



IBM Tivoli Training Tivoli Storage Manager 5.5

Preventing backup failures with Include- Exclude processing

Tivoli. software



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Slide 1

Welcome to the IBM Education Assistant training for IBM Tivoli Storage Manager version 5.5. This module covers the prevention of backup failures with include-exclude processing.

Objectives

- Upon completion of this module, you should be able to:
- Describe how to prevent backup failures with include-exclude statements.
- Explain the include-exclude process.

Slide 2 Objectives

Upon completion of this module, you should be able to describe how to prevent backup failures with include-exclude statements and explain the include-exclude process.

Preventing backup failures

ANS1311E ANS1329S ANR0522W

Server out of data storage space during backup

- Data reduction; only back up necessary files
- Automate storage pool management (expiration, migration, and reclamation)
- Allocate additional space to the storage pool
- Allocate more scratch tapes

Slide 3 Preventing Backup Failures

Common error messages seen for backup failures, are ANS1311E, ANS1329S, and ANR0522W. These are for Server out of data storage space during backup.

Various issues such as lack of storage pool space, lack of tapes, hardware problems or configuration problems can cause these messages .

To prevent the Server out of data storage space errors, consider the following actions:

- Data reduction; only back up the necessary files
- Automate storage pool management such as expiration, migration, and reclamation
- Allocate additional space to the storage pool
- Allocate more scratch tapes

This IBM Education Assistant module covers the prevention of backup failures with include-exclude processing, or data reduction.

Include-Exclude processing

Example of a
dsm.opt file

```

NODENAME          client
PASSWORDACCESS    GENERATE
EXCLUDE.BACKUP    "*:\microsoft uam volume\...\*"
EXCLUDE.BACKUP    "*:\microsoft uam volume\...\*"
EXCLUDE.BACKUP    "*:\...\EA DATA. SF"
EXCLUDE.BACKUP    "*:\IBMBIO.COM"
EXCLUDE.BACKUP    "*:\IBMDOS.COM"
EXCLUDE.BACKUP    "*:\IO.SYS"
EXCLUDE.BACKUP    "*:\...\system32\config\...\*"
EXCLUDE.BACKUP    "*:\...\system32\Perf11b*.dat"
EXCLUDE.BACKUP    "*:\...\system32\dhcp\...\*"
INCLUDE.BACKUP    "*:\...\system32\dhcp\backup\...\*"
EXCLUDE.BACKUP    "*:\...\system32\dns\...\*"
INCLUDE.BACKUP    "*:\...\system32\dns\backup\...\*"
EXCLUDE.ARCHIVE   "*:\microsoft uam volume\...\*"
EXCLUDE.ARCHIVE   "*:\microsoft uam volume\...\*"
EXCLUDE.ARCHIVE   "*:\...\EA DATA. SF"
EXCLUDE.ARCHIVE   "*:\IBMBIO.COM"
EXCLUDE.ARCHIVE   "*:\IBMDOS.COM"
EXCLUDE.ARCHIVE   "*:\IO.SYS"
EXCLUDE.ARCHIVE   "*:\...\system32\config\...\*"
EXCLUDE.ARCHIVE   "*:\...\system32\Perf11b*.dat"
EXCLUDE.ARCHIVE   "*:\...\system32\dhcp\...\*"
INCLUDE.ARCHIVE   "*:\...\system32\dhcp\backup\...\*"
EXCLUDE.ARCHIVE   "*:\...\system32\dns\...\*"
INCLUDE.ARCHIVE   "*:\...\system32\dns\backup\...\*"
EXCLUDE.DIR       "*:\System Volume Information"
EXCLUDE.DIR       "*:\...\Temporary Internet Files"
EXCLUDE.DIR       "*:\Recycled"
EXCLUDE.DIR       "*:\Recycler"
EXCLUDE.DIR       "*:\$Recycle.Bin"
TCPSEVERADDRESS   127.0.0.1
  
```

Slide 4 Include-Exclude Processing

One way to ensure that there is sufficient storage pool space for backups is to reduce the amount being backed up. With the incremental forever methodology, Tivoli Storage Manager only backs up changed data, but that can still be a significant amount. By adding include and exclude statements to the client's option file, you can exclude noncritical files and directories from backups and archives.

