InterNaqs Version 1.00

User Guide

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Chapter 1 Getting Started

InterNaqs is a set of utilities for the sharing of data among Nanometrics Naqs Server installations via TCP/IP, and subscription to Seedlink server data.

This user guide provides instructions for installing, configuring, and running the Inter-Naqs components. See also:

- NaqsServer
- General Utilities Watchdog
- Online data access Private Data Streams (in the Nanometrics Data Formats reference guide)

1.1 About InterNaqs

InterNaqs utilities include NaqsToUdp and SeedlinkToUdp:

- NaqsToUdp enables data to be transferred reliably from one Nanometrics acquisition system to another, via TCP/IP. It connects to the source NaqsServer and subscribes to one or more data channels using the NaqsServer datastream service. Packets are then relayed to the receiving NaqsServer via UDP. NaqsToUdp also relays retransmission requests from the receiving NaqsServer back to the source.
- SeedlinkToUdp enables data to be transferred from a Seedlink server system to a NaqsServer acquisition system. SeedlinkToUdp connects to the Seedlink server via TCP/IP, and subscribes to one or more data channels using the Seedlink protocol.

1.1.1 Inputs and outputs

1.1.1.1 Input files

NaqsToUdp and SeedlinkToUdp require that their configuration file be present in the current directory:

- NagsToUdp.ini Defines basic operating characteristics for NagsToUdp (for example, IP addresses, ports, channels).
- SeedlinkToUdp.ini Defines basic operating characteristics for Seedlink-ToUdp (for example, IP addresses, ports, stations).

You can edit the configuration files in any text editor.

1.1.1.2 Output files

NaqsToUdp and SeedlinkToUdp both produce a startup log file and daily log files, contain diagnostic messages generated by the program.

The daily log files provide a summary of the system operation. The date is encoded in the log file name (for example, NaqsToUdp_20031114.log). Each log message has an associated type:

- I Informational messages tracing the normal operation of the system.
- V Detailed informational messages tracing the normal operation of the system.
- D Debug, or verbose trace, messages generated during normal operation.

Log verbosity can be configured to show only messages at or above a specified severity level, by adjusting the verbosity setting. The verbosity of the log on startup is set in the . ini file. During operation, verbosity can be set to a different level by using the runtime commands.

1.2 Installing InterNaqs

1.2.1 Requirements

- Windows or Solaris operating system
- Java Runtime Environment 1.4.1 or higher
- Patches as may be recommended for the OS and JRE
- Nanometrics DLLs/Libraries 1.8 or higher
- NaqsServer 1.80 or higher

1.2.2 Install InterNaqs

Install InterNaqs on the same machine as the receiving NaqsServer.

On Windows:

- 1. From either a command prompt or Windows Explorer, open the installation CD directory Win32\InterNaqs\version number
- 2. Copy all files from the bin directory into the c:\nmx\bin directory, and all files from the user directory into the c:\nmx\user directory (these directories are created on your computer during DLL installation).
- 3. Check the system path, and add the directory c:\nmx\bin if it is not already included.
- 4. Adjust the configuration parameters as outlined in Chapter 2, "NaqsToUdp v1.00" and Chapter 3, "SeedlinkToUdp v1.00".

On Solaris and Linux:

• See the installation instructions for the acquisition system workstation.

Chapter 2 NaqsToUdp v1.00

NaqsToUdp is a communications program which enables data to be transferred reliably from one Nanometrics acquisition system to another, via TCP/IP. It connects to the source NaqsServer and subscribes to one or more data channels using the NaqsServer Datastream service. Packets received from the source NaqsServer are then relayed to the receiving NaqsServer via UDP. NaqsToUdp also relays retransmission requests from the receiving NaqsServer back to the source, to ensure full recovery of data which are missed due to any communications outage.

NaqsToUdp is installed as an InterNaqs utility; typically, it is run on the same machine as the receiving NaqsServer (see Section 1.2, "Installing InterNaqs," on page 2).

2.1 Running NaqsToUdp

NaqsToUdp would normally be set up to run on the same machine as NaqsServer on the receiving system.

2.1.1 Starting NaqsToUdp manually

• To start NaqsToUdp from the command line, enter either:

NaqsToUdp

or

NaqsToUdp inifile

where *inifile* is the path to the NaqsToUdp configuration file. If no inifile parameter is specified, NaqsToUdp looks for a file named NaqsToUdp.ini in its working directory.

