

Module 5: NetWorker Media Management

Upon completion of this module, you should be able to:

- Describe the function of a NetWorker pool.
- Configure a label template resource for a pool.
- Configure a NetWorker pool to filter specific save sets to specific sets of volumes.
- Label a volume into a pool.



This module focuses on NetWorker media pools. We look at how NetWorker uses pool attributes to direct save sets to specific sets of volumes. Next, we look at creating a label template and media pool resource, and labeling a volume into a pool.

Module 5: NetWorker Media Management

Lesson 1: NetWorker Pools Overview

During this lesson the following topics are covered:

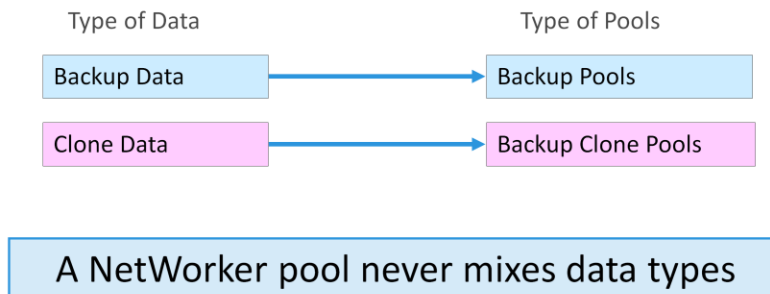
- Using NetWorker pools
- Pool selection criteria



This lesson covers the use of NetWorker media pools to filter save sets to a set of volumes.

NetWorker Pools

- Used to determine which set of volumes a save set should be written to.
- Filter save sets to a set of volumes based on save set characteristics.
- Highly configurable.



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A **pool** is a NetWorker resource that represents a set of volumes. A volume is associated with a pool when it is labeled.

Pools automatically separate data by data type. As illustrated in the slide, there are two types of pools – Backup and Backup Clone pool – that are used by NetWorker to segregate one type of data from another. For example, a save set being backed up can only be written to a volume belonging to a Backup pool, and when a save set is cloned, the new clone copy of the save set can only be written to a volume in a Backup Clone pool.

Backup pools are used by the NetWorker server to match a save set being backed up to a set of volumes, based on the save set characteristics.

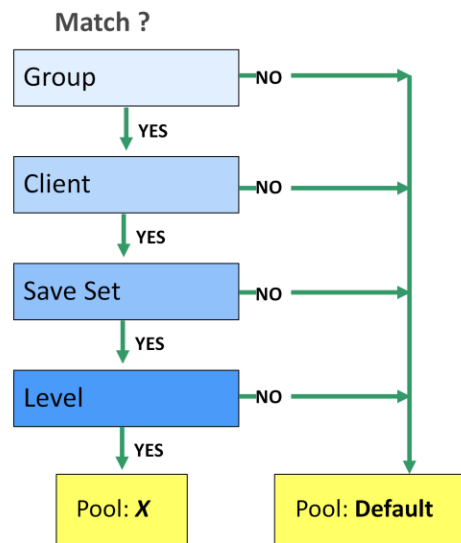
The following aspects of pool management are discussed on the following pages:

- Pool selection criteria
- Pool attributes
- Creating a label template
- Creating a pool

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Pool Selection Criteria

- Pools have four selection criteria (resource attributes).
- The NetWorker server compares save set characteristics to the set of attributes of each pool and directs the save stream to a volume in the pool that is the best match.
- If none of your defined pools match the backup parameters, the **Default** pool is used as a last resort.



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When determining which pool of volumes to write a save set to, NetWorker first compares certain characteristics of the save set to corresponding attributes of all configured backup pools. These characteristics are NetWorker group name, the name of the client generating the save set, the name of the save set, and the level of backup being performed. NetWorker attempts to match these criteria to pool attributes in the order shown in the slide.

If a save set matches all criteria of more than one pool, then the order of evaluation dictates which pool is used. A match on **Groups** takes precedence over a match on **Clients**, a match on **Clients** takes precedence over a match on **Save sets**, and a match on **Save sets** takes precedence over a match on **Level**.

If a save set characteristic explicitly matches one pool (the characteristic matches the pool attribute value) and implicitly matches another pool (the pool attribute value is empty), the pool explicitly matched is used.

If the save set characteristics do not match all specified criteria within a pool resource, the save set cannot be sent to that pool. If there is no pool that has one or more attribute values that explicitly match the save set characteristics, NetWorker sends the save stream to a volume in the **Default** pool. The **Default** pool has no values for any of the **Groups**, **Clients**, **Save sets**, or **Levels** attributes, thereby implicitly matching the characteristics of all save streams. The default pool is typically used as a pool of last resort and it is recommended that it not be used for production backups. It is better to specifically configure pools for the data that they will hold and leave the default pool for troubleshooting and testing only.

Note: The matching of save set characteristics to pool characteristics is done only when backups are performed. Clone data must be explicitly directed to a specific Backup Clone pool.

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Uses of Pools

Why should you use pools other than **Default**?

