

# **CA Access Control**

## **Endpoint Administration Guide for Windows** **r12.0 SP1**



**Third Edition**

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## CA Product References

This document references the following CA products:

- CA Access Control Premium Edition
- CA Access Control
- CA Single Sign-On (CA SSO)
- CA Top Secret®
- CA ACF2™
- CA Audit
- CA Network and Systems Management (CA NSM, formerly Unicenter NSM and Unicenter TNG)
- CA Software Delivery (formerly Unicenter Software Delivery)
- CA Enterprise Log Manager
- CA Identity Manager

## Documentation Conventions

The CA Access Control documentation uses the following conventions:

Format	Meaning
Mono-spaced font	Code or program output
<i>Italic</i>	Emphasis or a new term
<b>Bold</b>	Text that you must type exactly as shown
A forward slash (/)	Platform independent directory separator used to describe UNIX and Windows paths

The documentation also uses the following special conventions when explaining command syntax and user input (in a mono-spaced font):

Format	Meaning
<i>Italic</i>	Information that you must supply
Between square brackets ([ ])	Optional operands
Between braces ({ })	Set of mandatory operands

Format	Meaning
Choices separated by pipe ( ).	Separates alternative operands (choose one). For example, the following means <i>either</i> a user name <i>or</i> a group name:  <i>{username groupname}</i>
...	Indicates that the preceding item or group of items can be repeated
<u>Underline</u>	Default values
A backslash at end of line preceded by a space ( \)	Sometimes a command does not fit on a single line in this guide. In these cases, a space followed by a backslash ( \) at the end of a line indicates that the command continues on the following line.  <b>Note:</b> Avoid copying the backslash character and omit the line break. These are not part of the actual command syntax.

### Example: Command Notation Conventions

The following code illustrates how command conventions are used in this guide:

```
ruler className [props({all({propertyName1 [, propertyName2] ...})}]
```

In this example:

- The command name (ruler) is shown in regular mono-spaced font as it must be typed as shown.
- The *className* option is in italic as it is a placeholder for a class name (for example, USER).
- You can run the command without the second part enclosed in square brackets, which signifies optional operands.
- When using the optional parameter (props), you can choose the keyword *all* or, specify one or more property names separated by a comma.

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- Online and telephone contact information for technical assistance and customer services
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- Product and documentation downloads
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## Documentation Changes

The following documentation updates have been made since the r12.0 release of this documentation:

### Third Edition

The third edition of this documentation was released with CA Access Control r12.0 SP1 CR1.

- [Users and Groups](#) (see page 31)—Updated topic adds the definition of enterprise user stores.
- [Profile Groups](#) (see page 41)—Updated topic adds audit properties to the list of properties that you can define through a profile group.
  - [How CA Access Control Uses Profile Groups to Determine User Properties](#) (see page 41)—New topic describes the process that CA Access Control follows to determine user properties.
- [How to Change What CA Access Control Writes to the Audit Log](#) (see page 98)—Updated topic adds information about setting the audit property for members of a group.
- [Define the Audit Events That CA Access Control Writes to the Audit Log](#) (see page 99)—Updated topic replaces the Use the AUDIT Property to Specify Audit Logging of Events topic.
- [How CA Access Control Determines the Audit Mode for a User](#) (see page 100)—New topic describes the process that CA Access Control follows to determine audit properties for a user.
  - [Default Audit Modes for Users and Enterprise Users](#) (see page 103)—New topic describes the default audit modes for users and enterprise users in r12.0 SP1 CR1 and later.
- [Setting Audit Policies in Windows](#) (see page 104)—Updated topic adds a new example.

### Second Edition

The second edition of the documentation was released to coincide with the GA announcement of r12.0 SP1.

There were no changes to this deliverable in this edition.

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## First Edition

The first edition of this documentation was released on the CA Access Control r12.0 SP1 media.

- [Trace Record Filters](#) (see page 95)—New topic describes the filter files CA Access Control uses to filter user trace records and general trace records.
- [What CA Access Control Audits](#) (see page 96)—Updated topic adds password verification failure (PASSWORD class) to the events CA Access Control audits. This section also contains the following updated topic:
  - [Setting Audit Rules](#) (see page 98)—Updated topic adds information about audit records that are generated by user trace records.
- [The Auditing Process](#) (see page 106)—Updated topic adds information about audit records that are generated by user traces. This section also contains the following updated topic:
  - [How Auditing Works for Interception Events](#) (see page 107)—Updated topic adds information about audit records that are generated by user traces.
- [Viewing Audit Events](#) (see page 111)—New topic describes the tools you can use to view audit logs. This section also contains the following topics:
  - [Audit Events in the Windows Event Log](#) (see page 111)—New topic describes CA Access Control audit events in the Windows event log.
  - [Route Audit Events to the Windows Event Log](#) (see page 112)—New topic describes how to route CA Access Control audit events to the Windows event log.
  - [Route Audit Events to the Windows Event Log Channel](#) (see page 113)—New topic describes how to route CA Access Control audit events to the Windows event log channel.
- [Audit Record Filters](#) (see page 115)—New topic describes the purpose of the audit.cfg file.
- [Audit Display Filters](#) (see page 115)—Updated topic adds the audit.cfg file as a method to filter the audit records CA Access Control writes to the audit file.
- [Managing Remote PMDBs](#) (see page 149)—Updated topic adds restorepmd to the list of selang commands you can use in the pmd environment.

- [How You Use a PMDB to Propagate Configuration Settings](#) (see page 153)—New topic describes how configuration updates are propagated to a Policy Model's subscribers. This section also contains the following new topics:
    - [Virtual Configuration File](#) (see page 153)—New topic explains the purpose of the virtual configuration file.
    - [How New Subscribers Are Configured](#) (see page 154)—New topic describes how the Policy Model configures new subscribers.
  - [Policy Model Backup](#) (see page 162)—New topic explains the data that the Policy Model backs up when you back up a PMDB. This section also includes the following new topics:
    - [Back Up a PMDB Using selang](#) (see page 164)—New topic describes the selang commands you use to back up a PMDB.
    - [Back Up a PMDB Using sepmdb](#) (see page 163)—New topic describes how to use the sepmdb utility to back up a PMDB.
  - [Policy Model Restoration](#) (see page 165)—New topic explains the data that is restored when you restore a PMDB. This section also contains the following new topic:
    - [Restore a PMDB](#) (see page 165)—New topic describes how to restore a PMDB.
  - [Toggle Driver Interception](#) (see page 170)—New topic describes how to activate or deactivate the interception of the CA Access Control filter driver.
  - [Change Audit Configuration Settings](#) (see page 177)—New topic describes how to use selang commands to modify audit configuration settings.
  - [Out-Of-The-Box Sample Policies](#) (see page 179)—New chapter describes the sample policies that come with CA Access Control, and explains how to deploy the policies.
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# Chapter 1: Introduction

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This section contains the following topics:

[About this Guide](#) (see page 15)

[Who Should Use this Guide](#) (see page 15)

## About this Guide

This guide describes the concepts used by CA Access Control for Windows—a product that provides a total security solution for open systems. The guide describes Windows endpoint management tasks and concepts.

This guide is also provided with CA Access Control Premium Edition, which offers enterprise management and reporting capabilities, and advanced policy management features.

To simplify terminology, we refer to the product as CA Access Control throughout this guide.

## Who Should Use this Guide

This guide was written for security and system administrators who are implementing and maintaining a CA Access Control-protected environment.



# Chapter 2: Managing Endpoints

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CA Access Control is a software product that is an active, comprehensive security software solution for Open Systems, tied dynamically to the operating system. Each time a user requests a security-sensitive operation-such as opening a file, substituting a user ID, or obtaining a network service-CA Access Control can intercept the event in real time and evaluate its validity before passing control to the standard operating system (OS) functions.

This section contains the following topics:

[What Is CA Access Control?](#) (see page 17)

[Components](#) (see page 27)

[Endpoint Management](#) (see page 29)

## What Is CA Access Control?

CA Access Control provides you with a powerful tool for managing security for your native platforms, making it possible to implement a security policy that can be customized entirely to an enterprise's security requirements. CA Access Control lets you provide security for users, groups, and resources beyond what is available in native operating systems. It lets you centrally manage security across the organization and integrate your Windows and UNIX security policies in a heterogeneous environment.

## What Is Protected?

CA Access Control protects the following entities:

- **Files**

Is a user authorized to access a particular file?

CA Access Control restricts a user's ability to access a file. You can give a user one or more types of access, such as READ, WRITE, EXECUTE, DELETE, and RENAME. The access can be specified regarding an individual file or to a set of similarly named files.

- **Terminals**

Is a user authorized to use a particular terminal?

This check is done during the login process. Individual terminals and groups of terminals can be defined in the CA Access Control database, with access rules that state which users, or groups of users, are allowed to use the terminal or terminal group. Terminal protection ensures that no unauthorized terminal or station can be used to log into the accounts of powerfully authorized users.

- **Signon time**

Is a user authorized to log on at a particular time on a particular day?

Most users use their stations only on weekdays and only during work hours; the time-of-day and day-of-week login restrictions, as well as holiday restrictions, provide protection from hackers and from other unauthorized accessors.

- **TCP/IP**

Is another station authorized to receive TCP/IP services from the local computer? Is another station authorized to supply TCP/IP services to the local computer? Is another station permitted to receive services from every user of the local station?

The advantage of an open system—a system in which both the computers and the networks are open—is also a disadvantage. Once a computer is connected to the outside world, one can never be sure who enters the system and what damage an alien user may do, whether intentionally or by mistake. CA Access Control includes “firewalls” that prevent local stations and servers from providing services to unknown stations.

- **Multiple login privileges**

Is the user permitted to log in from a second terminal?

The term *concurrent logins* refers to a user's ability to be logged onto the system from more than one terminal. CA Access Control can prevent a user from logging in more than once. This prevents intruders from logging into the accounts of users who are already logged in.

- **User-defined entities**

You can define and protect both regular entities (such as TCP/IP services and terminals) and functional entities (known as *abstract* objects; such as performing a transaction and accessing a record in a database).

- **Aspects of administrator authority**

CA Access Control provides the means to both delegate superuser authorities to operators and restrict the privilege of the superuser account.

- **Registry keys**

Is a user authorized to access a particular registry key?

CA Access Control restricts a user's ability to access registry keys. You can give a user one or more types of access, such as READ, WRITE, and DELETE. The access can be specified with regard to an individual registry key or to a set of similarly named registry keys.

- **Programs**

Can a particular program be trusted? Is the user authorized to invoke it? Can the user access a specific resource using a program?

The security administrator can test programs to ensure that they do not contain any security loopholes that can be used to gain unauthorized access. Programs that pass the test and are considered safe, are defined as trusted programs. The CA Access Control self-protection module (also referred to as the **watchdog**) knows which program is in control at a particular time and checks whether the program has been modified or moved since it was classified as trusted. If a trusted program is modified or moved, the program is no longer considered trusted and CA Access Control does not allow it to run.

In addition, CA Access Control protects against various deliberate and accidental threats, including:

- **Kill attempts**

CA Access Control can be used to protect critical servers and services or daemons against kill attempts.

- **Password Attack**

CA Access Control protects against various types of password attacks, enforces the password-definition policies of your site, and detects break-in attempts.

- **Password Delinquency**

CA Access Control policies delineate rules that force users to create and use passwords of sufficient quality. To ensure that users create and use acceptable passwords, CA Access Control can set maximum and minimum lifetimes for passwords, restrict certain words, prohibit repetitive characters, and enforce other restrictions. Passwords are not permitted to last too long.

### ■ Account Management

CA Access Control policies ensure that dormant accounts are dealt with appropriately.

## How Is It Protected?

CA Access Control starts immediately after the operating system finishes its initialization. CA Access Control places hooks in system services that must be protected. In this way, control is passed to CA Access Control before the service is performed. CA Access Control decides whether the service should be granted to the user.

For example, a user may attempt to access a resource protected by CA Access Control. This access request generates a system call to the kernel to open the resource. CA Access Control intercepts that system call and decides whether to grant access. If permission is granted, CA Access Control passes control to the regular system service; if CA Access Control denies permission, it returns the standard permission-denied error code to the program that activated the system call, and the system call ends.

The decision is based on access rules and policies that are defined in the database. The database describes two types of objects: accessors and resources. *Accessors* are users and groups. *Resources* are objects to be protected, such as files and services. Each record in the database describes an accessor or a resource.

Each object belongs to a class—a collection of objects of the same type. For example, `TERMINAL` is a class containing objects that are terminals (workstations) protected by CA Access Control.

## Class Activation

The information about CLASS status (that is, whether the class was active or inactive) is held in the database. Every attempt to access a resource is intercepted by CA Access Control, which checks the status in the database. If the class is inactive, access is allowed without further checking for authorization.

CA Access Control issues a list of active classes when the engine starts and when a user changes the CLASS activity status. If a class is inactive, access to the resource is not intercepted, reducing overhead.

## Accessor Elements

Each user is represented by an *accessor element* (ACEE)—an in-memory reflection of the user's record in the database. CA Access Control builds the accessor element during the login process. The accessor element is associated with the user's process. Whenever the process requests a system service that is protected by CA Access Control, or issues an implicit request to access a resource, CA Access Control accesses the resource's record. It then determines whether the information in the previously created accessor element—such as the user's security level, mode, and group—lets the user access the resource.

## Expanding Native Security

The following CA Access Control features expand native security.

### Superuser Account Limitations

Users who administer and manage the operating systems are typically members of predefined accounts that are automatically created during system setup, such as the root account on UNIX systems, and the Administrator account on Windows systems. Each of the predefined accounts exists to perform a certain set of system functions.

Users acting as root or Administrator can perform a wide range of tasks, from creating, deleting, and modifying users to locking, reconfiguring, and shutting down servers.

One of the major security risks in these operating systems is that an unauthorized user can gain control of these accounts. If this happens, the user can cause enormous damage to the system.

CA Access Control lets you limit the rights granted to these accounts and to limit the rights of users who are members of the user groups that have these accounts as members. This reduces the vulnerability of your operating system.

### CA Access Control Administrators

When you installed CA Access Control, you were asked to name one or more CA Access Control administrators. CA Access Control administrators have the authority to modify all or part of the rules database. You should have at least one full-authority administrator. This administrator can modify or create access rules freely and can designate other levels of administrators.

Once you have defined users for your system, you can assign administrative authority to other users by assigning the ADMIN attribute to them.

**Note:** A user with the ADMIN attribute possesses powerful authority. Consequently, the number of ADMIN users should be strictly limited. It is also a good policy to separate the roles of the native superuser and ADMIN, removing the ADMIN attribute from the superuser after you have set up one or more CA Access Control security administrators.

Because you always need at least one user with authority to manage the database, CA Access Control does not let you delete the last user that has the ADMIN attribute.

If you expect any of the CA Access Control administrators to be administering other hosts from this workstation, be sure that a rule in the database on that host gives them READ and WRITE access from this workstation.

### Sub Administration

CA Access Control contains a *sub administration* feature. This lets administrators grant specific privileges that enable regular users to manage specific classes. These users are then called sub administrators.

For example, you can allow a specific user to manage users and groups only.

You can also specify a higher level of sub administration by granting access not only for specific classes, but for specified records in these classes.

### Administration Rights for Regular Users

CA Access Control lets you grant ordinary users (that is, non-administrators) the necessary rights and privileges so that these users can perform administrative tasks without being members of the Administrators group. The ability to delegate tasks by granting administrative privileges in this granular way is a significant advantage of CA Access Control.

- A record in the SUDO class stores a command script to allow users to run the script with borrowed permissions.
- The data property value is the command script. This value can be modified by adding to it optional script parameter values.
- Each record in the SUDO class identifies a command for which a user can borrow permissions from another user.
- The key of the SUDO class record is the name of the SUDO record. This name is used instead of the command name when a user executes the commands in the SUDO record.

## Enhanced File Protection

CA Access Control supports both logical and absolute file name formats. For example, if the file `foo.txt` is located under the directory `\tmp` on the logical drive `D` and the logical name `"D:"` is assigned to physical disk 1, partition 0, you can use either the logical or absolute file name to define a file to the CA Access Control database:

```
nr file D:\tmp\foo.txt
```

or

```
nr file \Device\HardDisk1\Partition1\tmp\foo.txt
```

**Note:** If the second format is used, the file remains protected even if the logical name of the disk is changed. The absolute file name format is also supported for CA Access Control generic file protection.

CA Access Control protects all file systems currently used in supported Windows operating systems. The two most commonly used are the Windows file system (NTFS) and the file allocation table (FAT). CA Access Control also supports CDFS (a file system especially for CDs).

CA Access Control supplies a total security solution to the file allocation table (FAT) and an extra layer of security to other file systems including NTFS and CDFS.

## Generic File Protection

CA Access Control supports both logical and absolute file names. The absolute file name format is also supported for CA Access Control generic file protection.

Generic file protection lets you protect all the files that fit a specified wildcard pattern (regular expression). Any resource with a name matching the specified wildcard pattern is protected by the specified generic access rule. CA Access Control lets you protect files generically.

Should a resource match more than one generic access rule, CA Access Control chooses the rule that most closely matches the file.

With generic file protection, no more than a handful of security rules must be defined to protect many of the files requiring protection.

## Password Protection

Native Windows security can protect passwords and enforce password quality in a number of ways. Windows offers the ability to:

- Enforce a maximum password age
- Enforce a minimum password length
- Save up to 24 generations of a user's passwords
- Lock out accounts after repeated login failures
- Force users to log on to Windows before changing their passwords

CA Access Control also enforces the same rules but through its own unique mechanisms. In addition, CA Access Control implements two-way password synchronization with mainframe computers.

## Enhanced Password Protection

Native Windows security provides a significant amount of [protection for user passwords](#) (see page 24). However, CA Access Control significantly extends password protection so that the likelihood of a hacker succeeding in stealing a password is greatly reduced.

When using CA Access Control, you can create additional rules that force users to choose safer, more secure passwords. For instance, you can demand that users select a minimum number of alphabetic, numeric, special, lowercase, or uppercase characters. You can also ensure that the new password selected by a user does not contain, and is not contained by, the password being replaced.

## Program Pathing

*Program pathing* is an access rule associated with a file that requires that the file is accessed only through a specific program. Program pathing greatly increases the security of sensitive files. CA Access Control lets you use program pathing to provide additional protection for the files in your system.

## B1 Security Level Certification

CA Access Control includes the following B1 "Orange Book" features: security levels, security categories, and security labels.

- Accessors and resources in the database can be assigned a *security level*. The security level is an integer between 1 and 255. An accessor can gain access to a resource only if the accessor has a security level equal to or greater than the security level assigned to the resource.
- Accessors and resources in the database can belong to one or more *security categories*. An accessor can access a resource only if the accessor belongs to all of the security categories assigned to the resource.

- A *security label* is a name that associates a particular security level with a set of zero or more security categories. Assigning a user to a security label gives the user both the security level and any security categories associated with the security label.

**Note:** For more information about B1 Orange Book features, see the *Implementation Guide*.

## Setting Up Audit Procedures

CA Access Control keeps audit records for events of access denial and access grants according to the audit rules defined in the database. The decision whether to log a certain event is based on the following rules:

- Every accessor and resource has an AUDIT property that can be set to indicate whether access successes, failures, or both, should be logged; in addition, the AUDIT property for accessors can indicate whether login successes, failures, or both should be logged.
- If the resource or the accessor has the AUDIT(ALL) attribute, all events concerning resources protected by CA Access Control are logged, regardless of whether access failed or succeeded.
- If the access to a resource protected by CA Access Control is successful and the user or the resource has AUDIT(SUCCESS), the event is logged.
- If the access to a resource protected by CA Access Control fails and the user or the resource has AUDIT(FAIL), the event is logged.

Only a system auditor, a user to whom the AUDITOR attribute is assigned, can perform auditing tasks such as changing the auditing attribute that is assigned to users and resources.

If a resource is in warning mode, any access that violates access rules for the resource results in a warning mode audit record, which states that CA Access Control permitted access to the resource.

The audit records constitute a file called the *audit log* (seos.audit). The location for the audit log is specified in the registry, as is the location for the error log.

The audit log (and also the error log) is specified under the following registry key:

HKEY\_LOCAL\_MACHINE\Software\ComputerAssociates\AccessControl\logmgr

The audit log is a binary file and cannot be edited or changed. However, you can use CA Access Control Endpoint Management to view recorded events, to filter out events by time restrictions or event type, and so forth. (You can also use the `seaudit` utility to accomplish these same tasks.)

Consider archiving (backing up) old audit logs and error logs to let you scan the events at a later date.

### Sending Audit Events to Unicenter TNG

Integration with Unicenter TNG is set up at installation.

You can choose to send audit data to Unicenter TNG, permit launching of CA Access Control from Unicenter TNG, or both. The two options are not interrelated.

Selecting the first option sets registry values under the subkey:

`HKEY_LOCAL_MACHINE\Software\ComputerAssociates\AccessControl\UCTNG`

The value `Integration` is set to 1 (yes) and the value `EvtManagerServer` receives the name of the Unicenter TNG host as a string value.

Audit events that are passed to Unicenter TNG appear in the Console logs in the Unicenter Enterprise Management\Enterprise Managers\Windows NT\Event window.

Audit Event	Display Color	Severity
Success	Blue	S
Denied	Orange	F
Fail	Orange	F
Warning	Blue	W
CA Access Control stopped (audit down)	Blue	I
CA Access Control started (audit start)	Blue	I

The second option permits launching CA Access Control from the Unicenter WorldView menu by pointing to the icon representing the TCP/IP Network in the Managed Objects window and selecting CA Access Control from the right-click menu.

CA Access Control also sends following information about events:

- Product name (CA Access Control + version number)
- User name

- Terminal name
- Class name
- Resource name
- Process name
- Event's time
- Full audit message in the format of CA Access Control auditing

The fields User name, Terminal name, Class name, Resource name, and Process name are not always sent, depending on event type.

## Components

CA Access Control includes a database (seosdb), two drivers (seosdrv and drveng), a number of services (including the Watchdog, the Agent, the Engine (seosd), the Policy Model, and Task Delegation), and a graphical user interface.

### Database

The database contains definitions of the following elements:

- Users and groups in your organization
- System resources that need protection
- Rules governing user and group access to system resources

### Drivers

The drivers protect all the CA Access Control files and registry keys by performing the following tasks:

- Intercepting every request to open a file or registry key, terminate a process, and perform network activities
- Passing these requests to the CA Access Control Engine and receiving the decision of the Engine whether the request should be granted or denied
- Forwarding the decision to the original system call of the operating system, which then continues its processing based on the answer it received from the drivers.

### Services

#### Watchdog

The Watchdog constantly checks that the other CA Access Control services are running. On the rare occasion when the Watchdog discovers that another service has stopped, it immediately starts the service again.

#### Agent

The Agent is responsible for the following tasks:

- Communicating with CA Access Control clients through a proprietary application protocol above TCP/IP
- Managing security for the CA Access Control user

#### Engine

The Engine is responsible for the following tasks:

- Managing the database, including controlling all database updates
- Deciding whether to grant access requests that it receives from the Driver and the Agent
- Checking that the Watchdog service is running, and restarting the Watchdog if it discovers that the Watchdog has stopped running

The Engine handles database access requests *and* makes the access decision, creating an efficient service.

#### Policy Model

Managing tens or hundreds of databases individually is not practical. Therefore, CA Access Control supplies the Policy Model service, a component that permits management of many computers from one computer. Using the Policy Model service is optional, but it greatly simplifies administration at large sites.

With the Policy Model service, use a Policy Model database (PMDB). Like other CA Access Control databases, the PMDB contains users, groups, protected resources, and rules governing access to the resources. In addition, the PMDB contains a list of subscriber stations. A subscriber station is one linked to the PMDB so that any change to the PMDB is automatically sent to the subscriber database.

You can create a basic security policy for your organization and implement all the necessary rules on a single database—the Policy Model database. The subscribers can include both Windows and UNIX stations, ensuring uniform rules with minimal administrative effort.

The system or security administrator updates the PMDB. The PMDB then propagates all updates from the PMDB to its subscribers in batch mode, freeing the administrator for other work.

A PMDB can have two types of subscribers: another PMDB or a local database. This PMDB also contains a list of subscribers to which it propagates database updates. This feature lets you build a hierarchy of PMDBs. The local database can be used to protect the users, groups, and resources defined on the station.

## selang

The command-line language, *selang*, performs all the functions of CA Access Control. To use *selang* commands, open a command prompt window and start *selang*. You can also use *selang* in scripts.

For more information about *selang* and its commands, see the chapter “The *selang* Command Language” in the *Reference Guide*.

## Endpoint Management

CA Access Control provides two ways to let you manage the resources in your enterprise and control who has access to them:

- **selang**—the CA Access Control command language.

The *selang* command language lets you make definitions in the CA Access Control database. The *selang* command language is the command definition language.

**Note:** For more information about using *selang*, see the *selang Reference Guide*.

- **CA Access Control Endpoint Management**—the endpoint administration interface.

The web-based interface lets you administer remote endpoints through a central administration server.

**Note:** For more information about installing CA Access Control Endpoint Management, see the *Implementation Guide*.



# Chapter 3: Managing Users and Groups

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This section contains the following topics:

[Users and Groups](#) (see page 31)

[Where Information about Accessors Is Stored](#) (see page 32)

[Guidelines for Managing Accessors in Enterprise Stores](#) (see page 33)

[Database Accessors](#) (see page 39)

[Accessor Management](#) (see page 42)

## Users and Groups

In CA Access Control, every action and access attempt is performed on behalf of a user, who is held responsible for submitting the request. Every process in the system is therefore associated with a certain user name. The user name identifies the user to CA Access Control.

A *user* is a person who can log on, or can be the owner of a batch or daemon program. In CA Access Control, every access attempt is performed by a user. CA Access Control can use user information from the CA Access Control database and from enterprise user stores. It stores user information in its database, in either a USER record or an XUSER record.

**Note:** An *enterprise user store* is a store in the operating system that stores users or groups, for example, `/etc/passwd` and `/etc/groups` on UNIX systems, or Active Directory on Windows.

A *group* is a collection of users. A group defines common access rules for users in the group. Groups can be nested (belong to other groups). CA Access Control can use group information from the CA Access Control database and from the enterprise user stores. Typically, you create groups and assign users to them, based on a role, for example, `database_administrators`.

The user records are the key accessor records. The main purpose for using groups in CA Access Control is to assign access authorities to all users in group at one time. Assigning access authorities at one time is easier and less error prone than assigning them separately to each user.

## Where Information about Accessors Is Stored

The information that CA Access Control uses about users and groups is stored both in the CA Access Control database and in the host operating system. The host operating system information stores are called *enterprise user stores*, or just *enterprise stores*. By default, CA Access Control is configured so that it does not use the enterprise stores. You can, however, configure CA Access Control so that if it cannot find a user or group defined in its database, it looks for, and uses the information from, the users and the group memberships defined in the enterprise stores.

**Note:** CA Access Control uses information from the enterprise stores but only writes to them if you use `selang` command in the native environment.

When checking for authorization, CA Access Control always checks for accessors defined in its own database before it checks the enterprise store: if you have an enterprise user with the same name as a user defined in the CA Access Control database, the enterprise user is ignored by CA Access Control.

## How CA Access Control Finds a User Record

When a user logs in, CA Access Control conducts the search in the following order, until it finds a record associated with the user:

1. CA Access Control searches for a user defined in its database.
2. CA Access Control searches its cache for an enterprise user of that name.

When the network is down, the operating system (OS) lets users log in using the OS cached credentials. The purpose of the CA Access Control cache is to let CA Access Control also use enterprise users' records in these cases.

3. CA Access Control uses the operating system to search the enterprise user stores for a user of that name.
4. If CA Access Control does not find a record associated with the user in its database or in the enterprise stores, CA Access Control assigns the user the attributes in the `_undefined` USER record.

## Integration with the Enterprise User Stores

Typically, you configure CA Access Control to use the groups and users that are defined in the enterprise user stores.

If you do configure CA Access Control like this, by default, when an access rule that references an enterprise user or group is created, or when a user logs in to the operating system, CA Access Control creates a record in its database for that user or group, if one did not exist before. These records have the class XUSER (for enterprise users) or XGROUP (for enterprise groups). They hold the properties that CA Access Control requires to enforce access rules. You do not need to manage them, because CA Access Control creates them as required.

The only properties of an enterprise user or group that CA Access Control fetches from the enterprise user stores are the names and the group membership properties.

