



NuDesign's SNMP / HTTP / CLI Evaluation Agent for SnapGear Embedded Linux

IXP42x Edition

Technical Notes

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1 Evaluation Agent Version History

1. Ver A001 - October 22, 2004 - Initial SnapGear / uCLinux embedded Linux Evaluation Agent release, based on rev 6.3 SNMPv3/HTTP libraries. Tested on ADI Engineering Coyote Gateway Reference Design.
2. Ver A003 – December 22, 2004 - SnapGear / uCLinux embedded Linux Evaluation Agent release, based on rev 6.3 SNMPv3/HTTP libraries. Tested on ADI Engineering Coyote Gateway Reference Design.
 - Added Web server User Management
 - Added Web server CGI support
 - Added secondary method of distribution of this evaluation.
3. Ver A005 – January 7, 2005- SnapGear / uCLinux embedded Linux Evaluation Agent release, based on rev 6.3 SNMPv3/HTTP libraries. Tested on ADI Engineering Coyote Gateway Reference Design.
 - Add note concerning image method of distribution.
4. Ver A007 – January 17, 2005- SnapGear / uCLinux embedded Linux Evaluation Agent release, based on rev 6.3 SNMPv3/HTTP libraries. Tested on ADI Engineering Coyote Gateway Reference Design.
 - Amended **Evaluation Agent Limitations** list item.
 - Amended **Configuration** section.
5. Ver A008 – February 7, 2005- Filenames of ZIP and PDF files revised.



2 Introduction

This document describes where to install and how to execute NuDesign's MultiProtocol (SNMP/HTTP/CLI) Agent Evaluation on an IXP42x target platform, such as ADI Engineering's Coyote Gateway Reference Design (<http://www.adiengineering.com>), executing SnapGear 3.1.1 (uClinux) built for the big endian (BE) mode of processor operation.

NuDesign's MultiProtocol Agent includes a fully functional V1, V2c, V3 SNMP agent, as well as a Web and command line interface to the agent.

This document is broken into the following four components:

- Requirements
- Installation
- Executable use
- Evaluation Agent Limitations

To completely access this Evaluation Agent, it should be evaluated in conjunction with NuDesign's Visual Embedded xAgentBuilder for C++. This product generates extension sub agent C++ source code for any MIB (user or standard) along with project build files (GNU makefiles) and optionally MIB based Web pages (see <http://www.ndt-inc.com> for an evaluation version of this software).

3 Requirements

The software in this distribution is to be installed and executed on platforms conforming to the following specification.

- IXP42x target platform executing SnapGear 3.1.1 (BE)
- A communication channel (serial or network) from a Windows or Linux PC platform to the target to install the software over.

The information provided by the software may be accessed by software as defined by the following.

- A SNMP management application, such as NuDesign's MIBrowser Professional. (see <http://www.ndt-inc.com> for an evaluation version of this software).
- A web browser capable of executing javascript, such as Internet Explorer, Netscape or Mozilla.



4 Installation

The installation is available in two forms. The first is a zip file of the zImage and ramdisk.gz files that may be downloaded and installed from Reboot. The second is a zip of the evaluation files which may be installed on an existing installation of the target operating system.

4.1 Installation via Image Files

This installation method is probably the easier of the two; just unzip and download the two files image files via `tftp` from the `Redboot` command line and initiate execution.

Note: the image supplied with this version of the evaluation enables the PCI Ethernet interface only. For the kernel to boot correctly, the ethernet card **MUST** be inserted into the PCI slot.

This evaluation release comes in the form of a Windows® Zip file named “NuDesign_EvalAgentuCLinuxIXP42xPlusOSNNN.zip”. (Where “NNN” is the release version number.) It contains the following files:

- zImage
- ramdisk.gz
- NuDesign SNMP Eval Agent for uCLinux IXP42x Edition.pdf (this document)

This file may be uncompressed using any utility capable of processing the file, such as WinZip®, WinRAR®, Ark (Linux).

