Rocky Enterprise Linux 9.2 Manual Pages on command 'ntpq.1'

C:\>man ntpq.1

NTPQ(1) BSD General Commands Manual NTPQ(1)

NAME

ntpq ? standard NTP query program

SYNOPSIS

ntpq [-flags] [-flag [value]] [--option-name[[=|]value]] [host ...]

DESCRIPTION

The ntpq utility program is used to query NTP servers to monitor NTP operations and performance, requesting information about current state and/or changes in that state. The program may be run either in interactive mode or controlled using command line arguments. Requests to read and write arbitrary variables can be assembled, with raw and pretty-printed output options being available. The ntpq utility can also obtain and print a list of peers in a common format by sending multiple queries to the server.

If one or more request options is included on the command line when ntpq is executed, each of the requests will be sent to the NTP servers running on each of the hosts given as command line arguments, or on localhost by default. If no request options are given, ntpq will attempt to read commands from the standard input and execute these on the NTP server running on the first host given on the command line, again defaulting to localhost when no other host is specified. The ntpq utility will prompt for commands if the standard input is a terminal device.

ntpq uses NTP mode 6 packets to communicate with the NTP server, and hence can be used to query any compatible server on the network which permits it. Note that since

NTP is a UDP protocol this communication will be somewhat unreliable, especially over large distances in terms of network topology. The ntpq utility makes one attempt to retransmit requests, and will time requests out if the remote host is not heard from within a suitable timeout time.

Note that in contexts where a host name is expected, a -4 qualifier preceding the host name forces resolution to the IPv4 namespace, while a -6 qualifier forces reso? lution to the IPv6 namespace. For examples and usage, see the ?NTP Debugging Techniques? page.

Specifying a command line option other than -i or -n will cause the specified query (queries) to be sent to the indicated host(s) immediately. Otherwise, ntpq will at? tempt to read interactive format commands from the standard input.

Internal Commands

Interactive format commands consist of a keyword followed by zero to four arguments. Only enough characters of the full keyword to uniquely identify the command need be typed.

A number of interactive format commands are executed entirely within the ntpq utility itself and do not result in NTP requests being sent to a server. These are described following.

? [command]

help [command] A ??? by itself will print a list of all the commands known to ntpq. A ??? followed by a command name will print function and usage information about the command.

addvars name[=value][,...]

rmvars name[,...]

clearvars

showvars The arguments to this command consist of a list of items of the form name[=value], where the =value is ignored, and can be omitted, in requests to the server to read variables. The ntpq utility maintains an internal list in which data to be included in messages can be assembled, and displayed or set using the readlist and writelist commands described below. The addvars command allows variables and their optional values to be added to the list. If more than one variable is to be added, the

list should be comma-separated and not contain white space.

The rmvars command can be used to remove individual variables from the list, while the clearvars command removes all vari? ables from the list. The showvars command displays the current list of optional variables.

authenticate [yes|no]

Normally ntpq does not authenticate requests unless they are write requests. The command authenticate yes causes ntpq to send authentication with all requests it makes. Authenticated requests causes some servers to handle requests slightly dif? ferently. The command authenticate causes ntpq to display whether or not it is currently authenticating requests.

cooked Causes output from query commands to be "cooked", so that vari? ables which are recognized by ntpq will have their values re? formatted for human consumption. Variables which ntpq could not decode completely are marked with a trailing ???.

debug [more|less|off]

With no argument, displays the current debug level. Otherwise, the debugging level is changed as indicated.

delay [milliseconds]

Specify a time interval to be added to timestamps included in requests which require authentication. This is used to enable (unreliable) server reconfiguration over long delay network paths or between machines whose clocks are unsynchronized. Ac? tually the server does not now require timestamps in authenti? cated requests, so this command may be obsolete. Without any arguments, displays the current delay.

drefid [hash|ipv4]