- You want full save sets to be retained longer than incremental save sets.
- You want extremely sensitive (secure) data from a particular client to be written to its own set of volumes.
- You want to separate file system data from database data.
- You do not want one client's data multiplexed with data from other clients to maximize recovery speed.
- You want to direct backups to a specific device.

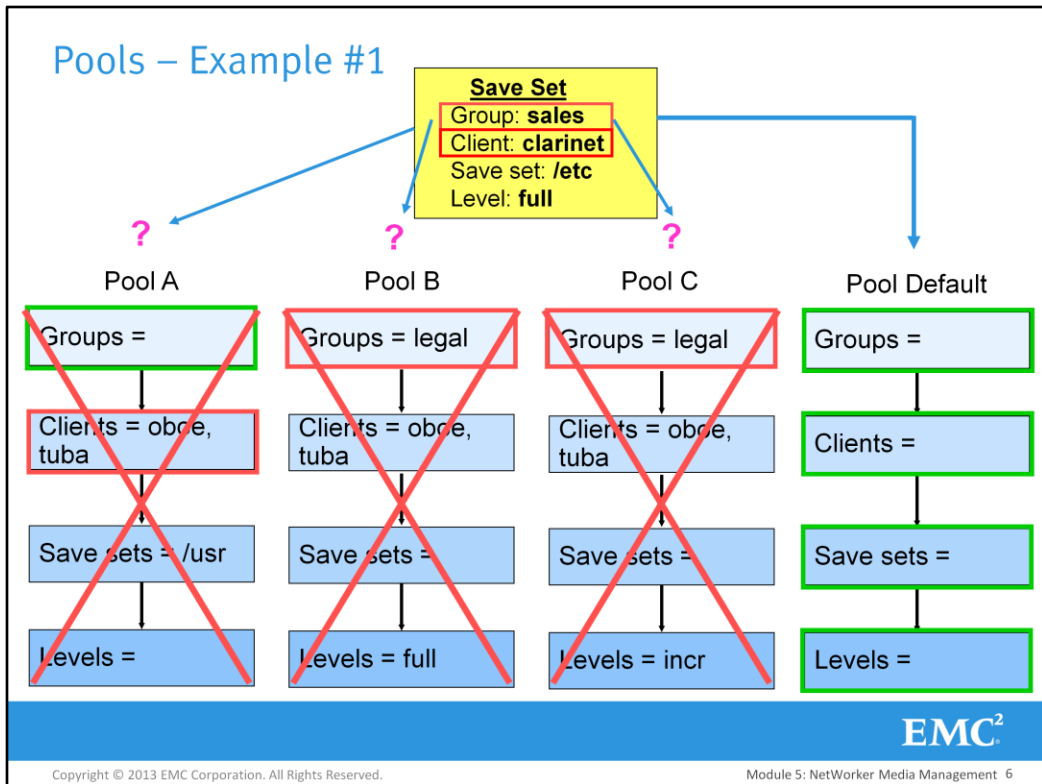
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Pools, other than **Default**, should be used when you want to store a particular type of data on a different set of volumes from other types of data. Suggested uses of pools are listed on the slide.

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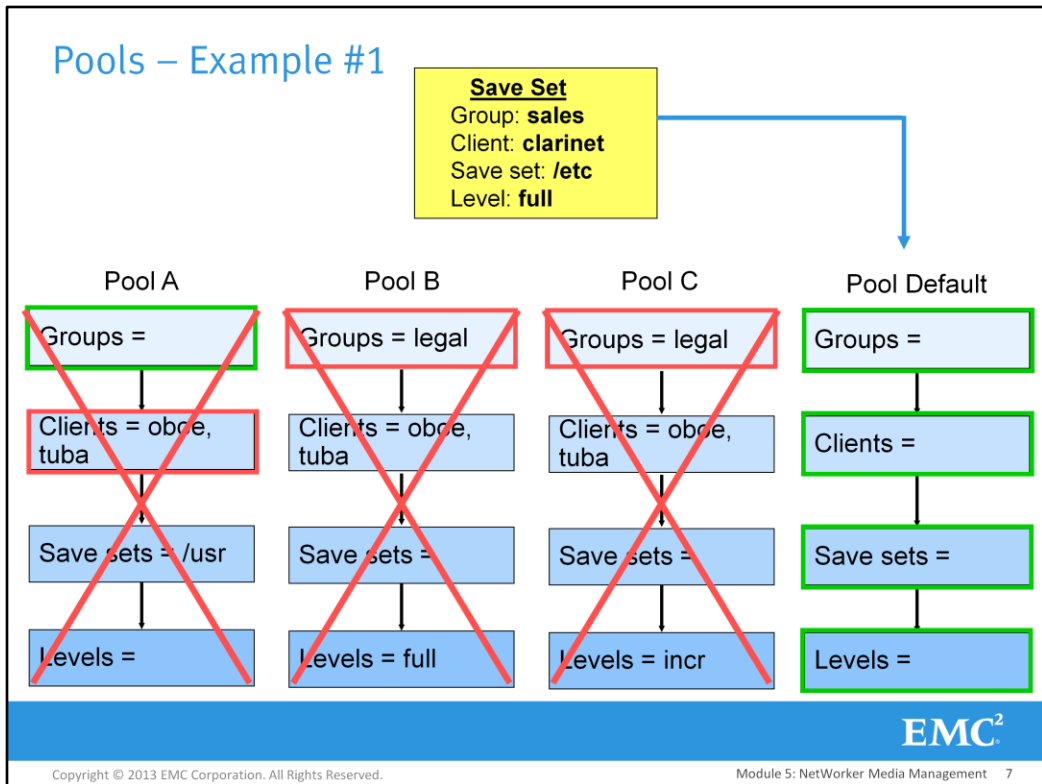
This slide, as well as the following two slides, displays several pools and their resource attribute values. The slides demonstrate how the NetWorker server matches a save set to the appropriate pool.