## Guidelines for Managing Accessors in Enterprise Stores

If you decide to manage your accessors in enterprise user stores, you should consider the guidelines in the following sections.

### Users and Groups that Must be Defined in the Database

CA Access Control needs some users and groups to be defined in its database, rather than in the enterprise user stores. These include:

- [Predefined users](#) (see page 39)
- [Predefined groups](#) (see page 40)
- A CA Access Control administrator
- Profile groups
- Logical users

### Restrictions on the Use of Enterprise Users

CA Access Control imposes the following restrictions on the use of enterprise users:

- You cannot create, or refer to, an enterprise user in CA Access Control if it has the same name as a user defined in the database.
- You cannot create, delete or modify an enterprise user using the selang AC environment.

- You cannot use an enterprise user as a logical user.
- By default, you cannot create an enterprise user in CA Access Control unless the user is already defined in the enterprise user store. However, you can enable or disable this behavior on UNIX systems.

**More information:**

[Enable or Disable Checking Enterprise Store before Creating XUSER Records on UNIX](#) (see page 36)

## Restrictions on the Use of Enterprise Groups

CA Access Control imposes the following restrictions on the use of enterprise groups:

- You cannot create or delete an enterprise group within the selang AC environment.
- You cannot change the membership of an enterprise group within the selang AC environment.
- You cannot use an enterprise group as a [Profile Group](#) (see page 41).

## Enable or Disable the Use of Enterprise Users and Groups

By default, CA Access Control cannot use the groups and users defined in the enterprise user stores, but you can enable CA Access Control to do so. We recommend that you enable this feature unless you need compatibility with previous versions of CA Access Control.

To let CA Access Control use enterprise users and groups, set the configuration setting `osuser_enabled` to 1 (one). To disable this behavior, set the value of `osuser_enabled` to 0 (zero).

### Example: Enable the Use of Enterprise Users and Groups on Windows

The following registry setting enables the use of enterprise users and groups on Windows:

- Key: HKLM\ComputerAssociates\AccessControl\OS\_user
- Name: `osuser_enabled`
- Type: REG\_DWORD
- Value: 1

**Example: Enable the Use of Enterprise Users and Groups on UNIX**

The following commands stop CA Access Control, enable the use of enterprise users and groups on UNIX, and restart CA Access Control:

```
secsns -s  
seini -s OS_User.osuser_enabled 1  
seload
```

**Enable or Disable the Creation of XUSER Records at Enterprise User Login**

If CA Access Control is enabled to use enterprise users, by default it creates a record (in the XUSER class) for a user when that user logs in. Sometimes you do not want this, for example, if thousands of users log on at the same time each day.

To prevent CA Access Control creating XUSER records when users log in, change the value of the configuration setting `create_user_in_db` to 0 (zero). To re-enable this behavior set the value to 1 (one).

**Example: Disable the Automatic Creation of XUSER Records on Enterprise User Login on Windows**

The following registry setting disables the automatic creation of an enterprise user record in CA Access Control on Windows:

- Key: HKLM\ComputerAssociates\AccessControl\OS\_user
- Name: `create_user_in_db`
- Type: REG\_DWORD
- Value: 0

**Example: Disable the Automatic Creation of XUSER Records on Enterprise User Login on UNIX**

The following commands stop CA Access Control, disable the automatic creation of a XUSER record on UNIX, and restart CA Access Control:

```
secsns -s  
seini -s OS_User.create_user_in_db 0  
seload
```

## Enable or Disable Checking Enterprise Store before Creating XUSER Records on UNIX

Sometimes you may want to create an enterprise user in CA Access Control when the user is not defined in the enterprise user store. On Windows you cannot create an enterprise user in CA Access Control unless the user exists in the Windows user store. On UNIX, the default behavior is the opposite to Windows. However, on UNIX, you can enable or disable this default behavior.

To disable checking (and therefore allow CA Access Control to create XUSER records when there is no enterprise user equivalent), change the value of the configuration setting `verify_osuser` to 0. To enforce checking, set the value to 1.

### Example: Enable Creation of XUSER Records without Checking the Enterprise User Store

The following set of commands stops CA Access Control, enables the creation of XUSER records with no enterprise store equivalents, and restarts CA Access Control:

```
secons -s  
seini -s OS_User.verify_osuser 0  
seload
```

## Recycled Enterprise Store Accounts on Windows

*Recycled accounts* are enterprise store users or groups that have been deleted and then recreated (using the same name). This is likely to happen when you remove a user from the user store (for example, when the user resigns) and then create a new account for a new user that has the same name as the old removed user.

Recycled accounts are a security concern because you do not necessarily want new accessors to have the same access permissions as those that were granted to the old account with the same name. To solve this problem, CA Access Control authorization is based on the SID. This means that when you create a new accessor, with the same name as a deleted accessor with existing access permissions, the new accessor does not automatically receive the old permissions of the old accessor.

**Important!** Recycled account accessors *do not* inherit the old access permissions. However, database access rules, which mention the accessor's name (not SID), may make it seem like these rules still apply. Use the `secons -checkSID` command to resolve this.

## Resolve Recycled Enterprise Accounts on Windows

If an enterprise account (user or group) has associated database rules is then recycled (deleted and created with the same name), it may look like the old database rules still apply to the new account. However, as CA Access Control authorization is based on SID, these rules no longer apply and you need to create new rules for the new group. Before you can create the new rules, you have to resolve recycled accounts.

To resolve recycled enterprise accounts open a command prompt and run the following commands:

```
secons -checkSID -users  
secons -checkSID -groups
```

CA Access Control works through all the enterprise user accounts it has (XUSER records) and then all the group accounts (XGROUP records) and identifies accounts with an SID that differs from the SID of the enterprise account. It renames these accounts in CA Access Control using the following naming convention: *SID (accountName)*

You can now create the new rules for the recycled account.

**Note:** Recycled user accounts are resolved in this way when the user logs in or tries to access a resource. We recommend that when you create an enterprise account, run the secons -checkSID command as a scheduled task.

### Example: A Recycled Group Account

Company ABCD has a group called *interns* in its enterprise store. The group has nine members and they are working on productA. The administrator makes the group known to CA Access Control and assigns it with access permissions to the files group members need to access, as follows:

```
nxcg interns owner(msmith)
auth file c:\products\productA\materials\* xgid(interns) access(all)
auth file c:\HR\interns\* xgid(interns) access(read)
```

When the interns complete their tenure with ABCD, the enterprise store administrator deletes the group. Three months later, a new group of interns with six members is created in the enterprise store, with the same name. The old rules in the CA Access Control database still exist so it seems like the new *interns* group inherited the permissions of the old group. However, these rules apply to the old interns group and the CA Access Control administrator needs to create new rules for the new group.

To do this, the administrator has to identify and resolve the recycled interns account, as follows:

```
secons -checkSID -groups interns
```

This renames the XGROUP resource, and any access rules references to it, to "*SID (domain\interns)*". Now, the administrator can create new rules for the new interns group that works on productB:

```
nxcg interns owner(msmith)
auth file c:\products\productB\materials\* xgid(interns) access(all)
auth file c:\HR\interns\* xgid(interns) access(read)
```

**Note:** For more information on the secons utility, see the *Reference Guide*.

## An Enterprise User or Group Cannot Access Resources but Correct Access Rules are Set

### Valid on Windows

#### Symptom:

I can see that an enterprise user or group has permissions to access a resource but they cannot access it.

#### Solution:

It is possible that the enterprise account has been recycled and the permissions in the database apply to the old account, not the new account that has the same name but a different SID. To check for this scenario, [resolve recycled enterprise accounts](#) (see page 37).

## Database Accessors

Regardless of how you decide to manage your users, some accessors must be defined in the CA Access Control database, as described in the following sections.

### Predefined Users

CA Access Control predefines the following users, which you cannot delete:

#### **\_dms**

Installed on the advanced policy management server components' databases (DMS, DH reader, and DH writer), the `_dms` user is used by `policyfetcher` and `devcalc` to communicate with the DH and DMS.

#### **\_seagent**

`_seagent` is the user name under which CA Access Control runs some internal processes, such as:

- The PMDB process, `sepmdd`
- (UNIX) The deviation calculation process, `devcalc`
- The user and group record update exit processes

The `_seagent` user has the `SERVER` attribute.

#### **\_undefined**

`_undefined` represents all users that are undefined in CA Access Control. You can use `_undefined` to include undefined users in ACLs.

#### **+devcalc**

(Windows) The user name under which CA Access Control runs the deviation calculation process, `devcalc`.

#### **+reportagent**

The user name under which CA Access Control runs the Report Agent.

#### **nobody**

The `nobody` user is a user record that cannot correspond to a real user. Use this record to create rules that do not give any user the associated permissions. For example, you can set *nobody* as the owner of resources, meaning that no user will get the permissions associated with owning that record.

## Predefined Groups

CA Access Control comes with predefined groups. Except for the `_interactive` and `_network` groups, you add users to these groups in the same way as you do for any other group.

### **`_abspath`**

If a user is in the `_abspath` group when logging in, that user must use absolute path names to invoke programs.

### **`_interactive`**

A user is a member of the `_interactive` group only for the purposes of an access attempt. Users are members of the `_interactive` group if they are logged into the same host as the resource they are trying to access. CA Access Control dynamically and automatically manages the membership of the `_interactive` group—you cannot change the membership.

### **`_network`**

This is the complementary group to `_interactive`. A user is a member of the `_network` group for the purposes of access only. Users are members of the `_network` group if they are trying to access a resource from a different host than the resource belongs to. CA Access Control dynamically and automatically manages the membership of the `_network` group—you cannot change the membership.

### **`_restricted`**

For users in the `_restricted` group, all files, and on Windows registry keys too, are protected by CA Access Control. If a file or a Windows registry key does not have an access rule explicitly defined, access permissions are covered by the `_default` record for that class (FILE or REGKEY).

**Note:** Users in the `_restricted` group may not have sufficient authorization to do their work. If you plan to add users to the `_restricted` group, consider using Warning mode initially.

### **`_surrogate`**

When a user uses a member of the `_surrogate` group as a surrogate, CA Access Control writes a full trace in the audit trail of the surrogate's actions, tagged with the original user's name.

### **Example: Adding a User to the `_restricted` Group Using `selang`**

The following `selang` command adds the enterprise user `john_smith` to the `_restricted` group:

```
joinx john_smith group(_restricted)
```

## Profile Groups

A *profile group* is a group defined in the CA Access Control database that contains default values for user properties. When you assign a user to a profile group, the profile group provides those values to the user unless they have already been set for the user.

You can specify a profile group for a user when you create the user, or you can assign the user to the profile group afterwards.

Profile groups let administrators efficiently create a standard setup with specific permissions for any new user assigned to that group. This setup can specify such things as the home directory of the user, the audit properties, the PMDB that defines the access authorities, and various password rules affecting a user who is associated with a profile group.

## How CA Access Control Uses Profile Groups to Determine User Properties

The following process describes how CA Access Control uses profile groups to determine user properties:

1. CA Access Control checks if the user's record in the USER or XUSER class has a value for the property.  
If the user's record has a value for the property, CA Access Control uses that value.
2. CA Access Control checks if the user is assigned to a profile group.  
If the user is assigned to a profile group, the process continues. If the user is not assigned to a profile group, CA Access Control assigns the default property value to the user.
3. CA Access Control checks if the profile group has a value for that property.  
If the profile group has a value for the property, CA Access Control assigns that value to the user. If the profile group does not have a value for the property, CA Access Control assigns the default property value to the user.  
**Note:** If the audit property of a user or profile group is not set, the audit property of a group can affect the audit property of a user.

### More information:

[How CA Access Control Determines the Audit Mode for a User](#) (see page 100)

## Accessor Management

You can create, modify, and delete database or enterprise user or group records by using CA Access Control Endpoint Management or by using selang.

### Manage Users or Groups

To manage your accessors you can use the CA Access Control Endpoint Management. If you want to view or modify the properties of a particular accessor, or if you want to delete an accessor, you first need to find that accessor.

#### To manage users or groups

1. In CA Access Control Endpoint Management click the Users tab, then click either the Users or Groups subtab.

Depending on your selection, the Users or the Groups page appears.

2. Complete the following fields in the Search section:

#### User \ Group Name

Defines a mask for the accessors you want to view. You can enter the full name of the accessor you are after or you can use a mask. For example, use \*admin\* to list accessors whose name contains "admin".

Use an \* (asterisk) to list all accessors.

#### User \ Group Repository

Specifies the source from which you want to fetch a list of accessors. The source can be either:

- **AC Internal Accounts**—accessors defined in the CA Access Control database.
- **Global Accounts**—accessors defined in specific enterprise user stores.

### Show only AC accounts/profiles

Specifies to list only those accounts that have records in the CA Access Control database as follows:

- If you chose AC Internal Accounts, lists only those accounts that exist in the CA Access Control database (no native accounts).
- If you chose Global Accounts, lists only those accounts that have a CA Access Control enterprise profile (XUSER or XGROUP records).

A list of accessors that exist in the repository you chose appears.

#### 3. Do *one* of the following:

- Click in the accessor's View column to view the accessor's properties.
- Click in the accessor's Delete column to delete the accessor.
- Click the accessor's name to modify the accessor's properties.
- Select the accessors you want to delete and click Delete.
- Click Create User or Create Group to create a new user or group record in the CA Access Control database.

## User Management Using selang

Use the following selang commands for records of enterprise users:

- **newxusr** and **editxusr**—define a new enterprise user record
- **chxusr** and **editxusr**—change the CA Access Control properties of an enterprise user
- **find xuser**—list enterprise users that have a CA Access Control record
- **rmxusr**—delete a user
- **show xuser**—display the CA Access Control properties of an enterprise user

Use the following selang commands for CA Access Control database user records:

- **newusr** and **editusr**—define a new user record
- **chusr** and **editusr**—change the properties of a user
- **rmusr**—delete a user
- **find user**—list database users
- **show user**—display the properties of a user

### Example: Define a User in the Database Using selang

The following selang command defines a new user in the CA Access Control database with security level 100:

```
newusr internalUser level(100)
```

### Example: Change a Property of an Enterprise User Using selang

The following selang command gives the AUDITOR property to an enterprise user Terry:

```
chxusr Terry auditor
```

## Group Management Using selang

You can change any property of any group, except that you cannot change the name or the membership of enterprise groups (from within CA Access Control).

To change group properties or to assign access rights associated with groups, you can use CA Access Control Endpoint Management or the following selang commands:

- **join[-]** and **joinx[-]**

Change the membership of an internal group

Use join to add internal accessors to the group. Use joinx to add enterprise groups and users to an internal group. Use the - (minus) form of the commands to remove accessors.

- **editgrp, newgrp, chgrp**

Change the non-membership properties of an internal group

- **editxgrp, newxgrp, chxgrp**

Change the non-membership properties of an enterprise group

- **rmgrp, rmxgrp**

Remove a user group

### Example: Define a Group in the Database Using selang

The following selang command defines a new group "sales" in the database. The full name of the group is "Sales Department":

```
newgrp sales name('Sales Department')
```

### **Example: Change a Property of a Group Defined in the Database Using selang**

The following selang command makes CA Access Control audit all events for members of the group AC\_admins:

```
chgrp AC_admins audit(all)
```

### **Example: Add an Enterprise Group to an ACL Using selang**

The following selang command adds the enterprise group mygroup to the ACL of the myfile:

```
Authorize FILE (myfile) xgid(mygroup)
```

### **Example: Add an Enterprise User to a Group Defined in the Database Using selang**

The following selang command adds the enterprise user mydomain\administrator to the group AC\_admins which is defined in the database:

```
joinx mydomain\administrator group(AC_admins)
```

### **Example: Add an Enterprise Group to a Group Defined in the Database Using selang**

The following selang command adds the enterprise group Guests to the \_restricted group:

```
joinx Guests group(_restricted)
```



# Chapter 4: Managing Resources

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This section contains the following topics:

[Resources](#) (see page 47)

[Classes](#) (see page 47)

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## Resources

A *resource* is an entity that can be accessed by an accessor and protected by an access rule, or the CA Access Control database record that corresponds to that entity. Examples of resources are files, programs, hosts, and terminals.

The main purpose of creating resource records in CA Access Control is to define access permissions for the resource that corresponds to the resource record. The access permissions that are required to access a resource are specified in the resource record's access control lists.

## Resource Groups

A *resource group* is a resource that contains a list of other resources. A resource group is a member of one of the following classes: CONTAINER, GFILE, GSUDO, GTERMINAL, or GHOST.

Because a resource group is itself a resource, it has the same properties as its member resources. Therefore the advantage of using resources groups is that it simplifies administration. You can change the properties of all the member resources by changing the properties of the resource group.

## Classes

In CA Access Control, the *class* of a record defines the properties that the record can have. All records in a class have the same properties, though different values for these properties.

Examples of classes are:

- **TERMINAL** class. This contains records for terminals, such as tty1, tty.
- **FILE** class. This contains records for files.
- **PROGRAM** class. This contains records of programs.

Each record contains values for the properties appropriate to the record class. For example, a record in the XUSER class includes such properties as the enterprise user's location and working hours, while a record in the HOSTNET class includes such properties as net services and IP address data.

CA Access Control includes predefined classes. You can also define new classes, called user-defined classes.

### Default Record for Class

Most classes can include a default record (\_default) specifying access types for resources of that class that are not defined in database records of their own.

Like other resource records, the \_default record can include an ACL and a defaccess field. You can create a \_default record for all classes except USER, GROUP, CATEGORY, SECLABEL, and SEOS.

## UACC Class (Deprecated)

The UACC class is no longer recommended. To specify the default values for records in a class, use the `_default` record.

Some earlier versions of CA Access Control used a separate class, called UACC, for records resembling the `_default` records of other classes. The UACC class is no longer recommended, and if you use a `_default` record, the equivalent record in the UACC class is not checked. In future versions, the UACC class may no longer be supported.

For example, suppose user Henderson tries to kill process `store_log`. CA Access Control checks for authorization in the following order. The primary question is this: Is the process `store_log` defined in the database? CA Access Control searches the database for a record named `store_log` in the PROCESS class.

- If no such record can be found, the process is not defined to CA Access Control. In that case, CA Access Control therefore uses either the `_default` record of class PROCESS, or the PROCESS record in the UACC class, to determine whether Henderson is allowed to kill `store_log`.
  - If user Henderson appears in the `_default` record's ACL, the authority specified in it is applied.
  - If Henderson does *not* appear in the `_default` record's ACL, the authority specified in the `defaccess` property of the `_default` record is applied. This authority is applied to all users who do not appear explicitly in the `_default` ACL.
- If process `store_log` is defined in the database, then the question is whether user Henderson appears in the ACL for process `store_log` in the database.
  - If user Henderson appears in the ACL for process `store_log`, the authority specified there is applied.
  - If Henderson does *not* appear in the ACL, CA Access Control applies the authority specified in the default access property of the `store_log` resource. This authority is called the resource's default access.

**Note:** If the default access (`defaccess`) of `_default` is set to NONE, or if `_default` is not specified and the default of the corresponding resource in the UACC class is NONE, then any accessor attempting to access a resource not defined in the class is denied access to the resource.

If the default access of `_default` (or UACC) is set to the highest authority (ALL, or in some cases READ or EXECUTE), then any resource that is not explicitly protected is accessible to everyone.

## Predefined Classes

The predefined classes can be categorized into the following types:

Class Type	Purpose
Accessor	Defines objects that access resources, such as users and groups
Definition	Defines objects that define security entities, such as security labels and categories
Installation	Defines objects that control the behavior of CA Access Control
Resource	Defines objects that are protected by access rules

The following table contains a list of all predefined classes.

Class	Class Type	Description
ADMIN	Definition	Lets you delegate administrative responsibilities to users who do not have the ADMIN attribute. You give these users global authorization attributes and limit their administration authority scope.
AGENT	Resource	Not applicable to CA Access Control
AGENT_TYPE	Resource	Not applicable to CA Access Control
APPL	Resource	Not applicable to CA Access Control
AUTHHOST	Accessor	Not applicable to CA Access Control
CALENDAR	Resource	Lets you define a Unicenter TNG calendar object for user, group, and resource enforced time restrictions.
CATEGORY	Definition	Lets you define a security category.
CONNECT	Resource	Lets you protect outgoing connections. The records in this class define which users can access which Internet hosts. Before you activate the CONNECT class, be sure that the streams module is active.
CONTAINER	Resource	Lets you define a group of objects from other resource classes, thus simplifying the job of defining access rules when a rule applies to several different classes of objects.
FILE	Resource	Lets you protect a file, a directory, or a file name mask.

<b>Class</b>	<b>Class Type</b>	<b>Description</b>
GAPPL	Resource	Not applicable to CA Access Control
GAUTHHOST	Definition	Not applicable to CA Access Control
GFILE	Resource	Each record in this class defines a group of files or directories. Grouping is accomplished by explicitly connecting files or directories (resources of the FILE class) to the GFILE resource in the same way users are connected to groups.
GHOST	Resource	Each record in this class defines a group of hosts. Grouping is accomplished by explicitly connecting hosts (resources of the HOST class) to the GHOST resource in the same way users are connected to groups.
GROUP	Accessor	Each record in this class defines an internal group.
GSUDO	Resource	Each record in this class defines a group of commands that one user can execute as if another user were executing it. The sesudo command uses this class.
GTERMINAL	Resource	Each record in this class defines a group of terminals.
HNODE	Definition	The HNODE class contains information about the organization's CA Access Control hosts. Each record in the class represents a node in the enterprise.
HOLIDAY	Definition	Each record in this class defines one or more periods when users need extra permission to log in.
HOST	Resource	Each record in this class defines a host. The host is identified by either its name or its IP address. The object contains access rules that determine whether the local host can receive services from this host.  Before you activate the HOST class, be sure that the streams module is active.
HOSTNET	Resource	Each record in this class is identified by an IP address mask and contains access rules.
HOSTNP	Resource	Each record in this class defines a group of hosts, where the hosts belonging to the group all have the same name pattern. Each HOSTNP object's name contains a wildcard.
LOGINAPPL	Definition	Each record in the LOGINAPPL class defines a login application, identifies who can use the program to log in, and controls the way the login program is used.
MFTERMINAL	Definition	Each record in the MFTERMINAL class defines a Mainframe CA Access Control administration computer.

<b>Class</b>	<b>Class Type</b>	<b>Description</b>
POLICY	Resource	Each record in the POLICY class defines the information required to deploy and remove a policy. It includes a link to the RULESET objects that contain a list of the selang commands for deploying and removing the policy.
PROCESS	Resource	Each record in this class defines an executable file.
PROGRAM	Resource	Each record in this class defines a trusted program that can be used with conditional access rules. Trusted programs are setuid/setgid programs that are monitored by the Watchdog to ensure they are not tampered with.
PWPOLICY	Definition	Each record in the PWPOLICY class defines a password policy.
RESOURCE_DESC	Definition	Not applicable to CA Access Control
RESPONSE_TAB	Definition	Not applicable to CA Access Control
RULESET	Resource	Each record in the RULESET class represents a set of rules which define a policy.
SECFILE	Definition	Each record in this class defines a file that must not be altered.
SECLABEL	Definition	Each record in this class defines a security label.
SEOS	Installation	The one record in this class specifies your active classes and password rules.
SPECIALPGM	Installation	Each record in the SPECIALPGM class registers backup, DCM, PBF and PBN functions in Windows or xdm, backup, mail, DCM, PBF, and PBN programs in UNIX or associates an application that needs special authorization protection with a logical user ID. This allows you to set access permissions according to what is being done rather than who is doing it.
SUDO	Resource	This class, used by the sesudo command, defines commands that one user (such as a regular user) can execute as if another user (such as root) were executing them.
SURROGATE	Resource	Each record in this class contains access rules for an accessor that define who can use that accessor as a surrogate.

Class	Class Type	Description
TCP	Resource	Each record in this class defines a TCP/IP service, for example, mail or http or ftp.
TERMINAL	Resource	Each record in this class defines a terminal—a device from which a user can log in.
UACC	Resource	Defines default access rules for each resource class.
USER	Accessor	Each record in this class defines an internal user.
USER_ATTR	Definition	Not applicable to CA Access Control
USER_DIR	Resource	Not applicable to CA Access Control
XGROUP	Resource	Each record in this class defines an enterprise group to CA Access Control.
XUSER	Resource	Each record in this class defines an enterprise user to CA Access Control.

**Note:** For more information about CA Access Control classes, see the *selang Reference Guide*.

## User-Defined Classes

CA Access Control enables you to define new classes, so that you can protect abstract objects by creating appropriate records for them.

### Example: User-Defined Class for a Database View

A site may use a database to store and display proprietary data.

You can define a user-defined class DATABASE\_VIEWS, and define each database view to be a resource member of that class. Give the resource an ACL that defines the access authority required to create that database view. When a user attempts to create a database view, CA Access Control checks the access authority of the user, and permits or disallows the creation based on the ACL.

## Wildcards in User-defined Classes Resources

By using wildcards in the name of a resource in a user-defined class, you can create a resource record that corresponds to multiple physical resources: any physical resource with a name that matches the wildcard pattern is protected by the access authorities associated with the resource record.

The wildcards you can use are:

- \* for any number of any characters
- ? for any one character

If a physical resource name matches more than one resource record name, the longest non-wildcard match is used for that resource.

CA Access Control does *not* accept the following wildcard patterns as resource names:

- \*
- /\*
- /tmp/\*
- /etc/\*

## User-Defined Class—Example

Suppose that your system serves a bank and you want to protect transfers of large amounts between accounts. You can use the following outline to set up this security.

1. Define a class to contain the records that describe transfers, called, for example, TRANSFERS.
2. For each monetary level transfer that you might want to protect, define a record in the TRANSFERS class.  
  
For example, you might define records named Upto.\$1K, Upto.\$1M, Upto.\$10M, and Over.\$10M.  
  
Define any other resources that you need to control transfers as members of the TRANSFERS class.
3. To give different users permission to perform different maximum transfers, grant or deny them access to the various records in the TRANSFERS class.
4. In addition, to handle programmatic transfers, insert in the bank's money-transfer program a call to the CA Access Control API, so that it checks the user's permission before it allows a transfer to proceed.

## Windows Services Protection

CA Access Control lets you protect Windows services. A *Windows service* is a program that runs in the background on Windows, and is the Windows equivalent to a daemon on UNIX.

The CA Access Control Windows service protection intercepts service access events that originate from one of the following:

- Service management and information events.

CA Access Control intercepts the `services.exe` process for each service access. This includes starting or stopping a service. For example, `net start service`, `net stop service`, and so on, are all protected.

Intercepted events in this case are audited using the protected service's name.

- Service database management events.

CA Access Control intercepts registry calls to the service control management database to protect against service state queries or changes. This means that CA Access Control automatically protects the registry areas that are associated with the protected service. Effectively, CA Access Control protects the following registry keys when you define service protection:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\service_name  
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\service_name*
```

Intercepted events in this case are audited using the full registry path.

You protect a Windows service in the same way as you protect other resources, that is by creating assigning a resource to the service and adding accessors to the resource's access control lists. The resource class for a Windows service is `WINSERVICE`. A `WINSERVICE` resource has two access control lists: an ACL and an NACL. Valid access types for an entry in a `WINSERVICE` access control list are:

- Read
- Modify
- Delete
- Start
- Stop
- Pause
- Resume
- Custom

## Enable and Disable Windows Services Protection

You can enable or disable the CA Access Control protection of Windows services.

To enable protection of Windows services, set the configuration setting `OperationMode` in the `Instrumentation\PlugIns\WinServicePlg` section of the CA Access Control registry to 1. To disable protection, set `OperationMode` to 0.

By default, CA Access Control enables protection of Windows services.

For CA Access Control to protect a Windows service, protection needs to be enabled and the `WINSERVICE` class needs to be active.

## Protect a Windows Service

You can protect a Windows Service and so provide additional protection to Windows operations.

### To protect a Windows Service

1. Ensure you have [enabled Windows services protection](#) (see page 56).
2. Ensure the `WINSERVICE` class is active. (It is active by default.)
3. Create a `WINSERVICE` record in CA Access Control, with the same name as the Windows service you want to protect.

**Note:** The Windows service name is shown on the General tab of the Windows service properties dialog, but is not the same as the "display name" on that tab.

4. Assign the accessors and their access authorization to the service.

The service is now protected.

### Example: Restrict Access to the Print Spooler

On Windows the print spooler has the service name `spooler`. The following `se`lang commands ensure the `WINSERVICE` class is active and make read and write the only default access types to the spooler.