Display refids as IPv4 or hash. Without any arguments, dis? plays whether refids are shown as IPv4 addresses or hashes.

exit Exit ntpq.

host [name] Set the host to which future queries will be sent. The name may be either a host name or a numeric address. Without any

arguments, displays the current host.

hostnames [yes|no]

If yes is specified, host names are printed in information dis? plays. If no is specified, numeric addresses are printed in? stead. The default is yes, unless modified using the command line -n switch. Without any arguments, displays whether host names or numeric addresses are shown.

keyid [keyid] This command allows the specification of a key number to be used to authenticate configuration requests. This must corre? spond to the controlkey key number the server has been config? ured to use for this purpose. Without any arguments, displays the current keyid.

keytype [digest]

Specify the digest algorithm to use for authenticating re? quests, with default MD5. If ntpq was built with OpenSSL sup? port, and OpenSSL is installed, digest can be any message di? gest algorithm supported by OpenSSL. If no argument is given, the current keytype digest algorithm used is displayed.

ntpversion [1|2|3|4]

Sets the NTP version number which ntpq claims in packets. De? faults to 3, and note that mode 6 control messages (and modes, for that matter) didn't exist in NTP version 1. There appear to be no servers left which demand version 1. With no argu? ment, displays the current NTP version that will be used when communicating with servers.

passwd This command prompts you to type in a password (which will not be echoed) which will be used to authenticate configuration re? quests. The password must correspond to the key configured for use by the NTP server for this purpose if such requests are to be successful.

poll [n] [verbose]

Poll an NTP server in client mode n times. Poll not imple? mented yet.

quit Exit ntpq.

raw Causes all output from query commands is printed as received from the remote server. The only formating/interpretation done on the data is to transform nonascii data into a printable (but barely understandable) form.

timeout [milliseconds]

Specify a timeout period for responses to server queries. The default is about 5000 milliseconds. Without any arguments, displays the current timeout period. Note that since ntpq re? tries each query once after a timeout, the total waiting time for a timeout will be twice the timeout value set.

version Display the version of the ntpq program.

Control Message Commands

Association ids are used to identify system, peer and clock variables. System vari? ables are assigned an association id of zero and system name space, while each asso? ciation is assigned a nonzero association id and peer namespace. Most control com? mands send a single message to the server and expect a single response message. The exceptions are the peers command, which sends a series of messages, and the mreadlist and mreadvar commands, which iterate over a range of associations.

apeers Display a list of peers in the form:

[tally]remote refid assid st t when pool reach delay offset jitter

where the output is just like the peers command except that the refid is displayed in hex format and the association number is also displayed.

associations

Display a list of mobilized associations in the form:

ind assid status conf reach auth condition last_event cnt

Variable Description

ind index on this list

assid association id

status peer status word

conf yes: persistent, no: ephemeral

reach yes: reachable, no: unreachable

auth ok, yes, bad and none

condition selection status (see the select field of the peer status word)

last_event event report (see the event field of the peer status word)

cnt event count (see the count field of the peer status word)

authinfo Display the authentication statistics counters: time since reset, stored keys, free keys, key lookups, keys not found, uncached keys, expired keys, encryptions, decryptions.

clocklist [associd]

cl [associd]

Display all clock variables in the variable list for those associa? tions supporting a reference clock.

clockvar [associd] [name[=value]][,...]

cv [associd] [name[=value]][,...]

Display a list of clock variables for those associations supporting a reference clock.