In this example, the save set being backed up is from a client in the NetWorker group **sales**. This excludes it from **Pool B** and **Pool C** because they accept only save sets from group **legal**. The client generating the save set is **clarinet**, which excludes the save set from **Pool A** which only accepts save sets from client **oboe** or **tuba**.

The only pool remaining is **Default**, which never excludes any save sets and therefore can accept any save set not explicitly matching another pool.

Note: If values are specified for multiple attributes, **all** of those attributes must match the corresponding save set characteristics. This is referred to as a “logical AND.”

If multiple values are specified for a single attribute, **any one** of those values must match the corresponding save set characteristic. This is referred to as a “logical OR.”



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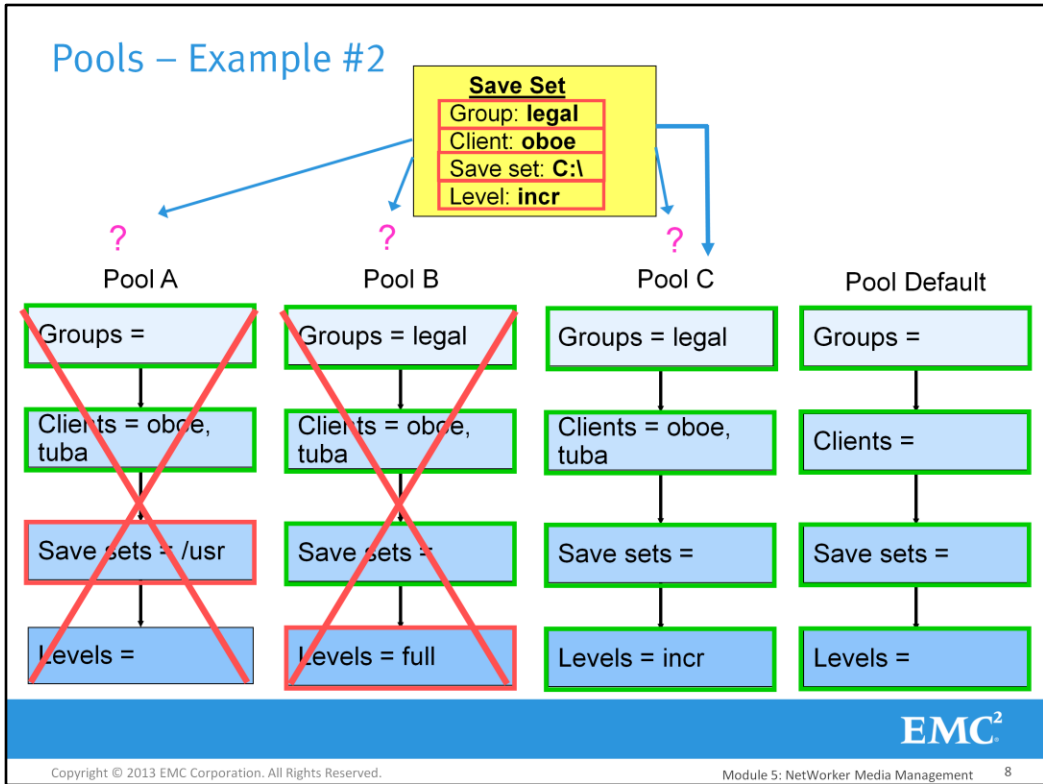
In this example, the save set being backed up is from a client in the NetWorker group **sales**. This excludes it from **Pool B** and **Pool C** because they accept only save sets from group **legal**. The client generating the save set is **clarinet**, which excludes the save set from **Pool A** which only accepts save sets from client **oboe** or **tuba**.

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In this example, the save set is generated by a client in the group `legal`. All the pools match this characteristic, although **Pool A** and **Default** match implicitly instead of explicitly.