2.1.2 Starting NaqsToUdp from NmxWatchdog

In Windows, NaqsToUdp can be started and monitored automatically by the Nanometrics watchdog program:

> Add an entry to your watchdog.ini file: [WatchEntry n] ProgramTitle = NaqsToUdp ProgramPathname = "java -jar c:\nmx\bin\NaqsToUdp.jar [inifile]" WorkingDirectory = "c:\nmx\user" ExitAction = Restart PingsSemaphore = true
StartDelay = 6s

2.1.3 Stopping NaqsToUdp

NaqsToUdp must be shut down properly in order for it to release its system resources.

• To stop NaqsToUdp, enter quit in the NaqsToUdp command window.

2.1.4 Using the NaqsToUdp run-time commands

NaqsToUdp supports a basic keyboard interface for entering run-time commands, with the options described in Table 2-1.

• To enter run-time commands in the NaqsToUdp terminal window, enter *command*.

To do this	Enter this command
List the channels available for subscription.	C
Display all log messages in the log file; set the log verbosity to DEBUG	D
Suppress debug messages in the log file; set the log verbosity to VERBOSE	V
Suppress debug and verbose messages in the log file; set the log verbosity to INFO	I
Move the log file (close the current log and start a new file)	М
Report the number of packets received from and sent to source.	R
Stop NaqsToUdp and exit.	quit

 Table 2-1
 NaqsToUdp run-time commands

2.1.5 Monitoring NaqsToUdp operation

NaqsToUdp generates log messages that trace the operation of the program. It displays these messages in the terminal window, and writes them to the NaqsToUdp log file. You can set the level of detail (the verbosity) of the information to be displayed and recorded.

- To view the log, open the file LogFilename_date.log (for example, NaqsToUdp_20031110.log) in a text editor. The log file name and location are set in the [Log] section of the NaqsToUdp.ini file.
- ▶ To set the verbosity of log messages on startup, edit the [Log] section of the NaqsToUdp.ini file.
- To change the verbosity of log messages while NaqsToUdp is running, use the runtime commands.

2.2 Configuring NaqsToUdp

The operating configuration for the program is specified in the NaqsToUdp.ini file. This file contains these three sections; all entries are required:

- [Connections]
- [Log]
- [Channels]

The format for each naqstoudp.ini entry is *Parameter* = *Value*. For example, DestinationPort = 32000. See also the example configuration file in Section 2.3 on page 6.

2.2.1 [Connections]

The [Connections] section defines the hostname and datastream port of the data source, and the hostname and UDP port of the receiving NaqsServer. It contains the parameters described in Table 2-2.

Parameter	Definition
SourceHost	The host name or IP address of the machine on which the source NaqsServer is running. Example: SourceHost = naqs.source.net
SourcePort	The NaqsServer Datastream port of the source acquisition system. Example: SourcePort = 28000
UseCallback	Specifies whether to connect to the source NaqsServer using a callback socket. This should be set to Yes only if the [Datastream] <i>SocketType</i> parameter on the source NaqsServer is set to Callback. • Permitted values: Yes, No. Example: UseCallback = No
DestinationHost	 The host name or IP address of the machine on which the receiving NaqsServer is running. If NaqsToUdp and the receiving NaqsServer are running on the same machine, you can set this to localhost. If you wish to make the data available to more than one acquisition system on your local network, set this to a multicast address. Example: DestinationHost = localhost
DestinationPort	 The UDP receive port on the receiving NaqsServer. This should match the [NetworkInterface] <i>Port</i> parameter in the Naqs.ini file. Example: DestinationPort = 32000

Table 2-2 [Connections] section parameters

2.2.2 [Log]

The [Log] section defines the location, name and verbosity of the NaqsToUdp log file. It contains the parameters described in Table 2-3.