To install the image files, unzip the files into a location that is accessible to a `tftp` server. Using `Reboot` command line, the following should suffice:

```
ip_address -h <Put the IP address of the TFTP server with
the images here>
load -v -r -b 0x700000 zImage
load -v -r -b 0x800000 ramdisk.gz
go -n 0x700000
```

The image should boot. You may now execute the NuDesign MultiProtocol evaluation agent **NDAgDE**. (See the instructions in the Executables section for more information.)

The files unique to this evaluation are described in the next section.



4.2 Installation

This evaluation release comes in the form of a Windows® Zip file named “NuDesign_EvalAgentuCLinuxIXP42xNNN.zip”. (Where “NNN” is the release version number.)

This file may be uncompressed using any utility capable of processing the file, such as WinZip®, WinRAR®, Ark (Linux).

The content of the zip file is hierarchical and convey where the various files should be installed. The contents are as follows:

```
bin/
  NDAgClient
  NDAgDE
  ndagd.xnv
  ndagdext.xnv

web/
  about.htm
  addgroup.asp
  addlimit.asp
  adduser.asp
  asp.asp
  bogus.asp
  contents.asp
  delgroup.asp
  delimit.asp
  deluser.asp
  docs.htm
  dspuser.asp
  FAQ.htm
  forms.asp
  gaws.gif
  GetNextResponse.shtml
  GetResponse.shtml
  home.asp
  Home.htm
  Index.htm
  loadcfg.asp
  MIBrowser.shtml
  nbar.gif
  NDMib.css
  NDMib.js
  overview.htm
  savecfg.asp
  small.htm
  tests.htm
  Title.htm
  treeapp.asp
  um.htm
  cgi-bin/
    arm-cgitest
  config/
```



```

:
:
NDAgMibImpl/
:
:
NDHost/
:
:
NDMIB2/
:
:

```

Expand the zip file, maintaining the file hierarchy depicted above. Then, using the communication application of your choice, copy the files under `bin` to these directories on the target.

Next, create a directory called `web` on the target and copy the `web` contents to that directory. The directory may be located anywhere you choose but the configuration file (`ndagd.xnv`) default to this directory being located from the root directory.

As an alternative or in the case that there is limited file space on the target, you could create `nfs` or `smb` directories back to a host PC and create soft links to the files from the PC, into the correct locations, using `ln -s ...`.

5 Executables

5.1 NDAgDE

Synopsis: NDAgDE [options]

5.1.1 Description:

This is the evaluation version of the NuDesign MultiProtocol (SNMP/HTTP/CLI) agent. It should reside in the `/bin` directory or any directory on the execution path. It is the core agent, including the `system`, `interfaces` and `snmp` groups from MIB-II and the `hrSystem` group from the Host Resources MIB.

5.1.2 Command Line Options:

When executed without command line options, it displays a short help and exits. The following command line options are recognized.



With no options, the executable prints a short help message.

- c, run the agent in the console.
- d, run the agent as a background process/service (daemon).
 - p used only with -d, opens a communication pipe to permit communication with `NDaGClient`.
- s, stops the agent running in the background.

5.1.3 Configuration

NDaGDE utilizes two files for nonvolatile storage. These are `/bin/ndagd.xnv` and `/bin/ndagdext.xnv` (the latter is not used with this evaluation software). The former controls global configuration items and the latter is used to manage loadable sub agents.

(See `xAgentBuilder` help documentation for more information on the format of these files.)

The file, `ndagd.xnv` has a wide range of configurable options. See `xAgentBuilder` documentation for more information. The following is taken from a sample XNV file:

```
[Web Agent]
Port=8080
Root=/web
HomePage=Home.htm

[Web VACM]
SecurityName=private
SecurityModel=secSNMPv2c(2)
SecurityLevel=noAuthNoPriv(1)
ContextName=""

[SNMP Agent]
Version=SNMPv3(3)
Port=161
```

Where:

[Web Agent] identifies the section associated with the HTTP server.

Port= is the TCP port number on which the HTTP server responds to requests. By default, this is set to TCP port 8080, to avoid port conflicts with a possibly resident web server.