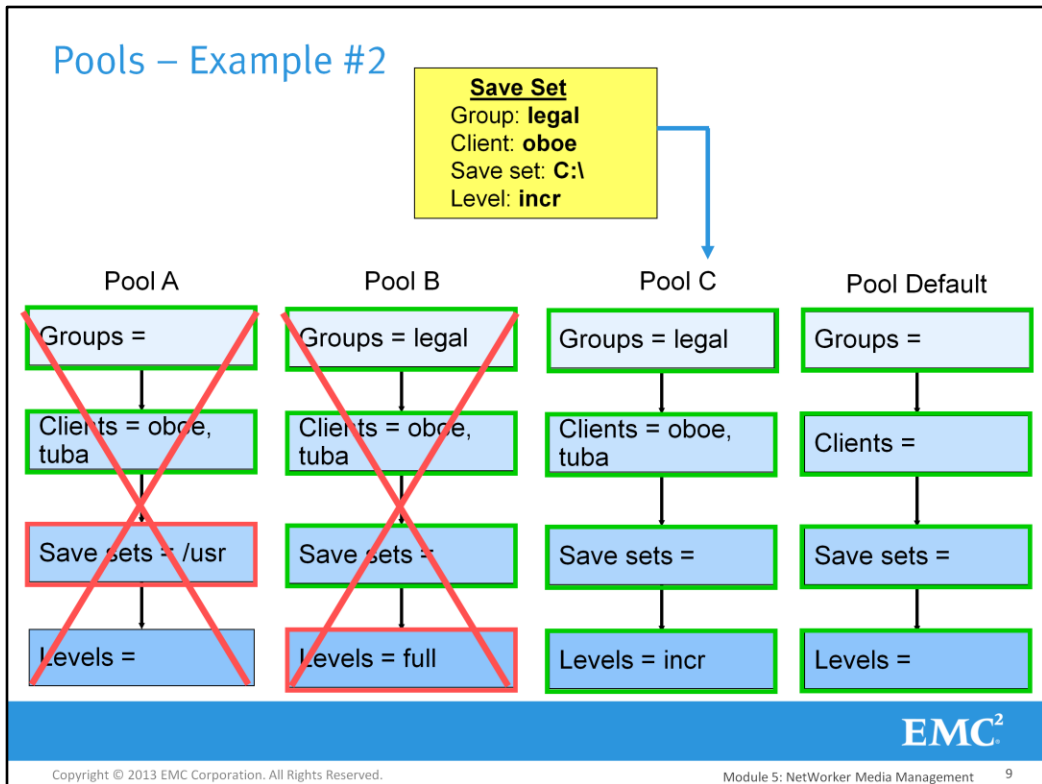
The client generating the save set is `oboe`, which also matches all the pools.

The save set name is `C:\`, causing it to be excluded from **Pool A** which only accepts save sets named `/usr`.

Finally, the backup level of `incr` causes the save set to be excluded from **Pool B**, which only accepts **Full** level save sets.

This leaves **Pool C** as being the best match for the save set because it explicitly matches at least one characteristic while the **Default** pool only implicitly matches all characteristics. An explicit match always takes priority over an implicit match.

(This slide for instructor slides only)



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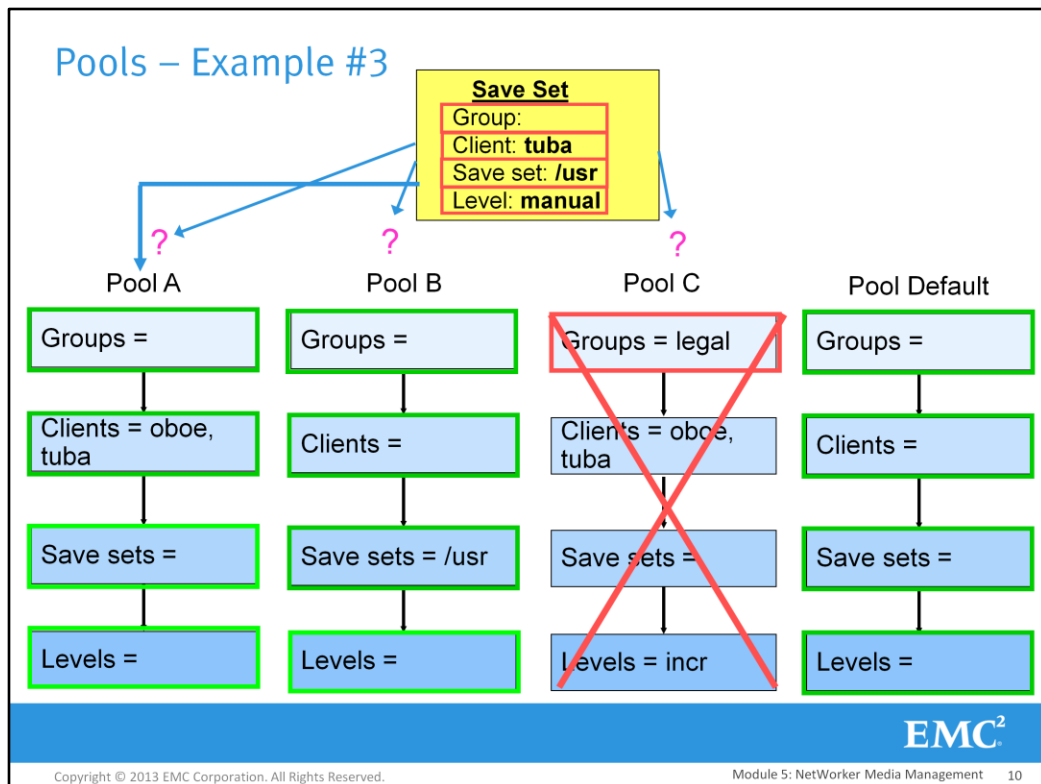
The client generating the save set is **oboe**, which also matches all the pools.

