

Appendix C **Directory Services Trace Utility**

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Overview

This appendix describes the DSTRACE utility, which is used on the NW 4.1 server console to monitor how NDS is functioning, whether NDS synchronization processes are complete, and to diagnose NDS errors.

DSTRACE is implemented as a “SET” command, which can be typed on the server console to enable the NDS debug screen and various debug messages and functions. The NDS engineers originally developed these “SET” commands to aid them in the development process. This appendix divides the functionality of DSTRACE into three parts:

- Basic Functions
- Debug Message Flags
- Background Process Flags

Note These Directory Services trace operations are discussed in the order listed above. You should read this appendix if you wish to turn on the debug screen and thus view Novell Directory Services “in action.” This document is for internal engineering use only and is not to be given to any outside parties. Certain of these functions are available through the NDS “SET” parameters as described in the “Utilities Reference” user manual. s

Concepts to Know

To understand this appendix you should be familiar with the following NDS concepts:

- Directory tree structure
- General NDS synchronization.
- NDS error codes

Basic Functions

The basic functions presented here control the general status of the DSTRACE screen. You can save the trace messages to a disk file for later examination. The default name of this file is: SYS:SYS-TEM\DSTRACE.DBG. To begin saving screen messages to this file at the current file pointer, type the following command on the console:

```
SET TTF = ON
```

To end saving the screen messages and close the file, type the following command:

```
SET TTF = OFF
```

These commands perform the same functions as the NDS *SET* parameter “NDS Trace to File = *ON/OFF*.”

Resetting the file pointer to the beginning of the file is done through the background process reset flag (*R) as explained in the “Background Process Flags” section below. It may also be accomplished through the NDS *SET* parameter, “NDS Trace File Length to Zero = *ON/OFF*”. However, to use this parameter, you must also set the *NDS Trace to File* parameter to *ON*. “SET TTF = ON” is also necessary for *R to work.

The command line for initiating the DSTRACE basic functions should be typed on the server console as follows:

```
SET DSTRACE = <command option>
```

Table C.1 lists the basic trace command options with the action performed by each and an explanation for their use.

Table C.1
Basic Trace Commands

Command Option	Action and Explanation
ON	Enables the NDS debug trace screen. This command restores the old trace bits, if they have been saved, or if no trace vector flags have been previously set, the <i>ON</i> and <i>MIN</i> debug message flags are set. This parameter performs the same function as the NDS <i>SET</i> parameter, “NDS Trace to Screen = <i>ON</i> ”.
OFF	Disables the debug trace screen. This command saves the currently set trace vector flags and clears the current trace flags. This parameter performs the same function as the NDS <i>SET</i> parameter, “NDS Trace to Screen = <i>OFF</i> ”.
ALL	Enables the debug trace screen and sets all debug trace message flags listed in the next section, “Debug Message Flags”.

Table C.1
Basic Trace Commands (Continued)

Command Option	Action and Explanation
AGENT	Enables the debug trace screen and sets the following debug trace message flags: <i>BACKLINK</i> , <i>DSAGENT</i> , <i>JANITOR</i> , <i>RESNAME</i> , and <i>VCLIENT</i> .
DEBUG	Enables the debug trace screen and sets the following debug trace message flags: <i>BACKLINK</i> , <i>ERRORS</i> , <i>EMU</i> , <i>FRAGGER</i> , <i>INIT</i> , <i>INSPECTOR</i> , <i>JANITOR</i> , <i>LIMBER</i> , <i>MISC</i> , <i>ON</i> , <i>PART</i> , <i>RECMAN</i> , <i>REPAIR</i> , <i>SCHEMA</i> , <i>SKULKER</i> , <i>STREAMS</i> , and <i>VCLIENT</i> .
NODEBUG	Clears all trace flags and turns off all debug messages, but leaves the trace screen enabled. (In other words, sets the debug message flag <i>ON</i> .)

Debug Message Flags

The following debug trace message flags turn *ON* or enable specific debug messages. To enable a trace flag, type a “+” in front of the flag option. To disable the trace flag, type a “-” in front of the option. You can also combine trace flags by using the Boolean operators “&” (AND) and “|” (OR) in the same DSTRACE command line. The command line should be typed on the server console as follows:

```
SET DSTRACE = +<trace flag> [| or +<trace flag>]
```

or

```
SET DSTRACE = -<trace flag> [& or -<trace flag>]
```

In the code, the flag is checked and the trace message displayed if the flag is set. The flags represent areas of interest in the code; for example, *BACKLINK* represents the Backlink process. Which messages are displayed depends on the bits that are set.