Parameter	Definition
LogFilename	The base filename for the NaqsToUdp log file. NaqsToUdp creates a new log file every day; it builds the log file name by inserting the date (<i>yyyymmdd</i>) between the base name and the file extension. For example, NaqsToUdp_20031114.log • Permitted values: Any valid file name, with no spaces. Example: LogFilename = NaqsToUdp.log
LogDirectory	 The pathname for the directory in which to store the NaqsToUdp log file. Names are treated as relative pathnames (relative to the directory in which NaqsToUdp is running), unless they are specified as absolute names (with a leading slash). Permitted values: Any valid pathname, with no spaces. Do <i>not</i> include the trailing slash. Example: LogPath = logs
Verbosity	 The startup verbosity of the log file, to show all messages (DEBUG, resulting in very large log files), suppress debug messages (VERBOSE, resulting in large log files), or suppress debug and detailed messages (INFO, the setting typically used to monitor operation). Permitted values: DEBUG, VERBOSE, INFO. Example: Verbosity = INFO

Table 2-3	[Log]	section	parameters
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2.2.3 [Channels]

The [Channels] section defines the channels that you want this program to receive. This section may contain any number of entries, one per line. Each channel should be identified using the dotted station/channel name by which the channel is identified on the source acquisition system; for example, STN02.bhz. See also Section 2.3, "Example configuration file (NaqsToUdp.ini)".

 To obtain a list of the channels available for subscription by NaqsToUdp, at the NaqsToUdp command window enter c.

2.3 Example configuration file (NaqsToUdp.ini)

This section contains an example NaqsToUdp.ini file. You can edit this file in any text editor.

The inifile reader ignores white space and blank lines, so white space can be added anywhere within the file if desired to improve readability. Also, the inifile reader recognizes the double-slash "//" as a comment delimiter. You can use this to add comments anywhere in the file, and to temporarily remove parameters or sections from the file.

```
// NaqsToUdp.ini
// Configuration file for NaqsToUdp version 1.00
[ Connections ]
SourceHost = naqs.source.net
SourcePort = 28000
UseCallback = No
DestinationHost = localhost
```

DestinationPort = 32000
[Log]
LogFilename = NaqsToUdp.log
LogDirectory = logs
Verbosity = verbose
[Channels]
STN02.bhz
STN02.bhn
STN02.bhe
STN02.soh

Chapter 3 SeedlinkToUdp v1.00

SeedlinkToUdp is a communications program which enables data to be transferred from any Seedlink server system to a Nanometrics NaqsServer acquisition system. SeedlinkToUdp connects to the Seedlink server via TCP/IP, and subscribes to one or more data channels using the Seedlink protocol. The current version accepts data using Steim (1) compression.

SeedlinkToUdp is installed as an InterNaqs utility; typically, it is run on the same machine as NaqsServer (see Section 1.2, "Installing InterNaqs," on page 2).

3.1 Running SeedlinkToUdp

SeedlinkToUdp would normally be set up to run on the same machine as NaqsServer.

3.1.1 Starting SeedlinkToUdp manually

 To start SeedlinkToUdp from the command line, enter either: SeedlinkToUdp

or

SeedlinkToUdp inifile

where *inifile* is the path to the SeedlinkToUdp configuration file. If no inifile parameter is specified, SeedlinkToUdp looks for a file named Seedlink-ToUdp.ini in its working directory.

3.1.2 Starting SeedlinkToUdp from NmxWatchdog

In Windows, SeedlinkToUdp can be started and monitored automatically by the Nanometrics watchdog program:

> Add an entry to your watchdog.ini file: [WatchEntry n] ProgramTitle = SeedlinkToUdp ProgramPathname = "java -jar c:\nmx\bin\SeedlinkToUdp.jar [inifile]" WorkingDirectory = "c:\nmx\user"

```
ExitAction = Restart
PingsSemaphore = true
StartDelay = 6s
```

3.1.3 Stopping SeedlinkToUdp

SeedlinkToUdp must be shut down properly in order for it to release its system resources.

• To stop SeedlinkToUdp, enter quit in the SeedlinkToUdp command window.

3.1.4 Using the SeedlinkToUdp run-time commands

SeedlinkToUdp supports a basic keyboard interface for entering run-time commands, with the options described in Table 3-1.

• To enter run-time commands in the SeedlinkToUdp terminal window, enter *command*.