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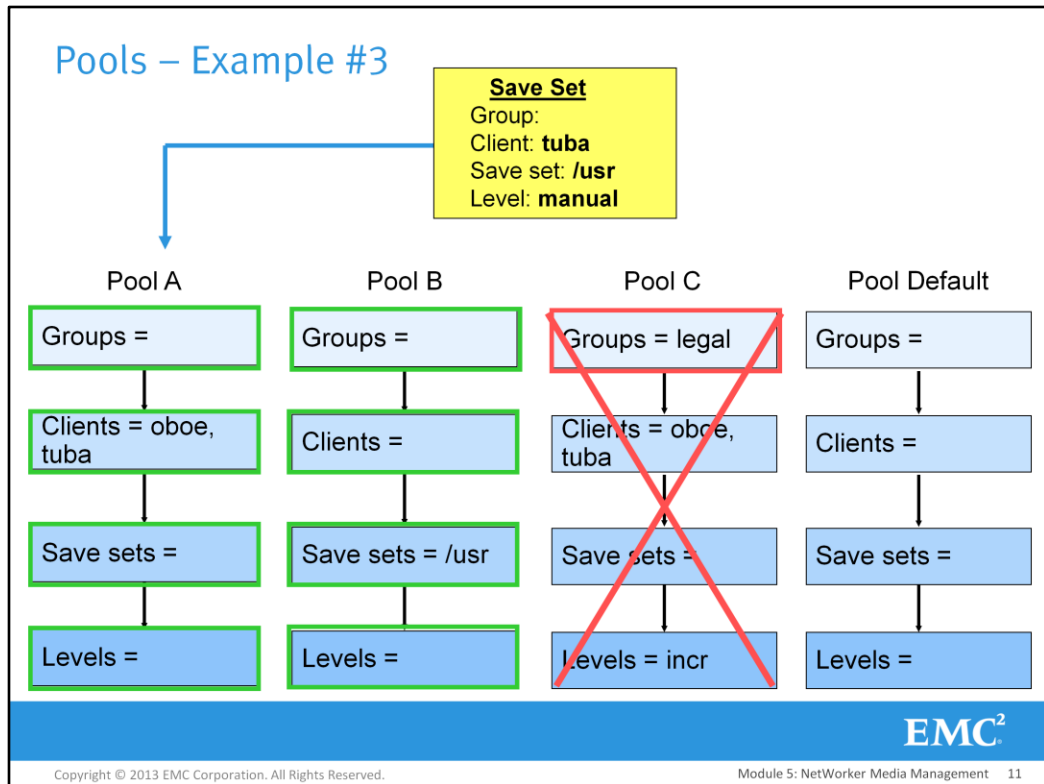
In this example, the save set being backed up has no Group characteristic, meaning the backup is a client-initiated (manual) backup. (If `savegrp` is not used to perform the backup, the save set has no group value). This excludes it from any pool containing a value in its **Group** attribute. This eliminates **Pool C**, which accepts save sets only from the **legal** group. **Pool A**, **Pool B**, and **Default** all implicitly match the group since they have no value for their **Group** attribute.

The client generating the save set is **tuba**, which explicitly matches **Pool A**, and implicitly matches **Pool B** and **Default**.

The save set name is `/usr`, which explicitly matches **Pool B**, and implicitly matches **Pool A** and **Default**. Finally, **Pool A**, **Pool B**, and **Default** implicitly match any level.

The **Default** pool will not be used because it is only used if no other pool exactly matches the save set. To choose between **Pool A** and **Pool B**, the characteristics matched by each pool is the deciding factor. The **Clients** characteristic matched by **Pool A** has a higher priority than the **Save sets** characteristic matched by **Pool B**. Thus, the save set is directed to a volume belonging to **Pool A**.

(This slide for instructor slides only)



In this example, the save set being backed up has no Group characteristic, meaning the backup is a client-initiated (manual) backup. (If `savegrp` is not used to perform the backup, the save set has no group value). This excludes it from any pool containing a value in its **Group** attribute. This eliminates **Pool C**, which accepts save sets only from the **legal** group. **Pool A**, **Pool B**, and **Default** all implicitly match the group since they have no value for their **Group** attribute.

The client generating the save set is **tuba**, which explicitly matches **Pool A**, and implicitly matches **Pool B** and **Default**.

The save set name is `/usr`, which explicitly matches **Pool B**, and implicitly matches **Pool A** and **Default**. Finally, **Pool A**, **Pool B**, and **Default** implicitly match any level.

The **Default** pool will not be used because it is only used if no other pool exactly matches the save set. To choose between **Pool A** and **Pool B**, the characteristics matched by each pool is the deciding factor. The **Clients** characteristic matched by **Pool A** has a higher priority than the **Save sets** characteristic matched by **Pool B**. Thus, the save set is directed to a volume belonging to **Pool A**.