Table C.2 lists the trace flag names for debug messages, the actions performed by each, and an explanation for their use. In the *String* column, alternate command line abbreviations are separated by a slash.

Table C.2
Trace flags for Debug Messages

String	Action and Explanation
AUDIT	Enables audit related debug messages. In many cases this will cause the server to pop into the debugger if auditing encounters an error.
AUTHEN	Enables trace messages that are displayed while authenticating inbound connections.

Table C.2
Trace flags for Debug Messages (Continued)

String	Action and Explanation
BACKLINK/ BLINK	Enables backlink messages.
COLLISION/ COLL	Enables messages relating to name collisions.
DSAGENT/ DSA	Enables trace messages relating to inbound client requests and displays the DSA verb in the request.
EMU	Enables bindery emulator related messages.
ERRET	Defined only in precheckin, not used in code. Displays file-name, line number, and error.
ERRORS/ERR/ E	Enables messages that check to see if errors are being traced.
FRAGGER/ FRAG	Enables fragger related debug messages.
IN	Enables messages relating to inbound synchronization traffic.
INIT	Enables debug messages encountered during the process of opening the local database. Also used in a control verb that renames the schema in the <i>Sync Up To</i> vector.
INSPECTOR/I	Enables the “inspector”, which verifies DS database and object integrity.
JANITOR/J	Enables janitor related messages.
LIMBER	Enables limber debug messages.
LOCKING/ LOCKS	Enables debug messages concerning namebase locking activity.
MERGE	This debug message flag is not currently used.
MIN	This debug message flag produces a subset of <i>TV_SKULKER</i> messages.
MISC	Enables additional miscellaneous debug messages.
ON	Enables the debug trace screen. This command restores the old trace bits, if they have been saved, or if no trace vector flags have been previously set, the <i>TV_ON</i> and <i>TV_MIN</i> flags are set.
PART	Enables partition debug messages that are useful in debugging partition operations.
RECMAN	Enables debug messages relating to namebase functions, such as rebuilding and verifying internal hash tables.
REPAIR	This debug message flag is not currently used.
RESNAME/ RN	Enables debug messages relating to resolving name requests.

Table C.2
Trace flags for Debug Messages (Continued)

String	Action and Explanation
SAP	Enables messages that are displayed when “sapping” tree names.
SCHEMA	Enables schema messages relating to modifications and skulking of the schema.
SKULKER/S/ SYNC	Enables synchronization process messages.
STREAMS	Enables stream related information messages.
TH	Enables messages relating to the scheduling and running of NDS thread processes.
TIMEVEC- TOR/TV	Enables debug messages for displaying local and remote <i>Sync Up To</i> vectors.
VCLIENT/VC	Enables messages dealing with server to server connections and outgoing client messages.

Background Process Flags

A number of flags have been implemented for enabling specific background processes and for changing tunable parameters for these processes. In order to enable a background process you must precede the trace flag with an asterisk (*). To change the tunable parameter for a background process you must precede the trace flag with an exclamation (!). The command line should be typed on the server console as follows:

```
SET DSTRACE = *<trace flag> [parameter]
```

or

```
SET DSTRACE = !<trace flag> [parameter]
```

Table C.3 lists the background process trace flags, parameters (when applicable), and actions and explanation for the use of each.

Table C.3
Background process flags

Flag	Parameters	Action and Explanation
*	None	Calls <i>ReloadDS</i> ; it has the same functionality as <i>DS_NCP_RELOAD</i> .
*B	None	Schedules <i>Checkbacklinks</i> ; sets <i>Force-BacklinkProcessing</i> to 1.

Table C.3
Background process flags (Continued)

