

NonStop NET/MASTER Tips and Techniques

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Introduction

This is an ongoing column with NonStop NET/MASTER tips and techniques. Each column is also accessible from <http://www.greshamsoftwarelabs.com.au/> (Gresham Software Labs). Please send all comments and suggestions to John New at jnew@greshamsoftwarelabs.com.au.

Biography

John New is a technical writer. He has written and updated various Tandem manuals. He currently writes hard-copy, online, and web documents for a variety of software products.

Using NonStop NET/MASTER RMS to Generate SNMP Traps

A little-known feature of NonStop NET/MASTER Rule Management Services (RMS) is its ability to generate SNMP traps. This article is written for Tandem users who use SNMP managers to monitor networks, who use NonStop NET/MASTER RMS for system and network automation, and who want to leverage NonStop NET/MASTER RMS for use with an SNMP network.

The article briefly describes some features of SNMP that are relevant to NonStop NET/MASTER RMS. It discusses how NonStop NET/MASTER RMS can automatically convert messages from EMS events to SNMP traps. It discusses how NonStop NET/MASTER RMS automatically generates SNMP traps if a rule action NCL procedure fails to recover an object after one or more automatic retries.

For more information about RMS, refer to the *NonStop NET/MASTER RMS Management and Operations Guide*. For more information about SNMP, refer to the following manuals: *SCF Reference Manual for the SNMP Agent*, *SNMP Configuration and Management Manual*, and *SNMP Subagent Programmer's Guide*.

SNMP and SNMP Traps¹

Simple Network Management Protocol (SNMP) is a widely-used network management protocol for TCP/IP networks.

Asynchronous SNMP messages are called SNMP traps. These are usually unsolicited messages reporting a significant or critical event sent by an SNMP agent process to an SNMP manager station (workstation). A separate entity called a management information base (MIB) contains information that describes message structure and interpretation. A MIB resides on the SNMP manager station and enables the manager to interpret arriving SNMP messages.

An SNMP subagent process handles a particular collection of resources on behalf of an SNMP agent. Examples are the EMS trap subagent and the NonStop NET/MASTER trap subagent. NonStop NET/MASTER RMS uses MIB entities supplied with the EMS trap subagent to convert EMS events to SNMP traps. It uses its own MIB entries to generate SNMP traps when a rule action fails after automatic rule retry.

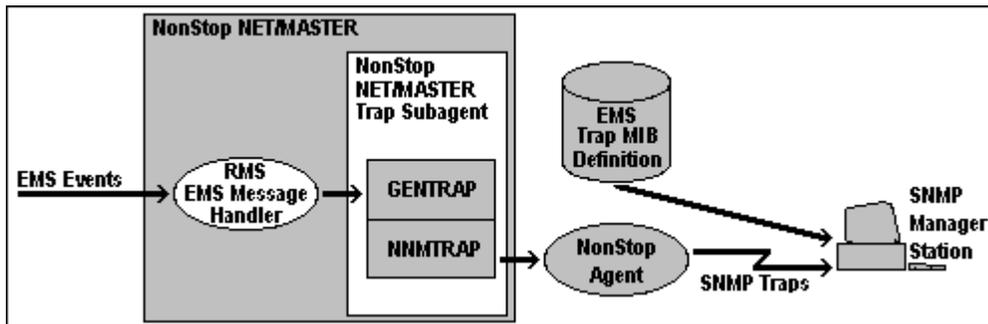
Converting Messages From EMS Events to SNMP Traps²

NonStop NET/MASTER RMS can automatically convert messages from EMS events to SNMP traps if you have installed and started NonStop NET/MASTER RMS, the NonStop SNMP agent, the EMS trap subagent, and the NonStop NET/MASTER trap subagent.

Conversion Overview

As Figure 1 shows, NonStop NET/MASTER RMS can read EMS events using an EMS message handler. This calls the NonStop NET/MASTER trap subagent, which consists of two NCL procedures, GENTRAP and NNMTRAP.

Figure 1



The GENTRAP NCL procedure creates an SNMP trap from an EMS event. The NNMTRAP NCL procedure handles communication between the NonStop NET/MASTER subagent and the NonStop agent process, and forwards SNMP traps to SNMP manager stations. The EMS trap subagent MIB on each SNMP manager station is used to interpret the SNMP traps.

Configuring an RMS EMS Message Handler for Conversion

An RMS EMS message handler is started with a ruleset that consists of a set of rules. When an EMS event message triggers a rule, the rule performs certain actions. One of these actions can include calling GENTRAP to convert the EMS event message to an SNMP trap.

To enable a rule to call GENTRAP as one of its actions, locate the RMS : System Action panel (page 5 of a rule definition), locate the "NCL Proc Name" field, then specify "GENTRAP" followed by the NonStop agent process name. For example, if the NonStop agent process name is \$ZSNMP, specify:

```
GENTRAP $ZSNMP
```

You can define a rule with a specific trigger or a general trigger. A typical specific trigger is a certain event message number (only messages with the specific number are converted to SNMP traps). A general trigger might be a certain subsystem (all messages from that subsystem are converted to SNMP traps).