The exclude list in the options file can be overridden by the include-exclude options on the backup or archive command line.

This is an example of include and exclude statements in a client's option file.

Include-Exclude processing rules

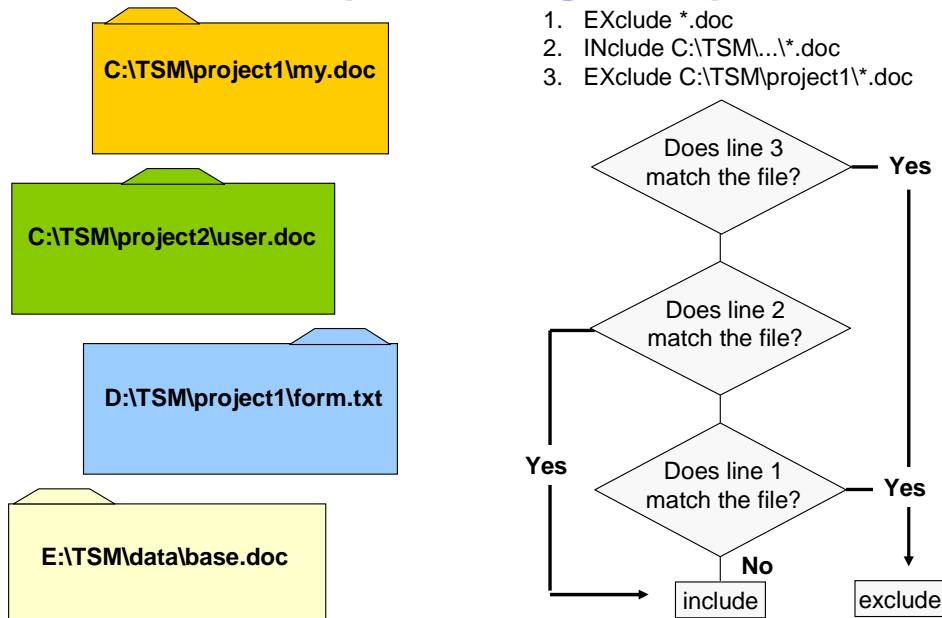


Slide 5 Include-Exclude Processing Rules

The three rules to remember for how Tivoli Storage Manager uses the include-exclude list to process client files, are:

- 1) The list is read from the bottom up.
- 2) Tivoli Storage Manager stops when it makes a match.
- 3) Objects not excluded are included.

Include-Exclude processing example



Slide 6 Include-Exclude Processing Example

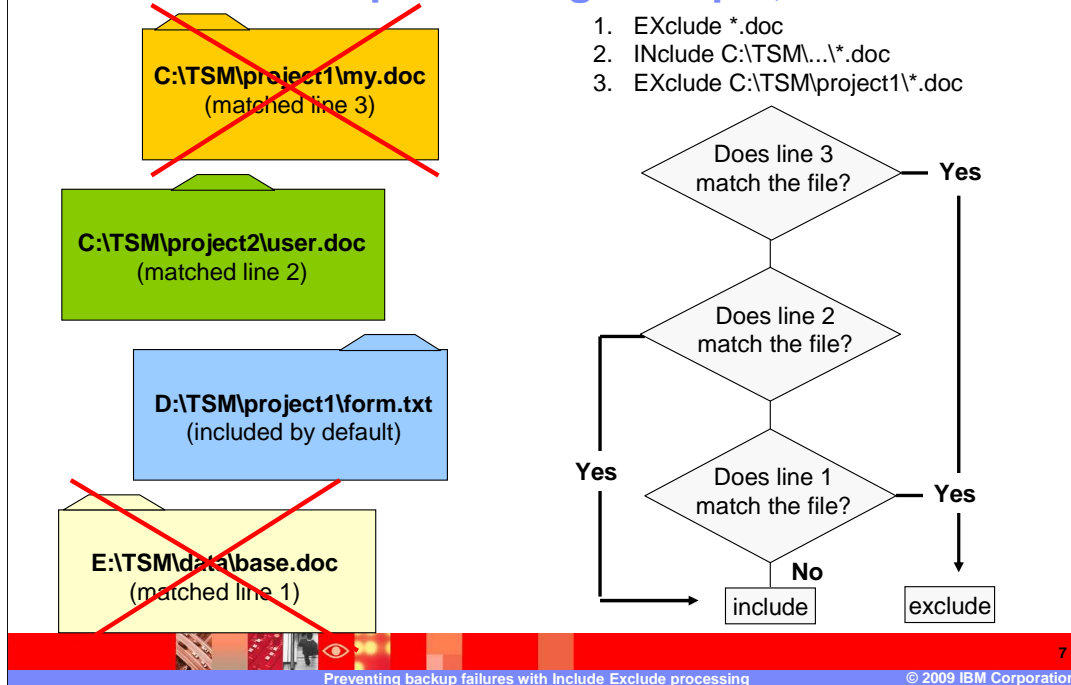
The include-exclude process is a bottom up process in that the last include-exclude statement is checked first. When the file matches the statement, exclude processing ends for that file.