Table 3-1	SeedlinkToUdp r	run-time commands
-----------	-----------------	-------------------

To do this	Enter this command
Display all log messages in the log file; set the log verbosity to DEBUG	D
Suppress debug messages in the log file; set the log verbosity to VERBOSE	V
Suppress debug and verbose messages in the log file; set the log verbosity to INFO	I
Move the log file (close the current log and start a new file)	М
Stop SeedlinkToUdp and exit.	quit

3.1.5 Monitoring SeedlinkToUdp operation

SeedlinkToUdp generates log messages that trace the operation of the program. It displays these messages in the terminal window, and writes them to the SeedlinkToUdp log file. You can set the level of detail (the verbosity) of the information to be displayed and recorded.

- ➤ To view the log, open the file LogFilename_date.log (for example, SeedlinkToUdp_200311211.log) in a text editor. The log file name and location are set in the [Log] section of the SeedlinkToUdp.ini file.
- To set the verbosity of log messages on startup, edit the [Log] section of the SeedlinkToUdp.ini file.
- To change the verbosity of log messages while SeedlinkToUdp is running, use the run-time commands.

3.2 Configuring SeedlinkToUdp

The operating configuration for the program is specified in the SeedlinkToUdp.ini file, and requires additional [ChannelPrototype] sections to the Naqs station file.

SeedlinkToUdp.ini contains three sections; all entries are required:

- [Log]
- [Connections]
- [Station]

The format for each SeedlinkToUdp.ini entry is *Parameter = Value*. For example, DestinationNaqsPort = 32000. See also the example configuration file in Section 3.3, "Example configuration file (SeedlinkToUdp.ini)," on page 13.

3.2.1 [Log]

The [Log] section defines the location, name, and verbosity of the SeedlinkToUdp log file. It contains the parameters described in Table 3-2.

Table 3-2 [Log] section parameters

Parameter	Definition
LogFile	 The base filename for the SeedlinkToUdp log file. SeedlinkToUdp creates a new log file every day; it builds the log file name by inserting the date (<i>yyyymmdd</i>) between the base name and the file extension. For example, SeedlinkToUdp_20031215.log. Permitted values: Any valid file name, with no spaces. Example: LogFile = SeedlinkToUdp.log
LogPath	 The pathname for the directory in which to store the SeedlinkToUdp log file. Names are treated as relative pathnames (relative to the directory in which SeedlinkToUdp is running), unless they are specified as absolute names (with a leading slash). Permitted values: Any valid pathname, with no spaces. Do <i>not</i> include the trailing slash. Example: LogPath = logs
Verbosity	The startup verbosity of the log file, to show all messages (DEBUG, resulting in very large log files), suppress debug messages (VERBOSE, resulting in large log files), or suppress debug and detailed messages (INFO, the setting typically used to monitor operation). • Permitted values: DEBUG, VERBOSE, INFO. Example: Verbosity = INFO

3.2.2 [Connections]

The [Connections] section defines the hostname and UDP port of the receiving NaqsServer on which SeedlinkToUdp is running, and the hostname and TCP port of the source Seedlink server. It contains the parameters described in Table 3-3.

Parameter	Definition	
DestinationNaqsAddress	 The host name or IP address of the NaqsServer machine. If SeedlinkToUdp and the receiving NaqsServer are running on the same machine, this may be set to localhost. 	
	Example : DestinationNaqsAddress = localhost	
DestinationNaqsPort	 The UDP receive port on the NaqsServer. This should match the [NetworkInterface] Port parameter in the Naqs.ini file. Example: DestinationNagsPort = 32000 	
SeedlinkServerAddress	The host name or IP address of the machine on which the Seedlink server is running. Example: SeedlinkServerAddress = seedlink.source.net	
SeedlinkServerPort	The Seedlink server TCP port number. Example: SeedlinkServerPort = 18000	

Table 3-3 [Connections] section parameters

3.2.3 [Station]

The [Station] section defines the channels that you want this program to receive from the Seedlink server. It contains the parameters listed in Table 3-4. There can be any number of [Station] sections.

Table 3-4	[Station]] section	parameters
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Parameter	Definition
Network	The Seedlink network name. Example: Network = RO
Station	The Seedlink station name. Example: Station = ST31
Channel	The Seedlink channel names, as a comma-separated list, or use * to list all channels for the station. Example: Channel = BHZ
Model	The instrument model as defined in the NaqsServer Naqs.stn file. Example: Model = HRD
SerialNumber	The instrument serial number as defined in the NaqsServer Naqs.stn file. Example: SerialNumber = 181

3.2.4 Naqs.stn [ChannelPrototype]

For data to be received correctly, the Naqs station file must have [ChannelPrototype] sections defined for the Seedlink channels, with *BundlesPerPacket* set to 27. (See also the NaqsServer user guide.)

