

**EMC NAS**  
**Access-Based Enumeration Support**  
Version 1

**Technical Note**

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## Introduction

With Microsoft® Windows Server™ 2003 Service Pack 1, Microsoft has included a new functionality called Access-based Enumeration (ABE).

ABE filters shared folders and files visible to a user based on that user's access rights, preventing the display of folders and files to which the user does not have full read access.

This was introduced for several reasons:

- ◆ Increase folder-level security
- ◆ Improve administrator productivity by reliably streamlining large directory structures for less-technically savvy users
- ◆ Provide a more seamless migration experience for users migrating to Windows servers.

Prior to the introduction of ABE from Microsoft, users had full visibility to the directory structure of an individual share regardless of the user's permissions within the directory structure. This full visibility into the directory structure created two problems within the NAS environment:

- ◆ Users had viewable access to directories and directory contents even with restricted permissions. Often directory names and filenames may present to the user a hint of the content, therefore creating a potential security risk within the network environment.
- ◆ As organizations grow, so does the directory hierarchy within a single file system. As the hierarchy gets more complicated, it takes more effort for individual users to identify content within the file system.

This document describes how ABE solves the security and administrative issues just described, as well as the usage model for the ABE feature in the context of EMC Celerra® hardware.

## Audience

This document is intended for EMC field personnel and customers interested in improving folder-level security and administration in a Windows environment. The content of this paper refers to ABE as it functions with the Celerra system. Additional information about the ABE feature can be found in Microsoft's *Access-based Enumeration White Paper*.

## Overview

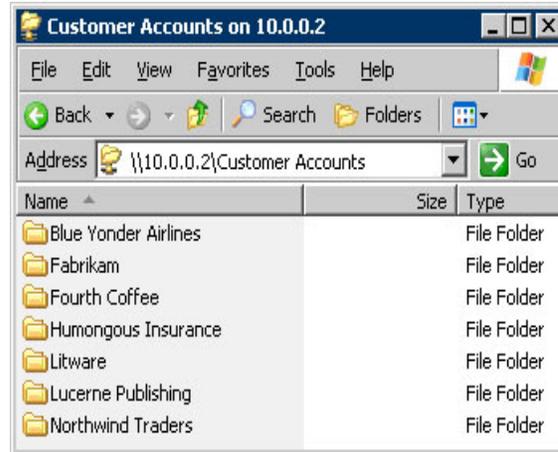
Access-based Enumeration is a feature delivered in Microsoft Windows Server 2003 Service Pack 1, which allows administrators to simplify file sharing in an organization with a large directory structure, as well as improve folder-level security within a Windows network.

As an organization grows, so does its data and the file structure that maintains the data with the organizations. The data structure is visible to the organization and poses the following problems:

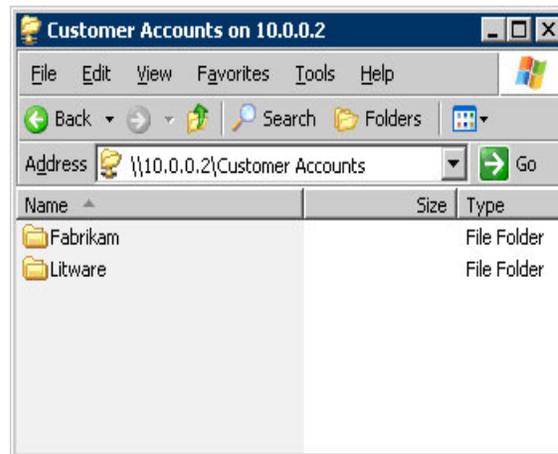
- ◆ All users that have visibility into the data structure, therefore this visibility can present a security risk. Even though users may not have permissions to read directories and files, they can view information such as the filename and the time it was created. This may present unintended access to information.
- ◆ All users typically have visibility into the shared view. Working within that shared view can become complex as the directory structure within the shared view develops into a complex hierarchy necessary to handle the business requirements.

