NAME

ntp_decode - ntpd Event Messages and Status Words

INTRODUCTION

This page lists the status words, event messages and error codes used for **ntpd** reporting and monitoring. Status words are used to display the current status of the running program. There is one system status word and a peer status word for each association. There is a clock status word for each association that supports a reference clock. There is a flash code for each association which shows errors found in the last packet received (pkt) and during protocol processing (peer). These are commonly viewed using the **ntpq** program.

Significant changes in program state are reported as events. There is one set of system events and a set of peer events for each association. In addition, there is a set of clock events for each association that supports a reference clock. Events are normally reported to the **protostats** monitoring file and optionally to the system log. In addition, if the trap facility is configured, events can be reported to a remote program that can page an administrator.

This page also includes a description of the error messages produced by the Autokey protocol. These messages are normally sent to the **cryptostats** monitoring file.

In the following tables the Code Field is the status or event code assigned and the Message Field a short string used for display and event reporting. The Description field contains a longer explanation of the status or event. Some messages include additional information useful for error diagnosis and performance assessment.

SYSTEM STATUS WORD

The system status word consists of four fields LI (0-1), Source (2-7), Count (8-11) and Code (12-15). It is reported in the first line of the **rv** display produced by the **ntpq** program.

Leap	Source	Count	Code

The Leap Field displays the system leap indicator bits coded as follows:

Code	Message	Description	
0	**leap_none**	normal synchronized state	
1	**leap_add_sec**	insert second after 23:59:59 of the current day	
2	**leap_del_sec**	delete second 23:59:59 of the current day	
3	**leap_alarm**	never synchronized	

The Source Field displays the current synchronization source coded as follows:.

Code	Message	Description	
0	**sync_unspec**	not yet synchronized	
1	**sync_pps**	pulse-per-second signal (Cs, Ru, GPS, etc.)	
2	**sync_lf_radio**	VLF/LF radio (WWVB, DCF77, etc.)	
3	**sync_hf_radio**	MF/HF radio (WWV, etc.)	
4	**sync_uhf_radio**	VHF/UHF radio/satellite (GPS, Galileo, etc.)	
5	**sync_local**	local timecode (IRIG, LOCAL driver, etc.)	
6	**sync_ntp**	NTP	
7	**sync_other**	other (IEEE 1588, openntp, crony, etc.)	
8	**sync_wristwatch**	eyeball and wristwatch	
9	**sync_telephone**	telephone modem (ACTS, PTB, etc.)	

The Count Field displays the number of events since the last time the code changed. Upon reaching 15, subsequent events with the same code are ignored.

The Event Field displays the most recent event message coded as follows:

Code	Message	Description	
00	**unspecified**	unspecified	
01	**freq_not_set**	frequency file not available	
02	**freq_set**	frequency set from frequency file	
03	**spike_detect**	spike detected	
04	**freq_mode**	initial frequency training mode	
05	**clock_sync**	clock synchronized	
06	**restart**	program restart	
07	**panic_stop**	clock error more than 600 s	
08	**no_system_peer**	no system peer	
09	**leap_armed**	leap second armed from file or Autokey	
0a	**leap_disarmed**	leap second disarmed	
0b	**leap_event**	leap event	
0c	**clock_step**	clock stepped	
0d	**kern**	kernel information message	
0e	**TAI...**	leapsecond values update from file	
0f	**stale leapsecond values**	new NIST leapseconds file needed	
10	**clockhop**	spurious clock hop suppressed	

PEER STATUS WORD

The peer status word consists of four fields: Status (0-4), Select (5-7), Count (8-11) and Code (12-15). It is reported in the first line of the **rv** *associd* display produced by the **ntpq** program.

Status	Select	Count	Code

The Status Field displays the peer status code bits in hexadecimal; each bit is an independent flag. (Note this field is 5 bits wide, and combines with the the 3-bit-wide Select Field to create the first full byte of the peer status word.) The meaning of each bit in the Status Field is listed in the following table:

Code	Message	Description	
08	**bcst**	broadcast association	
10	**reach**	host reachable	
20	**authenb**	authentication enabled	
40	**auth**	authentication ok	
80	**config**	persistent association	

The Select Field displays the current selection status. (The T Field in the following table gives the corresponding tally codes used in the **ntpq peers** display.) The values are coded as follows:

Code	Message	T	Description
0	**sel_reject**		discarded as not valid (TEST10-TEST13)
1	**sel_falsetick**	**x**	discarded by intersection algorithm
2	**sel_excess**	**.**	discarded by table overflow (not used)
3	**sel_outlyer**	**-**	discarded by the cluster algorithm
4	**sel_candidate**	**+**	included by the combine algorithm
5	**sel_backup**	**#**	backup (more than **tos maxclock** sources)
6	**sel_sys.peer**	*****	system peer
7	**sel_pps.peer**	**o**	PPS peer (when the prefer peer is valid)

The Count Field displays the number of events since the last time the code changed. Upon reaching 15, subsequent events with the same code are ignored.