:config configuration command line

Send the remainder of the command line, including whitespace, to the server as a run-time configuration command in the same format as a line in the configuration file. This command is experimental until further notice and clarification. Authentication is of course re? quired.

config-from-file filename

Send each line of filename to the server as run-time configuration commands in the same format as lines in the configuration file. This command is experimental until further notice and clarification. Authentication is required.

ifstats Display status and statistics counters for each local network inter?
face address: interface number, interface name and address or broad?
cast, drop, flag, ttl, mc, received, sent, send failed, peers, up?
time. Authentication is required.

iostats Display network and reference clock I/O statistics: time since re?
set, receive buffers, free receive buffers, used receive buffers,
low water refills, dropped packets, ignored packets, received pack?
ets, packets sent, packet send failures, input wakeups, useful input
wakeups.

kerninfo Display kernel loop and PPS statistics: associd, status, pll offset,
pll frequency, maximum error, estimated error, kernel status, pll
time constant, precision, frequency tolerance, pps frequency, pps
stability, pps jitter, calibration interval, calibration cycles,
jitter exceeded, stability exceeded, calibration errors. As with
other ntpq output, times are in milliseconds; very small values may
be shown as exponentials. The precision value displayed is in mil?
liseconds as well, unlike the precision system variable.

lassociations
Perform the same function as the associations command, except dis?
play mobilized and unmobilized associations, including all clients.

lopeers [-4|-6]
Display a list of all peers and clients showing dstadr (associated
with the given IP version).

lpassociations
Display the last obtained list of associations, including all
clients.

lpeers [-4|-6]
Display a list of all peers and clients (associated with the given
IP version).

monstats Display monitor facility status, statistics, and limits: enabled,
addresses, peak addresses, maximum addresses, reclaim above count,
reclaim older than, kilobytes, maximum kilobytes.

mreadlist associdlo associdhi

mrl associdlo associdhi

Perform the same function as the readlist command for a range of as? sociation ids.

mreadvar associdlo associdhi [name][,...]

This range may be determined from the list displayed by any command showing associations.

mrv associdlo associdhi [name][,...]

Perform the same function as the readvar command for a range of as? sociation ids. This range may be determined from the list displayed by any command showing associations.

mrulist [limited | kod | mincount=count | laddr=localaddr | sort=[-]sortorder | resany=hexmask | resall=hexmask]

Display traffic counts of the most recently seen source addresses collected and maintained by the monitor facility. With the excep? tion of sort=[-]sortorder, the options filter the list returned by ntpd(8). The limited and kod options return only entries represent? ing client addresses from which the last packet received triggered either discarding or a KoD response. The mincount=count option fil? ters entries representing less than count packets. The laddr=localaddr option filters entries for packets received on any local address other than localaddr. resany=hexmask and resall=hexmask filter entries containing none or less than all, re? spectively, of the bits in hexmask, which must begin with 0x. The sortorder defaults to lstint and may be addr, avgint, count, lstint, or any of those preceded by ?-? to reverse the sort order. The out? put columns are:

Column	Description
lstint	Interval in seconds between the receipt of the most recent packet from this address and the completion of the retrieval of the MRU list by ntpq.
avgint	Average interval in s between packets from this ad? dress.
rstr	Restriction flags associated with this address.

Most are copied unchanged from the matching restrict command, however 0x400 (kod) and 0x20 (limited) flags are cleared unless the last packet from this address triggered a rate control re? sponse.

r Rate control indicator, either a period, L or K for no rate control response, rate limiting by discard? ing, or rate limiting with a KoD response, respec? tively.

m Packet mode.

v Packet version number.

count Packets received from this address.

rport Source port of last packet from this address.

remote address

host or DNS name, numeric address, or address fol? lowed by claimed DNS name which could not be veri? fied in parentheses.

opeers [-4 | -6]

Obtain and print the old-style list of all peers and clients showing dstadr (associated with the given IP version), rather than the refid.

passociations

Perform the same function as the associations command, except that it uses previously stored data rather than making a new query.

peers Display a list of peers in the form:

[tally]remote refid st t when pool reach delay offset jitter

Variable Description

[tally] single-character code indicating current value of the select field of the peer status word: decode.html#peer

remote host name (or IP number) of peer. The value dis? played will be truncated to 15 characters unless the ntpq -w option is given, in which case the full

value will be displayed on the first line, and if too long, the remaining data will be displayed on the next line.