```
setoptions class+(WINSERVICE)
editres WINSERVICE(spooler) defacc(R,W)
```

## View Access Attempts to a Protected Windows Service

When CA Access Control protects a Windows service, it intercepts, and records in the audit log, access attempts that are related to the service. These access attempts may be a result of using the services.exe process to manage the service (start, stop, and so on), or a result of registry access to the service database management area of the protected service. While the former access is audit contains only the service name, the latter (registry access) contains the full registry path. To view all access attempts related to a Windows service, you have to use wildcards.

To view access attempts to a protected Windows service, create an audit filter that filters audit records of class WINSERVICE and resource name *\*myService\**

CA Access Control displays all audit records for the WINSERVICE resource you defined (whether access was attempted through the registry or through a service management interface).

### Example: View All Access Attempts to the Print Spooler Service

This example assumes that you defined the Print Spooler service to CA Access Control with no access as follows:

```
er winservice spooler defaccess(none) owner(nobody)
```

You can then use the seaudit utility to list all access attempts to the Print Spooler service as follows:

```
seaudit -resource WINSERVICE *spooler* *
```

This command lists all audit records for the class WINSERVICE that were recorded for access attempts to the Print Spooler service. The resulting output can look as follows:

```
seaudit - Audit log lister
03 Apr 2008 16:53:48 D WINSERVICE bigHost1\Administrator Read 69 2 Spooler
c:\WINDOWS\system32\services.exe bigHost1.comp.com
03 Apr 2008 16:53:48 D WINSERVICE bigHost1\Administrator Read 69 2 Spooler
c:\WINDOWS\system32\services.exe bigHost1.comp.com
03 Apr 2008 16:53:50 D WINSERVICE bigHost1\Administrator Read 69 2 Spooler
c:\WINDOWS\system32\services.exe bigHost1.comp.com
03 Apr 2008 16:53:50 D WINSERVICE bigHost1\Administrator Read 69 2 Spooler
c:\WINDOWS\system32\services.exe bigHost1.comp.com
03 Apr 2008 16:53:53 D WINSERVICE bigHost1\Administrator Read 69 2 Spooler
c:\WINDOWS\system32\services.exe bigHost1.comp.com
03 Apr 2008 16:53:53 D WINSERVICE bigHost1\Administrator Read 69 2 Spooler
c:\WINDOWS\system32\services.exe bigHost1.comp.com
03 Apr 2008 16:54:10 D WINSERVICE bigHost1\Administrator Read 69 2
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Spooler
```

```
C:\WINDOWS\regedit.exe bigHost1.comp.com
03 Apr 2008 16:54:10 D WINSERVICE bigHost1\Administrator Read 69 2
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Spooler
C:\WINDOWS\regedit.exe bigHost1.comp.com
03 Apr 2008 16:54:19 D WINSERVICE bigHost1\Administrator Read 69 2
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Spooler
C:\WINDOWS\regedit.exe bigHost1.comp.com
03 Apr 2008 16:54:26 D WINSERVICE bigHost1\Administrator Read 69 2
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Spooler
C:\WINDOWS\regedit.exe bigHost1.comp.com
03 Apr 2008 16:54:26 D WINSERVICE bigHost1\Administrator Write 69 2
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Spooler
C:\WINDOWS\regedit.exe bigHost1.comp.com
```

Total records displayed 11

## Windows Registry Protection

CA Access Control lets you protect entries in the Windows registry.

You provide protection to a registry key by assigning a resource of class REGKEY to the key. You can then specify access authorities on the key, as with other resources.

Specifying access rights on a key does not affect access to subkeys of the key, except for enumeration (listing) of subkeys, which requires read access to the key.

CA Access Control only supports the REGVAL resource in the AC environment on Windows Server 2003 and subsequent Windows systems. On these systems, CA Access Control protects registry values with the REGVAL class, and the REGKEY access authorization does not affect access to the key's values.

On earlier systems, CA Access Control does not support the REGVAL resource in the AC environment and the access authorization applied on a REGKEY record does affect access to the key's values.

REGKEY and REGVAL records have identical structures. Each record contains the following access control lists:

- ACL
- CALACL
- NACL
- PACL

REGVAL and REGKEY records both allow the same access types, which are as follows:

- READ
- WRITE
- DELETE
- NONE

**Note:** CA Access Control registry protection does not protect the registry operations of loading and unloading a hive. On Windows Server 2008 and subsequent systems, CA Access Control returns a value of REG\_NONE if an accessor tries to access a protected registry value with access NONE. A value of REG\_NONE confirms that a value is present but does not specify what the value is.

## Protect a Windows Registry Entry

You can protect a Windows registry entry, and so provide additional protection to Windows operations.

### To protect a Windows registry entry

1. If you want to use the REGKEY and REGVAL class records, ensure these classes are active. (They are active by default.)
2. Create a REGKEY or a REGVAL record with the name of the registry key or value you want to protect.

**Note:** Use the full registry path name to specify the key or value. You can use a wildcard to specify all sub-keys or sub-key values that are nested under a key.

The registry entry is now protected with the default access that CA Access Control provides for the record.

3. (Optional) Assign the users and groups, with their access authorization, to the appropriate access control list in the REGKEY or REGVAL record.

**Example: Provide default access of NONE to a Registry Key**

The following `selang` command provides default access of NONE to a registry key:

```
er REGKEY HKEY_LOCAL_MACHINE\SOFTWARE\TestKey1 defacc(NONE) owner(nobody)
```

As a result, the default access to key1 is as follows:

Action	Systems earlier than Windows Server 2003	Windows Server 2003 systems and later	Windows Server 2008 systems and later
Enumerate sub-keys	Deny	Deny	Deny
Query, modify, rename, or delete key	Deny	Deny	Deny
Load or unload hive to key	Deny	Deny	Deny
Enumerate values	Deny	Deny	Permit
Read, create, rename, or delete values	Deny	Permit	Permit
Enumerate sub-keys of sub-keys	Deny	Permit	Permit
Create sub-keys	Permit	Permit	Permit
Query, modify, rename, or delete sub-keys	Permit	Permit	Permit
Load or unload hive to sub-keys	Permit	Permit	Permit

**Example: Provide default access of READ to a Registry Key**

The following `selang` command provides default READ access to a registry key:

```
er REGKEY HKEY_LOCAL_MACHINE\SOFTWARE\TestKey1 defacc(READ) owner(nobody)
```

As a result, the default access to Key 1 is as follows:

Action	Systems earlier than Windows Server 2003	Windows Server 2003 and later	Windows Server 2008 and later
Enumerate sub-keys	Permit	Permit	Permit
Read key	Permit	Permit	Permit
Modify, rename, or delete key	Deny	Deny	Deny
Load or unload hive to key	Deny	Deny	Deny
Enumerate values	Permit	Permit	Permit
Read values	Permit	Permit	Permit
Create, rename, or delete values	Deny	Permit	Permit
Enumerate sub-keys of sub-keys	Permit	Permit	Permit
Create sub-keys	Permit	Permit	Permit
Query, modify, rename, or delete sub-keys	Permit	Permit	Permit
Load or unload hive to sub-keys	Permit	Permit	Permit
Enumerate sub-key values	Permit	Permit	Permit
Create sub-key values	Permit	Permit	Permit

### Example: Provide default access of NONE to a Registry Key Wildcard

The following selang command provides default access of NONE to all subkeys in a registry key:

```
er REGKEY HKEY_LOCAL_MACHINE\SOFTWARE\TestKey1* defacc(NONE) owner(nobody)
```

The wildcard (\*) does not apply to Key1, but to all subkeys of Key1; this means that any form of access is denied to all subkeys of Key1. Access is also denied to rename or delete Key1, due to the parent protection rule.

This command permits access to the values of Key1. The access to values of subkeys of Key1 (for example values of Key1\subkey1\) varies between different Windows systems:

- On Windows Server 2003 and subsequent systems, this command denies access to enumerate the values of any subkey of key1, but grants access to create, rename, delete, and read the values.
- On systems earlier than Windows Server 2003, this command denies all access to the values of subkeys of Key1.

### Example: Provide default access of NONE to a Registry Value

The following selang command protects a specific registry value with access NONE on Windows Server 2003 and subsequent systems:

```
er REGVAL HKEY_LOCAL_MACHINE\SOFTWARE\TestKey\value1 defacc(NONE) owner(nobody)
```

**Note:** On Windows Server 2008 and subsequent systems, CA Access Control returns a value of REG\_NONE if an accessor tries to access a protected registry value with access NONE. A value of REG\_NONE confirms that a value is present but does not specify what the value is.

## Protect File Streams

A stream is a sequence of bytes. File streams contain file data, and provide additional information about a file. For example, you can create a stream that contains keywords or metadata.

**Note:** File streams are only available on the NTFS file system. For more information on file streams, see the Microsoft Developer Network (MSDN) Library website.

When you create a FILE rule, CA Access Control automatically protects the default data stream for the file. For example, a rule that protects the file c:\foo.txt also governs permissions to c:\foo.txt::\$DATA. However, CA Access Control does not automatically protect any non-default data streams; for these, you have to create additional file protection rules.

To protect file streams do either *one* of the following:

- To protect a specific stream, create a file rule in the format:

*drive:\path\filename.ext.stream*

- To protect a specific stream type of a particular stream, create a file rule in the format:

*drive:\path\filename.ext.stream:type*

- To protect all streams, create a generic file rule in the format:

*drive:\path\filename.ext.\**

### **Example: Protect All File Streams**

The following selang command creates a generic file rule that protects all the streams in the file `c:\foo.txt`:

```
er file c:\foo.txt:* owner(nobody) defaccess(none)
```

### **Example: Protect A Specific Stream**

The following selang command creates a file rule that protects the stream *mystream* in the file `c:\foo.txt`:

```
er file c:\foo.txt:mystream owner(nobody) defaccess(none)
```



# Chapter 5: Managing Authorization

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This section contains the following topics:

[Access Authorities](#) (see page 65)

[Setting Access Authority - Examples](#) (see page 65)

[Access Control Lists](#) (see page 66)

[How Access Authority to a Resource Is Determined](#) (see page 68)

[Interaction Between User and Group Access Authorities](#) (see page 69)

[Security Levels, Categories, and Labels](#) (see page 70)

## Access Authorities

The main purpose of CA Access Control is to assign and enforce access authorities, also known as access rights.

An access authority always has the following components:

- The resource that the access applies to, for example, a file, host, or terminal
- The type of access, for example read, write, delete, log in, run
- The accessor, which is either a user or a group

A user has the authority to access a resource in a certain way because one or more of the following are true:

- The user has the access authority, as granted by the resource ACL
- The user is a member of a group that has access authority.
- The user is running a program that has the access authority. For example the user has the authority to run a program in the SPECIALPGM class, or to run a command in the SUDO class.

**Note:** For more information about access authority by class, see the *selang Reference Guide*.

## Setting Access Authority - Examples

### Example: Give an internal User Read Access

The following `selang` command adds the internal user `internal_user` to the ACL of terminal `tty30`, to give read access to the terminal:

```
authorize TERMINAL tty30 access(READ) uid(internal_user)
```

### Example: Give an Enterprise User Read Access

The following selang command adds the enterprise user Terry to the ACL of terminal tty30, to give read access to the terminal:

```
authorize TERMINAL tty30 access(READ) xuid(Terry)
```

### Example: Change an Access Authority of an Enterprise User to a Resource

The following selang command sets Terry's access to terminal tty30 to none, and so denies Terry access:

```
authorize TERMINAL tty30 access(NONE) xuid(Terry)
```

### Example: Remove the Access Authority of an Enterprise User from a Resource

The following selang command removes Terry from the ACL in the terminal tty30:

```
authorize- TERMINAL tty30 xuid(Terry) access-
```

Terry now has the default access to the terminal.

### Example: Give an Enterprise User Sub-administrator Access

The following selang commands set up the enterprise user Terry as a sub-administrator with the authority to manage users and files:

```
authorize ADMIN USER xuid(Terry)
authorize ADMIN FILE xuid(Terry)
```

## Access Control Lists

The access authorities to a resource are specified in an access control list. Every resource record has at least two access control lists:

#### ACL

Specifies the accessors that are granted access to the resource, together with the type of access that they are granted.

#### NACL

Specifies the accessors that are denied authorization to the resource, together with the type of access that they are denied.

The access authority can also depend on the circumstances around the access, such as whether the user is logged in locally or not.

## Conditional Access Control Lists

Conditional Access Control Lists (CACLs) provide an extension to ACLs. When an accessor attempts to access a resource, if the resource's ACL and NACL do not define an access authority for the user, CA Access Control examines the conditional access control lists.

The conditional access control lists specify access to resource where the access is by a particular method, for example by using a specified program.

For example you can use a conditional access control list to define a program pathing rule.

CA Access Control allows the following conditional access control lists:

- Program Access Control Lists (PACLs)
- TCP class access control lists
- CALENDAR class access control lists

To define an entry in a conditional access control list entry, you can use the `via` option of the `selang authorize` command.

In common with other access control lists, each entry in a conditional access control list specifies the accessors that are granted access to the resource, together with the type of access that they are granted. In addition, an entry in a conditional access control list specifies the condition under which the authority is assigned. For a PACL, the condition is the name of a program which the accessor needs to run to have the access.

### Example: Using a PACL

To allow the enterprise user `sysadm1` to become superuser only by running the program `secured_su`, you can specify the corresponding conditional access rule using the following `selang` command:

```
authorize SURROGATE user.root xuid(sysadm1) via(pgm(secured_su))
```

## defaccess—The Default Access Field

The record for a resource can include a default access field, `defaccess`. The value of the `defaccess` field specifies the access authority that is allowed to accessors who are not covered by any of the resource access control lists.

## How Access Authority to a Resource Is Determined

When an accessor attempts to access a resource, CA Access Control checks the access authority by running through one or more checks in a pre-determined order, until it gets a result. If any check produces an access result (deny or allow access), CA Access Control does not check any further, but instead returns the result.

The order in which it runs through these checks is important. For each resource, CA Access Control checks the access records in the following order by default:

1. The resource's time based restrictions
2. The resource's ownership (owners are allowed access)
3. B1 checks
4. The resource's NACL
5. The resource's ACL
6. The resource's PACL
7. The resource's defaccess field

The order of the last two checks is determined by the setting of the accpac option. You can disable the use of resource PACL by using the selang command setoptions setpacl-.

One access control list can contain more than one entry that affects a user. For example, it can contain an entry that mentions a user explicitly, and also entries for each of the groups to which the user belongs. CA Access Control checks all the possible entries at each level before it goes to the next level. For more information about how it resolves conflicting rules at each level, see [Interaction Between User and Group Access Authorities](#) (see page 69).

### Example: The Resultant Permission on a File

For the following table, assume that an accessor named user1 attempts to read the resource file1.

In the following table CA Access Control is following the default setting of the accpac option to use the PACL.

Entry in NACL for user1	Entry in ACL for user1	Entry in PACL for user1	Entry in defaccess	Resulting Permission
Read	(Any)	(Any)	(Any)	Read denied

Entry in NACL for user1	Entry in ACL for user1	Entry in PACL for user1	Entry in defaccess	Resulting Permission
(Not defined)	None	(Any)	(Any)	Read denied
(Not defined)	Read	(Any)	(Any)	Read granted
(Not defined)	(Not defined)	via pgm securereade r	(Any)	Read allowed through the securereader program
(Not defined)	(Not defined)	(Not defined)	Read	Read granted

Where an entry is shown as *(Not defined)*, this means that no entry for user1 exists in that access control list.

Where an entry is shown as *(Any)*, this means that the entry in that access control list does not matter, because CA Access Control does not check it.

The order that CA Access Control checks is from left to right. Notice that for all rows, the cells to the right of a cell with a defined access have the value *(any)*. Conversely all the cells to the left of a cell that contains a defined access have the value *(not defined)*.

## Interaction Between User and Group Access Authorities

You can explicitly grant or deny access authorities to a user, and also to groups to which the user belongs. Sometimes these can conflict. The following example shows what results if conflicting access authorities are assigned to the same resource when a user is a member of two groups (Group 1 and Group 2).

It assumes that the [accumulative group rights](#) (see page 70) option is set (the default setting).

Access Authority for User	Access Authority for Group 1	Access Authority for Group 2	Resulting Access Authority
Access denied	(Any)	(Any)	Access denied
Access granted	(Any)	(Any)	Access granted
(Not defined)	Access granted	(Not defined)	Access granted
(Not defined)	(Not defined)	Access granted	Access granted
(Not defined)	Access granted	Access granted	Access granted

Access Authority for User	Access Authority for Group 1	Access Authority for Group 2	Resulting Access Authority
<i>(Not defined)</i>	Access denied	<i>(Any)</i>	Access denied
<i>(Not defined)</i>	<i>(Any)</i>	Access denied	Access denied

Where an entry is shown as *(Not defined)*, this means that no entry for the user or group is defined.

Where an entry is shown as *(Any)*, this means that the access authority does not matter, because CA Access Control does not check it.

## Accumulative Group Rights (ACCGRR)

The *accumulative group rights* option (ACCGRR) affects how CA Access Control checks a resource's ACL. If ACCGRR is enabled, CA Access Control checks the ACL for the authorities granted from all the groups to which the user belongs. If ACCGRR is disabled, CA Access Control checks the ACL to see if any of the applicable entries contain the value none. If so, access is denied. Otherwise CA Access Control ignores all group entries except the first applicable one in the access control list. By default the option is enabled.

To enable the ACCGRR option, you can use the following `selang` command:

```
setoptions accgrr
```

To disable the ACCGRR option, you can use the following `selang` command:

```
setoptions accgrr-
```

## Security Levels, Categories, and Labels

Security levels and security categories provide additional ways to restrict access to a resource, complementary to the use of access control lists.

Security labels are a means to bundle security levels and categories together, to manage them more easily.

## Security Levels

A *security level* is an integer between 0 and 255 that you can assign to accessors and resources. An accessor cannot access a resource if the accessor has a security level less than the security level assigned to the resource, even if the user is granted access authority in the resource's access control list. If a resource has a zero security level, security level checking is not checked for that resource.

An accessor with a security level of zero cannot access any resource that has a non-zero security level.

## Security Categories

A *security category* is the name of record in the CATEGORY class. You can assign a security category to accessors and to resources. An accessor can access a resource only if the accessor is assigned to all of the security categories assigned to the resource.

## Security Labels

A *security label* is the name of a record in the SECLABEL class. A security label bundles together a security level and a set of security categories. Assigning a security label to an accessor or a resource gives the accessor or resource the combined security level and security categories associated with the security label. A security label overrides any specific security level and category assignments in an accessor or resource.

### Example: Use of a Security Label High\_Security

Assume High\_Security is a security label that contains a security level 255 and the security categories MANAGEMENT and CONFIDENTIAL.

if you assign a user user1 to the security label High\_Security, user1 has a security level of 255 and also has the security categories MANAGEMENT and CONFIDENTIAL.



# Chapter 6: Protecting Accounts

---

This section contains the following topics:

[Protecting User Impersonation Requests](#) (see page 73)

[Setting Up the Surrogate DO Facility](#) (see page 75)

[Defining SUDO Records \(Task Delegation\)](#) (see page 76)

[Checking User Inactivity](#) (see page 82)

## Protecting User Impersonation Requests

After an account logs in, you must monitor it to ensure that it performs only authorized functions on system resources. The operating systems provide some degree of protection for files based on the accessor's user SID. To bypass that protection, a user must first impersonate himself to another user SID. The operating system's protection against unauthorized impersonation is that the impersonation action asks the requesting user to specify the target user's password.

This scheme has many faults. A user who wants to impersonate himself to a user SID must memorize the target user's password, write it down, or ask the target user to use a trivial password. This violates several password policies. In addition, there is no effective accountability; you can never tell which user changed identification to a specific user. Moreover, once the password of the superuser is known to a user, any security is bypassed, and that user has unlimited access to the system.

CA Access Control uses a more advanced method for protecting impersonation: a user can change the user SID to another user's SID only if a specific rule allows the change.

For example, suppose that user X runs a program that performs some tasks as user Y. User X has user Y's password but does not have permission to substitute to user Y, so the program request is denied.

This way, Administrator's password is not enough for an intruder; there must also be a rule in the database that allows the intruder to become Administrator.

Each user SID and group SID can have an access rule in the database. CA Access Control has assigned the SURROGATE class for this type of protection. If in the initial stage you wish to grant access to any impersonation request, use the following command:

```
editres SURROGATE _default defaccess(READ)
```

This command tells CA Access Control to allow access if a user makes a request to impersonate himself to another user, and a record in the database does not explicitly protect the user substitution.

To protect against attempts to substitute the SID to that of the superuser, use the following command:

```
newres SURROGATE USER.Administrator defaccess(NONE)
```

This command tells CA Access Control that the Administrator user name is protected and that users not explicitly permitted to use it cannot impersonate to Administrator. To permit the security administrators to use Administrator, you must explicitly specify it by using the following command:

```
authorize SURROGATE USER.Administrator gid("Administrators")
```

### Usage Notes:

- If a SURROGATE record of a user does not specifically permit a certain user to do the substitution, the user gets the default access of that record. In the previous example, the default is NONE, which means that users without permission cannot impersonate to Administrator.
- A record called USER.\_default represents all users who do not have their own records. Similarly, record called GROUP.\_default represents all groups that do not have their own records. If no SURROGATE record for a certain accessor exists, a request for substitution to that accessor ends with the default specified in the SURROGATE USER.\_default record, the SURROGATE GROUP.\_default record, or the \_default record (for both users and groups).

- The default value for the `_default` record is `READ`; undefined `SURROGATE` records imply permission to impersonate into those users. This default meets the general rule of thumb during implementation that says "whatever is not defined in CA Access Control is not protected by CA Access Control." You can modify this rule after the implementation stage to the opposite rule: "whatever is not permitted in CA Access Control is automatically forbidden by CA Access Control."
- Many Windows utilities and services (for example, `Run As`) identify as user `"NT AUTHORITY\SYSTEM"` and not as the original user running them. To let users who use these utilities and services impersonate another user, you must create this `SYSTEM` user in the CA Access Control database and authorize it to impersonate the target user. For example:

```
auth SURROGATE USER.Administrator uid("NT AUTHORITY\SYSTEM") acc(R)
```

## Setting Up the Surrogate DO Facility

Operators, production personnel, and end users often need to perform tasks that only the superuser can perform.

The traditional solution is to supply all these users with the superuser's password, which compromises the security of the site. The secure alternative - keeping the password secret - results in the system administrator being overloaded with legitimate requests from users to perform routine tasks.

The Surrogate DO (`sesudo`) utility solves this dilemma. It allows users to perform actions that are defined in the `SUDO` class, where each record contains a script, specifies which users and groups can run the script, and lends them the necessary permissions for the purpose.

For example, to define a `SUDO` resource that starts the "Print Spooler" service as if the user were `System`, enter the following `selang` command:

```
newres SUDO StartSpooler data("net start spooler")
```

This `newres` command defines `StartSpooler` as a protected action that some users may receive `System` authority to perform.

**Important!** In the `data` property, use a full absolute path name. A relative path name could accidentally execute a Trojan horse program planted in an unprotected directory.

In addition, users can be authorized to perform the `StartSpooler` action by using the `authorize` command. For example, to allow the user `operator1` to start the "Print Spooler" service, enter the following `selang` command:

```
authorize SUDO StartSpooler uid(operator1)
```

You can also explicitly prevent a user from performing the protected action by using the `authorize` command. For example, to prevent the user `operator2` from starting the "Print Spooler" service, enter the `selang` command:

```
authorize SUDO StartSpooler uid(operator2) access(None)
```

Executing the `sesudo` utility performs the protected action. For example, the user `operator1` would start the "Print Spooler" service using the following command:

```
sesudo -do StartSpooler
```

The `sesudo` utility first checks whether the user is authorized to perform the SUDO action and then, provided the user is authorized to the resource, executes the command script defined in the resource. In the case of our example, `sesudo` checks whether `operator1` is authorized to perform the `StartSpooler` action and then invokes the command "net start spooler" with System credentials.

**Note:** For more information about the `sesudo` utility, see the *Reference Guide*.

## Defining SUDO Records (Task Delegation)

A record in the SUDO class stores a command script so that users can run the script with borrowed permissions. The ability to borrow permissions is tightly controlled by the SUDO record, as well as by the `sesudo` command that executes the scripts.

**Note:** The `sesudo` command cannot execute interactive processes when the SeOS Task Delegation service runs under a user account other than the SYSTEM account on a machine where Terminal Services are installed.

In a SUDO record, the `comment` property is used for a special purpose, and often it is known by its alternate name: the `data` property.

The `comment` property's value is the command script, with the optional addition of one or more script parameter values that are to be prohibited or permitted. The entire `comment` property value must be enclosed in single quotes, and executables should be referenced by their complete path names in order to prevent Trojan horses from taking their place.

This is the format for the `comment` property:

```
comment('cmd[;[prohibited-values];[permitted-values]]')
```

Because the lists of prohibited and permitted values are optional, a simple comment property value can be the following:

```
newres SUDO NET comment('net use')
```

The simple value in the command means that the command `sesudo NET` will execute the command `'net use'`. No particular script parameter values are prohibited; all are permitted.

Wildcards and powerful variables give you flexibility in specifying prohibited and permitted parameters. The wildcards you can use are the standard Windows wildcards. Prohibited and permitted parameters can also contain the following variables:

Variable	Description
\$A	An alpha value
\$G	An existing CA Access Control group name
\$H	(UNIX only) A parameter that starts with the user's home directory
\$N	A numeric value
\$O	The CA Access Control name of the user running <code>sesudo</code>
\$U	An existing CA Access Control user name
\$e	An empty entry. Use this to specify a SUDO command with no parameters for the rule.
\$f	An existing file name
\$g	An existing Windows group name
\$h	An existing host name
\$r	An existing file with Windows read access
\$u	An existing Windows user name
\$w	An existing file with Windows write access
\$x	An existing file with Windows execute access

If you append a list of *prohibited* parameter values to the script:

- Separate the script from the prohibited parameter values with a semicolon, but keep them all inside the single quotes. For example, if you want to prevent the user from using `-start` but you permit the user to use all other parameters, enter the following command:

```
newres SUDO scriptname comment('cmd;-start')
```

where *cmd* represents your script.

Alternatively, if you do not allow any parameter values, but rather want all parameters defaulted, define the SUDO record as follows:

```
newres SUDO scriptname comment('cmd;*')
```

- If a script parameter has more than one prohibited value, use the space character as a separator. For example, if you want to prevent the user from using `-start` and `-stop` but you permit the user to use all other parameters, enter the following command:

```
newres SUDO scriptname comment('cmd;-start -stop')
```

- If more than one script parameter has prohibited values, use the pipe character (`|`) as a separator between sets of prohibited values. For example, if you want to prevent the user from using `-start` and `-stop` for the script's first parameter and from using any existing Windows user name for the second parameter (see the previous list of variables), enter the following command:

```
newres SUDO scriptname comment('cmd;-start -stop | $u')
```

If the script has more parameters than you list, then your last set of prohibited parameters applies to all the remaining parameters.

If you append a list of *permitted* parameter values to the script,

- The `sesudo` utility checks that the parameter values:
  - Do *not* match any of the corresponding *prohibited* values.
  - Match at least one of the corresponding *permitted* values.

This means that if a parameter value is in the prohibited list, it will not be permitted even if it is also specified in the permitted list.

- Separate the list of *permitted* values from the list of *prohibited* values with a semicolon, but keep them all inside the single quotes. Even if you have no list of prohibited values, you still need the semicolon; otherwise what you intend to permit will be prohibited. For example, if you want to allow only the value `NAME` as a parameter value for the script, enter the following command:

```
newres SUDO scriptname comment('cmd;;NAME')
```

- Just as in the other list,
  - If a script parameter has more than one permitted value, use the space character as a separator.
  - If more than one script parameter has permitted values, use the pipe character (`|`) as a separator between sets of permitted values.

For example, if you have two parameters, and the first must be numeric but must not be a Windows user name, and the second must be alphabetic but must not be a Windows group name, enter the following command:

```
newres SUDO scriptname comment('cmd;$u | $g ;$N | $A')
```

If the script has more parameters than you list, then your last set of permitted parameters applies to all the remaining parameters.

Thus, the overall format for the comment property is this: first the script; then the prohibited values, parameter by parameter; then the permitted values, parameter by parameter:

```
comment('cmd;\nparam1_prohib1 param1_prohib2 ... param1_prohibN | \nparam2_prohib1 param2_prohib2 ... param2_prohibN | \n...\nparamN_prohib1 paramN_prohib2 ... paramN_prohibN ; \nparam1_permit1 param1_permit2 ... param1_permitN | \nparam2_permit1 param2_permit2 ... param2_permitN | \n...\nparamN_permit1 paramN_permit2 ... paramN_permitN')
```

The sesudo utility checks each parameter entered by the user in the following manner:

1. Test if parameter N matches permitted parameter N. (If permitted parameter N does not exist, the last permitted parameter is used.)
2. Test if parameter N matches prohibited parameter N. (If prohibited parameter N does not exist, the last prohibited parameter is used.)

If all the parameters match permitted parameters, and none match prohibited parameters, sesudo executes the command.

#### **Example: Set Up Task Delegation that Permits a User to Run net send**

The following procedure shows you how you let user Takashi execute the net send command and prevent him from executing the net start command:

1. In CA Access Control Endpoint Management click the Users tab, then click the Authorization and Delegation subtab.

The Authorization and Delegation menu options appear on the left.

2. Click Task Delegations.

The Task Delegations page appears.

3. Click Create Task.

The Create Task page appears.

4. Complete the dialog fields as follows:

Field	Value
Name	NET
Data	net;start;send *
Owner	nobody
Default Access	None (option cleared)
Authorized Accessors	USER: Takashi Allow: Execute

Click Save.

The new task delegation (SUDO) record is created.

## 5. Test the task delegation rule:

- a. Log in as Takashi.
- b. Open the command prompt and execute the following:

```
sesudo -do NET start
```

The following message appears:

```
sesudo: you are not allowed to use 'start' as parameter number 1.
```

**Note:** *net start* will not execute because it was defined as a prohibited value.

- c. Execute the following value:

```
sesudo -do NET send comp message
```

The command should execute.

### Example: Authorize a User to Execute Privileged Operations using an Interactive Application

A user can perform highly privileged operations using any snap-in MSC module, as the following example shows:

1. In CA Access Control Endpoint Management click the Users tab, then click the Authorization and Delegation subtab.

The Authorization and Delegation menu options appear on the left.

2. Click Task Delegations.

The Task Delegations page appears.

3. Click Create Task.

The Create Task page appears.

4. Complete the dialog fields as follows:

Field	Value
Name	services
Data	c:\winnt\system32\mmc.exe
Owner	nobody
Options	Interactive (option selected)
Default Access	None (option cleared)
Authorized Accessors	USER: Tori Allow: Execute

Click Save.

The new task delegation (SUDO) record is created. The Interactive option provides the desktop user interface that can be used by whoever is logged in when the service is started. This is available only if the service is running as a LocalSystem account.

5. Test the task delegation rule:
  - a. Log in as Tori.
  - b. Open the command prompt and execute the following:

```
sesudo -do services
```
  - c. mmc.exe will start.

## Checking User Inactivity

The inactivity feature protects the system from unauthorized access through accounts whose owners are away or no longer employed by the organization. An inactive day is a day in which the user does not log in. You can specify the number of inactive days that must pass before the user account is suspended and cannot log in. Once an account is suspended, you must manually reactivate it.

**Note:** Password changes count as activities, in terms of inactivity checks. If a user's password changes, that user cannot become suspended due to inactivity.

You can set the number of inactive days with the inactive property of a USER class record or a GROUP class record. The latter affects only users that have that group as a profile group. You can also set inactivity for all users systemwide with the INACT property of the SEOS class.

In *selang*, use the following command to specify inactivity globally:

```
setoptions inactive (numdays)
```

To set the number of days for a group (which overrides the systemwide inactive setting for that group), use the following command:

```
editgrp groupName inactive (numdays)
```

To set the number of days for a user (which overrides group and systemwide settings for that user), use the following command:

```
editusr userName inactive (numdays)
```

To reactivate a suspended user account, use the following command:

```
editusr userName resume
```

To reactivate a suspended profile group, use the following command:

```
editgrp userName resume
```

To disable inactive login checking at the systemwide level, use the following command:

```
setoptions inactive-
```

To disable inactive login checking for a group, use the following command:

```
editgrp groupName inactive-
```

To disable inactive login checking for a user, use the following command:

```
editusr userName inactive-
```



# Chapter 7: Managing User Passwords

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This section contains the following topics:

[Managing Password and Lockout Policies](#) (see page 85)

[Configure Password Quality Checking](#) (see page 86)

[Resolving Error Messages](#) (see page 87)

## Managing Password and Lockout Policies

Passwords are the most popular device for authentication, but password protection methods have well-known problems: trivial passwords are easy to guess; passwords that last for years and cyclic passwords are eventually broken; and passwords sent in clear text over a network can be trapped by listeners.

Windows has a set of password rules and policies that force users to use passwords that avoid most of these common pitfalls. CA Access Control has additional rules that ensure that users select even more secure passwords.

You can specify the following rules in CA Access Control:

- A new password cannot match previous passwords. The number of previous passwords that CA Access Control stores is specified in the password policy.
- A new password cannot contain the user name.
- A new password cannot contain the password that it is replacing.
- A new password cannot match the password that it is replacing. CA Access Control disregards letter case.
- A new password must have at least the minimum number of alphanumeric characters, special characters, digits, lowercase characters, and uppercase characters specified in the password policy.

- A new password must not have more repetitive characters than is specified in the password policy.
- A new password cannot be one of the restricted words in the dictionary included in CA Access Control. The dictionary is specified in the Dictionary value in the registry subkey:

HKEY\_LOCAL\_MACHINE\Software\ComputerAssociates\AccessControl\passwd

Each password must have a maximum lifetime; that is, it must expire, forcing the user to choose a new password after a certain interval.

- Each password must have a minimum lifetime. By specifying a minimum lifetime, you can prevent users from quickly and repeatedly changing passwords. With frequently changed passwords, they could overflow the password history stack and then re-use a previous password.

## Configure Password Quality Checking

### To configure password quality checking

1. In CA Access Control Endpoint Management click the Configuration tab.  
The configuration menu options appear on the left.
2. Click Class Activation in the Miscellaneous section options.  
The Class Activation page appears.
3. Select PASSWORD in the User Identity Control section, and click Save.  
This activates password quality checking.
4. Click User Password Policy in the Policies section options.  
The User Password Policy page appears.
5. Define the rules to be used for the password checks, and click Save.  
The rules you define for password checks are now enforced when passwords are changed.
6. Update the new passwords by using the sepass utility.

**Note:** For more information about sepass utility, see the *Reference Guide*.

### Example: Define Password Checking Rules

The following selang commands activate password quality checking and define password rules that enforce a minimum of:

- Six alphanumeric characters
- Three lowercase characters
- Two numeric characters

```
setoptions class+ (PASSWORD)  
setoptions password(rules(alpha("6") lowercase("3") numeric("2")))
```

**Note:** For more information about the format of the setoptions command, see the *Reference Guide*.

## Resolving Error Messages

If you are setting passwords for users on Windows NT systems, the following message may appear:

The password is shorter than required.

This error means that the password does not meet the policy requirements. This is caused by any of the following:

- The password is shorter or longer than the required length.
- The password has been used recently and exists in the Windows NT Change History field.
- The password does not have enough unique characters.
- The password does not meet other password policy requirements (such as those set with CA Access Control password policies).

To avoid this error, make sure you set a password which meets all applicable requirements.



# Chapter 8: Monitoring and Auditing

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This section contains the following topics:

[Security Auditors](#) (see page 89)

[Events Interception](#) (see page 90)

[Monitoring Access Control Activity](#) (see page 95)

[What CA Access Control Audits](#) (see page 96)

[The Auditing Process](#) (see page 106)

[Viewing Audit Events](#) (see page 111)

[The Audit Log](#) (see page 114)

## Security Auditors

One of the most important tasks of security auditors and system administrators is auditing or monitoring system activity to detect suspicious or malicious activity. Security auditing plays an essential role in a secure environment, and the security auditing features in CA Access Control include the following:

- Providing a reliable indication of who has accessed the system, what resources have been accessed, how the resource has been accessed (for example, read a file), and when resources have been accessed
- Notifying and alerting appropriate users in case of an attempted security breach, even if the attempt failed
- Indicating what changes have been made to the security rules, and by whom
- Providing a means to test the effect of access rules before they are enforced

CA Access Control auditing is modeled after real-world auditing: security auditors act independently of system and security administrators, although you can change your implementation so that this is not the case if some other model is more appropriate for your environment.

A security auditor is a user to whom the AUDITOR attribute is assigned. Users defined as security auditors are permitted to perform auditing tasks such as changing the audit rules that are assigned to users and resources. They are also authorized to use the CA Access Control auditing utilities without being required to have the ADMIN attribute.

## Events Interception

CA Access Control intercepts an event if the following two conditions are met:

- The appropriate class is active.
- A rule anticipating this event exists in the database.

For example, you can use the following generic rule to audit all file accesses to files that reside in c:\data\payroll:

```
newres FILE c:\data\payroll*
```

You also need to make sure that the FILE class is active (the default).

## Types of Intercepted Events

CA Access Control intercepts two types of events:

- Interception Events

Information from an interception event is cached as part of the process for future use by an audit event.

- Audit Events

## Interception Modes

Based on the interception mode, CA Access Control intercepts, checks for authorization, and logs audit records of access request events. CA Access Control has the following modes of interception:

- Full Enforcement mode
- Audit Only mode
- No Interception mode

**Note:** Warning mode (see definition on page 91) is not an interception mode; it works in Full Enforcement mode only and is designed for short term use during implementation.

## Audit Only Mode

*Audit Only mode* records all intercepted events without checking or enforcing access rules. Use this mode to collect data for compliance requirements or regulations. In Audit Only mode, CA Access Control intercepts the event and writes an audit event but does not process the request for authorization and does not enforce rules. As a result, CA Access Control permits all access requests it intercepts. This means that the authorization result recorded in the audit log for all events is *P* (permitted).

The following restrictions apply to Audit Only mode:

- No audit records are sent to Unicenter.  
In Audit Only mode all events are permitted (*P*). Permitted events are not sent to Unicenter.
- The audit properties of the resource and the user are *not* taken into consideration.  
Audit Only mode records *all intercepted* events regardless of resource- or user-specific settings.

## Set Up Audit Only Mode

*Audit Only mode* records all intercepted events without checking or enforcing access rules. Use this mode to collect data for compliance requirements or regulations.

To set up Audit Only mode, set the SeOSD\GeneralInterceptionMode CA Access Control registry entry to 1.

**Important!** If you use Audit Only mode, make sure that you have enough disk space for the audit logs and that the size limit of the audit log is large enough. You should also consider options for [audit log backup](#) (see page 119).

## Warning Mode

*Warning Mode* is a property that you can apply to a resource, and an option that you can apply to a class. If Warning mode is applied to a resource or a class and an access violates an access rule, CA Access Control writes an audit log entry with the return code *W*, but permits the access to the resource. If a class is in Warning mode, all the resources in that class are in Warning mode.

Warning Mode only has an effect if CA Access Control is in Full Enforcement mode.

**Note:** Full Enforcement mode is the only mode CA Access Control for UNIX supports. CA Access Control for Windows also supports Audit Only mode.

You can use Warning mode when you introduce or modify an access policy. If you do this, you can examine the audit log to preview the results of your intended policy before you put that policy into effect. You can display the audit log by using the `seaudit` command.

If a class has the property *warning*, you can put the class into Warning mode. If a resource group or class is in Warning mode, when an access rule is violated, CA Access Control allows the access and writes an entry in the audit log that references the resource (not the resource group or class).

The Warning mode settings on a resource and on a class are independent: if you put a resource into Warning mode, it remains in Warning mode, even if it belongs to a class and you remove Warning mode from that class.

**Note:** You can only put resources or classes into Warning mode if they have the property *warning*; not all resources or classes have this property.

### More information:

[Audit Only Mode](#) (see page 91)

## Put a Resource into Warning Mode

You put a resource into Warning mode to monitor the effects of access rules, without needing to enforce these rules.

**Note:** As well as putting individual resources into Warning mode, you can [put a class into Warning mode](#) (see page 93).

### To put a resource into Warning mode

1. In CA Access Control Endpoint Management edit the resource you want to put into Warning mode.

The appropriate Modify page appears.

2. Click the Audit tab.

The Audit Modes page for the resource appears.

3. Select Warning Mode, and click Save.

The resource you modified is now in Warning mode.

**Note:** In Warning mode, CA Access Control always writes warning records to the audit log when access is permitted but access rules are violated: you do not need to set the audit property on the resource for this to happen.

Use the `sereport` utility (report number 6) to see all resources in Warning mode.

### Example: Put a File into Warning Mode

The following selang example puts the file c:\myfile into Warning mode:

```
chres FILE c:\myfile warning
```

### Example: Clear Warning Mode from a File

The following selang example takes the file c:\myfile out of Warning mode:

```
chres FILE c:\myfile warning-
```

Warning mode is now not active for the myfile, so CA Access Control enforces the access rules for myfile.

### Example: Put a Terminal into Warning Mode

The following selang example puts the terminal myterminal into warning mode:

```
chres terminal myterminal warning
```

CA Access Control permits access by any authorized user from the terminal myterminal, but logs an audit record for any user that normally would be denied access from that terminal.

## Put a Class into Warning Mode

Rather than putting individual records into Warning mode, you can put all records in a class into Warning mode. Use Warning mode to monitor the effects of access rules, without needing to enforce these rules.

Put a class into Warning mode by setting the Warning property on the class. You can use the setoptions selang command to do this, as follows:

```
setoptions class(classname) flags+ (W)
```

**Note:** The W flag is case sensitive and must be in upper case.

#### ***classname***

Defines the name of the class you want to put into Warning mode.

To clear Warning mode for the class, you can also use the setoptions command, as follows:

```
setoptions class(classname) flags- (W)
```

## Find Out Which Resources Are in Warning Mode

You should use Warning mode as a temporary measure when implementing CA Access Control. Once you are comfortable that users have the required access to the resources they require, you should turn off Warning mode and CA Access Control will start enforcing the associated rules.

To find out which resources are in Warning mode, you can create a report that shows all resources with Warning mode.

To create a report, enter the following command:

```
sereport -f pathname.html -r 6
```

CA Access Control creates the report.

**Note:** For more information about the sereport utility, see the *Reference Guide*.

## Find Out Which Classes Are in Warning Mode

You should use Warning mode as a temporary measure when implementing CA Access Control. Once you are comfortable that users have the required access to the resources they require, you should turn off Warning mode and CA Access Control will start enforcing the associated rules.

To find out which classes are in Warning mode, you can get CA Access Control to display this data.

To display this data, enter the following selang command:

```
setoptions cwarnlist
```

CA Access Control displays a table showing the classes that are in Warning mode.

**Note:** For more information about setoptions, see the *selang Reference Guide*.

## Monitoring Access Control Activity

The CA Access Control trace is a real-time log that can show every action taken by CA Access Control. Trace records are accumulated in *ACInstallDir\log\seosd.trace* (where *ACInstallDir* is the directory where you installed CA Access Control).

Or they are accumulated in whatever file you specify as the *trace\_file* value in the registry subkey:

```
HKEY_LOCAL_MACHINE\SOFTWARE\ComputerAssociates\AccessControl\SeOSD\
```

Although you can filter the records from the trace file, the trace mechanism is designed for system monitoring and not for security auditing.

By default, CA Access Control only generates trace messages during CA Access Control initialization. Once CA Access Control is initialized, it stops the trace mechanism and trace messages are not generated.

### Trace Record Filters

CA Access Control generates two types of trace records:

- User trace records—Record actions completed by the user, for example, user1 accessed file c:\tmp\tmp.exe.
- General trace records—Record actions completed by the system, for example, the Watchdog set a program to be non-trusted.

Trace records are written to the seos.trace file, and can be filtered using the trcfilter.ini file.

If you set a user to be traceable, each time a trace record is written for that user, a matching audit record is written to the seos.audit file. Audit records are filtered by the audit.cfg file.

**Note:** Audit records generated by trace events are not cached, and always go through the full enforcement flow.

The following *selang* command sets a user to be traceable:

```
editusr userName audit(trace)
```

To view trace or audit records, use the *seaudit* utility.

## Filtering Trace Records

Using a trace filter file, you can specify that certain types of activity should not appear in the trace file. The trace filter file is specified with the *trace\_filter* value in the registry key:

HKEY\_LOCAL\_MACHINE\SOFTWARE\ComputerAssociates\AccessControl\SeOSD

The default value is *ACInstallDir\log\trcfilter.ini* (where *ACInstallDir* is the directory where you installed CA Access Control).

**Important!** CA Access Control creates the trace filter file at installation with the single line: *\*seosd.trace\**. Never delete this record.

Each line in the trace filter file represents an access or an activity that should *not* be traced. For example, to eliminate tracing the users' access to Microsoft Word, add the following line to the trace filter file:

\*winword.exe\*

## What CA Access Control Audits

For security auditing, CA Access Control keeps audit records for intercepted events according to the audit rules defined in the database and the enforcement mode it operates in. The records in the audit log accumulate according to these audit rules.

Full auditing provides audit records for all intercepted events of any of the following:

- File access (FILE class)
- Program execution (PROGRAM class)
- Registry access (REGKEY and REGVAL classes).
- Impersonation control (SURROGATE class)
- Network control (CONNECT, TCP, HOST, GHOST, HOSTNET, and HOSTNP classes)
- Log in (TERMINAL class)

**Note:** Intercepted login events are not cached; they always follow the auditing process for interception events.

- Service protection (WINSERVICE class)

- Password verification failure (PASSWORD class)
- Process termination (PROCESS class)

The decision whether to log an event depends on the CA Access Control interception mode.

## What CA Access Control Audits in Full Enforcement Mode

In Full Enforcement mode (regular operation), CA Access Control logs events as follows:

- If Warning mode is turned *off* for the intercepted resource, CA Access Control enforces rules and logs the events based on the *audit* property of the resource or user.

Audit Property	Events Logged
ALL	<i>All</i>
SUCCESS	Access permitted
FAIL	Access denied

- If Warning mode is turned *on* for the intercepted resource, a record is written to the audit log if an access request violates an access rule (if the rules were enforced, the request would have failed). The audit record mentions that the violation was permitted because Warning mode is in effect.

Rules are not enforced in this mode.

## What CA Access Control Audits in Audit Only Mode

In Audit Only mode, CA Access Control does not process requests for authorization or enforce rules. All intercepted login events for the accessor and all intercepted events for resources protected by CA Access Control are logged, regardless of whether access failed or succeeded.

## How to Change What CA Access Control Writes to the Audit Log

You can change what CA Access Control writes to the audit log in two ways:

- Use the AUDIT property of the resources or accessors to define the audit events that CA Access Control writes to the audit log.

**Note:** You can use the AUDIT property for a GROUP or XGROUP to set the audit property for all members of the group. However, you cannot use the AUDIT property to set the audit mode for group members if a user's audit mode is defined in a USER record, XUSER record, or profile group.

- Use the audit configuration file audit.cfg to filter the events CA Access Control sends to the audit log. You cannot use the audit.cfg file to add events to the audit log.

To reduce the number of audit records, you can also control consecutive audit events written to the log file. This customization is based on time interval between consecutive matching audit events (that is, an access to a resource with the same process ID, thread ID, rule ID, user ID, and access mask). The time interval, in seconds, can be set by setting the value of the AuditRefreshPeriod registry entry. By default, the AuditRefreshPeriod is set to zero (0), which means that all events are written to the log file.

## Setting Audit Rules

For security auditing, CA Access Control keeps audit records for events of access denial or access grants according to the audit rules defined in the database.

Every accessor and resource has an AUDIT property that can be set to one or more of the following values:

### **FAIL**

Logs access failures by the accessor to the resource.

### **SUCCESS**

Logs successful accesses by the accessor to the resource.

### **LOGINFAIL**

Logs every logon failure by the accessor. (This value does not apply to resources.)

### **LOGINSUCCESS**

Logs every successful logon by the accessor. (This value does not apply to resources.)

**ALL**

Logs the same information as FAIL, SUCCESS, LOGINFAIL, and LOGINSUCCESS for accessors or FAIL and SUCCESS for resources.

**NONE**

Logs nothing concerning the accessor or resource.

Whenever you create or update an accessor or resource record in the database, you can specify the AUDIT property. You can also specify whether email notification of logged events should be sent and to whom.

The records in the audit log accumulate according to these audit rules. The decision whether to log an event is based on the following:

- If the resource or accessor has AUDIT(ALL), all login events for the accessor and all events concerning resources protected by CA Access Control are logged, regardless of whether access failed or succeeded.
- If access to a resource protected by CA Access Control is successful and the accessor or resource has AUDIT(SUCCESS), the event is logged.
- If access to a resource protected by CA Access Control fails and the accessor or resource has AUDIT(FAIL), the event is logged.

In addition, if you set a user to be traceable, each time a trace record is written for that user, a corresponding audit record is written to the audit log.

## Define the Audit Events That CA Access Control Writes to the Audit Log

CA Access Control writes access success and failures to the audit log. To define which access events CA Access Control writes to the audit log, change the value of the AUDIT property for the resource or accessor that you want to audit. You can also use this method to specify that CA Access Control logs every trace event to the audit log.

You use the AUDIT property to specify the audit events that CA Access Control writes to the audit log. Use `selang` or CA Access Control Endpoint Management to set the AUDIT property for resources and accessors as follows:

Value of AUDIT	What CA Access Control Logs	Applicable Objects
FAIL	Access failures	Users and resources
SUCCESS	Access successes	Users and resources
LOGINFAIL	Login failures	Users
LOGINSUCCESS	Login successes	Users

Value of AUDIT	What CA Access Control Logs	Applicable Objects
ALL	Equivalent to FAIL, SUCCESS, LOGINFAIL and LOGINSUCCESS	Users and resources
TRACE	Equivalent to ALL plus all system events	Users
NONE	No logging	Users and resources

**Note:** If the audit property of a user is not set, the AUDIT value of a group or profile group can affect the audit mode CA Access Control uses for the user.

## How CA Access Control Determines the Audit Mode for a User

The audit mode for a user specifies which audit events CA Access Control sends to the audit log for that user. The following process describes how CA Access Control determines the audit mode for a user:

1. CA Access Control checks if the user's record in the USER or XUSER class has a value for the AUDIT property.

If the user's record has a value for the AUDIT property, CA Access Control uses that value as the audit mode for the user.

2. CA Access Control checks if the user is assigned to a profile group. If the user is assigned to a profile group, CA Access Control checks if the profile group's record in the GROUP or XGROUP class has a value for the AUDIT property.

If the user is assigned to a profile group and the profile group's record has a value for the AUDIT property, CA Access Control uses that value as the audit mode for the user.

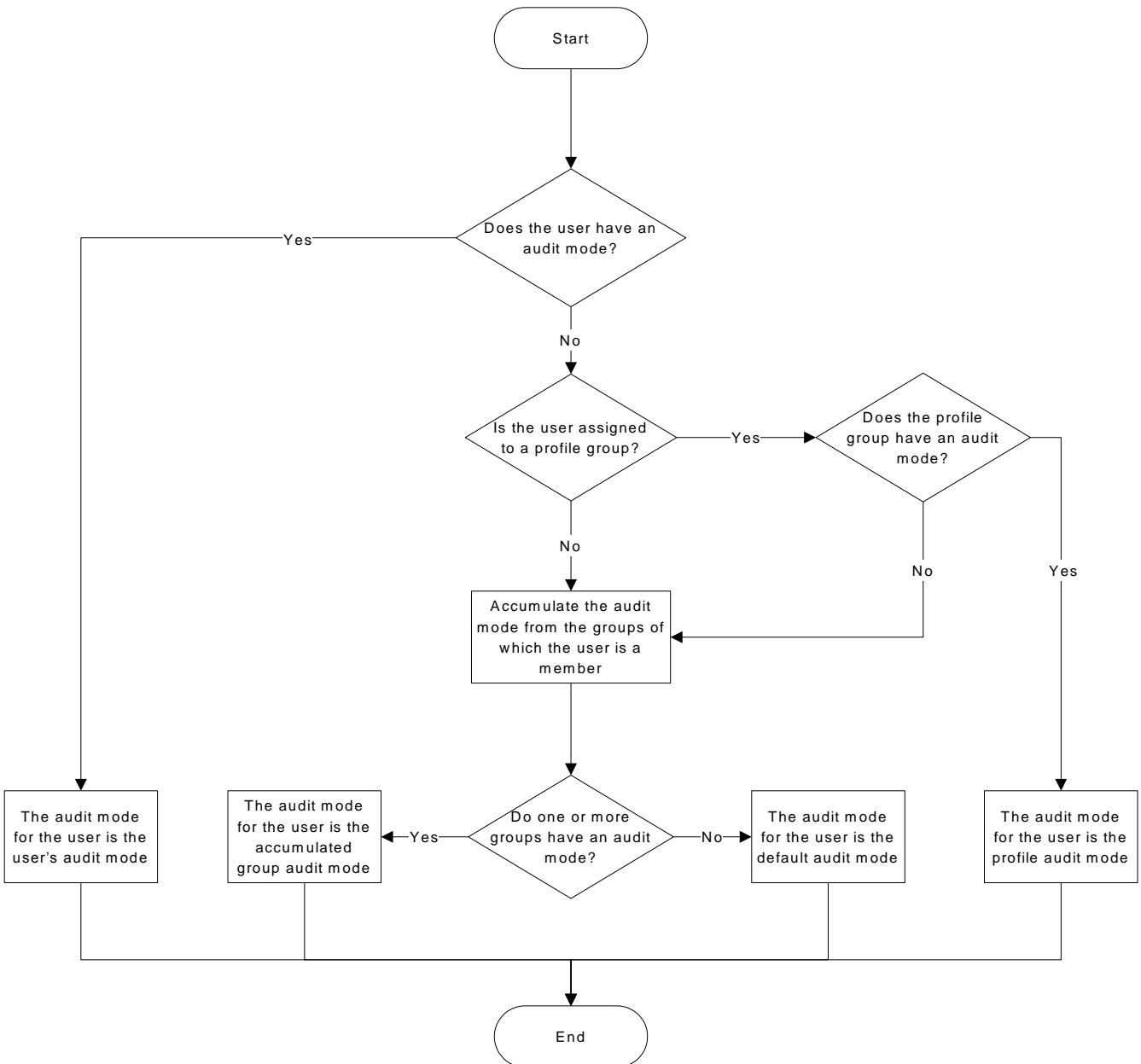
3. CA Access Control checks if the user is a member of a group. If the user is a group member, CA Access Control checks if the group's record in the GROUP or XGROUP class has a value for the AUDIT property.

If the user is group member and the group's record has a value for the AUDIT property, CA Access Control uses that value as the audit mode for the user. If the user is not a member of a group, or if the group's record does not have a value for the AUDIT property, CA Access Control assigns the default audit mode to the user.

**Note:** The user's audit mode accumulates if a user is a member of more than one group and the groups have different audit modes. The audit mode for the user is the sum of all the audit modes for the groups of which they are members.

**Note:** If CA Access Control uses the value of a group's AUDIT property to determine the audit mode for a user, and you change the group's audit mode while the user is logged in, the audit mode for the logged-in user also changes. The user does not have to log off for the change in group audit mode to take effect.

The following diagram shows how CA Access Control determines the audit mode for a user:



### Example: Audit by Groups

User Jan is a member of Group A and Group B. Group A has an audit mode of FAIL and Group B has an audit mode of SUCCESS. Because Jan is a member of both groups, Jan has the accumulated audit mode of FAIL and SUCCESS.

**More information:**

[How CA Access Control Uses Profile Groups to Determine User Properties](#) (see page 41)

**Default Audit Modes for Users and Enterprise Users**

When you create a user (USER object), CA Access Control assigns the default AUDIT\_MODE to the object. The default value of the AUDIT\_MODE property is Failure, SuccessLogin, SuccessFailure.

When you create an enterprise user (XUSER object), by default CA Access Control does not assign a default AUDIT\_MODE value to the object.

**Note:** (UNIX) To change the default value of the AUDIT\_MODE property for USER objects, edit the value of DefaultAudit in the [newusr] section of the lang.ini file.

## Setting Audit Policies in Windows

In addition to setting access rules for accessors and resources, you can specify Windows events that you want to write to the audit log. You can specify such audit policies for the entire organization, on a group basis, on a profile group basis, or on a user-by-user basis.

### Example: Set an Audit Policy for All Members of a Profile Group

The following example shows you how you can set an audit policy for all users that are part of profile group:

1. Create a new profile group with the audit mode you require. For example:

```
newgrp profileGroup audit(failure) owner(nobody)
```

2. Create a new user and attach it to the profile group you created. For example:

```
newusr user1 profile(profileGroup) owner(nobody)
```

3. Remove the user's audit setting. For example:

```
chusr user1 audit-
```

You can now check whether this setting is effective:

1. Log on as the new user:

```
runas /user:user1 cmd.exe
```

2. From user1's command prompt window, enter the following:

```
secons -whoami
```

This command displays the information that is used for authorization and is held in the ACEE for user1.