If a [ChannelPrototype] is already defined in the Nags.stn file for a type of channel that will also be received via SeedlinkToUdp, add a new
 [ChannelPrototype] section for the Seedlink channel type withBundlesPerPacket set to 27.

```
For example:
[ ChannelPrototype ] // predefined channel - all fields mandatory
TypeName = BHZ-1 // label for this type
Name = BHZ // channel name
Component = 1 // digitiser component
Sensor = STS-2 // pointer to predefined [Sensor] characteristics
Azimuth = 0 // azimuth in degrees clockwise from North
Dip = 90 // dip in degrees (positive down)
Depth = 0 // has to be defined for each channel
BundlesPerPacket = 15 // number of bundles per data packet
RingBufferSize = 50
                         // file size in MB
RingBufferPath = d:\nmx // where files are located
ResponseFile = none // name of SEED response file
[ ChannelPrototype ] // predefined channel - all fields mandatory
TypeName = BHZ-seedlink // label for this type
Name = BHZ // channel name
Component = 1 // digitiser component
Sensor = STS-2 // pointer to predefined [Sensor]
// characteristics
                       // azimuth in degrees clockwise from North
Azimuth = 0
Dip = 90
                         // dip in degrees (positive down)
Depth = 0
                         // has to be defined for each channel
BundlesPerPacket = 27 // number of bundles per data packet
RingBufferSize = 50 // file size in MB
RingBufferPath = d:\nmx // where files are located
ResponseFile = none // name of SEED response file
```

3.3 Example configuration file (SeedlinkToUdp.ini)

This section contains an example SeedlinkToUdp.ini file. You can edit this file in any text editor.

The inifile reader ignores white space and blank lines, so white space can be added anywhere within the file if desired to improve readability. Also, the inifile reader recognizes the double-slash "//" as a comment delimiter. You can use this to add comments anywhere in the file, and to temporarily remove parameters or sections from the file.

```
[ Station ]
Network = RO // The Seedlink Network Name
Station = ST31 // The Seedlink Station Name
Channel = BHN, BHE // Seedlink channels as a comma-separated list,
                  // or * for all channels
                  // The NaqsServer Instrument Model
Model = HRD
SerialNumber = 181 // The NagsServer Instrument SerialNumber
[ Station ]
                  // The Seedlink Network Name
Network = RO
Station = ST32
                  // The Seedlink Station Name
Channels = *
                  // Seedlink channels as a comma-separated list,
                  // or * for all channels
Model = HRD
                  // The NagsServer Instrument Model
SerialNumber = 182 // The NagsServer Instrument SerialNumber
[ Station ]
Network = RO
                   // The Seedlink Network Name
Station = ST33
                   // The Seedlink Station Name
Channels = *
                   // Seedlink channels as a comma-separated list,
                   // or * for all channels
Model = HRD
                  // The NaqsServer Instrument Model
SerialNumber = 183 // The NagsServer Instrument SerialNumber
[ Station ]
Network = RO
                  // The Seedlink Network Name
Station = ST34
                  // The Seedlink Station Name
Channels = *
                   // Seedlink channels as a comma-separated list,
                   // or * for all channels
Model = HRD
                  // The NagsServer Instrument Model
SerialNumber = 184 // The NagsServer Instrument SerialNumber
[ Station ]
Network = CH
                  // The Seedlink Network Name
Station = BOURR
                  // The Seedlink Station Name
Channels = *
                  // Seedlink channels as a comma-separated list,
                  // or * for all channels
                  // The NaqsServer Instrument Model
Model = HRD
SerialNumber = 201 // The NagsServer Instrument SerialNumber
[ Station ]
Network = CH
                  // The Seedlink Network Name
Station = DAVOX
                  // The Seedlink Station Name
Channels = *
                  // Seedlink channels as a comma-separated list,
                   // or * for all channels
Model = HRD
                  // The NagsServer Instrument Model
SerialNumber = 202 // The NaqsServer Instrument SerialNumber
```