The Celerra system is compliant with the Microsoft's ABE implementation shipped as part of Microsoft Windows Server 2003 Service Pack 1.

To illustrate the ABE functionality, Figure 1 on page 4 displays a view of a file system with ABE disabled. When ABE is enabled, an individual user will have a different view of the file system based on the access privileges (see Figure 2 on page 4).



**Figure 1. ABE disabled**



**Figure 2. ABE enabled**

ABE can be used as a strategy to hide the lost+found and .etc directories created as part of a multiprotocol file system. The lost+found and .etc directories can be granted administrative permissions only, therefore those directories will not be visible to Windows users.

## Configuring ABE

ABE management is simple; it can be either enabled or disabled on an individual share. Enabling ABE on a share will allow users to view and access folders based on permissions.

Microsoft provides a GUI and CLI tool to control ABE on a per-share basis. The GUI tool is specific to administration of local shares of a server, and therefore does not apply to Celerra-based shares. The CLI tool provided by Microsoft provides the ability to enable and disable the ABE feature on remote shares.

```
abecmd [/enable | /disable] [/server servername] {/all | sharename}
```

EMC® also provides a CLI-based tool to enable ABE remotely. This tool can be found on the Celerra Utilities disk shipped as part of the Celerra software.

The EMC tool has a syntax derived from the Microsoft tool, except for the additional option **/g** to query the ABE state of share or all share of a server.

```
emcabe [/e | /d | /g] [/t servername] [/a | /s sharename] [/h]
```

**/e** Enables ABE on specified share(s).

**/d** Disables ABE on specified share(s).

**/g** Gets ABE state of the specified share(s).

The **/e**, **/d**, **/g** options are mutually exclusive.

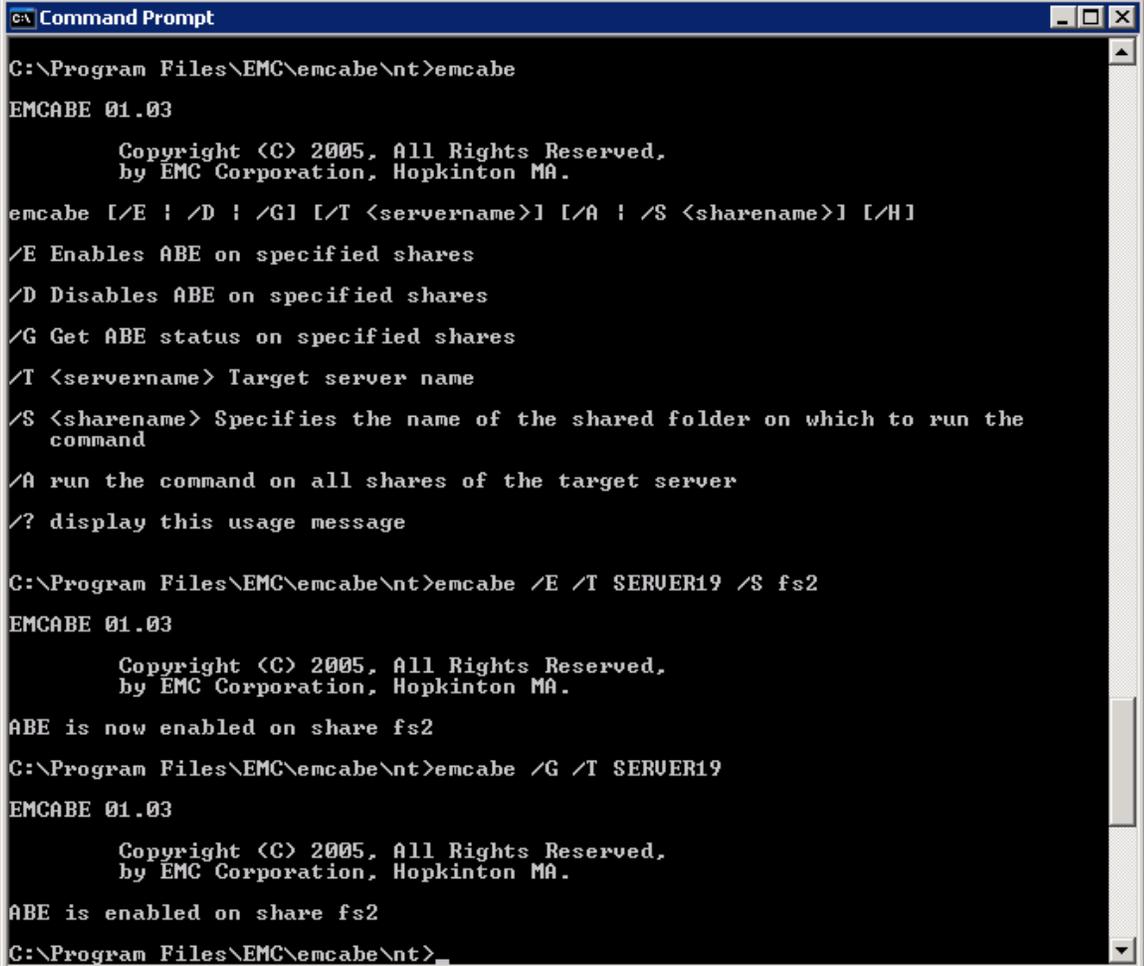
**/t *servername*** Specifies the target server name. By default, the target server is the local machine.

