GCOM® SNMP White Paper

May, 2004

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Introduction

SNMP capability for GCOM appliances and kits running on Linux or Solaris (Intel or SPARC) is built around the NET-SNMP package from www.net-snmp.org.

GCOM customizes the configuration of this package such that when the package is installed, all but a very few of the installed components are located in a directory tree under directory `/usr/lib/gcom/snmp`. Users familiar with the NET-SNMP package should not expect to find files in the default configuration locations. The following table lists the directories and the file types contained within each.

Directory	Description
`/usr/lib/gcom/snmp`	Main directory and location of `snmpd.log` file
`/usr/lib/gcom/snmp/bin`	User executable files
`/usr/lib/gcom/snmp/sbin`	System executable files
`/usr/lib/gcom/snmp/lib`	NET-SNMP libraries
`/usr/lib/gcom/snmp/man`	NET-SNMP manual pages
`/usr/lib/gcom/snmp/subagents`	GCOM written extensions to NET-SNMP master agent
`/usr/lib/gcom/snmp/mibs`	Standard and GCOM-specific MIBs
`/usr/lib/gcom/snmp/conf/snmp`	Location of `snmp.conf` and `snmpd.conf`

For detailed information about the NET-SNMP package, operation, and configuration, visit the NET-SNMP web site at www.net-snmp.org.

Installation Notes

For the most part, installation of SNMP on Linux and Solaris is identical except for the few differences detailed below.

Linux

When SNMP is installed on Linux, the `/etc/init.d/snmpd` and `/etc/init.d/snmptrapd` scripts are modified by the install script to cause each to use `snmpd` and `snmptrapd`, respectively, from the GCOM-installed SNMP software. If GCOM SNMP is uninstalled, these two files are restored to their original state.

During install, any `libnetsnmp*` files in `/usr/lib` are moved to `/usr/lib/gcom/snmp/lib.old` to prevent accidental use of these libraries by GCOM's version of NET-SNMP. If GCOM SNMP is uninstalled, the files from `/usr/lib/gcom/snmp/lib.old` are moved back to `/usr/lib`.

Installation of any package from GCOM that installs SNMP does not attempt to enable boot time startup of SNMP if it is not already enabled. It is left up to the system administrator to perform this task if boot time startup of SNMP is desired.

Solaris

When SNMP is installed on Solaris, the `net-snmp.rsrc` `net-snmp.reg` files are added to the `/etc/snmp/conf` directory. These two files are used to configure Solaris's SNMP master daemon (`snmpdx`) to proxy SNMP requests for any OID under the GCOM OID tree to the NET-SNMP master agent (`snmpd`). While it is possible to entirely replace Solaris's master agent with the NET-SNMP master agent, using the proxying method allows the Solaris master agent to remain in use just in case it too may have been extended.

When GCOM's version of NET-SNMP is installed, the `snmpd.conf` file is installed into `/usr/lib/gcom/snmp/conf/snmp`. This file is used to configure the NET-SNMP master agent and contains information used to configure SNMP security and access rights.

When the SNMP package is installed, the access rights are set to be extremely permissive and the system administrator should modify this file to reflect his specific security requirements.

Refer to the *snmpd.conf(5)* and *snmpd(1)* man pages and the NET-SNMP web site at www.net-snmp.org for detailed information on the content and meaning of information contained within this file. Additional help may be obtained via NET-SNMP specific newsgroups and/or via IRC on irc.freenode.net on channel #net-snmp.

Verifying the Installation

Testing SNMP to see that it is properly installed and working is simple. After installation completes, type the following command on the machine on which the package was installed.

```
/usr/lib/gcom/snmp/bin/snmpwalk -v 1 -c public localhost
rsysModuleStatus
```

The following should be displayed:

```
RSYS-MODULE-STATUS-MIB::version.0.0 = STRING: 1.54DEVp1.28
RSYS-MODULE-STATUS-MIB::release-date.0.0 = STRING: 02/19/04:04/13/04
RSYS-MODULE-STATUS-MIB::total-opens.0 = Counter32: 2
RSYS-MODULE-STATUS-MIB::initialized.0 = INTEGER: no(0)
RSYS-MODULE-STATUS-MIB::requests.0 = Counter32: 6
RSYS-MODULE-STATUS-MIB::ring-runs.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::ring-empty.0 = INTEGER: 7
RSYS-MODULE-STATUS-MIB::queue-enabled.0 = INTEGER: disabled(0)
RSYS-MODULE-STATUS-MIB::allocb-deferred.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::failed-opens.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::rejected-requests.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::bufcall-failure.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::bfrsize.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::max-ticks-ms.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::max-spl-lvl.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::STRB-calls.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::STRB-fast.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::STRB-no-bfr.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::STRB-no-M-DATA.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::STRB-allocb-fail.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::STRB-linear-fail.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::Rsched-lock-cnt.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::MWHTRB-calls.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::MWHTRB-fails.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::bfr-linearize-calls.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::bfr-linearize-fails.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::bfr-linearized.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::bfr-nchains.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::bfrs-in-chains.0 = INTEGER: 0
RSYS-MODULE-STATUS-MIB::put-deferred.0 = Counter32: 0
RSYS-MODULE-STATUS-MIB::svc-deferred.0 = Counter32: 8
RSYS-MODULE-STATUS-MIB::deferred-done.0 = Counter32: 8
RSYS-MODULE-STATUS-MIB::deferred-err.0 = Counter32: 0
```

