dth A%  Atime D%  Dtime
----- - - - - - ------ ----- --------- -------- -------- --- ----- --- -----
   3 F - - T F    0     0        0         0       0  0    0  0     0
     => Description: EXAMPLE_FILTER_DESCRIPTION
   4 T - - T F   10     1        1         1       0 100 9871  0     0
```

3.2.8.7 NSLA [verbose]

Dumps monitoring information for all NSLA entities (filters, alarms and advisors).

Command history:

Release	Modification
11.00.05	As of version 11.00.05, the "all" command is NSLA.
11.01.00	As of version 11.01.00, the "all" command is NSLA.
11.01.08	The verbose option was added as of version 11.01.08.

Syntax:

```
NSLA+LIST
```

Example:

```
NSLA+list nsla verbose
                         Network Service Level Advisor
--------------------------------------------------------------------------------
Enabled:     TRUE
Mute:        FALSE


FILTERS

  ID  O A M E I sample Toggl T. sample Over Ath Und. Dth A%  Atime D%  Dtime
----- - - - - - ------ ----- --------- -------- -------- --- ----- --- -----
   3 F - - T F      0     0         0        0        0   0     0   0     0
     => Description: EXAMPLE_FILTER_DESCRIPTION
   4 T - - T F     10     1         1        1        0 100  9871   0     0

ALARMS

  ID  O A M E Toggl Before last change      Last change
----- - - - - ----- ------------------ -------------------
   3 F - F T     0                 -                    -
     => Description: EXAMPLE_ALARM_DESCRIPTION
     => Expression : F3 = 0
   4 T - F T     1                 - 2000-10-12 01:00:02
     => Expression : /(F3*F4) = /(0*1)
   5 F - F T     0                 -                    -
     => Expression : Recursivity detected

ADVISORS

  ID  O A M E Toggl Before last change      Last change
----- - - - - ----- ------------------ -------------------
   3 F - - T     0                 -                    -
     => Description: EXAMPLE_ADVISOR_DESCRIPTION
     => Expression :A3 = 0
   4 T - - T     1                 - 2000-10-12 01:00:02
     => Expression : A4 = 1
```

Common parameters

ID		NSLA entity (filter/alarm/advisor) identifier.
O		OUTPUT, entity output.
	F	FALSE, output is FALSE.
	T	TRUE, output is TRUE.
A		ACTIVATE, deactivation/activation status through monitoring.
	a	ACTIVATED, output is forced to TRUE through monitoring.
	d	DEACTIVATED, output is forced to FALSE through monitoring.
	-	Output is not forced through monitoring.
E		ENABLE, enable/disable status.
	T	TRUE, entity is enabled.
	F	FALSE, entity is disabled.
M		MUTE, indicates if the entity is mute.
	c	Entity is muted through config.
	m	Entity is muted through monitoring.
	-	Entity is not muted.
I		INVERT, indicates if filter output is inverted.
	T	TRUE, output is inverted.
	F	FALSE, output is not inverted.
Toggles		Number of changes in the entity (internal output).

Filtering parameters

Sample	Value of the last sample received by the filter.

T. Samples	Total number of samples processed by the filter.
Over A Th	Total number of samples over the activation threshold.
Under D Th	Total number of samples equal to, or under, the deactivation threshold.
A%	Percentage of samples over the activation threshold in current filtering window.
Atime	Interval where the activation sensibility reaches a certain percentage of samples in all filtering windows that is equal to, or over, the upper activation threshold.
D%	Percentage of samples equal to, or under, the deactivation threshold in the current filtering window.
Dtime	Interval where the deactivation sensibility reaches a certain percentage of samples in all filtering windows that is equal to, or under, the deactivation threshold.

Verbose parameters

| Description | Entity description. |
| Expression | Current value of operands in alarm/advisor output expression. |

3.2.9 CLEAR

Clears NSLA monitoring history information.

Command history:

Release	Modification
11.01.08	The clear command was added as of version 11.01.08.

3.2.9.1 ADVISOR <id_1> [<id_2>]

Clears the monitoring history information for an advisor identified by its identifier <id_1>, as well as the monitoring history information for the range of advisors from <id_1> to <id_2>.

3.2.9.2 ADVISOR all

Clears the monitoring history information for all configured advisors.

Syntax:

```
NSLA+CLEAR
```

Example:

```
NSLA+clear advisor all
 Cleared Advisors: 2
```

3.2.9.3 ALARM <id_1> [<id_2>]

Clears the monitoring history information for an alarm identified by its identifier <id_1>, as well as the monitoring history information for the range of alarms from <id_1> to <id_2>.

3.2.9.4 ALARM all

Clears the monitoring history information for all configured alarms.

Syntax:

```
NSLA+CLEAR
```

Example:

```
NSLA+clear alarm all
 Cleared Alarms: 3
```

3.2.9.5 FILTER <id_1> [<id_2>]

Clears the monitoring history information for a filter identified by its identifier <id_1>, as well as the monitoring information for the range of filters from <id_1> to <id_2>.

3.2.9.6 FILTER all

Clears the monitoring history information for all configured filters.

Syntax:

```
NSLA+CLEAR
```

Example:

```
NSLA+clear filter all
 Cleared Filters: 2
```

3.2.9.7 NSLA

Clears the monitoring history information for all NSLA entities (filters, alarms and advisors).

Syntax:

```
NSLA+CLEAR
```

Example:

```
NSLA+clear nsla
 Cleared Filters: 2
 Cleared Alarms: 3
 Cleared Advisors: 2
```

3.2.10 EXIT

Use this command to exit the NSLA monitoring menu and return to the main configuration menu (+).

Syntax:

```
NSLA+EXIT
+
```