refid source IP address or 'kiss code: decode.html#kiss

st stratum: 0 for local reference clocks, 1 for servers with local reference clocks, ..., 16 for unsynchronized server clocks

t u: unicast or manycast client, b: broadcast or mul? ticast client, p: pool source, l: local (reference clock), s: symmetric (peer), A: manycast server, B: broadcast server, M: multicast server

when time in seconds, minutes, hours, or days since the last packet was received, or ?-? if a packet has never been received

poll poll interval (s)

reach reach shift register (octal)

delay roundtrip delay

offset offset of server relative to this host

jitter offset RMS error estimate.

pstats associd

Display the statistics for the peer with the given associd: associd, status, remote host, local address, time last received, time until next send, reachability change, packets sent, packets received, bad authentication, bogus origin, duplicate, bad dispersion, bad refer? ence time, candidate order.

readlist [associd]

rl [associd]

Display all system or peer variables. If the associd is omitted, it is assumed to be zero.

readvar [associd name[=value] [, ...]]

rv [associd name[=value] [, ...]]

Display the specified system or peer variables. If associd is zero, the variables are from the System Variables name space, otherwise

they are from the Peer Variables name space. The associd is re?
quired, as the same name can occur in both spaces. If no name is
included, all operative variables in the name space are displayed.
In this case only, if the associd is omitted, it is assumed to be
zero. Multiple names are specified with comma separators and with?
out whitespace. Note that time values are represented in millisec?
onds and frequency values in parts-per-million (PPM). Some NTP
timestamps are represented in the format YYYYMM DD TTTT, where YYYY
is the year, MM the month of year, DD the day of month and TTTT the
time of day.

reslist Display the access control (restrict) list for ntpq. Authentication
is required.

saveconfig filename
Save the current configuration, including any runtime modifications
made by :config or config-from-file, to the NTP server host file
filename. This command will be rejected by the server unless
saveconfigdir: miscopt.html#saveconfigdir appears in the ntpd(8)
configuration file. filename can use date(1) format specifiers to
substitute the current date and time, for example,

saveconfig ntp-%Y%m%d-%H%M%S.conf.

The filename used is stored in system variable savedconfig. Authen?
tication is required.

sysinfo Display system operational summary: associd, status, system peer,
system peer mode, leap indicator, stratum, log2 precision, root de?
lay, root dispersion, reference id, reference time, system jitter,
clock jitter, clock wander, broadcast delay, symm. auth. delay.

sysstats Display system uptime and packet counts maintained in the protocol
module: uptime, sysstats reset, packets received, current version,
older version, bad length or format, authentication failed, de?
clined, restricted, rate limited, KoD responses, processed for time.

timerstats
Display interval timer counters: time since reset, timer overruns,
calls to transmit.

writelist associd

Set all system or peer variables included in the variable list.

writevar associd name=value [, ...]

Set the specified variables in the variable list. If the associd is zero, the variables are from the System Variables name space, other? wise they are from the Peer Variables name space. The associd is required, as the same name can occur in both spaces. Authentication is required.

Status Words and Kiss Codes

The current state of the operating program is shown in a set of status words main? tained by the system. Status information is also available on a per-association ba? sis. These words are displayed by the readlist and associations commands both in hexadecimal and in decoded short tip strings. The codes, tips and short explanations are documented on the Event Messages and Status Words: decode.html page. The page also includes a list of system and peer messages, the code for the latest of which is included in the status word.

Information resulting from protocol machine state transitions is displayed using an informal set of ASCII strings called kiss codes: decode.html#kiss. The original pur? pose was for kiss-o'-death (KoD) packets sent by the server to advise the client of an unusual condition. They are now displayed, when appropriate, in the reference identifier field in various billboards.

System Variables

The following system variables appear in the readlist billboard. Not all variables are displayed in some configurations.