Use the flowchart to determine whether the files on the left will be included or excluded from processing

according to the include-exclude processing rules.

When commands are shown in mixed case, the capitalized letters are the shortcuts. The shortcut for include is I N and exclude is E X.

Include-Exclude processing example, continued



Slide 7 Include-Exclude Processing Example, continued

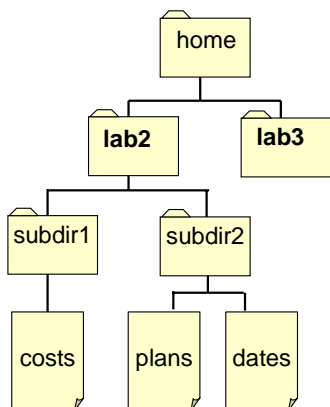
The first file, C:\TSM\project1\my.doc matched on line 3 and the processing stopped; it is excluded.

The second file, C:\TSM\project2\user.doc matched line 2 and the processing stopped; it is included.

The third file, D:\TSM\project1\form.txt is included by default, because if it is not excluded, it is included.

The last file, E:\TSM\data\base.doc matched line 1; it is excluded.

Exclude directories from backup



The Tivoli Storage Manager backup-archive client builds an internal traverse tree before performing a backup.

The **EXCLUDE.DIR** statement excludes a directory structure from the traverse tree. It prevents directories and directory attributes from being backed up.

Example 1 – from dsm.sys

```
Include /home/lab2/subdir2
Exclude.dir /home/lab2
Include /home/lab2/subdir1
```

Example 2 – Command-line command

```
dsmc> selective -subdir=yes /home/*
dsmc> selective /home/lab2/subdir1/*
```

Example 3 – from dsm.opt

```
Exclude.dir c:\home\lab2\subdir1
```

Slide 8 Exclude Directories from Backup

Exclude.file, which can be abbreviated to exclude, excludes files from backup.

The exclude.dir statement excludes a directory and directory attributes from backup and from being traversed during incremental backup. A directory is traversed even if all the files from that directory are excluded, unless exclude.dir is specified.

If a directory structure is excluded using exclude.dir, subdirectories in the excluded directory tree are not eligible for backup. Any include statement that includes part of an excluded directory structure is ignored at backup time.

The Backup of Excluded Directories.

Even though a directory structure is excluded using the new exclude.dir statement, subdirectories and files within the excluded directory structure can be explicitly backed up.

The exclude statement goes in the client user option file dsm.opt on single user Windows® Tivoli Storage Manager clients and in the include-exclude file dsm.sys on UNIX® clients.

Using the graphic on the left side of the slide, consider example 1:

```
Include /home/lab2/subdir2
```

```
Exclude.dir /home/lab2
```

```
Include /home/lab2/subdir1
```

In this example, the include statement for the subdir2 and subdir1 directory is ignored when an incremental backup is performed. This is because the subdirectory has been excluded using an exclude.dir statement.