```
ACEE audit mode is: Failure; Originated from Profile group definition
```

This message confirms that the audit policy is derived from the profile group the user is attached to.

### Example: Set a Audit Policy for Group Members

In this example, a fictional company named Forward Inc wants to use CA Access Control to protect all files in the /production directory. The /production directory has full access permissions in the native environment.

Forward Inc wants to deny and audit any attempts to access the /production directory. However, Forward Inc permits read access to the /production directory for developers. This access is not audited. An attempt by a developer to write to the /production directory is denied and audited.

Developers can request full access to the /production directory. Forward Inc audits any activity that a user with full access performs in the /production directory.

The following process describes the steps Forward Inc takes to implement the previous scenario:

1. Create a group named Developers in the native environment. Join all the developers to this group.
2. Create a group named Dev\_Access\_All in the native environment. Do not join any users to this group.
3. Define a generic access rule for the /production directory, as follows:

```
authorize FILE /production/* access(none) uid(*)
```

This rule sets the default access as none.

4. Define a generic audit rule for the /production directory, as follows:

```
editres FILE /production/* audit(failure)
```

This rule audits any failed attempt to access the /production directory.

5. Define an access rule for the Developers group, as follows:

```
authorize FILE /production/* access(read) xgid(Developers)
```

This rule permits members of the Developers group to have read access to the /production directory.

**Note:** The rule you set in Step 4 helps ensure that CA Access Control audits any failed access attempt by any user, including members of the Development group.

6. Define an access rule for the Dev\_Access\_All group, as follows:

```
authorize FILE /production/* access(all) xgid(Dev_Access_All)
```

This rule permits members of the Dev\_Access\_All group to have full access to the /production directory.

7. Define an audit rule for the Dev\_Access\_All group, as follows:

```
chxgrp Dev_Access_All audit(all)
```

This rule audits every action a member of the Dev\_Access\_All group performs.

8. When a member of the Developers group needs full access to the /production directory, add the user to the Dev\_Access\_All group in the native environment.

The user has full access to the /production directory, and CA Access Control audits every action the user performs.

**Note:** The user must start a new logon session for the change in group membership to take effect.

9. When the user has completed their task in the /production directory, remove the user from the Dev\_Access\_All group in the native environment.

The user now has read access to the /production directory. CA Access Control denies and audits any other access attempt on the /production directory by the user.

**Note:** The user must start a new logon session for the change in group membership to take effect.

## The Auditing Process

To configure CA Access Control for your auditing requirements, you must first understand how auditing works. Auditing lets you keep track of access requests (events) that CA Access Control intercepted. You can use this data to meet with compliance requirements, to analyze and refine your access rules for your security requirements, or to monitor access requests.

The process CA Access Control follows to record audit events in the log depends on the type of event it intercepts:

- [Interception events](#) (see page 107)

**Note:** Intercepted login events (TERMINAL class), and audit records generated by user traces, are not cached; they always follow the auditing process for interception events.

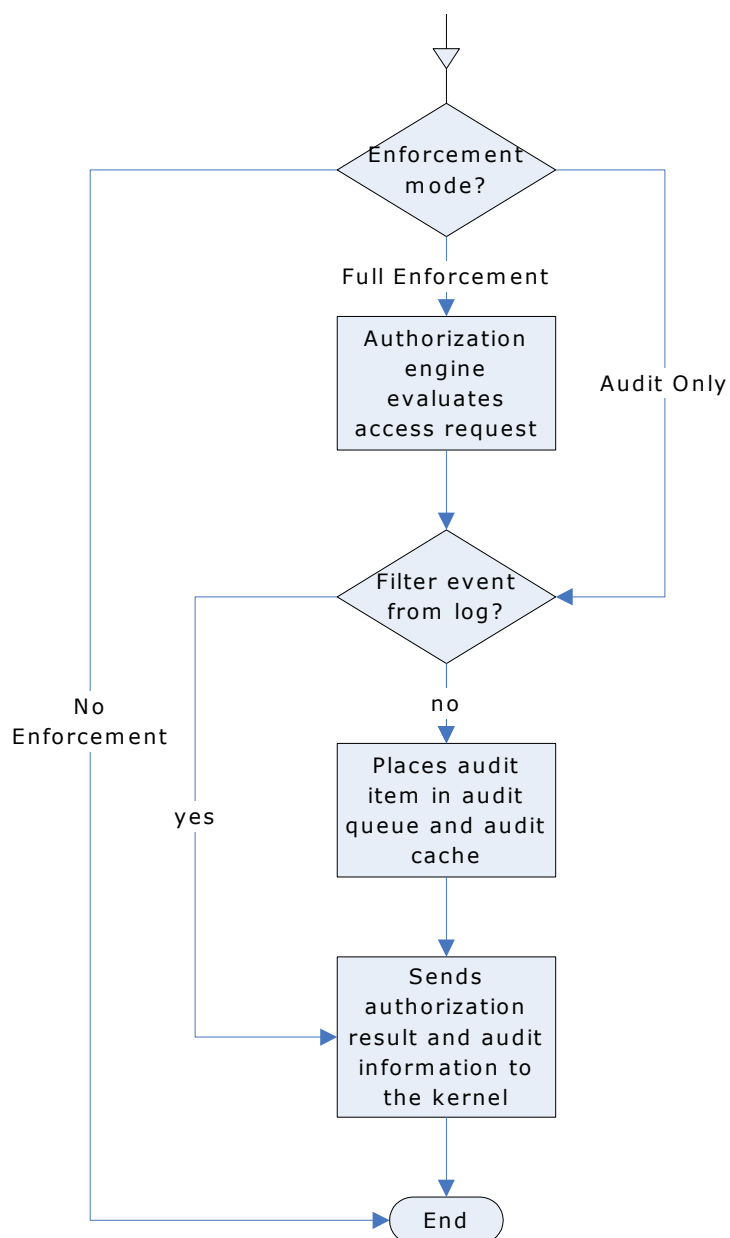
- [Audit events](#) (see page 109)

**Note:** CA Access Control intercepts an event only if the appropriate class is active, and the database contains a rule anticipating this event.

## How Auditing Works for Interception Events

An *interception event* is an event that CA Access Control encounters for the first time and for which no authorization information or audit information exists in the kernel cache.

To log audit records, CA Access Control performs the following actions and causes these effects for an interception event:



- In No Enforcement mode, events are not intercepted or audited.
- In Full Enforcement mode, CA Access Control does the following:
  1. The authorization engine places an audit item based on the authorization result in the audit queue and in the audit cache.

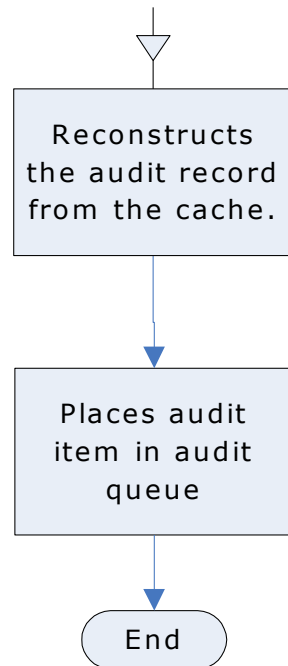
CA Access Control writes an audit item only if the audit property for the resource or accessor is set to audit the resulting event and the audit filter file is not set to filter this event.
  2. The authorization engine returns an informative answer on the authorization result and the audit related information to the kernel.
- In Audit Only mode, CA Access Control does not process the request for authorization. Audit information is always written, regardless of the audit property of the resource and user.

CA Access Control writes an audit item only if the audit filter file is not set to filter this event. The authorization result in this mode is always *P* (permitted).

**Note:** Intercepted login events (TERMINAL class), and audit records generated by user traces, are not cached; the authorization engine always writes audit records for these events.

## How Auditing Works for Audit Events

The following diagram and steps demonstrate how auditing works for audit events:



Once the kernel notifies CA Access Control about the cached interception event, CA Access Control performs the following actions to log the audit event:

1. Reconstructs the audit data using the audit cache out of the information sent by the kernel
2. Puts the audit item in the audit queue

## Kernel and Audit Caches

The *kernel cache* contains data about previously intercepted events. The kernel identifies such cached intercepted events (audit events) and sends them to CA Access Control for processing. Essentially, CA Access Control uses the kernel cache to intercept events that follow the same pattern as a previously intercepted event.

The *audit cache* contains data that lets CA Access Control reconstruct reoccurring audit records and send them to the audit queue without needing to follow the authorization process. This means that intercepted events, for which enough information already exists in the cache (audit events), are processed quickly and added to the audit queue. The authorization engine provides the data that is stored in the kernel and audit caches from the result of the initial event it intercepted (the interception event).

## Cache Reset

CA Access Control clears both the kernel and audit caches in the following cases:

- Database changes  
CA Access Control clears the entire cache when database information changes. New or modified access rules make an existing cache potentially inaccurate.
- Time checkpoint reached  
CA Access Control clears the entire cache when a time checkpoint affects an authorization result for any event. At the time that a DAYTIME restriction property or a HOLIDAY class record changes, the authorization result may change too and the cache becomes potentially inaccurate.
- PROGRAM resource change  
CA Access Control clears the entire cache when the watchdog identifies that a PROGRAM resource has changed and become un-trusted. An un-trusted program affects the result of an authorization request regarding that program. This makes the cache potentially inaccurate.
- Audit cache filling  
CA Access Control clears 10% of cache items (the least recently used items) when the audit cache fills up.

Once the cache is cleared, information from new interception events is needed to refill the cache and let CA Access Control intercept an audit event.

## Viewing Audit Events

CA Access Control sends audit events to the audit logs. You view the audit logs using the following CA Access Control tools:

- CA Access Control Endpoint Management
- The seaudit utility

You can configure CA Access Control to also send audit events to the Windows event log. The event log stores audit events from various applications in a single collection. You use the Windows Event Viewer to view audit events in the event log.

### Audit Events in the Windows Event Log

The Windows event log stores audit events from various sources in a single collection. If you configure CA Access Control to route audit events to the event log, each time seosd writes an audit event to the CA Access Control audit log, a corresponding event is sent to the event log.

The audit.cfg file filters audit events from both the audit log and the event log. If an audit event is not written to the audit log, it is not sent to the event log.

The Windows 2008 event log also routes audit events into containers called channels, depending on the volume, audience, and originating application of the audit events. The CA Access Control channel is named CA-AccessControl-AuthorizationEngine/Audit.

If you have deployed CA Access Control on a Windows 2008 server, you can choose to send audit events to:

- the event log
- the channel
- both the event log and the channel
- neither the event log or the channel

## Route Audit Events to the Windows Event Log

If you configure CA Access Control to route audit events to the Windows event log, each time seosd writes an audit event to the CA Access Control audit log, a corresponding event is sent to the event log. You can also configure CA Access Control to send Policy Model audit events to the event log.

### To route events to the event log

1. Stop CA Access Control using the following command:

```
secons -s
```

CA Access Control stops.

2. Set the value of the SendAuditToNativeLog configuration setting in the logmgr section to 1.

Audit events are sent to the Windows event log.

3. (Optional) Set the value of the SendAuditToNativeLog configuration setting in the Pmd section to 1.

Audit events for policy models are sent to the Windows event log.

4. Restart CA Access Control using the following command:

```
seosd -start
```

CA Access Control restarts.

### Example: Route Audit Events to the Event Log

The following example routes audit events to the event log. You must be in the remote configuration environment (env config) to use this command:

```
er config ACROOT section(logmgr) token(SendAuditToNativeLog) value(1)
```

### Example: Route Policy Model Audit Events to the Event Log

The following example routes Policy Model audit events to the event log. You must be in the remote configuration environment (env config) to use this command:

```
er config ACROOT section(Pmd) token(SendAuditToNativeLog) value(1)
```

### More information:

[Change Configuration Settings](#) (see page 175)

## Route Audit Events to the Windows Event Log Channel

### Valid for Windows Server 2008 only

If you configure CA Access Control to route audit events to the Windows event log channel, each time seosd writes an audit event to the CA Access Control audit log, a corresponding event is sent to the event log channel. The CA Access Control event log channel is named CA-AccessControl-AuthorizationEngine/Audit.

You can also configure CA Access Control to send Policy Model audit events to the event log channel. The Policy Model event log channel is named CA-AccessControl-Policy Models/Audit.

### To route events to the event log channel

1. Stop CA Access Control using the following command:

```
secons -s
```

CA Access Control stops.

2. Set the value of the SendAuditToNativeChannel token in the logmgr registry subkey to 1.

Audit events are sent to the Windows event log channel.

3. (Optional) Set the value of the SendAuditToNativeChannel token in the Pmd registry subkey to 1.

Policy Model audit events are sent to the Windows event log channel.

4. Restart CA Access Control using the following command:

```
seosd -start
```

CA Access Control restarts.

### Example: Route Audit Events to the Event Log Channel

The following example routes audit events to the event log channel. You must be in the remote configuration environment (env config) to use this command:

```
er config ACROOT section(logmgr) token(SendAuditToNativeChannel) value(1)
```

### Example: Route Policy Model Audit Events to the Event Log Channel

The following example routes Policy Model audit events to the event log channel. You must be in the remote configuration environment (env config) to use this command:

```
er config ACROOT section(Pmd) token(SendAuditToNativeChannel) value(1)
```

## The Audit Log

The audit log is stored in a file. The value *audit\_log* in the following Windows registry subkey specifies the location of the audit log file:

```
HKEY_LOCAL_MACHINE\SOFTWARE\ComputerAssociates\AccessControl\logmgr
```

The default value for this key is:

```
C:\Program Files\CA\AccessControl\log\seos.audit
```

By default, CA Access Control automatically backs up the audit log when it reaches 1024 KB. You can change this size by changing the value *audit\_size* in the subkey:

```
HKEY_LOCAL_MACHINE\Software\ComputerAssociates\AccessControl\logmgr
```

You can also choose to back up the audit log periodically (daily, weekly, or monthly) by changing the value *BackUp\_Date* in the Windows registry subkey:

```
HKEY_LOCAL_MACHINE\SOFTWARE\ComputerAssociates\AccessControl\logmgr
```

**Note:** For more information about these registry subkeys, see the *Reference Guide*.

## Using Audit Logs

CA Access Control provides two built-in tools for viewing, filtering, and searching the audit logs:

- CA Access Control Endpoint Management
- The seaudit utility

You can display every record in the audit log, or you can use filters to select particular records from the audit log.

The remainder of this chapter describes how to view the records in the audit log when using audit filters in CA Access Control Endpoint Management.

## Audit Record Filters

The `audit.cfg` file filters audit records on a host by defining records that should not be sent to the audit file. Each line in the file represents a rule for filtering out audit information (that is, the records that match the criteria in the line will not appear in the audit file). This filter helps to limit the size of the `seos.audit` file by keeping only the records needed. You can edit the `audit.cfg` file to suit your enterprise requirements.

By default, the `audit.cfg` file is located in the `ACInstallDir/etc` directory (UNIX) or `ACInstallDir\data` directory (Windows). You can change the location of the `audit.cfg` file by editing the `[logmgr] AuditFiltersFile` token in the `seos.ini` file (UNIX), or the `AuditFiltersFile` entry in the `logmgr` registry key (Windows).

The CA Access Control Engine, `seosd`, reads the `audit.cfg` file at startup. When a message is sent to the audit file, `seosd` checks if the message matches one of the rules in the `audit.cfg` file. If the message matches a rule, the message is not written to the audit file.

**Note:** For more information about the `audit.cfg` file, see the *Reference Guide*.

## Audit Display Filters

The number of records in the audit log can become enormous. To reduce the number of records that CA Access Control *displays*, use filters to select certain types of records for display. You can filter events by various criteria, including time or event type.

**Note:** You can also filter the the audit records CA Access Control *writes* to the audit file using the `audit.cfg` file.

You can create a filter in CA Access Control Endpoint Management by assigning a name and choosing at least one switch. You can choose additional switches, and zero, one, or several options. You can also filter records with the `seaudit` utility.

CA Access Control Endpoint Management provides several predefined filters, and you can create your own filters.

## Switches

### List INET audit records of Host and Service

Lists the INET audit records of the TCP requests received from the specified hosts for the specified services. Host and service are masks that identify which set of hosts and services are searched for.

### Show LOGINs for user on terminal

Displays the following:

- LOGIN records for the specified user on the specified terminal. Both *user* and *terminal* are masks.
- Records created by the authorization engine when an invalid password is entered multiple times.

### List RESOURCEs audit of class on resource for users

Lists resource records. You can specify the following:

- *Class*—a mask that identifies the class to which the accessed resource belongs.
- *Resource*—a mask that identifies the names of the resources that were accessed.
- *User*—a mask that identifies the name of the users who accessed the resources.

### List startup/shutdown messages

Lists the startup and shutdown messages from the CA Access Control services.

### List updates to database

Lists database update audit records. You can specify:

- *Cmd*—a mask identifying the set of selang commands to search for.
- *Class*—a mask identifying the classes to search for.
- *Object*—a mask identifying the records to search for.
- *User*—a mask identifying the users who executed the commands.

### List WATCHDOG audit records

Lists the Watchdog audit records.

### List all records

Lists all records except those sent to the audit log by the tracing facility.

## Options

### **Listing's Ending Date**

Specifies the end date. Records logged after the specified date are not listed.

### **Listing's Ending Time**

Specifies the end time. Records logged after the specified time are not listed.

### **Hide failures**

Specifies that failures not be listed.

### **Hide any granted accesses**

Specifies that successful (granted) accesses not be listed.

### **Hide logout records**

Specifies that logout records not be listed.

### **Show internet address not host name**

Specifies that Internet addresses be listed instead of host names in TCP/IP records.

### **Hide NOTIFY audit records**

Specifies that NOTIFY audit records not be listed.

### **Hide passwords attempts and actions**

Specifies that password attempt records not be listed.

### **Show only records originated from *host***

Specifies that only records originating from the specified host be listed. This option is applicable only when connected to a UNIX workstation.

### **Listing's Starting Date**

Specifies the start date. Records logged before the specified date are not listed.

### **Listing's Starting Time**

Specifies the start time. Records logged before the specified time are not listed.

### **Show port numbers not names**

Specifies that port numbers be listed instead of service names.

### **Hide warning records**

Specifies that warning records not be listed.

## Predefined Filters

CA Access Control comes with the following predefined filters:

### **All records**

Displays every record in the audit log. No filtering takes place.

### **Today's records**

Shows every record created today.

### **Last 2 days' records**

Shows every record created yesterday and today.

### **Last 7 days' records**

Shows every record created during the last seven days.

### **Connections to AC services**

Shows records that indicate when users connect to CA Access Control services such as CA Access Control Endpoint Management or selang.

**Note:** When connecting to a UNIX workstation, the name for this filter becomes Login Records. The records represent user logins.

### **Administration activity**

Shows all records that update the CA Access Control or operating system databases. Updates to the databases include adds, deletes, and changes to all types of records.

## Create a User-Defined Filter

You can build as many filters as you need. Create a custom filter when you want to view only a particular set of audit records.

### **To create a user-defined filter**

1. In CA Access Control Endpoint Management click the Audit Events tab.  
The Audit Records Viewer - Filter Settings section shows the list of Saved Filters.
2. In the Saved Filters section, click Actions, Create Filter.  
The Audit Filter Wizard appears.

3. Use the wizard to create a custom filter. The following fields are not self-explanatory:

**Select Switches**

Specifies the [switches](#) (see page 116) you want to use in your filter.

**Filter Switches Settings**

Specifies settings for the switches you selected. Essentially these are masks that you can define for the audit events you want to filter.

**Filter Options Settings**

Specifies the [options](#) (see page 117) you want to set for audit filtering.

Click Finish.

The new audit filter you defined is saved and loaded.

## Audit Log Backup

CA Access Control lets you automatically backup the audit log file for archiving.

The name of the audit log backup file is set in the logmgr\audit\_back CA Access Control registry entry.

You can use the following methods for backing up the audit log file:

- Size-triggered backups
- Date-triggered backups

The method and settings you choose for backing up your audit log file should depend on:

- Whether you need backup copies of the log file
- How much auditing data is likely to be generated in your environment
- System performance issues (for example, larger audit log files increase processing time)

## Set the Size at which the Audit Log will be Backed Up Automatically

You can set a limit on the size of the audit log file. When the file reaches the defined size, CA Access Control automatically creates a backup copy of the file and clears the log. This means that the file is automatically backed up regularly.

To set the size at which the audit log will be backed up automatically, set the maximum size you require, in KB, in the logmgr\audit\_size CA Access Control registry entry.

**Note:** You can define the name of the backup file by setting the logmgr\audit\_back CA Access Control registry entry.

**Important!** If the logmgr/BackUp\_Date CA Access Control registry entry is set to yes (no is the default), each size-triggered backup copy of the audit log is suffixed with a timestamp. In all other cases, including when date-triggered backups are configured, each backup copy *overwrites* the previously written backup copy.

### Example: Set automatic backup of audit log file when it reaches 5 MB

This example shows you how you set your audit log file to be backed up when it reaches 5 MB (5120 KB). To do this, set the logmgr\audit\_size CA Access Control registry entry to **5120**.

When the audit log file reaches 5 MB, CA Access Control will create a backup copy of the file, named seos.audit.bak by default, and clear the log.

### Example: Set automatic backup of audit log file when it reaches 1 MB with a custom name and a timestamp

This example shows you how you set your audit log file to be backed up when it reaches 1 MB (1024 KB), using a custom name for the backup file and adding a timestamp to the name.

To do this, set the following CA Access Control registry entries as shown:

- logmgr\audit\_size=1024
- logmgr\audit\_back=log\ac\_audit.old
- logmgr\BackUp\_Date=yes

When the audit log file reaches 1 MB, CA Access Control will create a backup copy of the file, and clear the log. The name of the backup log file name will be: ac\_audit.old.*timestamp*, where *timestamp* is the date and time in the format DD-Mon-YYYY.hhmmss. For example:

ac\_audit.old.06-Feb-2007.144330

## Set the Time Interval at which the Audit Log will be Backed Up Automatically

You can define a time interval (daily, weekly, or monthly) at which CA Access Control automatically creates a backup copy of the audit log file and clears the log.

To set the time interval at which the audit log is backed up automatically, set the interval in the logmgr\BackUp\_Date CA Access Control registry entry. The interval can be one of the following:

### **daily**

Backs up the audit log file once a day.

### **weekly**

Backs up the audit log file once a week.

### **monthly**

Backs up the audit log file once a month.

**Note:** You can define the name of the backup file by setting the logmgr\audit\_back CA Access Control registry entry.

**Important!** If the audit log reaches the size limit defined in the logmgr\audit\_size CA Access Control registry entry before the backup interval is reached, CA Access Control creates a backup copy of the file without a timestamp. Each such backup copy can potentially overwrite any previous copy.

### **Example: Set a daily backup of the audit log file**

This example shows you how you set your audit log file to be backed up daily. To do this, set the logmgr\BackUp\_Date CA Access Control registry to **daily**.

Once a day CA Access Control creates a backup copy of the file, and clears the log. The backup log file name has the *.timestamp* suffix, where *timestamp* is the date and time in the format DD-Mon-YYYY.hhmmss. For example:

seos.audit.bak.06-Feb-2007.144330

## Audit Log Troubleshooting

This section lets you troubleshoot problems you may encounter with the audit log.

## SID Resolution Failed (Event Viewer Warning)

### Valid on Windows

#### Symptom:

When I view the Application log of the Windows Event Viewer, I find a Warning event from CA Access Control that says that resolving a specific SID into an account name has failed.

#### Solution:

A *security identifier (SID)* is a numeric value that identifies a user or group to the operating system. Each entry in the system access control list (SACL) has an SID that identifies the user or group for whom access is allowed, denied, or audited.

This warning appears when the operating system was not able to convert the SID into an account name. Make sure that the problematic system and its corresponding domain controller are configured correctly for SID resolution.

## SID Resolution Times Out (Event Viewer Warning)

### Valid on Windows

#### Symptom:

When I view the Application log of the Windows Event Viewer, I find a Warning event from CA Access Control that says that resolving a specific SID into an account name has timed out.

#### Solution:

A *security identifier (SID)* is a numeric value that identifies a user or group to the operating system. Each entry in the system access control list (SACL) has an SID that identifies the user or group for whom access is allowed, denied, or audited.

This warning appears when the operating system was not able to convert the SID into an account name within the defined timeout. Make sure that the:

- Problematic system and its corresponding domain controller are configured correctly for SID resolution
- Network settings are configured correctly

You can also increase the timeout by changing the SeOSD\DefLookupTimeout CA Access Control registry entry.

**Note:** Increasing the SID resolution timeout may downgrade CA Access Control performance.

## Process Short Names Appear in the Audit Log

### Valid on Windows

#### Symptom:

When I view the CA Access Control audit log, some records list process short names (8.3 format). For example, if a process named C:\Program File\MyVeryLongProcessName.exe tries to write to a protected file, this process may appear in the audit log as MYVERY~1.EXE.

#### Solution:

Such records appear when a cache reset occurs after an event is sent to the audit queue, but before it is handled by the audit collector. In this situation, the information the audit collector has cannot be synchronized and it has to reconstruct the audit event.

Run the secons utility with the -i option to evaluate and optimize audit cache performance. Also, minimize [cache resets](#) (see page 110) in your production environment.



# Chapter 9: Scope of Administration Authority

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This section contains the following topics:

[Global Authorization Attributes](#) (see page 125)

[Group Authorization](#) (see page 127)

[Ownership](#) (see page 130)

[Authorization Examples](#) (see page 132)

[Sub Administration](#) (see page 134)

[Environmental Considerations](#) (see page 136)

## Global Authorization Attributes

Global authorization attributes are set in the user record. Each global authorization attribute permits the user to perform certain types of functions. This section describes the functions and the limits of each global authorization attribute.

### ADMIN Attribute

The ADMIN attribute lets a user execute almost all commands in CA Access Control. Users who are defined in the database with the ADMIN attribute can define and update users, groups, and resources in the database. This is the most powerful attribute in CA Access Control, but it does have limitations:

- If only one user in the database has the ADMIN attribute, that user cannot be deleted, and the ADMIN attribute cannot be removed from the record.
- Users with the ADMIN attribute but without the AUDITOR attribute cannot change the type of auditing that is done on a user, group, or resource (audit mode). If you have the ADMIN attribute and need to change the auditing characteristics of a user, group, or resource, assign yourself the AUDITOR attribute.
- Users with the ADMIN attribute cannot delete superuser (the root account on UNIX or the Administrator account on Windows), but they can set root to be a non-ADMIN user.

## AUDITOR Attribute

Users with the AUDITOR attribute can monitor system usage. Explicit privileges of a user with the AUDITOR attribute include the following:

- Users can display information in the database.

Auditors can execute the *selang* commands *showusr*, *showgrp*, *showres*, and *showfile*.

- Users can set the audit mode for existing records.

Auditors can execute the *selang* commands *chusr*, *chgrp*, *chres*, and *chfile*.

## OPERATOR Attribute

Users with the OPERATOR attribute have READ access to all files. With this access, they can list everything in the database, and they can run backup jobs. To list database records, operators use the *showusr*, *showgrp*, *showres*, *showfile*, and *find* commands. The OPERATOR attribute also lets a user use the *secons* utility.

**Note:** For more information about the *secons* utility, see the *Reference Guide*.

## PWMANAGER Attribute

The PWMANAGER attribute gives a regular user the authority to use the *chusr* or *sepass* command to change the passwords of other users.

**Note:** To let the PWMANAGER change the ADMIN user's password, set the *cng\_adminpwd* option of the *setoptions* command. For more information, see the *selang Reference Guide*.

The PWMANAGER attribute does not include authority to change the number of grace logins, the password interval of another user, or general password rules.

The PWMANAGER's authority also includes use of the *showusr* and *find* commands.

**Note:** If a user has the *nochgpass* property set to yes, a PWMANAGER cannot change the password for that user.

## SERVER Attribute

CA Access Control, like many other security models, does not permit a regular user to ask: "Can user A access resource X?" The only question a regular user can ask is: "Can I access resource X?" However, a process that supplies services to many users, such as a database server service or an in-house application, should be permitted to ask for authorization on behalf of other users.

The SERVER attribute allows a process to ask for authorization for users. Users with the SERVER attribute set can issue the SEOSROUTE\_VerifyCreate API.

**Note:** For more information about the server attribute and CA Access Control APIs, see the *SDK Guide*.

## IGN\_HOL Attribute

The IGN\_HOL attribute allows users to log in during any period defined in a holiday record. Each record in the HOLIDAY class defines one or more periods when users need extra permission to log in. With the IGN\_HOL attribute, users can log in at any time, regardless of the periods defined in holiday records.

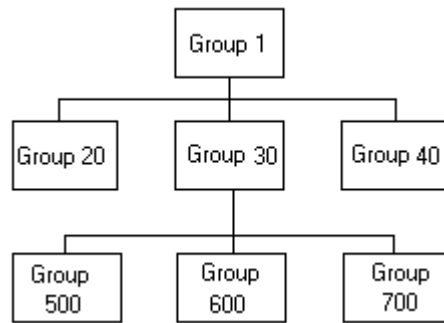
**Note:** For more information about the HOLIDAY class, see the *Reference Guide*.

## Group Authorization

It is necessary to understand the concept of parentage before discussing group authorization attributes.

## Parentage

The concept of subordinate and superior groups, also known as parentage, is important when discussing group administration privileges. One group can be the parent-superior-of one or more groups. A *child* or subordinate group can have only one parent. Assigning a parent to a group is optional. Consider the following diagram:



Group 1 is the parent of the three Groups 20, 30, and 40. Group 30 is also the parent of three groups-500, 600, and 700. Group 600 has only one parent-Group 30. Group 1 has no parent.

## Group Authorization Attributes

All records, including resource records and accessor records alike, have owners. Owning a record means having authorization to view, edit, and remove it.

A group can own its own records. However, within a group that owns records, only certain privileged users can manage the records. These special users have a group authorization attribute set in their own user records. The group authorization attributes are the following:

- GROUP-ADMIN
- GROUP-AUDITOR
- GROUP-OPERATOR
- GROUP-PWMANAGER

The join command-which only a properly authorized user can issue-sets these attributes. The join command serves the purpose of both putting a user into a group, and specifying the user's group authorization attribute (if any).

The privileged members of the group may or may not be authorized to manage the user records that define the members of the group, depending on who owns those records.

**More information:**

[Ownership](#) (see page 130)

**GROUP-ADMIN Attribute**

Users with a group administration authorization attribute can create a certain set of records. In order to create a record, the group administrator has to specify the owner of the record.

The owner of the records must be the group in which the user has a group authorization attribute. If that group is the parent of other groups, the owner can also be from one of the sub groups. The whole set of records is called the group scope. The authorization examples provided illustrate the concept of group scope.

Users with the GROUP-ADMIN attribute have the following access authority for the records within their group scope:

Access	Description	Commands
Read	Show the properties of the record.	showusr, showgrp, showres, showfile
Create	Create new records in the database. You must specify the owner.	newusr, newgrp, newres, newfile
Modify	Change the properties of the record.	chusr, chgrp, chres, chfile
Delete	Remove records from the database.	rmusr, rmgrp, rmres, rmfile
Connect	Join a user to a group or separate a user from a group.	join, join-

The GROUP-ADMIN attribute also has limits:

- GROUP-ADMIN users cannot make resources inaccessible to themselves, so:
  - GROUP-ADMIN users cannot assign a security level that is higher than their own security level.
  - GROUP-ADMIN users cannot assign a security category or security label that they do not have.
- GROUP-ADMIN users cannot delete the user superuser (the root account on UNIX or the Administrator account on Windows) from the database.

- Several limitations concern the global authorization attributes described in Global Authorization Attributes in this chapter:
  - A GROUP-ADMIN user cannot delete the only ADMIN user record in the database.
  - A GROUP-ADMIN user cannot remove the ADMIN attribute from the record of the last ADMIN user in the database.
  - GROUP-ADMIN users without the AUDITOR attribute cannot update the audit mode. Only a GROUP-ADMIN user with the AUDITOR attribute can update the audit mode.
  - GROUP-ADMIN users cannot set the global authorization attributes-ADMIN, AUDITOR, OPERATOR, PWMANAGER, and SERVER-for any user.

### GROUP-AUDITOR Attribute

A user with the GROUP-AUDITOR attribute can list the properties of any record within the group scope. The group auditor can also set the audit mode for any record within the group scope.

### GROUP-OPERATOR Attribute

A user with the GROUP-OPERATOR attribute can list the properties of any record within the group scope.

### GROUP-PWMANAGER Attribute

A user with the GROUP-PWMANAGER attribute can change the password of any user whose record is within the group scope.

## Ownership

Every record in the database-including both accessor records and resource records-has an owner. When you add a record to the database, you can either explicitly assign its owner by using the owner parameter or allow CA Access Control to assign the user who defines the record as the owner of the record.

An owner can be a user or a group. When a group owns a record, only users who have joined the group with the GROUP-ADMIN property can use the privileges of ownership. If you remove a user or group that owns records from the database, the records no longer have an owner.

Users who own records have the following access authority for the records they own:

Access	Description	Commands
Read	Show the properties of the record.	showusr, showgrp, showres, showfile
Modify	Change the properties of the record.	chusr, chgrp, chres, chfile
Delete	Remove the record from the database.	rmusr, rmgrp, rmres, rmfile
Connect	Join a user to a group or separate a user from a group.	join, join-

If you do not want a user or group to have ownership authority over a particular record, assign the owner *nobody* to the record.

The limits of the ownership privileges are as follows:

- The owner of the last ADMIN user in the database cannot delete that user record.
- Owners who do not have the AUDITOR attribute cannot update the audit mode. Only an owner with the AUDITOR attribute can update the audit mode.
- The owner of superuser (the root account on UNIX or the Administrator account on Windows) cannot delete root from the database.
- Owners cannot set the global authorization attributes-ADMIN, AUDITOR, OPERATOR, and PWMANAGER-for the users they own.
- Owners cannot make resources inaccessible to themselves, so:
  - Owners cannot assign a security level that is higher than their own security level.
  - Owners cannot assign a security category or security label that they do not have.

## File Ownership

CA Access Control allows the owner of a file to protect the file by defining a record in the FILE class. The owner of the file has full authority over the record of that file, so the owner can use the `newfile`, `chfile`, `showfile`, `authorize`, and `authorize-` commands with all parameters for the record that protect the file.

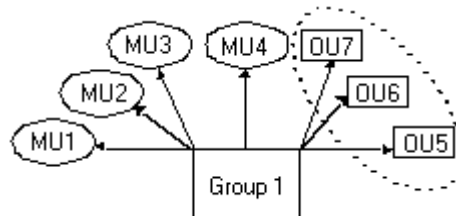
On UNIX, when a user creates a file, UNIX assigns the user as the owner of the file. CA Access Control allows UNIX file owners to define FILE records, unless this feature is explicitly disabled. If you do not want file owners to define FILE records, make sure that the `use_unix_file_owner` token in the `[seos]` section of the `seos.ini` file to `no`. (This is the default setting.)

## Authorization Examples

Following are diagrams that illustrate the concepts of group authorization attributes, parentage, ownership, membership, and group scope. These diagrams only contain users and groups, but the concept of ownership also applies to resource and file records.

### Single Group Authorization

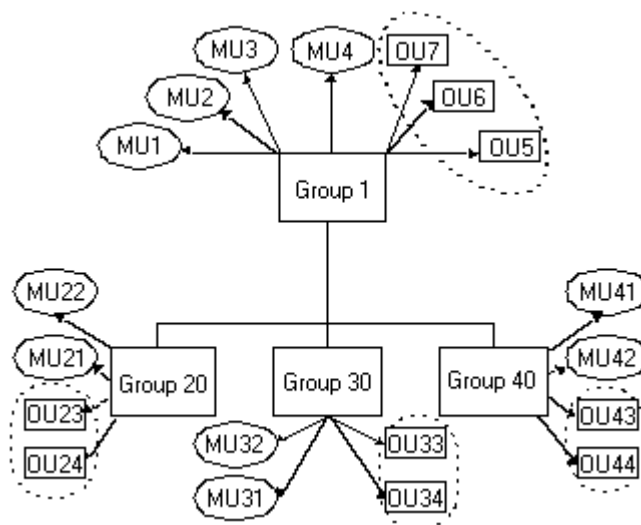
In the following diagram, four users are members of Group 1: MU1, MU2, MU3, and MU4. Group 1 also owns three users-OU5, OU6, and OU7. The member MU4 has the GROUP-ADMIN attribute.



The ellipse indicates the group scope of the commands executed by user MU4. It includes all the users owned by Group 1-OU5, OU6, and OU7.

## Parent and Child Groups

In the following diagram, four users are members of Group 1: MU1, MU2, MU3, and MU4. Group 1 also owns three users-OU5, OU6, and OU7. The member MU4 has the GROUP-ADMIN attribute set in its record.



Group 1 is also the parent of three groups-20, 30, and 40. Each of these subordinate groups has two users who are members of the group and two users who are owned by the group.

The four ellipses indicate the group scope of the commands executed by user MU4. It includes all the users owned by Group 1, as well as the users owned by the groups subordinate to Group 1. The users in the group scope of MU4 are OU5, OU6, OU7, OU23, OU24, OU33, OU34, OU43, and OU44.

If there were groups subordinate to Groups 20, 30, or 40 that owned users, groups, or resources, the records owned by these groups would also be in the group scope of commands executed by user MU4.

## Sub Administration

Security administrators (users with the ADMIN attribute) can grant specific administrative privileges to regular users. These regular users are then called sub administrators. Sub-administrators have privileges to manage only specified CA Access Control classes or objects. For example, a sub administrator can be authorized to manage only user and group objects. You can set a higher level of sub administration by authorizing the sub admin user the administrative privileges for specific objects in a class.

Sub administrators of users, groups and resources can use `selang` to perform administrative tasks related to these resources.

### How to Grant Specific Administrative Privileges to Regular Users

Because administrators—users with the ADMIN attribute—can execute almost all actions in CA Access Control, you may want to delegate specific administrative tasks to sub administrators. To do this, you need to grant those users with privileges to classes in the CA Access Control database that control the specific administrative tasks the user needs to perform as follows:

1. Identify one or more classes that control the tasks you want to delegate.

For example, CA Access Control uses the USER and GROUP classes to create accessor resources. If you want to delegate accessor management, you then need to use the USER and GROUP records of the ADMIN class.

2. Authorize one or more sub administrator to the applicable resource of the ADMIN class.

For example, to let a sub administrator view and modify user records, grant the user with *read* and *modify* access to the USER record of the ADMIN class.

### The ADMIN Class

Sub administrators—users listed in the access control list (ACL) of records in the class ADMIN—have privileges similar to users with the ADMIN attribute. However, the privileges of users in the ACL for records in the class ADMIN are limited to the particular class represented by the record. For example, the SURROGATE record in the ADMIN class determines which users can administer records of the SURROGATE class.

**Note:** For more information about CA Access Control classes, see the *Reference Guide*.

A user in the ACL for a particular record in class ADMIN can execute the following commands:

Access	Description	Commands
Read	Show the properties of the record in the class.	showusr, showgrp, showres, showfile, find
Create	Create new database records in the class.	newusr, newgrp, newres, newfile
Modify	Change properties in the class.	chusr, chgrp, chres, chfile
Delete	Remove existing class records from the database.	rmusr, rmgrp, rmres, rmfile
Connect	Add users to and remove users from groups. This access is valid only in the ACL of the GROUP record.	join, join-
Password	Control the password of all users within the database, and their password attributes. This access grants the same authority as the access permitted a user with the PWMANAGER attribute. This is valid only in the ACL for record USER.	chusr

Users with ADMIN class privileges have the following limitations:

- Users defined in the ACL of the USER record in class ADMIN cannot delete the last ADMIN user in the database.
- ADMIN class users cannot set the global authorization attributes-ADMIN, AUDITOR, OPERATOR, and PWMANAGER-for the users they own.
- ADMIN class users cannot necessarily update the audit mode. Only an ADMIN class user with the AUDITOR attribute can update the audit mode.
- ADMIN class users cannot delete superuser (the root account on UNIX or the Administrator account on Windows), but they can set root to be NOADMIN.
- ADMIN class users cannot make resources inaccessible to themselves, so:
  - ADMIN class users cannot assign a security level to a resource that is higher than their own security level.
  - ADMIN class users cannot assign a security category or security label that they do not have.

These limitations are part of the B1 security level certification.

## Environmental Considerations

One of the factors governing whether you can update information in your database is the position you occupy in the environment.

### Remote Administration Restrictions

You may access a remote station over a network and update the database on the remote station. To update the database on the remote station, both you and your terminal need permission.

- You must be explicitly defined as a user in the database of the remote station. For whatever commands you want to execute, the appropriate attribute must be set in your user record in the database of the remote station.
- You must explicitly mention your local terminal's needs in a rule granting it WRITE permission for accessing the remote station; otherwise, you cannot perform CA Access Control administration there.

With WRITE permission through a default access field (`_default`), or through the UACC class, you can enter the `selang` command shell at the remote station. However, you *cannot* execute any `selang` commands or otherwise access to the remote database. With READ permission, you can log in to the remote station but you cannot perform CA Access Control administration there.

Here is an example of this distinction between WRITE and READ permission:

1. To specify a new terminal with READ as default access, where administrators can log in from the terminal but cannot manipulate the database from it, issue the following command:

```
newres TERMINAL tty13 defacc(read)
```

2. To grant user ADMIN1 permission to manipulate the database from the new terminal (that is, grant WRITE permission as well as READ permission), issue the following command:

```
authorize TERMINAL tty13 uid(ADMIN1) access(r,w)
```

## UNIX Environment

For managing users and groups in UNIX, users in CA Access Control with global or group authorization attributes have the same privileges and limits for UNIX as they do for CA Access Control.

If you use `selang` while the `seosd` daemon is *not* running (for example, at installation time), you must follow these rules:

- You must include the `-l` option in the `selang` command.
- The user of `selang` must be `root`. (This exclusive root privilege complies with regular UNIX restrictions.)

## Windows Environment

For managing users and groups in Windows, users in CA Access Control with global or group authorization attributes have the same privileges and limits for Windows as they do for CA Access Control.

If you use `selang` while the `seosd` daemon is *not* running (for example, at installation time), you must follow these rules:

- You must include the `-l` option in the `selang` command.
- The user of `selang` must be Administrator or belong to the Administrators group.



# Chapter 10: Unicenter Migration and Integration

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This section contains the following topics:

[Installing Unicenter Integration Tools](#) (see page 139)

[Unicenter Integration Features](#) (see page 139)

[Unicenter Security Data Migration Features](#) (see page 140)

[Unicenter Calendar](#) (see page 145)

[Certification with Unicenter](#) (see page 146)

## Installing Unicenter Integration Tools

CA Access Control is fully integrated into the Unicenter Enterprise Management environment. The following sections describe how CA Access Control handles the integration.

**Important!** To integrate Unicenter TNG with CA Access Control, you must have Unicenter TNG installed on the same machine as CA Access Control.

**Note:** For complete installation instructions for the Windows environment, see the *Implementation Guide*.

## Unicenter Integration Features

The following sections describe how CA Access Control integrates with Unicenter TNG.

### SSF/EMSec API Support

The EMSec APIs for Windows channel calls into a single DLL. The EMSec support for Unicenter Integration consists of a replacement CAUSECR.DLL. This DLL receives calls to the EMSec APIs, and then reformats and redirects these requests to equivalent CA Access Control APIs. The return codes from the CA Access Control APIs are converted back into their corresponding EMSec API return codes and control is returned to the caller of the EMSec API. This approach protects the integrity of existing applications that are currently using the EMSec API.

EMSec support is active after the Unicenter integration setup procedure completes. The Unicenter integration setup replaces the current CAUSECR.DLL in the Unicenter installation path (CAIGLBL0000 directory). At this point, incoming EMSec API requests are intercepted by the replacement CAUSER.DLL and the requested information is seamlessly retrieved through the CA Access Control APIs.

## Unicenter Security Data Migration Features

The following sections describe how to migrate Unicenter Security data to CA Access Control.

### Unicenter Security Options Migration

The CA Access Control program called MigOpts.exe extracts selected Unicenter Security options and customizes the targeted CA Access Control database according to these options. To activate this feature, you must run the Unicenter integration with Unicenter Security data migration setup procedure. This setup procedure automatically runs MigOpts.exe.

The following Unicenter Security options can be migrated *completely* into the CA Access Control environment:

- AUDIT\_LOGIN
- MODIFY\_PWDNEVEREXP
- PWDQUEUEUSE
- SEC\_AUDIT\_DBUPDATE
- SEC\_AUDIT\_SEND
- SEC\_PASSWORD\_ALPHA
- SSF\_MAXPWDVIO
- SSF\_MINPWDLEN
- SSF\_SECPWEXCL
- USER\_DEFSEID
- USER\_PWDCHANGE
- USER\_PWDCHGMAXDAYS

- USER\_PWDCHGMINDAYS
- USER\_PWDMAINT

**Note: USER\_PWDMAINT** is migrated into the CA Access Control environment specific to the existing Unicenter Security data. CA Access Control maintains password information, but this process is not automated. When the existing Unicenter TNG users are exported from Unicenter Security into the CA Access Control database, this manual process is performed automatically if the value of the USER\_PWDMAINT option is yes. However, after migration is complete, if an administrator adds a new user whose password information must be tracked, the administrator must additionally ensure that a “\_\_workload\_\_” application object exists. For example:

```
na __workload__;
```

Then the administrator must update the user's login information to include the “\_\_workload\_\_” application object. For example:

```
el (Username) appl('__workload__');
```

Additionally, ExportTngDb.exe migrates Unicenter TNG users who are members of the **SSF\_AUTH** Unicenter Security option into the CA Access Control environment by setting the users' admin attribute before adding them to CA Access Control.

## Unicenter Security Database Migration

The CA Access Control called ExportTngDb.exe extracts data from the Unicenter Security database and translates it into CA Access Control commands to populate the CA Access Control database. ExportTngDb.exe migrates the following:

- Unicenter Security users
- Unicenter Security user groups
- Unicenter Security rules

**Notes:**

- We do not recommend running Unicenter TNG login intercepts after running the Unicenter Integration and Migration Installation process. Once the Unicenter Integration and Migration Installation process has executed successfully, you should verify that Unicenter TNG login intercepts are disabled.
- Unicenter TNG Data Scoping rules (rules that target Unicenter TNG asset types with a -DT suffix) are not supported by the CA Access Control Migration process. Rules of this type are ignored during the migration process.
- Unicenter Security rules that have been implemented against any of the following Unicenter Security asset types are obsolete because Unicenter Security is no longer used: CA-USER, CA-ACCESS, CA-USERGROUP, CA-ASSETGROUP, CA-ASSETTYPE, and CA-UPSNode. Rules that target any of these asset types, or any of their derivatives, are ignored during the migration process.

To activate ExportTngDb.exe, you must run the Unicenter integration with Unicenter Security data migration setup procedure. This setup procedure automatically performs the Unicenter Security data migration process.

**Note:** Creation and modification statistics of all Unicenter TNG objects are lost in the migration process.

Due to Unicenter TNG and CA Access Control product differences, the following attributes of Unicenter Security **users** cannot be migrated to CA Access Control:

**Statistics**

**The following user statistics are not supported by CA Access Control:**

- Last login statistics (date and time, node of last login)
- Password change statistics (date and time, node, user who changed last password, and expiration date of the Password)
- Password violation statistics (date and time, node of last unsuccessful login, and number of unsuccessful logins since last successful login)
- Access violation statistics (date and time, node of last access violation, and number of access violations)
- Suspension statistics (date and time of suspension)

**PWDCHANGE VALUE (RANDOM)**

Random password generation

UPSSTATGROUP

UPS station group

- Not supported by CA Access Control

**USERORIGIN**

User Origin (NIS or Local)

**VIOLMODE**

Violation Mode (FAIL, MONITOR, WARN, QUIET)

- CA Access Control supports FAIL mode only.

**VIOLACTION**

Violation Action (CANUSER, CANU&LOG, CANU&LOG&SUS)

- CA Access Control supports CANUSER action only.

Due to Unicenter TNG and CA Access Control product differences, the following attributes of Unicenter Security **rules** cannot be migrated to CA Access Control:

**EXPIRES**

Rule expiration date is not supported by CA Access Control.

## Unicenter User Exit Support

To assist in migration, CA Access Control lets you run existing Unicenter Security user exits unchanged in the CA Access Control environment. You do not have to rewrite all user exits as part of the migration.

Using only the existing user exit interfaces in Unicenter Security and CA Access Control, each installed component is registered as a standard CA Access Control user exit, which then brings up the corresponding Unicenter Security exit.

To initiate this feature, run the Unicenter Integration with Unicenter Security Data Migration setup procedure. Once the setup procedure is complete, this functionality is active.

**Note:** Because Unicenter TNG and CA Access Control use different architectures, only the exit points and data items that are comparable between Unicenter Security and CA Access Control are supported. The following Unicenter Security exit points are supported:

**EmSec\_CredExit()**

The input to the Unicenter Credential Authentication exit, EmSec\_CredExit() is mapped by EMSECSIGNON. With CA Access Control, only the user and node members within this structure have meaningful data. The user member is set to the user name being authenticated, and the node member is set to the current local node name. All other members of the EMSECSIGNON structure are set to binary zeros. The other parameters, the detailed return code, and the message passed back from the Unicenter Resource Check Exit are ignored.

**EmSec\_PwExitNew()**

The input to the Unicenter Password Validation exit, EmSec\_PwExitNew, consists of a user (the user whose password we are changing), a password (the new password), and a node name (under e CA Access Control support, this is always the local node name). An older exit, EmSec\_PwExit, is used if this fails. It contains only the user and password as input and is fully supported under CA Access Control.

**EmSecSSFResCheck()**

The input to the Resource Check exit, EmSecSSFResCheck(), is mapped by EMSECRESHECK. The user member in EMSECRESHECK is set to the value of the accessing user. The class member in EMSECRESHECK is set to the value of the class of resource for the access. The entity member in EMSECRESHECK is set to the value of the object name. The CA Access Control access information is converted to Unicenter-style access permissions and placed into the attributes member of EMSECRESHECK. All other members of EMSECRESHECK are set to binary zeros. The other parameters, the detailed return code, and the message passed back from the Unicenter Resource Check Exit are ignored. Once the Unicenter integration setup completes, this functionality is active.

## Unicenter Calendar

Unicenter TNG provides a calendar facility, with which you can set time restrictions for users, groups, and resources. The calendar contains time intervals of 15 minutes that you can set to ON or OFF. A calendar time interval set to OFF prevents access to resource; a calendar time interval set to ON allows access to resource.

In Windows, an administrator can set calendar usage before security startup only.

**Note:** Unicenter TNG must be installed on the local machine. CA Access Control uses local Unicenter TNG services to retrieve calendar settings.

1. Stop CA Access Control security. Enter:

```
secons -s
```

2. In the Windows registry, go to the following subkey:

```
HKEY_LOCAL_MACHINE\Software\ComputerAssociates\AccessControl\UCTNG
```

In this subkey, set the TNG\_calendars value to yes. Set the TNG\_refresh\_interval value to the appropriate time value in minutes.

3. Start CA Access Control security. Enter:

```
seosd -start
```

To link a CA Access Control resource with the calendar, you must issue the following database commands in selang:

```
nr CALENDAR calendar_name
nr file C:\myfile.txt calendar (calendar_name) defaccess (a)
```

The Unicenter TNG calendar access control list (ACL) is an additional security constraint feature. The regular Unicenter TNG calendar property restricts the current resource according to the appropriate Unicenter TNG calendar status. The Unicenter TNG calendar ACL property restricts access for (or gives access to) specific users and groups for the current resource according to the Unicenter TNG calendar status.

The two types of ACL Unicenter TNG calendar properties are regular and restrictive.

- The regular calendar ACL property permits user or group access to the resource according to ACL access.
- The restrictive (denied) calendar ACL property denies user or group access to the resource accordingly to ACL access.

To add a user or group to the regular calendar ACL (CALACL), enter the following command in selang:

```
auth resource_class_name object_name uid_or_gid_name calendar(calendar_name) access(access_value)
```

For example:

```
auth file file2 uid(george) calendar(holidays) access (r w)
```

To add a user or group to the denied calendar ACL, enter the following command in selang:

```
auth resource_class_name object_name uid_or_gid_name calendar(TNG_calendar_name)  
deniedaccess(access_value)
```

For example:

```
auth file file2 uid(george) calendar(holidays) deniedaccess(r w)
```

You can use regular and restrictive properties for the same resource (such as calendar and uid). The following command adds a user named George with read access to the denied calendar ACL for file1.