Variable	Description
status	system status word: decode.html#sys
version	NTP software version and build time
processor	hardware platform and version
system	operating system and version
leap	leap warning indicator (0-3)
stratum	stratum (1-15)
precision	precision (log2 s)
rootdelay	total roundtrip delay to the primary reference clock

rootdisp total dispersion to the primary reference clock

refid reference id or kiss code: decode.html#kiss

reftime reference time

clock date and time of day

peer system peer association id

tc time constant and poll exponent (log2 s) (3-17)

mintc minimum time constant (log2 s) (3-10)

offset combined offset of server relative to this host

frequency frequency drift (PPM) relative to hardware clock

sys_jitter

combined system jitter

clk_wander

clock frequency wander (PPM)

clk_jitter

clock jitter

tai TAI-UTC offset (s)

leapsec NTP seconds when the next leap second is/was inserted

expire NTP seconds when the NIST leapseconds file expires

The jitter and wander statistics are exponentially-weighted RMS averages. The system jitter is defined in the NTPv4 specification; the clock jitter statistic is computed by the clock discipline module.

When the NTPv4 daemon is compiled with the OpenSSL software library, additional system variables are displayed, including some or all of the following, depending on the particular Autokey dance:

Variable Description

host Autokey host name for this host

ident Autokey group name for this host

flags host flags (see Autokey specification)

digest OpenSSL message digest algorithm

signature OpenSSL digest/signature scheme

update NTP seconds at last signature update

cert certificate subject, issuer and certificate flags

until NTP seconds when the certificate expires

Peer Variables

The following peer variables appear in the readlist billboard for each association.

Not all variables are displayed in some configurations.

Variable	Description
associd	association id
status	peer status word: decode.html#peer
srcadr	source (remote) IP address
srcport	source (remote) port
dstadr	destination (local) IP address
dstport	destination (local) port
leap	leap indicator (0-3)
stratum	stratum (0-15)
precision	precision (log2 s)
rootdelay	total roundtrip delay to the primary reference clock
rootdisp	total root dispersion to the primary reference clock
refid	reference id or kiss code: decode.html#kiss
reftime	reference time
rec	last packet received time
reach	reach register (octal)
unreach	unreach counter
hmode	host mode (1-6)
pmode	peer mode (1-5)
hpoll	host poll exponent (log2 s) (3-17)
ppoll	peer poll exponent (log2 s) (3-17)
headway	headway (see Rate Management and the Kiss-o'-Death Packet: rate.html)
flash	flash status word: decode.html#flash
keyid	symmetric key id
offset	filter offset
delay	filter delay
dispersion	filter dispersion
jitter	filter jitter

bias unicast/broadcast bias

xleave interleave delay (see NTP Interleaved Modes: xleave.html)

The bias variable is calculated when the first broadcast packet is received after the calibration volley. It represents the offset of the broadcast subgraph relative to the unicast subgraph. The xleave variable appears only for the interleaved symmetric and interleaved modes. It represents the internal queuing, buffering and transmis? sion delays for the preceding packet.

When the NTPv4 daemon is compiled with the OpenSSL software library, additional peer variables are displayed, including the following:

Variable Description

flags peer flags (see Autokey specification)

host Autokey server name

flags peer flags (see Autokey specification)

signature OpenSSL digest/signature scheme

initsequence

initial key id

initkey initial key index

timestamp Autokey signature timestamp

ident Autokey group name for this association

Clock Variables

The following clock variables appear in the clocklist billboard for each association with a reference clock. Not all variables are displayed in some configurations.

Variable Description

associd association id

status clock status word: decode.html#clock

device device description

timecode ASCII time code string (specific to device)

poll poll messages sent

noreply no reply

badformat bad format

baddata bad date or time

fudgetime1

fudge time 1

fudgetime2

fudge time 2

stratum driver stratum

refid driver reference id

flags driver flags

OPTIONS

-4, --ipv4

Force IPv4 name resolution. This option must not appear in combination with any of the following options: ipv6.