**/s *sharename*** Specifies the name of the shared folder on which to run the command.

**/a** Runs the command on all shares of the target server.

The **/a** and **/s** options are mutually exclusive.

**/h** Displays a usage message.



```
C:\Program Files\EMC\emcabe\nt>emcabe
EMCABE 01.03
      Copyright (C) 2005, All Rights Reserved,
      by EMC Corporation, Hopkinton MA.

emcabe [/E | /D | /G] [/T <servername>] [/A | /S <sharename>] [/H]
/E Enables ABE on specified shares
/D Disables ABE on specified shares
/G Get ABE status on specified shares
/T <servername> Target server name
/S <sharename> Specifies the name of the shared folder on which to run the
  command
/A run the command on all shares of the target server
/? display this usage message

C:\Program Files\EMC\emcabe\nt>emcabe /E /T SERVER19 /S fs2
EMCABE 01.03
      Copyright (C) 2005, All Rights Reserved,
      by EMC Corporation, Hopkinton MA.
ABE is now enabled on share fs2

C:\Program Files\EMC\emcabe\nt>emcabe /G /T SERVER19
EMCABE 01.03
      Copyright (C) 2005, All Rights Reserved,
      by EMC Corporation, Hopkinton MA.
ABE is enabled on share fs2

C:\Program Files\EMC\emcabe\nt>
```

**Figure 3. emcabe usage**

Once ABE is enabled on an individual share, there is no additional management.

## Considerations

ABE provides the ability to improve folder-level security and administration. The following considerations must be addressed when enabling this feature for an individual share:

- ◆ ABE may impact the backup process if users do not have backup privileges on the server. If a backup user is assigned “backup files and directory” rights, then ABE will not impact the backup process. Typically backup applications are configured with these rights.
- ◆ In an ABE-enabled environment where multiple users work from the same client computer, implementers must consider that cached server contents on the client computer can be seen by all users of the client computer.
- ◆ ABE will process the directory structure of the file system based on the user permissions. This processing requires CPU cycles from the file server. The CPU cycles needed to process a directory structure depend on the size of the directory structure. Microsoft has reported a 2 to 3 percent CPU impact as a result of enabling ABE. Microsoft’s *Access-based Enumeration White Paper* provides data associated with CPU performance analysis.

## Conclusion

Access-based Enumeration is a Windows feature that allows administrators to increase folder-level security and improve productivity by reliably streamlining large directory structures for less-technically savvy users.

This feature is fully supported on the Celerra system, and administrators should take advantage of the feature’s benefits when deploying the Celerra system in a Windows environment.

## References

External: *Access-based Enumeration White Paper*, Microsoft

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