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Module 5: NetWorker Media Management

Lesson 1 Summary

During this lesson the following topics were covered:

- Using NetWorker pools
- Pool selection criteria

The EMC logo is located in the bottom right corner of the slide. It consists of the letters "EMC" in a bold, white, sans-serif font, with a small superscript "2" to the right of the "C". The logo is set against a solid blue background that spans the width of the slide.

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This lesson covered the use of NetWorker media pools to filter save sets to a set of volumes.

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Lesson 2: Configuring a Pool Resource

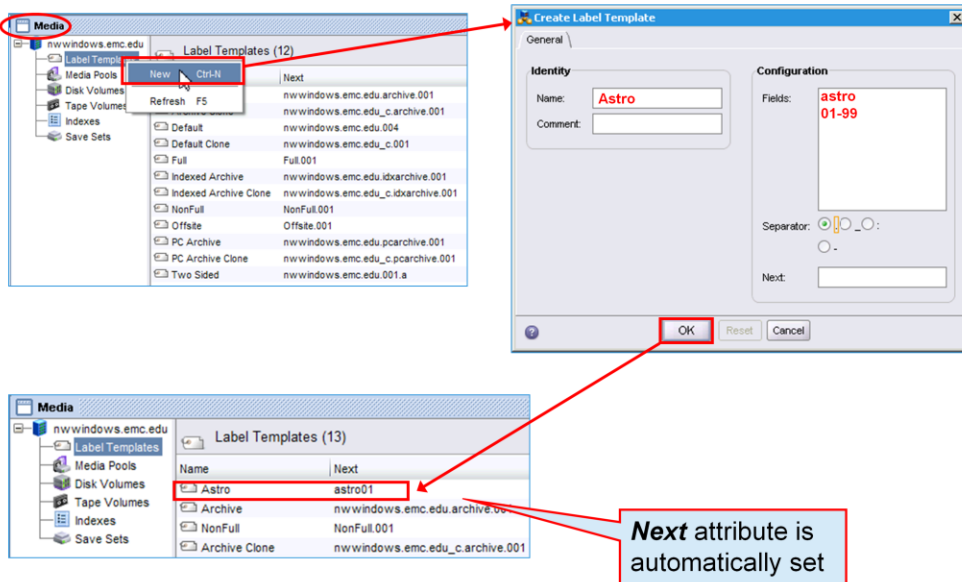
During this lesson the following topics are covered:

- Configuring a label template resource
- Configuring a pool resource
- Labeling a volume
- Overriding pool criteria for a client



This lesson covers how to configure label template and pool resources, what happens when labeling a volume, and how to override pool criteria for a specific client.

NetWorker Label Template Resource



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The first step in configuring a new pool is to create a NetWorker label template resource. The label template is used by the pool to determine the volume name to assign to a volume being labeled into the pool.

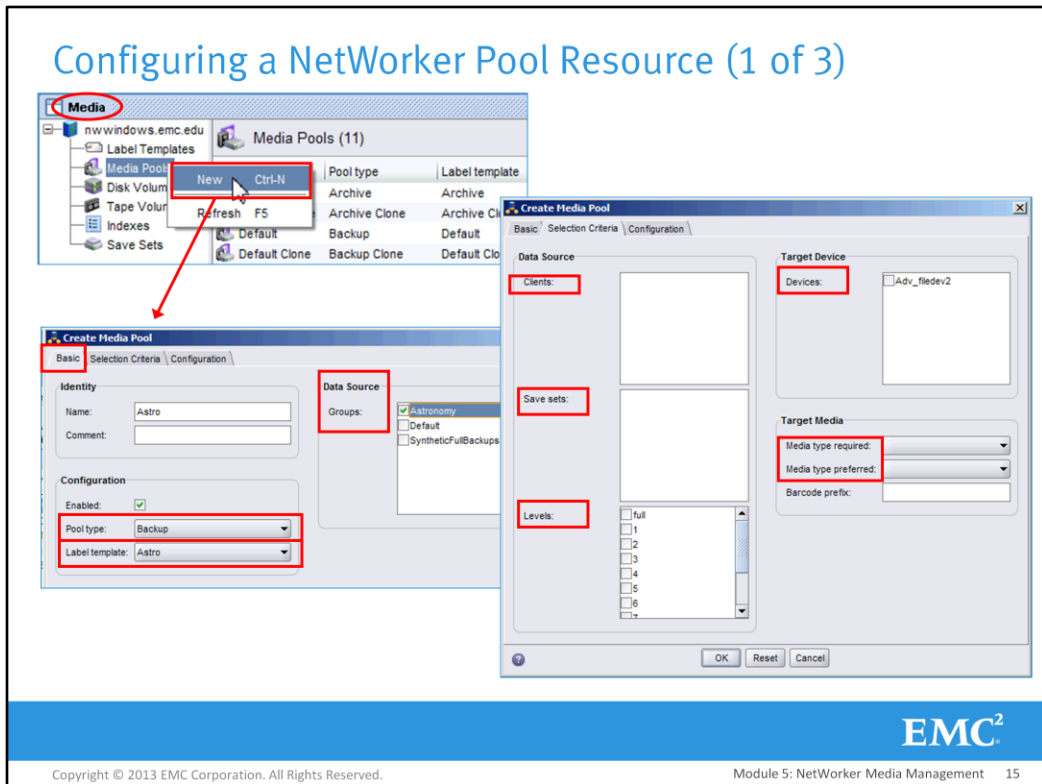
Ideally, each pool should have its own unique label template. However, more than one pool can use the same label template. If a volume being labeled resides in an autochanger that is configured to “match barcodes labels”, the label template is ignored and the volume name will be the same as its barcode value.