Flag	Parameters	Action and Explanation
!B	Time in minutes (Limits are 2 to 10080 minutes [7 days].)	Sets <i>Backlink</i> interval. This is the same as the NDS <i>SET</i> parameter “NDS Backlink Interval = <minutes>.” Note: the default time is 780 minutes (13 hours).
*D	Replica RootID	Removes the replica root ID from <i>SendAll-PartitionList</i> .
*E	None	Calls <i>CheckECache</i> ; verifies that the entry cache matches the database.
*F	None	Sets <i>ForceFlatCleaner</i> to 1; schedules the Janitor process to run in 5 seconds.
!F	Time in minutes. The value must be greater than 2 minutes and less than 7 days or it will remain unchanged.	Sets <i>FlatCleaningInterval</i> time. This is the same as the NDS <i>SET</i> parameter “NDS Janitor Interval = <minutes>.” Note: the default time is 60 minutes.
*G	None	Sets <i>GiveUpOnServer</i> to 1; causes current outbound request in <i>ConnRequest</i> to return <i>ERR_DS_LOCKED</i> .
*H	None	Immediately schedules synchronization for all replicas.
!H	Time in minutes	Sets <i>HeartBeatSkulkInterval</i> ; the time in minutes must be greater than or equal to 2 and less than or equal to 1440. This is the same as the NDS <i>SET</i> parameter “NDS Inactivity Synchronization Interval = <minutes>.” Note: the default time is 30 minutes.
*I	Replica RootID	Adds <i>ReplicaRootEntryID</i> to the <i>Send-All-PartitionList</i> .
!I	Time in minutes	Sets <i>HeartBeatSchemaInterval</i> ; it must be set to greater than or equal to 2 minutes and less than or equal to 25 hours. Note: the default time is 30 minutes.
!J	Time in minutes. Limits are 1 to 10080 minutes.	Sets the Janitor interval. Note: the default time is 2 minutes.
*L	None	Schedules the Limber process to run in 5 seconds.
*M	Bytes	Sets maximum trace file size. This flag sets the maximum size of the trace file in bytes (10,000 - 10,000,000).
*P	None	Displays tunable parameters values. This flag displays the tunable parameters and their current settings.

Table C.3
Background process flags (Continued)

Flag	Parameters	Action and Explanation
*R	None	Reset TTF trace file. This flag initiates a reset on the trace file, DSTRACE.DBG. It performs the same function as the NDS <i>SET</i> parameter, “NDS Trace File Length Set to Zero = ON/OFF”.
!R	Number of times	Sets maximum disk access before yield. This tunable parameter changes the maximum times of disk access before yielding. Note: the default is 10.
*S	None	Schedule skulker synchronization. This flag initiates a check to see if synchronization is necessary on any of the replicas on that server. If so, it schedules the synchronization process to run sooner than normal.
!S	None = enable. 0 = disable schema synchronization. Non-zero = enable schema synchronization.	Enables/disables schema synchronization.
*SS	None	Schedule schema synchronization to run immediately.
!T	Time in minutes (greater than or equal to 1 hour and less than or equal to 12 hours)	Sets server state <i>UP</i> threshold. Note: the default time is 30 minutes.
*U	Optional ID of server object. If ID is given, sets the state of that object to <i>UP</i> . If no ID is given, sets the state of all objects in the pseudoserver’s remote server ID list to <i>UP</i> .	Sets server state to <i>UP</i> . This performs the same function as the NDS <i>SET</i> parameter, “NDS Servers Status = UP”.
!V	List of versions to restrict, separated by commas. If no versions are listed, there are no restrictions.	NDS version restrictions. This tunable parameter gives a list of versions it will not authenticate to or receive authentication from, if no version restrictions are listed in the parameter field.
!W	Time in ticks	Set <i>ScaleBack</i> factor. This NDS client tunable parameter changes the IPX RIP delay (length of time to wait after getting an IPX time-out before re-sending). Note: the default is 20. This parameter has a range of 1-1999 ticks.

Table C.3
Background process flags (Continued)

Flag	Parameters	Action and Explanation
!X	Number of retries	IPX retry count for NDS Client. This tunable parameter changes the number of IPX retries before giving an NDS -625 error. This is the same as the NDS <i>SET</i> parameter “NDS client NCP retries = <number>.” Note: the default is 3 retries. This parameter has a range of 1-49 retries.
!Y	Number. Valid range is 1-529; if 0 or greater than 529, set to default (2).	IPX TimeOutScaleFactor. This NDS client tunable parameter is used to factor the estimated trip delay. It is used in the equation: IPX TIMEOUT=(Ti * Y) + Z (where Ti = ticks to get to destination server).
!Z	Number. Valid range is 1-499; if 0 or greater than 499, set to default (4).	IPX TimeOutShiftFactor. This NDS client tunable parameter is used to add additional delay for the IPX timeout. This is the first IPX command to change if you want to increase the timeout. It is used in the equation: IPX TIMEOUT=(Ti * Y) + Z (where Ti = ticks to get to destination server).