Using the same graphic, consider example 2:

You issue the command: **selective -subdir=yes /home/***

This selective backup command backs up all files, except files in the excluded directory (/home/lab2). This is because the exclude.dir statement is honored for subdirectories.

You issue the command: **selective /home/lab2/subdir1/***

This selective backup command backs up files in the /home/lab2/subdir1 directory. This is an explicit backup of an excluded directory that overrides the exclude.dir statement.

If you use the exclude.dir c:\home\lab2\subdir1 statement, as in example 3, what will happen to the costs file? It is excluded. What will happen to the plans file? It is included, and what will happen to the dates file? It is also included.

Compression, encryption, and adaptive subfile backup processing

Tivoli Storage Manager processes exclude.dir and other include-exclude statements first.

Tivoli Storage Manager then considers:

- ▶ include.compression
- ▶ include.encrypt
- ▶ include.subfile

For example, consider the following include-exclude list:

```
exclude c:\lab\file.txt
include.compression c:\lab\file.txt
include.encrypt c:\lab\file.txt
include.subfile c:\lab\file.txt
```

Slide 9 Compression, Encryption, and Adaptive Subfile Backup Processing

The compression option compresses files before they are sent to the server.

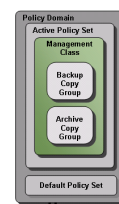
You can encrypt the data that is sent to the server during a backup or archive operation using standard encryption.

Adaptive subfile backup allows you to perform a backup over a network device with limited bandwidth, such as a modem. An adaptive subfile backup sends only changed portions of a file to the server during successive backup operations instead of sending the entire file.

For the example shown here, Tivoli Storage Manager examines the exclude c:\lab\file.txt statement first and determines that it is excluded from backup processing and is, therefore, not a candidate for compression, encryption, or adaptive subfile backup processing.

Identify files to be included or excluded from backup

Tivoli Storage
Manager server



policy

dsm.opt
file

You can assign a management class for a file or file group by using an **INCLUDE** statement in your client options file.

For example, to associate all the files in the costs directory with a management class named *project*, you would enter:

```
Include c:\TSM\project2\costs\* project
```

Slide 10 Identify Files to Be Included or Excluded from Backup

The include-exclude list allows you to establish files that are to be included in or excluded from backup processing. The include statement is used for two purposes. One is to specify exceptions to the exclude list. The other is to associate a management class with a file or group of files. The include statement is also used during archive to determine the management class, while the exclude statement is not checked during the archive processing.

Unless you have the exclude.dir statement, directory type files are always included during the backup, even when all the files within the directory are excluded.

You can assign a management class for a file or file group by using an include statement in your client options file.

For example, to associate all the files in the costs directory with a management class named *project*,

you would enter: **Include c:\TSM\project2\costs* project**

The include-exclude list uses metacharacters to select files to be included or excluded.

Some metacharacters differ depending on the client platform. These metacharacters allow you to specify wildcard processing. The metacharacters can also be used in the command line to specify the file requirements on most commands.

Metacharacters

Character	Function	Example
?	Match only one character	us?.doc
*	Match any characters	u*.doc
\...	Match any directory for Windows	\...\usr.doc
/...	Match any directory for UNIX	/.../usr.doc

Slide 11 **Metacharacters**

This chart displays examples of a few metacharacters. If you want to match one and only one character, use the question mark symbol.

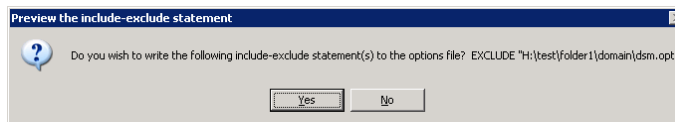
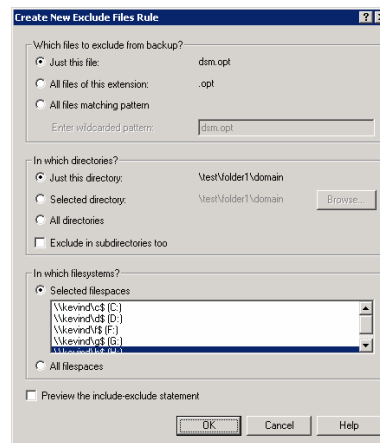
In this example, all documents with three letter names beginning with the letters U and S will be matched.