Attribute	Function
Name	The name of the label template. This is referenced in the pool resource.
Fields	The alphanumeric text components that make up the label values. If a field value contains a hyphen(-), it is considered a range. Ranges must have the same number of characters on each side of the hyphen. For example, 01-99 is the range 01, 02, 03, ..., 99.
Separator	The character to separate the component fields of the label template. Valid characters are period(.), hyphen(-), underscore(_), and colon (:).
Next	The volume name that will be used for the next volume labeled into the pool. This field is automatically populated.

Table 5-1: Label Template Attributes

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Configuring a NetWorker Pool Resource (1 of 3)



The NetWorker Media pool resource is used to configure a pool.

On the **Basic** tab, select the appropriate pool type and a matching label template. For the Data Source **Group** attribute, select the backup groups that are allowed to send data to the pool.

To specify additional criteria, include values for the **Clients**, **Save sets** and/or **Levels** attributes on the **Selection Criteria** tab.

Note that leaving a **Data Source** attribute blank means that all save sets will match the pool for that characteristic. Specifying multiple values for an attribute means any one of the values must match (logical “or”). Specifying values for multiple attributes requires that each attribute match (logical “and”).

Selecting one or more **devices** specifies the devices on which volumes in the pool may be mounted. This results in the pool always using only those devices. When a value is specified for **Media type required**, it is the only media type that can be labeled or written to in this pool. **Media type preferred** is used when a request is made for a writable volume. The preferred type will be considered first within a priority level.

Configuring a NetWorker Pool Resource (2 of 3)

The screenshot shows the 'Create Media Pool' configuration window with the 'Configuration' tab selected. The window is divided into several sections:

- Data Management:** Contains 'Max parallelism' (a numeric input field) and 'Auto media verify' (a checkbox).
- Configuration:** Contains 'Store index entries' (a checked checkbox) and 'Retention policy' (a dropdown menu).
- Volume Operations:** Contains 'Recycle from other pools' and 'Recycle to other pools' (both checkboxes), 'Recycle start' (a time input field), 'Recycle interval' (set to 24:00), 'Max volumes to recycle' (set to 200), and 'Recycle last start' (a time input field).
- WORM Configuration:** Contains 'WORM pool' and 'Create DLTWORM' (both checkboxes).
- AlphaStor Devices:** Contains 'Mount class' (set to 'default').

Red boxes highlight the 'Max parallelism' field, the 'Auto media verify' checkbox, the 'Store index entries' checkbox, and the 'Recycle from other pools' checkbox.

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On the **Configuration** tab, **Max parallelism** specifies the maximum number of simultaneous save streams that can be sent to a drive on which a volume from this pool is mounted. When the **Auto media verify** attribute is selected, the NetWorker server verifies data written to volumes from the pool. Verification occurs when either a volume becomes full or a volume becomes idle. Data is verified by repositioning the volume to read a portion of the data previously written to the media. The data read is compared to the original data written. Verification succeeds if there is a match. If verification fails, the volume is marked full.

Under Volume Operations, the **Recycle from other pools** attribute allows recyclable volumes from other pools to be relabeled into a different pool. The **Recycle to other pools** attribute allows recyclable volumes in the pool to be relabeled into a different pool. Both attributes are disabled by default.

When the **Store index entries** attribute is enabled (default setting), CFI entries are generated for save sets that are written to the pool. Specifying a **Retention policy** on the pool resource applies to save sets directed to the pool. NetWorker uses the longer of the pool retention policy or the client retention policy.

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Configuring a NetWorker Pool Resource (3 of 3)

The screenshot shows the 'Create Media Pool' window with the 'Configuration' tab selected. The 'Volume Operations' section is highlighted with a red box. The fields in this section are: 'Recycle start' (empty), 'Recycle interval' (24:00), 'Max volumes to recycle' (200), and 'Recycle last start' (empty). Other sections include 'Data Management' (Max parallelism, Auto media verify), 'Configuration' (Store index entries, Retention policy), 'WORM Configuration' (WORM pool, Create DLTWORM), and 'AlphaStor Devices' (Mount class).

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Automatically relabeling a recyclable volume allows for volumes to be relabeled outside of backup windows. Also, backup and clone operations can complete in potentially less time where appendable volumes are available at the time of the backup or clone.