- Root=** is the path to the root directory for the server's HTML pages. (Note, if during installation, the web directories was placed somewhere other than at the root, then this item will need to reflect the change.)
- HomePage=** identifies the specific default HTML page.
- [Web VACM]** identifies the VACM section associated with the HTTP server. This specifies the MIB "view" available to web server. Objects requested in pages that are "in view" will return results. Those outside will not. Changing this configuration should generally not be necessary unless the default configuration provided is invalidated by administrative changes to the V3 configuration of the agent.
- SecurityName=** is the V3 security name the web server uses when accessing MIB objects. This may be any `usmUserSecurityName` currently in the `usmUserTable`. By default 'private' is specified. An entry in the `usmUserTable` for this name is also default.
- SecurityModel=** is the V3 security model the web server uses when accessing MIB objects. This may be one of `secSNMPv1(0)`, `secSNMPv2c(1)` or `secSNMPv3(3)`.
- SecurityLevel=** is the V3 security level the web server uses when accessing MIB objects. Default is `noAuthNoPriv(1)`. It could also take the values `authNoPriv(2)` or `authPriv(3)`
- [Snmp Agent]** identifies the section associated with the SNMP component.
- Port=** is the UDP port number on which the SNMP agent responds to requests.
- Version=** is the maximum SNMP version number the SNMP agent will respond to. Default is `SNMPv3(3)`. `SNMPv1(1)` or `SNMPv2c(2)` may also be used.

(Skip this section when using evaluation software)

As a means of illustrating the information in the `ndagdext.xnv` file, following is the taken from the default content of the file.

```
[ExtensionAgents]
1=NDMib2
2=NDHost

[NDMib2]
Load=0
```



```

Path=/lib/libNDMIB2.so.1
Web=

[NDHost]
Load=0
Path=/lib/libNDHost.so.1
Web=

```

The section identified by `[ExtensionAgents]` is used to enumerate the sub agents that are available to load or unload. In this case, two are defined, one each for `NDMib2` and `NDHost`.

The right side of the expression defines a section name in which sub agent specific information is found. In each such named section are three expressions defined as follows:

1. `Load=`, takes a value of '0' or '1'. When the value is '1', it indicates that the sub agent is to be loaded the next time the file is evaluated, otherwise it is unloaded. (See the `-r` command line option for the (daemon) agent)
2. `Path=`, specifies the path to the sub agent shared object library.
3. `Web=`, specifies to path to the HTML files associated with this sub agent.

(Note: the Web path examples above will likely need to be set appropriate for the target configuration. Also note the above examples happen to be NFS mounts from a development host station.)

5.1.3.1 Default V3 SNMP Community/USM Configuration

By default, the following configurations are available for accessing the agent.

Note: the configuration provided is the default configuration for all NuDesign SNMP products and as a result is more or less public information. As such it should only be used for a test and or development deployment. Deploying this configuration in a production environment is **NOT** recommended.

public	V1/V2c read-only community string with access to all implemented MIB objects.
private	V1/V2c read-write community string with access to all implemented MIB objects.
public	noAuthNoPriv , V3 read-only USM User with access to all implemented MIB objects. No authorization or privacy passwords.
md5	authNoPriv (MD5), V3 read-write USM User with access to all implemented MIB objects. Auth password: md5auth , privacy password: none.



sha	authNoPriv (SHA), V3 read-write USM User with access to all implemented MIB objects. Auth password: shaauth , privacy password: none.
md5des	authPriv (MD5, DES), V3 read-write USM User with access to all implemented MIB objects. Auth password: md5desauth , privacy password: md5despriv .
shades	authNoPriv (SHA, DES), V3 read-write USM User with access to all implemented MIB objects. Auth password: shadesauth , privacy password: shadespriv .
private	authPriv (MD5, DES), V3 read-write USM User with access to all implemented MIB objects. Auth password: privateauth , privacy password: privatepriv .

5.2 NDAgClient

Synopsis: NDAgClient

5.2.1 Description:

NDAgClient is a client application that exposes the command line interface of an agent service that is running in the background as a daemon. There is a limitation of one active client application running at one time. If another client is running and another is started, the user will see a message indicating this. This application uses a file "lock" on a temporary file. The file used is "/tmp/NDAgD-client-lock". If for any reason this client application is terminated abnormally (i.e. without invoking the either the 'exit' or 'q' command in the application, see below) then the user may be required to remove the lock file if it was not removed by the terminated session.