The Event Field displays the most recent event message coded as follows:

Code	Message	Description	
01	**mobilize**	association mobilized	
02	**demobilize**	association demobilized	
03	**unreachable**	server unreachable	
04	**reachable**	server reachable	
05	**restart**	association restart	
06	**no_reply**	no server found (**ntpdate** mode)	
07	**rate_exceeded**	rate exceeded (kiss code **RATE**)	
08	**access_denied**	access denied (kiss code **DENY**)	
09	**leap_armed**	leap armed from server LI code	
0a	**sys_peer**	become system peer	
0b	**clock_event**	see clock status word	
0c	**bad_auth**	authentication failure	
0d	**popcorn**	popcorn spike suppressor	
0e	**interleave_mode**	entering interleave mode	
0f	**interleave_error**	interleave error (recovered)	
10	**TAI...**	leapsecond values update from server	

CLOCK STATUS WORD

The clock status word consists of four fields: Unused (0-7), Count (8-11) and Code (12-15). It is reported in the first line of the **clockvar** *associd* display produced by the **ntpq** program.

Unused	Count	Code	

The Count Field displays the number of events since the last **lockvar** command, while the Event Field displays the most recent event message coded as follows:

Code	Message	Description	
00	**clk_unspe**	nominal	
01	**clk_noreply**	no reply to poll	
02	**clk_badformat**	bad timecode format	
03	**clk_fault**	hardware or software fault	
04	**clk_bad_signal**	signal loss	
05	**clk_bad_date**	bad date format	
06	**clk_bad_time**	bad time format	

When the clock driver sets the code to a new value, a **clock_alarm** (11) peer event is reported.

FLASH STATUS WORD

The flash status word is displayed by the **ntpq** program **rv** command. It consists of a number of bits coded in hexadecimal as follows:

Code	Tag	Message	Description
0001	TEST1	**pkt_dup**	duplicate packet
0002	TEST2	**pkt_bogus**	bogus packet
0004	TEST3	**pkt_unsync**	protocol unsynchronized
0008	TEST4	**pkt_denied**	access denied
0010	TEST5	**pkt_auth**	bad authentication
0020	TEST6	**pkt_stratum**	bad synch or stratum
0040	TEST7	**pkt_header**	bad header
0080	TEST8	**pkt_autokey**	bad autokey
0100	TEST9	**pkt_crypto**	bad crypto
0200	TEST10	**peer_stratum**	peer bad synch or stratum
0400	TEST11	**peer_dist**	peer distance exceeded
0800	TEST12	**peer_loop**	peer synchronization loop
1000	TEST13	**peer_unreach**	peer unreachable

KISS CODES

Kiss codes are used in kiss-o'-death (koD) packets, billboard displays and log messages. They consist of a string of four zero-padded ASCII charactes. In practice they are informal and tend to change with time and implementation. Some of these codes can appear in the reference identifier field in **ntpq** billboards. Following is the current list:

Code	Description		
ACST	manycast server		
AUTH	authentication error		
AUTO	Autokey sequence error		
BCST	broadcast server		
CRYPT	Autokey protocol error		
DENY	access denied by server		
INIT	association initialized		
MCST	multicast server		
RATE	rate exceeded		
TIME	association timeout		
STEP	step time change		

CRYPTO MESSAGES

These messages are sent to the **cryptostats** file when an error is detected in the Autokey protocol.

Code	Message	Description	
01	**bad_format**	bad extension field format or length	
02	**bad_timestamp**	bad timestamp	
03	**bad_filestamp**	bad filestamp	
04	**bad_public_key**	bad or missing public key	
05	**bad_digest**	unsupported digest type	
06	**bad_identity**	unsupported identity type	
07	**bad_siglength**	bad signature length	
08	**bad signature**	extension field signature not verified	
09	**cert_not_verified**	certificate signature not verified	
0a	**cert_expired**	host certificate expired	
0b	**bad_cookie**	bad or missing cookie	
0c	**bad_leapseconds**	bad or missing leapseconds values	
0d	**cert_missing**	bad or missing certificate	
0e	**bad_group_key**	bad or missing group key	
0f	**proto_error**	protocol error	

SEE ALSO

ntpq(8), ntp_mon(5)

The official HTML documentation.

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