Any or all of the values above may or may not match the values you see when you run the command. If `version` and/or `release-date` are NULL strings, run the command a second time. If you see information as above, SNMP is installed properly and working. If you do not see the above information, type the following command:

```
/usr/lib/gcom/snmp/bin/snmpwalk -v 1 -c public localhost system
```

You should see information similar to what is shown below. Depending on whether the system is Solaris or Linux, you may see more or less information.

```
SNMPv2-MIB::sysDescr.0 = STRING: Sun SNMP Agent,
SNMPv2-MIB::sysObjectID.0 = OID: SNMPv2-SMI::enterprises.42.2.1.1
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (6563198)
18:13:51.98
SNMPv2-MIB::sysContact.0 = STRING: System administrator
SNMPv2-MIB::sysName.0 = STRING: solintel
SNMPv2-MIB::sysLocation.0 = STRING: System administrators office
SNMPv2-MIB::sysServices.0 = INTEGER: 72
```

If you do not see information similar to the above and the operating system is Linux, make sure the NET-SNMP master agent daemon (`snmpd`) is running. If not, as root user, type `/etc/init.d/snmpd start` and retry the tests.

If you do not see information similar to the above and the operating system is Solaris, make sure the Solaris SNMP master agent daemon (`snmpdx`) is running. If not, as root user, type `/etc/init.d/init.snmpdx start` and retry the tests.

If after doing all of the above, SNMP is still not working, contact GCOM support via email at support@gcom.com. When contacting support please include the following files:

- `snmpd.log` file from `/usr/lib/gcom/snmp`
- `/etc/init.d/snmpd` file (Linux)
- `net-snmp.rsrc` (if Solaris)
- `net-snmp.reg` (Solaris) files from `/etc/snmp/conf`

Please indicate which of the above tests failed.

GCOM SNMP MIBs

GCOM SNMP is supplied with several GCOM-specific MIBs. The MIBs are located in `/usr/lib/gcom/snmp/mibs` and the following table describes each MIB.

Name	OID	Description
`GCOM-MIB.TXT`	enterprises.17873	MIB used to define GCOM OID and GCOM trap OIDs.
`RS-232-MIB.txt`	gcom.1	Standard RFC1659 MIB relocated under GCOM OID
`RSYS-MIB.txt`	gcom.2	MIB used to define rsys OID
`DLPI-MIB.TXT`	gcom.3	MIB used to define dlpi OID
`X25-MIB.txt`	gcom.4	Standard RFC1382 MIB relocated under GCOM OID
`FRAME-RELAY-DTE-MIB.txt`	gcom.5	Standard RFC2115 MIB relocated under GCOM OID
`SSD-MIB.txt`	gcom.10	MIB defining information available from `Gcom_ssd` when it is running.
`RSYS-CONFIGURATION-MIB.txt`	gcom.rsys.1	MIB defining GCOM Rsystem configuration information available.
`RSYS-STATUS-MIB.txt`	gcom.rsys.2	MIB defining GCOM Rsystem status information available.
`RSYS-MODULE-STATUS-MIB.txt`	gcom.rsys.3	MIB defining GCOM Rsystem module status information available.
`DLPI-INIT-MIB.TXT`	gcom.dlpi.1	MIB defining GCOM DLPI initialization parameters information available.
`DLPI-MODULE-STATUS-MIB.txt`	gcom.dlpi.2	MIB defining GCOM DLPI Module status information available.
`LAPB-MIB.txt`	gcom.dlpi.3	Standard RFC1381 MIB relocated under GCOM OID.

GCOM SNMP Traps

GCOM SNMP sends the following SNMP traps.

Trap Type	OID	Description
`gcomMonitorStartup`	gcom.99.0.1	This trap is sent whenever the `Gcom_monitor` is started
`gcomMonitorShutdown`	gcom.99.0.2	This trap is sent whenever the `Gcom_monitor` is stopped via `Gcom_xxx -[X|E]`. This trap will NOT be sent if `Gcom_monitor` exits as a result of a condition that would cause a core dump or if `Gcom_monitor` is killed using the kill command.
`gcomModemSig`	gcom.99.0.3	This trap is sent by `Gcom_monitor` for each modem signal for each configured sync comm line. Variable bindings sent with the trap indicate the line number, signal type, and current state. This trap is sent when `Gcom_monitor` initially starts up and any time the state of an unmasked modem signal changes.
`gcomSSDStartup`	gcom.99.0.4	This trap is sent by `Gcom_ssd` when it starts up AND `Gcom_ssd` is configured to load the `libssd_snmp.so` module.