5.3 Executable Command Line UI

The following are the commands available from both the agent console and NDAgClient. Note: details about parameter use are available via the '?' and 'help' commands.

Command	Function
q	Stops the agent.
?	Displays a list of command options.
help	Displays help on a specific command.

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clivacm	Displays or modifies the command line's VACM configuration.
agents	Displays, suspends or resumes the SNMP or HTTP agents.
agparams	Displays current agent operations parameters.
get	Performs a get on an object.
getnext	Performs a get-next on an object.
gget	Performs a group get of a scalar group of objects. E.g. gget SNMPv2-MIB.system.
mib	Displays the list of MIB objects currently available in the agent.
rget	Performs a get of a row of a table.
set	Performs a set on an object.
setti	Performs a set and increment on an object. (For "Spinlock" variables.)
tget	Performs a get of a table. E.g. tget RFC1213-MIB.ifTable.
walk	Walk some or all objects in the agent.

Additionally, there is a circular command history buffer of the last 10 commands executed, available by using the up or down cursor keys.



When using `NDAgClient`, there are two additional operations available. These are:

Command	Function
<code>exit</code>	Exits <code>NDAgClient</code> , but leaves the daemon executing.
<code>!<command></code>	Executes the provided <code>command</code> in the daemon's context.
	E.g. <code>!ls -l</code>
	There is a limitation in this mechanism in that the output from the requested application must go to <code>stdout</code> .

6 Evaluation Agent Limitations

The following are the limitations for this evaluation software.

1. Only the `system`, `interfaces` and `snmp` MIB groups from MIB-II are accessible. (Full MIB implementation is provided with the retail version).
2. Only the `hrSystem` SNMP MIB group from the Host Resources MIB are accessible. (Full MIB implementation is available with the retail version).
3. The evaluation software does not support dynamically loadable sub agents, from either the command line or the console interface, produced by `xAgentBuilder`. (Dynamically loaded sub agents are a feature of the retail version)
4. The evaluation software does not support V3 proxying (as defined by the `snmpProxyMIB`) (The V3 proxy implementation is available with the retail version).



7 About NuDesign Team

NuDesign provides software development tools, libraries, components and applications for the management and monitoring of networks, systems, services, applications, desktop and embedded devices. The company also provides professional services to customers requiring specific management solutions.

NuDesign's focus is on industry standard management protocols like SNMP and emerging management protocols using HTTP and XML/SOAP transport.

NuDesign's customers are Original Equipment Manufacturers, System Integrators, Service Providers and End Users worldwide.

The benefits of deploying NuDesign's management software technologies are lower costs and reliable, low risk, quick-to-market solutions:

- The End User management products are feature rich, extensible, yet very easy to use out of a box.
- The middleware components come with easy to understand and re-use coding examples.
- The highly automated agent development tools with associated tutorials enable fast prototyping and development, and facilitate organization and design process while supporting multiple target environments with generation of very complete and immediately compilable agent code.

NuDesign's products and services include:

- SNMP development tools and components - SNMP / WEB / CLI agent code visual generation tools for multiple desktop and embedded targets, with standalone Agent and Master Agent / Extension Subagent architectures.
- SNMP components for development of management applications and SNMP MIB building / browsing, managing and testing applications.
- SNMP Management Applications - supporting SNMPv3 Agent and MIB management features, including Graphing, Get, Set, Walk, SNMP packet Trace and Scripting capabilities, Trap Send / Receive applets.
- Host resource monitoring products, and IP services and infrastructure monitoring products.
- Design and Support Services - specific network / element management & monitoring products, porting SNMP code to custom embedded hardware, developing custom management applications. Developing new products that require SNMP / WEB based management interfaces or adding WEB interfaces to existing products.

For more information please visit www.ndt-inc.com, it contains SNMP and MIB development tools and management product descriptions, tutorials and full feature product evaluations packages or call 416 737 0328 to discuss your specific needs.