Force resolution of following host names on the command line to the IPv4 namespace.

-6, --ipv6

Force IPv6 name resolution. This option must not appear in combination with any of the following options: ipv4.

Force resolution of following host names on the command line to the IPv6 namespace.

-c cmd, --command=cmd

run a command and exit. This option may appear an unlimited number of times.

The following argument is interpreted as an interactive format command and is added to the list of commands to be executed on the specified host(s).

-d, --debug-level

Increase debug verbosity level. This option may appear an unlimited number of times.

-D number, --set-debug-level=number

Set the debug verbosity level. This option may appear an unlimited number of times. This option takes an integer number as its argument.

-i, --interactive

Force ntpq to operate in interactive mode. This option must not appear in combination with any of the following options: command, peers.

Force ntpq to operate in interactive mode. Prompts will be written to the standard output and commands read from the standard input.

-n, --numeric

numeric host addresses.

Output all host addresses in dotted-quad numeric format rather than convert?

ing to the canonical host names.

--old-rv

Always output status line with readvar.

By default, ntpq now suppresses the associd=... line that precedes the out?

put of readvar (alias rv) when a single variable is requested, such as ntpq

-c "rv 0 offset". This option causes ntpq to include both lines of output

for a single-variable readvar. Using an environment variable to preset this

option in a script will enable both older and newer ntpq to behave identi?

cally in this regard.

-p, --peers

Print a list of the peers. This option must not appear in combination with

any of the following options: interactive.

Print a list of the peers known to the server as well as a summary of their

state. This is equivalent to the 'peers' interactive command.

-r keyword, --refid=keyword

Set default display type for S2+ refids. This option takes a keyword as its

argument. The argument sets an enumeration value that can be tested by com?

paring them against the option value macro. The available keywords are:

hash ipv4

or their numeric equivalent.

The default keyword for this option is:

ipv4

Set the default display format for S2+ refids.

-w, --wide

Display the full 'remote' value.

Display the full value of the 'remote' value. If this requires more than 15

characters, display the full value, emit a newline, and continue the data

display properly indented on the next line.

-?, --help

Display usage information and exit.

-!, --more-help

Pass the extended usage information through a pager.

-> [cfgfile], --save-opts [=cfgfile]

Save the option state to cfgfile. The default is the last configuration file listed in the OPTION PRESETS section, below. The command will exit after up? dating the config file.

-< cfgfile, --load-opts=cfgfile, --no-load-opts

Load options from cfgfile. The no-load-opts form will disable the loading of earlier config/rc/ini files. --no-load-opts is handled early, out of order.

--version [{v|c|n}]

Output version of program and exit. The default mode is `v', a simple ver? sion. The `c' mode will print copyright information and `n' will print the full copyright notice.

OPTION PRESETS

Any option that is not marked as not presettable may be preset by loading values from configuration ("RC" or ".INI") file(s) and values from environment variables named:

NTPQ_<option-name> or NTPQ

The environmental presets take precedence (are processed later than) the configura? tion files. The homerc files are "$HOME", and ".". If any of these are directories, then the file .ntprc is searched for within those directories.

ENVIRONMENT

See OPTION PRESETS for configuration environment variables.

FILES

See OPTION PRESETS for configuration files.

EXIT STATUS

One of the following exit values will be returned:

0 (EXIT_SUCCESS)

Successful program execution.

1 (EXIT_FAILURE)

The operation failed or the command syntax was not valid.

66 (EX_NOINPUT)

A specified configuration file could not be loaded.

70 (EX_SOFTWARE)

libopts had an internal operational error. Please report it to auto? gen-users@lists.sourceforge.net. Thank you.

AUTHORS

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BUGS

Please send bug reports to: http://bugs.ntp.org, bugs@ntp.org

NOTES

This manual page was AutoGen-erated from the ntpq option definitions.