Relabeling of eligible volumes in a pool can be scheduled to occur automatically using these attributes under Volume Operations:

- **Recycle start:** defines the time to start the automatic relabel process each day. By default, the automatic relabel process is not done.
- **Recycle interval:** defines the interval between two starts of automatic relabel processes.
- **Max volumes to recycle:** defines the maximum number of recyclable volumes that can be relabeled during each automatic relabel process.
- **Recycle last start:** this is the last time that scheduled automatic recycling was performed.

Note: For a complete list of pool and label template resource attributes, see the `nsr_pool` and `nsr_label` topics in the *EMC NetWorker Command Reference Guide* or the UNIX man pages. Also, please refer to the “Media pools” topic in the *EMC NetWorker Administration Guide*.

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Labeling a Volume

The screenshot displays the NetWorker Media Management interface. On the left, a tree view shows the 'Library: STK@3.0.0' selected. A context menu is open over the library, with the 'Label...' option highlighted. A red arrow points from this menu to the 'Label Library Media' dialog box on the right. The dialog box has a 'Slot Range' section with 'Slot' set to '1' and 'Volume' set to 'Pool'. Below this is a 'Slot List' with '1-12' selected. The 'Devices to use' section has 'Automatic Selection' selected. The 'Target Media Pool' is set to 'Default'. The 'Volume Label' and 'Bar Code Label' fields are empty. The 'Operation Options' section has 'Prompt to Overwrite Existing Label' checked and 'Allow Manual Recycle' unchecked. The 'OK' button is highlighted with a red box. A red arrow also points from the 'OK' button to a 'Pool: Default' section at the bottom left, which shows three tape icons labeled E01001L4, E01002L4, and E01003L4. In the background, a table lists volumes with their slot and barcode information.

Slot	Volume	Barcode
1	<unlabeled>	E01001
2	<unlabeled>	E01002
3	<unlabeled>	E01003
4	<unlabeled>	E01004
5	<unlabeled>	E01005
6	<unlabeled>	E01006
7	<unlabeled>	E01007
8	<unlabeled>	E01008
9	<unlabeled>	E01009
10	<unlabeled>	E01010
11	<unlabeled>	E01011
12	Cleaning Tap...	E01012

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A **volume** is a physical piece of media to which save sets are written. A volume must be labeled before NetWorker can write to it. During volume labeling, the NetWorker software writes a unique label on the volume.

The label contains information such as the volume name, the name of the pool to which the volume was assigned, and the block size to be used when writing to the volume.

During a backup, the NetWorker server matches a save set to the appropriate `nsrmmid` based on the save set attributes and the pool to which the volume belongs.

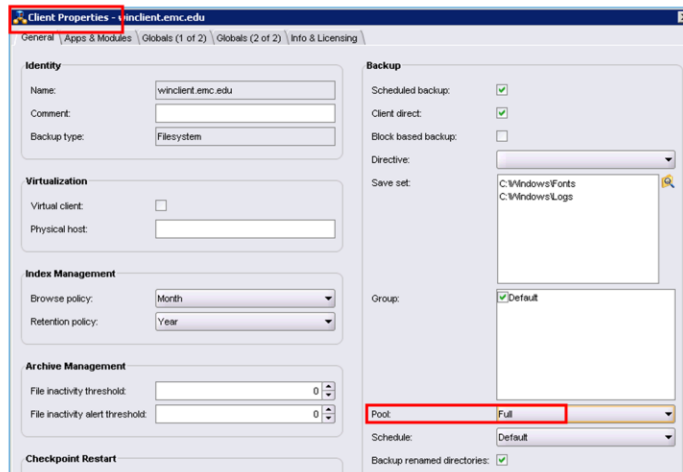
The following events happen when a volume is labeled.

1. The volume is named and a volume record is created in the media database. If any previous entry for the volume exists in the media database, it is deleted. Any existing data on the volume is effectively deleted.
2. The volume is assigned to a pool.
3. The label being written establishes the volume's block size, which is determined by the device's **Media type** attribute.

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Overriding Pool Criteria for a Client

- Specifying a pool on a client resource overrides all other pool criteria associated with the group or save set for the client.



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When a pool is specified for the **Pool** attribute of a client resource, NetWorker uses this media pool during scheduled backups of the save sets specified in the client. This selection overrides any other pool criteria associated with the group or save set for this client.

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Module 5: NetWorker Media Management

Lesson 2 Summary

During this lesson the following topics were covered:

- Configuring a label template resource
- Configuring a pool resource
- Labeling a volume
- Overriding pool criteria for a client



This lesson covered how to configure label template and pool resources, what happens when labeling a volume, and how to override pool criteria for a specific client.

Lab 5: Configure Pools and Label Templates



In this lab, we will configure a label template resource and then configure a pool resource.

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In this lab, you will:

- Create a label template resource.
- Create a pool resource.
- Perform a backup to verify the pool is properly configured.

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Module 5: Summary

Key points covered in this module include:

- Functions of NetWorker pools.
- Configuring a label template for a pool.
- Configuring a NetWorker pool.
- Labeling a volume into a pool.

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This module covered NetWorker label templates and media pools. We looked at how NetWorker uses pool attributes to direct save sets to specific sets of volumes, how to create a label template and media pool resource, and how to label a volume into a pool.