```
auth file file1 uid(george) calendar(holidays) deniedaccess(r)
```

To remove a user or group from a Unicenter TNG calendar ACL property, use auth- :

```
auth- file file2 uid(george) calendar(holidays)
```

Use the Show Resource (sr) command to see all Unicenter TNG calendar ACLs assigned to a specific resource:

```
sr file file1
```

## Certification with Unicenter

The following features comply with Unicenter TNG 2.2 SP1, Unicenter TNG 2.4, or Unicenter NSM 3.0:

- Sending “events”
- Synchronizing mainframe passwords
- Using the Unicenter TNG calendar

# Chapter 11: Managing Policy Models

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This section contains the following topics:

[The Policy Model Database](#) (see page 147)

[Architecture Dependency](#) (see page 150)

[Methods for Centrally Managing Policies](#) (see page 152)

[Automatic Rule-based Policy Updates](#) (see page 152)

[Integrate PMDBs with Unicenter](#) (see page 166)

## The Policy Model Database

Managing tens or hundreds of databases individually is not practical. CA Access Control supplies the Policy Model service, a component that lets you manage many databases from one central database. Using the Policy Model (PMD) service is optional, but it greatly simplifies administration at large sites.

**Note:** In Windows Task Manager, the Policy Model service appears as `sepmdd.exe`.

The Policy Model service, uses a Policy Model database (PMDB). Like other CA Access Control databases, the PMDB contains users, groups, protected resources, and rules governing access to the resources. In addition, the PMDB contains a list of *subscriber* databases. Each subscriber is a CA Access Control database that resides on a separate computer, or another PMDB that resides on the same or another computer. A PMDB that updates a subscriber is the subscriber's *parent*.

The PMDB is a useful tool for managing many databases that have similar authority restrictions and access rules.

**Note:** For information about administrating a PMDB (`sepmdd` utility), see the *Reference Guide*. For information about managing PMDBs remotely using `selang`, see the *selang Reference Guide*.

## PMDB Location on Disk

All PMDBs on a computer reside in a common directory. The `_pmd_directory_` value in the following subkey of the Windows registry specifies the name of the directory:

```
HKEY_LOCAL_MACHINE\Software\ComputerAssociates\AccessControl\Pmd
```

The default value of `_pmd_directory_` in the NTFS root directory is: *ACInstallDir\data*, where *ACInstallDir* is the directory where you installed CA Access Control (by default `C:\Program Files\CA\AccessControl`).

Each PMDB occupies a subdirectory in the common directory. The files in the subdirectory contain all the data required to define the Policy Model. Policy Model configuration settings are stored in a `Pmd` subkey of the CA Access Control registry settings. The name of the subkey is the name of the Policy Model.

## Managing Local PMDBs

CA Access Control offers a utility for administering PMDBs:

### **sepmdb**

A PMDB administration utility that lets you:

- Administer subscribers
- Truncate the update file
- Administer Dual Control
- Manage the Policy Model log file
- Perform other administrative tasks

**Note:** For a comprehensive discussion of *sepmdb*, see the *Reference Guide*.

## Managing Remote PMDBs

CA Access Control also offers you a range of `selang` commands that you can use in the `pmd` environment. These commands let you manage PMDBs remotely:

### **backuppmd**

Backs up a PMDB.

### **createpmd**

Creates a PMDB.

### **deletepmd**

Deletes a PMDB.

### **findpmd**

Displays the names of all PMDBs on the computer.

### **listpmd**

Lists the following information about a PMDB:

- Subscribers and their status
- PMDB description and its status
- Commands in the update file and their offsets
- Contents of the error log

### **pmd**

A PMDB administration command that lets you:

- Remove a subscriber from the list of unavailable subscribers
- Clear the Policy Model error log
- Start and stop the Policy Model service
- Lock and unlock the Policy Model
- Truncate the update file

### **restorepmd**

Restores a PMDB from its backup files.

### **subs**

A PMDB subscription command that lets you:

- Add an existing subscriber to a parent PMDB
- Add a new subscriber to a parent PMDB
- Assign a parent PMDB to a database (CA Access Control or another PMDB)

**subspmd**

Assigns a parent PMDB to the local database.

**unsubs**

Removes a subscriber from the PMDB.

**Note:** For a comprehensive discussion of *selang* commands you can use in the *pm* environment, see the *selang Reference Guide*.

## Architecture Dependency

When deploying CA Access Control, you should consider the hierarchy of your environment. At many sites, the network includes a variety of architectures. Some policy rules, such as the list of trusted programs, are architecture-dependent. On the other hand, most rules are independent of the system's architecture.

You can cover both kinds of rules by using a hierarchy. You can define a global database for architecture-independent rules, and give it subscriber PMDBs that define architecture-dependent rules.

**Note:** The root PMDB and all of its subscribers can reside on the same computer or on separate computers, depending on the physical needs of your environment.

### Example: A Two-tiered Deployment Hierarchy

The following UNIX example also applies to a Windows architecture with small modifications.

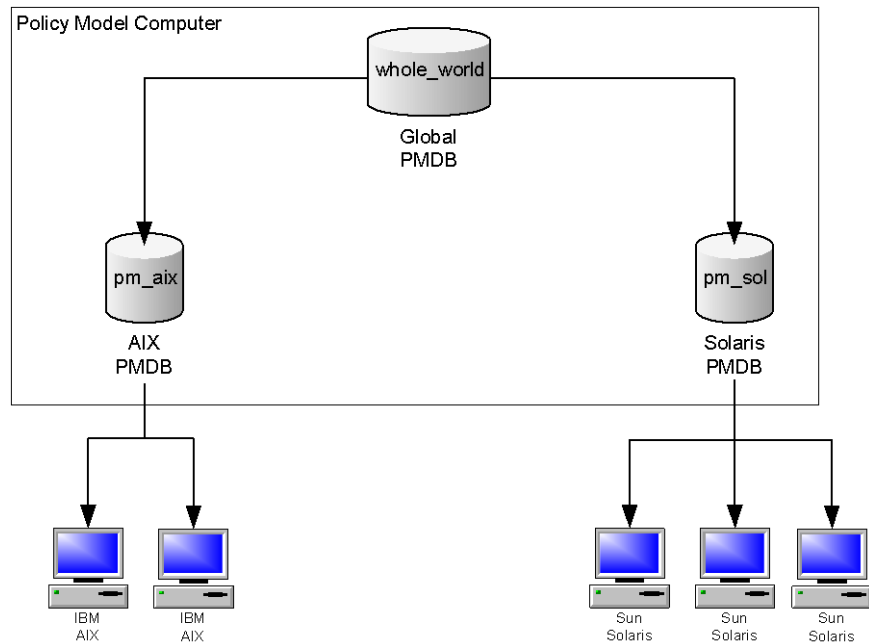
In the example, the site consists of IBM AIX and Sun Solaris systems. Since the list of trusted programs on IBM AIX differs from the one on Sun Solaris, the PMDBs need to consider architecture dependency.

To set up a multiple-architecture PMDB, set up your PMDBs as follows:

1. Define a PMDB named `whole_world`, to contain the users, groups, and all other architecture independent policies.
2. Define a PMDB named `pm_aix`, to contain all the IBM AIX specific rules.

3. Define the PMDB `pm_sol`, to contain all the Sun Solaris specific rules.

The PMDBs `pm_aix` and `pm_solaris` are subscribers of the PMDB `whole_world`. All IBM AIX computers at the site are subscribers of `pm_aix`. All Sun Solaris computers at the site are subscribers of `pm_sol`. The concept is illustrated in the following chart.



4. When you enter platform-independent commands in `whole_world`, such as adding a user or setting a `SURROGATE` rule, all databases at the site are automatically updated.
5. When you add a trusted program to `pm_aix`, only IBM AIX computers are updated, without affecting the Sun Solaris systems.

## Methods for Centrally Managing Policies

CA Access Control lets you manage several databases from a single computer in two ways:

- **Automatic rule-based policy updates**—Regular rules you define in a central database (PMDB) are automatically propagated to databases in a configured hierarchy.

**Note:** Dual control is only available with this method and on UNIX only. Information about dual control for automatic rule-based policy updates is found in the *Endpoint Administration Guide for UNIX*. Information about automatic rule-based policy updates can also be found in the *Endpoint Administration Guide for Windows*.

- **Advanced policy management**—Policies (groups of rules) you deploy are propagated to all databases based on host or host group assignment. You can also undeploy (remove) policies and view deployment status and deployment deviation. You need to install and configure additional components to use this functionality.

**Note:** Information about advanced policy management is found in the *Enterprise Administration Guide*.

## Automatic Rule-based Policy Updates

Single-rule policy updates (regular selang rules) you make in a central database are automatically propagated to the subscriber databases. By subscribing several computers to the same database, and by subscribing one database to another, you can create a hierarchy. You configure your environment for automatic rule-based policy updates after installation.

**Note:** This method of managing policies is limited to letting you make single-rule policy updates across your hierarchy. Other functionality is only available through implementing advanced policy management and reporting.

## How Automatic Rule-based Policy Updates Work

When you configure your environment for automatic rule-based policy updates, each rule you define in the central database is automatically propagated to all of its subscribers in the following way:

1. A rule is defined for any PMDB with at least one subscriber.
2. The PMDB sends the command to all subscriber databases.

3. The subscriber database applies the propagated command.
  - a. If the subscriber database does not respond, the PMDB sends the command at a regular interval (by default, every 30 minutes) until the subscriber database has been updated.
  - b. If a subscriber database is responding, but refuses to apply the command, the PMDB places the command in the [Policy Model error log](#) (see page 160).
4. If the subscriber database is a parent to other subscribers, it then sends the command to its subscribers.

#### Example: Removing a user from all computers in a hierarchy

If a user is deleted from a PMDB using the `rmusr` command, the same `rmusr` command is sent to all the subscriber databases. In this way, a single `rmusr` command can remove a user from many databases on a variety of computers.

## How You Use a PMDB to Propagate Configuration Settings

When you edit a Policy Model's configuration, the new configuration values are propagated to the Policy Model's subscribers.

The following process describes how configuration updates are propagated to a Policy Model's subscribers:

1. You edit one or more of the Policy Model's configuration values.
2. The Policy Model writes the new configuration values to the virtual configuration file.

**Note:** The virtual configuration file does not contain values for the `audit.cfg` file. The Policy Model does not write any changes you make to this file to the virtual configuration file.
3. The Policy Model sends the new configuration values to its subscribers.
4. `selang` commands update each subscriber with the new configuration values.

### Virtual Configuration File

Each Policy Model has a virtual configuration file that contains the configuration values for its subscribers. The virtual configuration file is located in the PMD directory, and is named `cfg_configname`, where *configname* is the name of the Policy Model configuration.

The virtual configuration file does not contain the configuration values held in the `audit.cfg` file.

## How New Subscribers Are Configured

The Policy Model configures each new subscriber with the existing configuration values. The existing configuration values are stored in the virtual configuration file.

**Note:** The virtual configuration file does not store configuration values from the audit.cfg file. Any changes you make to the audit.cfg file prior to creating a new subscriber are not propagated to the new subscriber.

The following process describes how a Policy Model configures new subscribers:

1. You create a new subscriber to the Policy Model.
2. The Policy Model reads the values in its virtual configuration file.
3. The Policy Model adds the configuration values from its virtual configuration file to the updates.dat file. The updates.dat file also contains the access rules for the Policy.
4. The Policy Model sends the updates.dat file to the new subscriber.
5. selang commands configure the new subscriber with the values in the updates.dat file.

## How You Can Set Up a Hierarchy

CA Access Control uses the Policy Model service to propagate rule-based policy updates across the configured hierarchy. By subscribing several CA Access Control computers to the same PMDB, and by subscribing one PMDB to another, you create a hierarchy.

The most straightforward way to set up the PMDB hierarchy is as you install CA Access Control, so it is worth thinking through how you want to structure the hierarchy before you begin the installation. Make sure that all the hosts in the PMDB hierarchy are part of the same network, since the parent PMDB and its subscribers must be able to communicate with each other. That is, the parent must be able to connect with each of its subscribers by name, and every subscriber must be able to connect to the parent PMDB by name.

**Note:** For more information about installing CA Access Control, see the *Implementation Guide*.

If you want to change the configuration that you created during installation or if you did not create a PMDB structure during installation, you can change or create the PMDB configuration at any time. You can do this in one of the following ways:

- With CA Access Control Endpoint Management
- With the `sepmdd` utility

To create a PMDB hierarchy and enable automatic rule-based policy updates after installation, do the following:

1. Create and configure the master PMDB.
2. (Optional) Create and configure subscriber PMDBs.
3. Define parent PMDBs for the subscribing computers, called *endpoints*.

## Update Subscribers

When updating subscribers, the Policy Model performs the following actions:

1. The Policy Model tries to fully qualify subscriber names as they are added or deleted from the Policy Model.
2. The PMDB service, `sepmdd`, attempts to update a subscriber database.
3. If the maximum time elapses and the service does not succeed in updating a subscriber, it skips that particular subscriber and tries to update the rest of the subscribers on its list.
4. After it completes its first scan of the subscriber list, `sepmdd` then performs a second scan, in which it tries to update the subscribers that it did not succeed in updating during its first scan.

**Note:** Whenever a PMDB encounters an error while propagating updates to subscribers, the `sepmdd` service creates an entry in the [Policy Model error log file](#) (see page 160). This file, `ERROR_LOG`, is located in the [PMDB directory](#) (see page 148).

## Update a Policy Model Database

Working at the computer where the PMDB resides does not automatically update the PMDB itself. To update a PMDB, you need to specify it as your target database.

You can specify the PMDB using `selang` or CA Access Control Endpoint Management. To specify a target database using `selang`, use the `hosts` command in the `selang` command shell:

```
hosts pmd_name@pmd_host
```

All `selang` commands now update the policy model database specified. The commands then automatically propagate to the active databases on this computer and of all subscriber computers.

### Example: Specify a target PMDB

To set the target database to `policy1` on `myPMD_host`, use the following command:

```
hosts policy1@myPMD_host
```

If you now enter the `newusr` command, the new user is added to the `policy1` database as well as the active databases on this computer and of all subscriber computers.

## Clean Up the Update File

The `sepmc` utility automatically writes each update it receives in the `updates.dat` file. To prevent the file from growing too large, we recommend that you delete processed updates from the file periodically.

To clean up the update file, use the following command:

```
sepmc -t pmdName auto
```

`sepmc` calculates the offset of the first update entry that has not been propagated and deletes all the update entries before it.

**Note:** For more information about `sepmc` utility, see the *Reference Guide*.

## Propagate and Synchronize Passwords

Once you set up a PMDB hierarchy, you can use it to keep user passwords synchronized throughout your system when the user passwords are changed with the Windows User Manager or software other than CA Access Control.

**Note:** CA Access Control also supports [mainframe password synchronization](#) (see page 189).

**To propagate and synchronize passwords**

1. Create a PMDB Hierarchy.
2. Enter the name of the appropriate parent PMDB as the passwd\_pmd entry value in the registry on every station on which users or administrators may change passwords.

```
HKEY_LOCAL_MACHINE\Software\ComputerAssociates\AccessControl\AccessControl\passwd_pmd
```

The PMDB then propagates the password change to all its subscribers. If the passwd\_pmd value is blank, CA Access Control checks the secondary\_pmd value and sends new and updated passwords to the PMDB listed in this value, unless it also is blank.

**Note:** If the PMDB sends a user password to a subscriber in which the user is not defined, settings are not changed and the user remains undefined for the subscriber.

**Remove a Subscriber**

If you no longer want to propagate updates to a particular subscriber, you should remove it.

**To remove a subscriber**

1. Remove the computer from the subscription list:

```
sepmdb -u PMDB_name computer_name
```

The computer is removed from the Policy Model subscription list.

2. Shut down seosd on the computer that you removed from the subscription list:

```
secons -s
```

The seosd service is shut down.

3. Delete the value of the parent\_pmd registry value in the following registry key on the computer you removed from the subscription list:

```
HKEY_LOCAL_MACHINE\Software\ComputerAssociates\AccessControl\AccessControl
```

The computer will stop accepting updates from the parent PMDB.

4. Restart seosd.

The active database on the computer that you removed from the subscription list, is no longer a subscriber of the specified PMDB.

**Note:** Once the database is unsubscribed from the PMDB, the PMDB no longer sends commands.

## Filter Updates

If you want your PMDB to update different subsets of data at different subscriber databases, you need to define which records are sent to subscriber databases.

### To filter updates

1. Configure PMDBs to serve as parents to subsets of subscribers.
2. Modify the *Filter* registry entry in the registry key of the parent PMDB, to point to a filter file you set up on the same computer.

Updates to the subscriber databases are then limited to the records that pass the filter.

## Policy Model Filter File

A filter file consists of lines, each with six fields. The fields contain information on:

- The form of access permitted or denied.  
For example, EDIT or MODIFY
- The environment affected:  
For example, AC or Native
- The class of the record.  
For example, USER or TERMINAL
- The objects, within the class, that the rule covers.  
For example, User1, AuditGroup, or COM2
- The properties that the record grants or cancels.  
For example, OWNER and FULL\_NAME in the filter line means that any command having those properties is filtered. You must enter each property exactly as it appears in the *Reference Guide*.
- Whether such records should be forwarded to the subscriber database or not:  
PASS or NOPASS

The following rules apply to each line in the filter file:

- You can use an asterisk (\*) to denote all possible values in any field.
- If more than one line covers the same records, the *first* applicable line is used.
- Spaces separate the fields.
- In fields with more than one value, semicolons separate the values.

- Lines beginning with # are considered a comment line.
- Empty lines are not allowed.

### Example: Filter file

The following example describes a line from a filter file:

CREATE	AC	USER	*	FULL_NAME;OBJ_TYPE	NOPASS
form of access	environment	class	record name ( * =all)	properties	treatment

In this example, if we name the file with this line Printer1\_Filter.flt and edit the registry for PMDB PM-1 so that filter=C:\Program Files\CA\AccessControl\Printer1\_Filter.flt, then PMDB PM-1 will not propagate to its subscribers any records that create new users with the FULL\_NAME and OBJ\_TYPE property.

## Policy Model Error Log File

The Policy Model error log, which is organized chronologically, looks similar to this:

Error Text	Error Category
20 Nov 03 11:56:07 (pmdb1): fargo nu u5 0 Retry ERROR: Login procedure failed (10068) ERROR: Cannot accept update from a non-parent PMDB (pmdb1@name.company.com) (10104)	Configuration Errors
20 Nov 03 19:53:17 (pmdb1): fargo nu u5 0 Retry ERROR: Connection failed (10071) Host is unreachable (12296)	Connection Errors
20 Nov 03 11:57:06 (pmdb1): fargo nu u5 560 Cont ERROR: Failed to create USER u5 (10028) Already exists (-9)	Database Update Errors
20 Nov 03 11:57:06 (pmdb1): fargo nu u5 1120 Cont ERROR: Failed to create USER u5 (10028) Already exists (-9)	

The Policy Model error log is in binary format; you can view it only by entering the following command:

```
ACInstallDir/bin/sepmd -e pmdname
```

**Note:** Do not manually delete an error log (for example, with the UNIX `rm` command). To delete the log, only use the following command:

```
ACInstallDir/bin/sepmd -c pmdname
```

**Important!** The error log in CA Access Control r5.1 and later versions has a format that is not compatible with the format of earlier versions. `sepmd` cannot handle error logs from these earlier versions. When you upgrade to a version that has this format, the old error log is copied to `ERROR_LOG.bak`; a new log file is created when you start `sepmd`.

### Example: PMDB Update Error Message

The following example shows a typical error message:

```

date      time      pmdb name      subscriber      command      offset      flag
  ↓         ↓         ↓         ↓         ↓         ↓         ↓
20 Nov 03 19:53:17 (pmdb1): fargo  nu u5 0  Retry
ERROR: Connection failed (10071) ← major level (type of error)
Host is unreachable (12296) ← minor level (cause of error)
                        ↑
                    return code
  
```

- The top line always consists of the date, time, and subscriber. The command that generated the error appears next, followed by the offset (in decimal format), which indicates the location of the failed update inside the updates file. Lastly, the flag indicates whether the PMDB retries the update automatically or continues without it.
- The second line shows an example of a major level message (what type of error occurred) and its return code.
- The third line displays an example of a minor level message (why the error occurred), and its return code.

### Example: Error Message

A command may generate and display more than one error. Also, an error may consist of a major level message, a minor level message, or both.

The following error has only one message level:

```
Fri Dec 29 10:30:43 2003 CIMV_PROD:Release failed. Return code = 9241
```

This message occurs when sepmd pull attempts to release a subscriber that is already available.

## Native Policy Model Repositories

You can store all native environment user and group object types in the PMDB. By storing this information in the PMDB, you can receive information about objects using show commands (such as show user or show group). The returned objects are an image of the actual objects that are defined in Windows or UNIX subscribers.

After connecting to a Policy Model, a user can choose the following environments:

- AC
- Native

- NT
- UNIX
- Config

**Note:** Native operates exactly as Windows while you are working in a Windows operating system, or exactly as UNIX while you are working on a UNIX operating system.

To use native environment repositories, use the following commands:

- Enter the following commands at the selang prompt:

```
env NT; find
```

Your results list all the native environment object types.

**Note:** For descriptions of these object types, see the Windows environment classes and properties in the *Reference Guide*.

- Enter the following commands to receive a list of NT and Active Directory USER properties:

```
env NT; ruler user
```

- Enter the following commands to receive a list of NT and Active Directory GROUP properties:

```
env NT; ruler group
```

If a Policy Model is a subscriber of another (parent) Policy Model, it receives data from a parent through propagation and saves in the database all user and group properties, so you can see them and change them.

**Note:** For more information, see the sepmd utility in the *Reference Guide*.

## Policy Model Backup

When you back up a PMDB, you copy the data in the Policy Model database to another directory. This includes:

- policy information
- the list of the Policy Model's subscribers
- configuration settings
- registry entries
- the updates.dat file

You cannot restore a PMDB from backup files that use another platform, operating system, or version of CA Access Control. Ensure you back up the Policy Model to a host running the same platform, operating system, and version of CA Access Control.

## Back Up a PMDB Using `sepmdb`

When you back up the PMDB, you copy the data from the Policy Model database to a specified directory. You should store the backed up PMDB files in a secure location, preferably protected by CA Access Control access rules.

You can use the `sepmdb` utility to back up a PMDB on a local host. You can also use `selang` commands to back up a PMDB on a remote host.

**Note:** You can back up a PMDB recursively. A recursive backup backs up all the PMDBs in a hierarchy to the host you specify, and modifies the PMDB subscribers so that the subscription still works when the backup is moved to the host. You can only use a recursive backup if the master and child PMDBs are deployed on the same host.

### To back up a PMDB using `sepmdb`

1. Lock the PMDB using the following command:

```
sepmdb -bl pmdb_name
```

The PMDB is locked and cannot send commands to its subscribers.

2. Do one of the following:

- Back up the PMDB using the following command:

```
sepmdb -bh pmdb_name [destination_directory]
```

- Back up the PMDB recursively using the following command:

```
sepmdb -bh pmdb_name [destination_directory] [backup_host_name]
```

**Note:** If you do not specify a destination directory, the backup is saved to the following directory:

```
ACInstallDir\data\policies_backup\pmdb_name
```

3. Unlock the PMDB using the following command:

```
sepmdb -ul pmdb_name
```

The PMDB is unlocked and can send commands to its subscribers.

## Back Up a PMDB Using selang

When you back up the PMDB, you copy the data from the Policy Model database to a specified directory. You should store the backed up PMDB files in a secure location, preferably protected by CA Access Control access rules.

You can use selang commands to back up a PMDB on a local or remote host. You can also use the sepmd utility to back up a PMDB on a local host.

**Note:** You can back up a PMDB recursively. A recursive backup backs up all the PMDBs in a hierarchy to the host you specify, and modifies the PMDB subscribers so that the subscription still works when the backup is moved to the host. You can only use a recursive backup if the master and child PMDBs are deployed on the same host.

### To back up a PMDB using selang

1. (Optional) If you are using selang to connect to the PMDB from a remote host, connect to the PMDB host using the following command:

```
host pmdb_host_name
```

2. Move to the PMD environment using the following command:

```
env pmd
```

3. Lock the DMS using the following command:

```
pmd pmdb_name lock
```

The PMDB is locked and cannot send commands to its subscribers.

4. Back up the DMS database using the following command:

```
backuppmd pmdb_name [destination(destination_directory)] [hir_host(host_name)]
```

**Note:** If you do not specify a destination directory, the backup is saved to the following directory:

```
ACInstallDir\data\policies_backup\pmdbName
```

5. Unlock the PMDB using the following command:

```
pmd pmdb_name unlock
```

The PMDB is unlocked and can send commands to its subscribers.

## Policy Model Restoration

When a Policy Model is restored, CA Access Control copies the backup PMDB files into the specified directory. Everything that is in the original PMDB files is copied to the new PMDB directory, including:

- policy information
- the list of the Policy Model's subscribers
- configuration settings
- registry entries
- the updates.dat file

If there is an existing PMDB in the destination directory, CA Access Control deletes the existing files before copying the restoration files into that directory.

You cannot restore a PMDB from backup files that use another platform, operating system, or version of CA Access Control. Ensure you back up the Policy Model to a host running the same platform, operating system, and version of CA Access Control.

## Restore a PMDB

When you restore a PMDB, CA Access Control copies the data from the PMDB backup files into the directory you specify. CA Access Control must be running on the terminal you do the restoration on.

**Note:** If you back up and restore the PMDB on different terminals, the PMDB does not automatically update the terminal resource in the restored PMDB database. You must add the new terminal resource to the restored PMDB. To add the new terminal resource, stop the restored PMDB, run the *selang -p pmdb* command, then start the restored PMDB.

To restore a PMDB, run *one* of the following on the terminal that you want to restore the PMDB on:

- `sepmdb -restore` utility
- `selang restore pmd` command

**Note:** For more information about the `sepmdb` utility, see the *Reference Guide*. For more information about `selang` commands, see the *selang Reference Guide*.

## Integrate PMDBs with Unicenter

Integrating your PMDB with Unicenter TNG lets you use the PMDB to create rules that secure Unicenter TNG objects from being manipulated by the various Unicenter TNG components (such as the command processor, Event Management, and Workload Management).

You must perform the integration manually.

### To integrate a PMDB with Unicenter TNG

1. Create the PMDB.
2. Migrate Unicenter Security options into the PMDB with the following command:

```
MigOpts pmdb-name
```

where *pmdb-name* is the name of your PMDB.

**Note:** This step is required only if you used Unicenter Security and selected Security Data Migration under the Unicenter Integration during the CA Access Control installation. If you did not use Unicenter Security, then you never established any security options and there is nothing to migrate into your PMDB.

3. Create classes for any user-defined Unicenter TNG asset types with the following command:

```
defclass.bat pmdb-name
```

where *pmdb-name* is the name of your PMDB

**Note:** This step is required only if you used Unicenter Security and created user-defined asset types. Unicenter TNG asset types are automatically defined in every new PMDB if you selected Unicenter Integration during the CA Access Control installation.

# Chapter 12: General Security Features

---

This section contains the following topics:

[Maintenance Mode Protection \(Silent Mode\)](#) (see page 167)

[Bypass Drivers](#) (see page 168)

[Disable CA Access Control Kernel Interceptions](#) (see page 171)

[Stack Overflow Protection](#) (see page 171)

## Maintenance Mode Protection (Silent Mode)

CA Access Control has a maintenance mode, also known as silent mode, for protection when the CA Access Control services are down for maintenance. In this mode, CA Access Control denies events while these services are down.

When CA Access Control is running, it intercepts security sensitive events and checks whether the event is allowed. Without activating maintenance mode, all events are permitted when CA Access Control services are down. With active maintenance mode, events are denied when CA Access Control services are down, stopping user activity while the system is maintained.

Maintenance mode can be tuned, and it is disabled by default.

When the CA Access Control security services are down:

- If maintenance mode is active, all security sensitive events are denied, except for special cases and for events executed by the maintenance user.
- If maintenance mode is disabled, CA Access Control does not intervene and execution is passed to the operating system.

When maintenance mode is activated and security is down, the prevented events are not logged in the audit log file.

To enable maintenance mode, follow these steps:

1. Make sure the CA Access Control services are down.
2. Using a registry editor, navigate to registry key

`\HKEY_LOCAL_MACHINE\SOFTWARE\ComputerAssociates\AccessControl\FsiDrv`

and change the following values:

- `SilentModeEnabled` = 1
- `SilentModeAdmins` = *special\_admins*

The *special\_admins* variable defines a list of user names that are allowed to access the computer while CA Access Control services are down.

Use a new line for each user. Whether specified or not, *SYSTEM* is always a maintenance mode user.

**Note:** On Windows 2000 and Windows NT you cannot use regedit to edit the `SilentModeAdmins` key; use Regedt32.exe instead.

3. Start CA Access Control services with “seosd -start” command from the command shell, or using an option from Windows Start menu.

Now, if CA Access Control services are down, only users that are listed under `SilentModeAdmins` registry key will have access to the computer, and all other users will receive a deny to any attempt of activity.

## Bypass Drivers

To specify that some drivers can operate without needing to submit operations for CA Access Control authorization checks, define a bypass for these drivers. For example, define a bypass for your antivirus program driver so that it can open files for scanning without CA Access Control authorization checks. Without the bypass, the driver might cause a deadlock with CA Access Control.

**Note:** A bypass for a current version of Trend Micro™ PC-cillin Antivirus is configured out-of-the-box.

### To bypass drivers

1. Set the `BypassDriversCount` registry entry value to the number of drivers you want to define a bypass for.

You can find this entry in the `FsiDrv` key of the CA Access Control registry.

**Note:** You must stop CA Access Control before you can change CA Access Control registry entries.

2. For each driver you want to bypass:
  - a. Create a registry entry of type REG\_SZ named `DriverName_drvNumber`  
  
The first entry should be `DriverName_0` and the last `DriverName_X`, where *X* is `BypassDriversCount - 1`.
  - b. Edit each `DriverName_drvNumber` entry so that its value is the name of the program driver you want to bypass.  
  
The value should be the name of the driver only (for example, `thisdrv.sys`).
3. Restart CA Access Control.  
  
CA Access Control reloads and bypasses the drivers you defined in the registry.

### Example: Bypass Drivers to Resolve Compatibility Issues

This example resolves a compatibility issue an antivirus product has with CA Access Control by defining the antivirus drivers (`avDriverA.sys` and `avDriverB.sys`) for bypass. You set registry entries for driver bypass in the CA Access Control registry tree under the `FsiDrv` key:

`HKLM\SOFTWARE\ComputerAssociates\AccessControl\FsiDrv`

Set the registry entries as follows:

Name	Type	Data
BypassDriversCount	REG_DWORD	2
DriverName_0	REG_SZ	avDriverA.sys
DriverName_1	REG_SZ	avDriverB.sys

The `BypassDriversCount` registry entry value of 2 tells CA Access Control to look for two drivers to bypass. Each `DriverName_drvNumber` registry entry value defines a driver to bypass.

## Toggle Driver Interception

You can activate or deactivate the interception of the CA Access Control filter driver.

**Note:** When the interception is deactivated, CA Access Control protection that is not enforced by the filter driver still applies. This includes password quality checks, login events, Windows services events, STOP, and so on.

To activate interception, set UseFsiDrv to 1; to deactivate, set UseFsiDrv to 0.

You can find this configuration setting in the AccessControl section of the CA Access Control registry.

After you change this registry value, restart CA Access Control services.

## Disable CA Access Control Kernel Interceptions

You can disable the following CA Access Control interceptions at the kernel level:

- network interception
- process interception
- registry interception
- file interception

Even when the network, process, registry, and file classes are disabled and you are not using those classes to intercept kernel activity, the network, process, registry, and file interception processing code is initiated at boot time and working at run time, affecting performance. To improve performance, you can disable one or more interceptions from initiating at boot time.

### **To disable CA Access Control interceptions at the kernel level**

1. Create one or more of the following registry entries of type REG\_DWORD and set the value of one or more entries to 1.
  - DisableNetworkInterception—disables network interception
  - DisableProcessInterception—disables process interception
  - DisableRegistryInterception—disables registry interception
  - DisableFileInterception—disables file interception

The entries must be created under the following registry key:

HKLM\SYSTEM\CurrentControlSet\Services\driveng\Parameters

2. Reboot the computer.

CA Access Control reloads without initializing the disabled interception types.

## Stack Overflow Protection

Stack Overflow Protection (STOP) is a feature that prevents hackers from creating and exploiting stack overflow to break into systems. Stack overflow enables hackers to execute arbitrary commands on remote or local systems, many times as the administrator. They do this by exploiting bugs in the operating system or other programs. These special types of bugs permit users to overwrite the program stack, changing the next command to be executed.

STOP works by intercepting crucial operating system calls to each application on the computer. Each call is then given an initial analysis before being sent for further analysis if it seems suspicious. Further analysis is performed using data from the STOP configuration and signature files.

## Enable STOP

STOP lets you prevent hackers from creating and exploiting stack overflow to break into your systems. You can enable STOP when installing CA Access Control. Alternatively, you can enable STOP manually.

### To enable STOP

1. Enter the following command:

```
secons -s
```

CA Access Control shuts down.

2. Set the STOP *OperationMode* registry entry to 1.

The registry entry can be found in the following key:

```
HKEY_LOCAL_MACHINE\SOFTWARE\ComputerAssociates\AccessControl\Instrumentation\Plugins\Stop  
Plg
```

When CA Access Control is started, STOP modules will load and STOP will be enabled on the computer.

3. (Optional) Adjust STOP configuration using registry entries in the following keys:

```
HKEY_LOCAL_MACHINE\SOFTWARE\ComputerAssociates\AccessControl\Instrumentation\Plugins\Stop  
Plg
```

```
HKEY_LOCAL_MACHINE\Software\ComputerAssociates\AccessControl\STOP
```

**Note:** For more information about STOP registry settings, see the *Reference Guide*.

4. the following command:

```
seosd -start
```

CA Access Control starts up.

## Configure STOP for Receiving Signature File Updates

You can make sure that all computers in your environment have the latest STOP information required for preventing stack overflow. You can do this by updating the STOP signature file on a central computer and setting up your computers to regularly retrieve the file.

### To configure STOP for receiving signature file updates

1. Enter the following command:

```
secons -s
```

CA Access Control shuts down.

2. Set the *STOPSignatureBrokerName* registry entry to the host name the computer you want to CA Access Control to retrieve the signature file from.

The registry entry can be found in the following key:

HKEY\_LOCAL\_MACHINE\Software\ComputerAssociates\AccessControl\STOP

When you start CA Access Control (and then at a defined interval), it retrieves the STOP signature file from the specified computer.

3. Set the *STOPUpdateInterval* registry entry to the interval at which you want the signature file updated.

CA Access Control retrieves the signature file from the specified computer at the specified interval.

4. (Optional) Adjust STOP configuration using registry entries in the following key:

HKEY\_LOCAL\_MACHINE\Software\ComputerAssociates\AccessControl\STOP

**Note:** For more information about STOP registry settings, see the *Reference Guide*.

5. the following command:

seosd -start

CA Access Control starts up.

**Note:** You can retrieve the signature file from any host using the eACSigUpdate utility. For more information about this utility, see the *Reference Guide*.



# Chapter 13: Configuring Settings

---

CA Access Control lets you manage CA Access Control endpoint configuration settings remotely. To do this you can use CA Access Control Endpoint Management or the selang config environment.

This section contains the following topics:

[Configuration Settings](#) (see page 175)

[Change Configuration Settings](#) (see page 175)

[Change Audit Configuration Settings](#) (see page 177)

## Configuration Settings

CA Access Control stores endpoint and Policy Model configuration settings it uses in:

- The Windows registry on Windows computers.
- Initialization files (.ini) on UNIX computers.

**Note:** For information about the configuration settings you can make and what they mean, see the *Reference Guide*.

## Change Configuration Settings

To affect how CA Access Control and any Policy Models work, you need to make changes to the configuration settings.

### To change configuration settings

1. In CA Access Control Endpoint Management click the Configuration tab.

The Configuration menu options appear on the left.

2. Click Remote Configuration in the Miscellaneous section of the menu.

The Remote Configuration page appears.

3. Expand the relevant configuration section to locate and click on the configuration setting you want to change.

The Section: *sectionName* System Tokens page appears, displaying all the configuration settings in it.

4. Locate and edit the configuration setting as required, then click Save Tokens.

The changed configuration setting is saved.

### Example: List Configuration Resources for a Windows Host

The following example shows the output of the find config command on a Windows host that has a Policy Model named pmdb:

```
AC(config)> find config

(localhost)
pmdb@PMDROOT
ACROOT
SEOSDRV
```

### Examples: Modify ACROOT Configuration Settings on Windows

The following examples show you how you can modify CA Access Control for Windows configuration settings.

- This example configures CA Access Control to use Audit Only mode:  
er CONFIG ACROOT section(SeOSD) token(GenericInterceptionMode) value(1)
- This example adds a domain name to the list of domain name CA Access Control maintains for host name resolution:  
er CONFIG ACROOT section(SeOSD) token(domain\_names) value+(company.com)
- This example removes a domain name from the list of domain name CA Access Control maintains for host name resolution:  
er CONFIG ACROOT section(SeOSD) token(domain\_names) value-(company.com)
- This example removes a configuration setting:  
er CONFIG ACROOT section(AccessControl) token-(Emulate)
- This example configures the parent Policy Model of a Policy Model on the managed host:  
er config myPMD@PMDROOT token(Parent\_Pmd) value(topPMD@host1.comp.ca)

### Examples: Modify seos.ini Configuration Settings on UNIX

The following examples show you how you can modify CA Access Control for UNIX configuration settings.

- This example configures CA Access Control to enable PAM authentication for :

```
er CONFIG seos.ini section(seos) token(pam_enabled) value(yes)
```

- This example adds a domain name to the list of domain name CA Access Control maintains for host name resolution:

```
er CONFIG seos.ini section(seosd) token(domain_names) value+(company.com)
```

- This example removes a domain name from the list of domain name CA Access Control maintains for host name resolution:

```
er CONFIG seos.ini section(seosd) token(domain_names) value-(company.com)
```

- This example removes a configuration setting:

```
er CONFIG seos.ini section(serevu) token-(admin_user)
```

## Change Audit Configuration Settings

To affect how CA Access Control generates and stores audit records, you need to make changes to the settings in the audit configuration files. You use `selang` commands to change the settings in the audit configuration files.

### To change audit configuration settings

1. (Optional) If you are using `selang` to connect to a remote host, connect to the host using the following command:

```
host host_name
```

2. Move to the config environment using the following command:

```
env config
```

3. Use the `editres config` command to modify the configuration settings as required.

The audit configuration settings are changed.

### Example: Modify audit configuration file

The following example adds a line to the audit configuration file:

```
er CONFIG audit.cfg line+("FILE;*;Administrator;*;R;P")
```



# Chapter 14: Deploying Sample Policies

---

This section contains the following topics:

[Sample Policies Out-Of-The-Box](#) (see page 179)

[Where Are Sample Policies Stored?](#) (see page 179)

[Sample Policy Scripts](#) (see page 180)

[Policy Deployment](#) (see page 182)

## Sample Policies Out-Of-The-Box

The sample policies that come with CA Access Control provide you with segregation of duties and best practices that we recommend for the protection of operating system and application resources. Each policy is a selang script that includes comments that explain the policy's purpose and the rules it contains.

The policies provide a baseline for securing your systems with CA Access Control. You should customize the sample policies for your security policies and environment (operating system policies depend on the actual OS packages you have installed). Using the sample policies as a basis for your own policies simplifies the process of creating policies for your organization.

Sample policies are available for common applications, operating systems and virtualization systems.

## Where Are Sample Policies Stored?

CA Access Control installs sample policies into the following directory:

*ACInstallDir\Samples\Policies\*

### ***ACInstallDir***

Defines the directory where CA Access Control is installed.

There are three (3) subdirectories in this location:

- **Applications**—contains application servers policies.
- **OS**—contains operating systems policies.
- **Virtualization**—contains virtualization systems policies.

CA Access Control provides the policies as text files that contain the selang script that executes the deploy. Each policy also has a matching policy that you can use to undeploy the protection policy.

Sample policies have the following naming convention: *OS\_ACTION*

### **OS**

Defines the operating system the policy is designed for.

### **ACTION**

Specifies the policy action the script takes.

**Values:** deploy and undeploy

For example, the following file contains the sample deployment policy for Red Hat Enterprise Linux 4.0: `Linux _LINUX40_deploy.txt`

**Note:** Application policies do not have an undeployment script.

## Sample Policy Scripts

Each policy is a selang script that includes comments that explain the policy's purpose and the rules it contains. Sample policy scripts group resources and users to simplify the policy:

### ■ Containers

Sample policies group related resources into a single container resource. Using this method, a common policy is applied to all the related resources once. Policy rules (ACLs) do not need to be applied to individual resources. For example, a policy can use a container to group all of the system's configuration files.

Policy containers use the following naming convention:

`POL_container_name`. You can think of these containers as sub-policies. For example, OS sample policies use the `POL_SYS_CONF` container to protect OS configuration files.

### ■ Roles

To simplify user management, sample policies apply ACLs to roles. Each role is uses a CA Access Control group of users that you can add real users to.

Policy roles use the following convention: `ROL_role_name`. For example, sample policies use the `ROL_SYSTEM` group for built-in system users like `adm` and `lp`. Many policies assign these users with wide-ranging permissions (for proper system operation) but also expire them so that users cannot use them to log in.

### Example: Policy Script Comments

The following snippet from the Solaris SPARC 9 sample policy illustrates how sample policies are annotated. Using selang syntax rules, the lines that begin with a hash symbol (#) are comments.

```
#
# * Home Directories Protection Policy *
# *****
#
# This policy uses the FILE class to protect the home
# directories of sensitive users so that only the owner
# of each directory can access it.
#
# Prerequisites:
#   None
#
# Roles:
#   None
#
# Containers:
#   POL_HOME_DIR      - home directories of sensitive users
#
# define container POL_HOME_DIR
# Protect home directories
editres  CONTAINER POL_HOME_DIR audit(FAILURE) owner(+nobody) comment("AC Sample - Protect
home directories")
  authorize CONTAINER POL_HOME_DIR uid(*_undefined)  access(NONE)
editusr (root)
# define specific FILE resources and connect them with POL_HOME_DIR
editres FILE ("/root/*") audit(FAILURE) owner(+nobody) defaccess(NONE) warning  comment("AC Sample")
authorize FILE ("/root/*") uid(root) access(ALL)
chres CONTAINER POL_HOME_DIR mem+("/root/*") of_class(FILE)
```

### Example: Containers in Sample Policies

The following selang output shows the properties of the POL\_SYS\_FILES. An AIX sample policy contains this sub-policy that protects system files.

```
AC> sr container POL_SYS_FILES
Data for CONTAINER 'POL_SYS_FILES'
```

```
-----
ACLS      :
  Accessor      Access
  ROL_SYSADMIN  (GROUP ) All
  ROL_SYSTEM    (GROUP ) All
  *             (USER  ) R, Chdir
  _undefined    (USER  ) R, Chdir
```

```
Members      :  
  /boot/*    (FILE )  
  /dev/kmem   (FILE )  
  /dev/mem    (FILE )  
  /dev/port   (FILE )  
Audit mode   : Failure  
Owner        : +nobody (USER )  
Create time  : 10-Dec-2008 10:32  
Update time  : 10-Dec-2008 10:35  
Updated by   : root    (USER )  
Comment      : AC Sample - Protect OS system files
```

## Policy Deployment

When you deploy any CA Access Control policy, you should follow some common steps to ensure that the policy deploys and performs as expected and without errors. The following section describes the actions you should take before and after you deploy sample policies.

### How to Prepare an Endpoint for Policy Deployment

Before you implement any policy, you should prepare the endpoint for the policy. This lets you later isolate issues that are specifically related to this policy.

To prepare an endpoint for policy deployment:

- Use a fresh installation of the operating system or application  
  
Use the latest available manufacture-supplied version and patch of the OS for OS policies. This lets you protect the system before a modification potentially compromises the system. After you apply the policy, you can apply patches and configure the system as required knowing that the policy protects the system from malicious or accidental changes. The same logic applies to applications.
- Implement separation of duties  
  
Review the policy rules and add additional roles if required. Create your own policy that defines roles, users, and their relationship (role membership). You can then deploy this policy before or after the sample policy.  
  
Make sure you do not give any single user too many privileges. For example, by default the superuser is added to ROL\_AC\_ADMIN, which provides CA Access Control administration privileges. However, the best practice is to remove this user and add security administrators to this group instead.

- Create a new CA Access Control database or back up your existing database

Create a new database before you implement the policy. This ensures that policy rules are not going to conflict or otherwise change existing rules in the database. If you cannot create a new database, you should back up the database so that you can restore it to the state before you applied the policy.

- Use a new audit log file

Back up the existing audit log file and then remove it. This ensures that CA Access Control will create a new audit log file when it logs new events. Having an audit log file that only contains events that relate to the policy you deploy can help you identify and isolate issues relating to the policy more quickly.

- (Windows only) Set environment variables

CA Access Control provides Windows sample policies in two versions:

- Hard-coded

If you use the hard-coded sample policies, you only need to set the %COMPUTERNAME% variable to the fully qualified computer name.

- Variable-based

If you use the variable-based sample policies, you must set the %COMPUTERNAME%, %SystemRoot%, and %SystemDrive% variables. You must also have CA Access Control running to use the variable-based version.

## How to Deploy Policies in a Staged Manner

When you deploy your policy, there are several actions you can take to ensure that the policy deploys and performs as expected and without errors. After you have prepared your endpoint for policy deployment, we recommend that you proceed with a staged policy deployment.

To deploy policies in a staged manner:

1. Deploy the policy in Warning mode

The policy is now active but does not enforce its rules. You can then examine the audit log to preview the results of your intended policy before you put that policy into effect.

**Note:** By default, the sample policies' scripts set Warning mode for all policy rules.

2. Review the CA Access Control audit log for warning messages

After you deploy the policy, any policy breaches show up in the audit log as warnings (assuming your policy rules use Warning mode).

3. Use the system in real scenarios and analyze the audit log again

To test your policy effectively you can perform regular operating procedures on the computer (log in, start and stop services and applications, and so on). You can then analyze the audit log again to see if any new warnings appear.

4. Correct the policy as required

Using the information you gathered from the audit log, you can fix the policy to account for expected use in your environment.

5. Remove Warning mode to enable the policy

Once you are confident your policy is ready to enforce rules in your production environment, you can remove Warning mode to enable it.

The policy is now enforced.

**Note:** If you want to make changes to a policy, you should first disable policy enforcement (use Warning mode), make the changes to the policy and then reactivate it when you are confident the changes are working as desired.

### More information:

[Deploy a Sample Policy](#) (see page 185)

[How to Customize the Sample Policies for Your Environment](#) (see page 186)

[Enable Sample Policy Enforcement](#) (see page 186)

[Warning Mode](#) (see page 91)

## Deploy a Sample Policy

There are two methods to deploy the CA Access Control sample policies:

- Run the policy file in `selang` on the endpoint. In this method, each rule in the policy is executed on the local CA Access Control database. When the `selang` command completes executing, the policy is deployed on the endpoint.

**Note:** For more information about using `selang` to run commands in a file, see the *Selang Reference Guide*.

- Use Advanced Policy Management. With this method you can use CA Access Control Enterprise Management to store the sample policy on the DMS and then assign it to multiple endpoints.

**Note:** For more information about the CA Access Control Enterprise Management and Advanced Policy Management, see the *Enterprise Administration Guide*.

### Example: Deploy a Sample RHEL 5 Policy Using `selang`

The following command show you how you deploy the `selang` script that contains the sample policy for Red Hat Enterprise Linux 5:

```
selang -f _LINUX50_deploy.txt > _LINUX50_deploy.log
```

## How to Customize the Sample Policies for Your Environment

The sample policies are provided as a basis for your own security policy. To deploy a sample policy, you should customize it for your environment.

To customize a sample policy for your environment:

- Review the CA Access Control and system log files.  
Look for and identify warnings or errors that occurred during the deployment process and modify the policy to account for these.
- Set the TERMINAL rules for the local host.  
You need to set TERMINAL rules to let users log in to the computer.
- Join users to policy roles.  
Sample policies use roles for authorization. You need to assign users in your organization to these roles.  
**Important!** When you undeploy a policy, do not delete the users or groups you created. This may affect the normal behavior of the ACL lists and accessor associations in other policies that use those same users and groups.
- (Windows only) Run the coexistence utility eACoexist.exe.  
This utility identifies conflicts between CA Access Control and other installed programs and resolves them by creating a bypass for that program.

## Enable Sample Policy Enforcement

By default, the sample policies' scripts set Warning mode for all policy rules. When you deploy the policy it is active but does not enforce its rules. After you familiarize yourself with the policy and customize it as required, you should be ready to enable the policy so that policy rules are enforced.

### To enable sample policy enforcement

1. Edit the policy script to replace all *selang* rule instances of *warning* with the *warning-* option.  
When you run a rule that sets *warning-* for a resource or accessor, CA Access Control removes Warning mode from the resource or accessor.
2. Deploy the edited policy.  
Policy enforcement is enabled.

## Disable Sample Policy Enforcement

By default, the sample policies' scripts set Warning mode for all policy rules. When you enable policy enforcement, you remove Warning mode. To disable policy enforcement you should reintroduce Warning mode.

### To disable sample policy enforcement

Do *one* of the following:

- Edit the policy script to replace all `selang` rule instances of *warning-* with the *warning* option.

When you run a rule that sets warning for a resource or accessor, CA Access Control sets Warning mode for the resource or accessor.

- Review the policy to identify the affected classes and set Warning mode for those classes.

Policy enforcement is disabled.

## How to Perform System Maintenance When You Have Sample Policies Deployed

At certain times you may need to perform system maintenance to upgrade the system, install a new application, and so on. During system maintenance you should disable the policy to avoid errors during the procedure.

To perform system maintenance when you have sample policies deployed, do the following:

1. Disable policy enforcement.
2. Perform the maintenance.
3. Enable policy enforcement.
4. Review CA Access Control audit log files.

The audit log contains warnings for the files that were affected by the maintenance.

### More information:

[Find Out Which Classes Are in Warning Mode](#) (see page 94)



# Appendix A: Synchronizing Passwords with Mainframes

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This section contains the following topics:

[Password Synchronization Support](#) (see page 189)

[Password Policy Model Methods](#) (see page 189)

[Installation Requirements for Password Synchronization](#) (see page 190)

[Checking the Installation](#) (see page 191)

[Completing the Policy Model Configuration](#) (see page 192)

[The CAICCI Configuration File](#) (see page 194)

## Password Synchronization Support

CA Access Control supports password synchronization between mainframes running CA Top Secret, CA ACF2, or RACF security products and Windows or UNIX machines running CA Access Control. Synchronization is accomplished using the standard CA Access Control password Policy Model mechanism.

## Password Policy Model Methods

To implement password synchronization with a mainframe in your network, choose a Windows machine running CA Access Control to serve as a parent to the mainframe and make sure the mainframe password synchronization option is installed. Next, define the mainframe to CA Access Control and subscribe the mainframe to the password Policy Model from that Windows machine. Once you have done this, any password change a mainframe user makes is propagated to all the machines in the password Policy Model hierarchy.

When you give the mainframe administrator CA Access Control authorization to make password changes, any user password change, suspend action, or resume user action the administrator takes on the mainframe is propagated from the mainframe through the password Policy Model hierarchy. Likewise, administrative password changes and suspend or resume user actions made anywhere in the password Policy Model hierarchy are propagated to the mainframe.

## Installation Requirements for Password Synchronization

### On the Mainframe

You must have Unicenter TNG 2.2 SP1, Unicenter TNG 2.4, Unicenter NSM 3.0, or CA Common Services installed on your computer. The password synchronization utility relies on Unicenter TNG's built-in CAICCI (Common Communication Interface).

You can find instructions for configuring the mainframe for password synchronization in the following locations:

- For CA ACF2, in the *CA ACF2 Administrator Guide*
- For CA Top Secret, in the *CA Top Secret User Guide*
- For RACF, in the MAINFRAME directory of the CA Access Control Endpoint Components for Windows DVD

### On Windows

On each Windows machine that you want to use as a parent to a mainframe for password synchronization, you must install CA Access Control with the Mainframe Password Synchronization option.

**Note:** If you already installed CA Access Control, you can run the installation program again to choose the Mainframe Password Synchronization option. Reinstalling does not alter your current database or settings.

Before you begin the installation, obtain the host name, SYSID, and administrator name for each mainframe that you want to subscribe to the Policy Model from this machine. If you do not have access to this information at installation time, you can skip that part of the installation and subscribe the mainframes later.

To start the CA Access Control installation program, choose Custom Installation, and check the Mainframe Password Synchronization option. The installation wizard uses the Unicenter CAICCI package, but you must restart Unicenter TNG to update CAICCI configuration.

The installation lets you subscribe hosts to the Policy Model. If you have the host names and SYSIDs for the mainframes, you can subscribe them now. Otherwise, you can skip this step and subscribe these hosts later.

## Checking the Installation

When you have completed the CA Access Control installation, you can check whether it successfully installed the necessary services and processes as follows:

1. Use the Windows Services applet (Start, Settings, Control Panel, Services for Windows NT or Start, Settings, Control Panel, Administrative Tools, Services in Windows 2000) to view the list of services.

The following services should appear in the Services list:

- Unicenter (NR-Server)
- Unicenter (Remote)
- Unicenter (Transport)
- CA Access Control Main Frame Sync

2. Open the Windows Task Manager and choose the Processes tab.

The following processes should appear in the list:

- mfscpfd.exe
- mfsd.exe
- eacmfs.exe

If you subscribed mainframe hosts to a Policy Model during installation, verify that they appear in the subscriber list as follows:

1. In CA Access Control Endpoint Management click the Policy Models tab.

The Policy Models page appears.

2. Click the Policy Model to which you subscribed mainframes during installation.

The Policy Model Details page appears.

3. Locate the Subscribers List section and verify that the mainframe hosts you subscribed appear in the list.

## Completing the Policy Model Configuration

Once you have installed the appropriate software on your mainframes and the parent Windows system, you must perform the following actions on the Windows system to complete the configuration required for password synchronization:

- Create an MFTERMINAL record in the PMDB for each mainframe host that you plan to subscribe to the Policy Model.  
  
When you create a record in the PMDB instead of the local database, this record gets propagated to all the hosts in the Policy Model hierarchy.
- Create a USER record in the PMDB and in the native Windows environment for each mainframe administrator who issues password changes, giving these users Administrator or Password Manager authority so that CA Access Control recognizes their right to make password changes.
- Again in the PMDB, give these mainframe administrators full access permissions (read and write) to the TERMINAL record for the Windows machine and read access to the MFTERMINAL records for any mainframe from which they can issue a password change.
- Give these mainframe administrators logon locally privileges in the native Windows environment. Password changes that arrive from the mainframe must be able to be executed in CA Access Control on the local machine under the authorization of the appropriate mainframe administrator user.
- Subscribe the mainframes to the Policy Model (if you did not do this during installation).
- Check the passwd\_pmd key in the Windows registry to ensure that it specifies the password Policy Model for password changes from the local machine and its subscribers. Update the registry entry if necessary.

These items do not need to be performed in any particular order (except, of course, that you cannot give mainframe administrators access permissions to the MFTERMINAL records until you have created the administrator's user record and the mainframe's MFTERMINAL record).

The following procedure is one way to accomplish these steps.

1. Subscribe the mainframes to a Policy Model, if you did not do this during installation, as follows:
  - a. In CA Access Control Endpoint Management click the Policy Models tab.  
The Policy Models page appears.
  - b. Click the appropriate Policy Model.  
The Policy Model Details page appears.

- c. Locate the Subscribers List section and click Add Subscriber.

The Add Subscriber page appears

- d. Type the Subscriber Name, which is the fully qualified host name for the mainframe.
- e. Select Mainframe subscriber.

This enables the fields in the Mainframe section.

- f. Complete the following Mainframe fields:

- Host Type
- System ID
- Administrator's Name
- Port

Click OK.

- g. Repeat these steps for each mainframe subscriber you want to add.

2. Modify the passwd\_pmd configuration setting (HKLM\\SOFTWARE\\ComputerAssociates\\AccessControl\\AccessControl) to the fully-qualified name of the local computer's parent in the password Policy Model hierarchy.
3. Create USER records for the mainframe administrators, give them the authority to change passwords in CA Access Control, and give them the logon-locally user right in Windows.
4. Connect to the Policy Model through selang:

*host pmd@localhost*

5. Create an MFTERMINAL record for each mainframe using the following command:

*newres MFTERMINAL mfSYSID defaccess (none) owner (userName)*

where *mfSYSID* is the SYSID of the mainframe and *userName* is the user who owns this MFTERMINAL record.

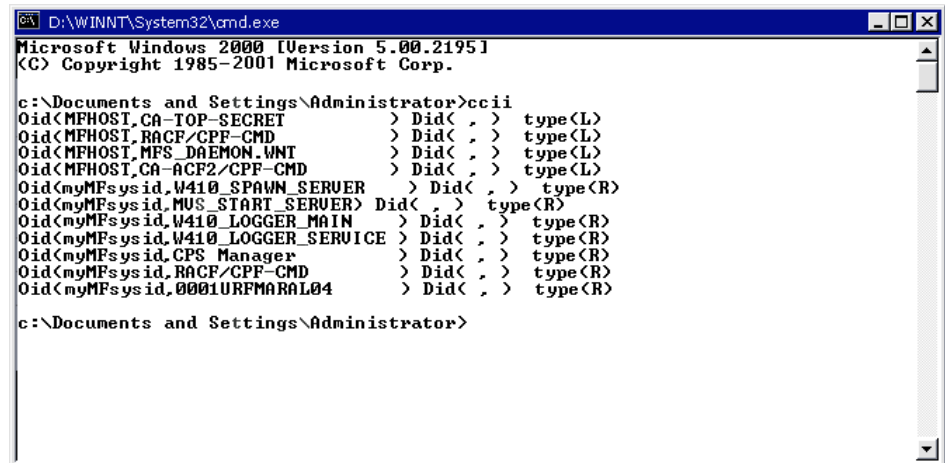
6. Give each mainframe administrator access to the appropriate MFTERMINAL record using the following command:

*authorize MFTERMINAL mfSYSID uid (mfAdmin) access (read)*

where *mfSYSID* is the SYSID of the mainframe and *mfAdmin* is the mainframe administrator user.

## Starting Mainframe Synchronization

To be sure that communication was established, run the ccii utility from a command prompt.



```

D:\WINNT\System32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2001 Microsoft Corp.

c:\Documents and Settings\Administrator>ccii
Oid(MFHOST,CA-TOP-SECRET) > Did( , ) type(L)
Oid(MFHOST,RACF/CPF-CMD) > Did( , ) type(L)
Oid(MFHOST,MFS_DAEMON.WNT) > Did( , ) type(L)
Oid(MFHOST,CA-ACF2/CPF-CMD) > Did( , ) type(L)
Oid(myMFsysid,W410_SPANN_SERVER) > Did( , ) type(R)
Oid(myMFsysid,MUS_START_SERVER) > Did( , ) type(R)
Oid(myMFsysid,W410_LOGGER_MAIN) > Did( , ) type(R)
Oid(myMFsysid,W410_LOGGER_SERVICE) > Did( , ) type(R)
Oid(myMFsysid,CPS_Manager) > Did( , ) type(R)
Oid(myMFsysid,RACF/CPF-CMD) > Did( , ) type(R)
Oid(myMFsysid,0001URFMARAL04) > Did( , ) type(R)

c:\Documents and Settings\Administrator>

```

## The CAICCI Configuration File

During installation and anytime you subscribe a mainframe to a Policy Model, CA Access Control automatically updates the CAICCI configuration file.

If, for some reason, you want to perform these updates manually, use the following procedure:

1. In Notepad, open the CAICCI configuration file (*cciDirectory\tng\causer\ccirmtd.rc*).

2. Add the following line:

```
REMOTE = mfName mfSYSID 1024 startup port 1721
```

where *mfName* is the mainframe name and *mfSYSID* is the mainframe SYSID.

3. Save the file.
4. Stop remote CAICCI services:
5. Restart remote CAICCI services:

```
ccictrl stop rmt
```

```
ccictrl start rmt
```