If you want to match any number of characters, use the asterisk. In this example, all documents starting with the letter U will be matched.

When using metacharacters to match a directory path, use slash, dot, dot, dot, slash. That would be a forward slash for UNIX and a back slash for Windows.

Include-Exclude wizard

- The wizard helps users create an include-exclude statement that is intuitive and easy to use.
- The exclude wizard window opens for already included files.
- The include wizard window opens for excluded files.
- The files section is disabled for directory objects.
- The **Preview the include-exclude statement** check box should be selected to view excluded files.



Slide 12 Include-Exclude Wizard


The wizard helps you create an include-exclude statement that is intuitive and easy to use.

The exclude wizard window opens for already included files and the include wizard window opens for excluded files.

The files section is disabled, however, for directory objects.

To preview excluded files, the include-exclude statement check box should be selected.


Include-Exclude in the Backup-Archive tree

The screenshot shows the IBM Tivoli Storage Manager - [Backup] application window. The main pane displays a backup-archive tree with various directories. The directory 'oldcritical' is highlighted with a red 'X' icon, indicating it is excluded. A callout box points to the 'oldcritical' directory with the text: "Excluded directories appear on the backup-archive tree with this icon: ". Another callout box points to the 'Include' and 'Exclude' buttons in the toolbar, with the text: "Exclude Include". The status bar at the bottom of the window displays: "Directory 'oldcritical' is excluded. For Help, press F1".

IBM Tivoli Storage Manager - [Backup]

File Edit Actions Utilities View Window Help

Exclude Include

Excluded directories appear on the backup-archive tree with this icon: 

Directory 'oldcritical' is excluded
For Help, press F1

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Slide 13 Include-Exclude in the Backup-Archive Tree

You can include or exclude a file in the backup-archive tree, by selecting the file, then clicking the include or exclude button.

Include-Exclude Exercise

Domain: /usr/ /home/

1. Exclude /home/admin/*.*
2. Exclude /home/nobody/.../*
3. Exclude /usr/lwp/*
4. Include /usr/lwp/resume.*

Included or Excluded?

_____ /home/admin/bob.log
 _____ /home/admin/fileone
 _____ /home/nobody/data/file1.dat
 _____ /usr/lwp/resume.ibm
 _____ /usr/lwp/data/file1.dat

The list is read
from the
BOTTOM UP.



If it is not
EXCLUDED,
it is
INCLUDED.

Slide 14 Include-Exclude Exercise

Now for your quiz.

Determine if the files specified will be selected for backup based upon the include-exclude list provided. Remember, if it is not excluded, it is included.

Is the first example, **/home/admin/bob.log** included or excluded?

It does not match line 4; it does not match line 3; and it does not match line 2. It is excluded, because it matched line 1.

Is the second example, **/home/admin/fileone** included or excluded?

Does it match any line? No. Therefore it is included, because it was not excluded.

Is the third example, **/home/nobody/data/file1.dat** included or excluded?

It does not match line 4 or line 3. It is excluded, because it matched line 2.

Is the fourth example, **/usr/lwp/resume.ibm** included or excluded?

It is included, because it matched line 4.

Is the fifth example, **/usr/lwp/data/file1.dat** included or excluded?

It does not match line 4, but it does match line 3, therefore it is excluded.

Training roadmap for *IBM Tivoli Storage Manager*

http://www.ibm.com/software/tivoli/education/edu_prd.html



Slide 15 Training Roadmap for *IBM Tivoli Storage Manager*

If you go to www.ibm.com/software/tivoli/education/edu_prd.html this will take you to the training page, where you can access the training list for Tivoli Storage Manager version 5.5.

Summary

You should now be able to:

- Describe how to prevent backup failures with include-exclude statements.
- Explain the include-exclude process.

Slide 16 **Summary**

You should now be able to describe how to prevent backup failures with include-exclude statements and explain the include-exclude process.

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