Generating SNMP Traps When a Rule Action Fails³

By default, NonStop NET/MASTER RMS automatically generates SNMP traps if a rule action NCL procedure fails to recover an object after one or more automatic retries.

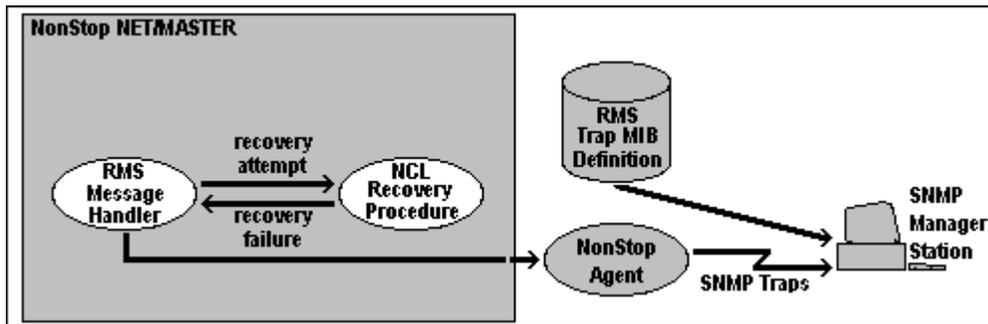
Automatic Rule Retry Overview

The actions performed by a rule are often implemented using rule action NCL procedures. You can code a rule action NCL procedure to attempt to perform actions once and report that the actions either succeeded or failed; or, if the actions fail, you can code the NCL procedure to attempt to automatically retry the actions. Additionally, you can explicitly specify the delay between retry attempts and the number of retry attempts.

An SNMP trap is generated when a rule action NCL procedure fails to recover an object after the fourth attempt or the rule action NCL procedure fails but does not request a retry. The standard rules in the RMS BASERULE ruleset use the automatic retry feature and therefore automatically generate SNMP traps if a rule action NCL procedure fails.

Figure 2 shows the result if the recovery attempt fails after one or more automatic retries.

Figure 2



Opening the NonStop Agent From RMS

By default, when you start RMS, it attempts to open a NonStop agent called \$ZSNMP. Therefore this agent must be running for the open attempt to succeed. If your RMS system uses an agent other than \$ZSNMP, you can either modify the RMS initialization file, ZRMSININ, to always open another agent or you can open another agent as required after RMS startup.

The RMS SNMP OPEN command opens the agent process and enables the sending of SNMP traps to the agent process. The following example opens an agent process called \$ASNMP:

```
RMS SNMP OPEN AGENT=$ASNMP
```

If you do not specify the AGENT operand, a default process name of \$ZSNMP is opened. After the command, you can use the SHOW UDB command from Operator Control Services to check for any Guardian file error. You can open only one agent at a time.

Closing the NonStop Agent From RMS

You can use the RMS SNMP CLOSE command to close the agent process and disable the sending of SNMP traps to the agent process. For example:

```
RMS SNMP CLOSE AGENT=$ASNMP
```

Creating the RMS MIB

SNMP manager stations must use specific RMS MIB entries to correctly interpret SNMP traps generated by RMS. You can use the RMS SNMP MIB command to automatically create these MIB entries. The command outputs the MIB source code (in ASN.1) in an edit-format file, which you can then transfer to appropriate SNMP manager stations.

You should explicitly specify a NonStop NET/MASTER process character as part of the command. If you do not specify a process character, the process character for the current NonStop NET/MASTER MS system is used. For example, if the name of the control process of the current NonStop NET/MASTER MS system is \$ZNNM, the process character is Z.

The following example outputs the RMS MIB for the NonStop NET/MASTER MS system with the A process character:

```
RMS SNMP MIB FILE=$MYVOL.MYSUBVOL.AMIBFILE PCHAR=A
```

The following table shows some of the fields in the RMS MIB and, therefore, some of the fields in an SNMP trap generated after automatic rule retry failure:

Field	Description
ruleset	Name of the ruleset containing the triggered rule.
ruleID	Name of the rule that triggered this action.
subject	Subject of the message that triggered this rule action.

status	Current status of the rule action. For example, "FAILED - RETRYING" or "FAILED - NO RETRIES".
retryDelay	Period of delay before next retry.
failMsg	Failure message specified by the rule action. The message text is the current value of the &SYSMSG variable.

Conclusion

Generating SNMP traps from NonStop NET/MASTER RMS is very easy. You can use RMS to automatically convert EMS event messages to SNMP traps and to automatically generate SNMP traps after automatic rule retry failure. This enables you to leverage NonStop NET/MASTER RMS for use with an SNMP network.

¹ For more information, refer to the *SNMP Configuration and Management Manual*, Tandem Computers Inc., 1995, Section 1

² *ibid.*, Section 9

³ For more information, refer to the *NonStop NET/MASTER RMS Management and Operations Guide*, Tandem Computers Inc., 1995, pp.5-59 to 5-60; and to New, John, "Using RMS to Automatically Retry Rule Actions", *Tandem Connection*, Vol.17, No.5, 1996