

# CA Plex

## Release Notes

r7.0



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## Documentation Changes

The following documentation updates have been made since the last release of this documentation:

- [.NET Client Application Generator](#) (see page 9)—Added a new section to describe the .NET Client application generator support information.
- [Plex Packager Tool](#) (see page 10)—Added a new section to describe the Plex Packaging Tool information.
- [Web Service Import](#) (see page 10)—Added a new section to describe the Web Service Import information.
- [WCF Proxy](#) (see page 11)—Added a new section to describe the WCF Proxy information.
- [IBM i Unicode Enhancement](#) (see page 12)—Added a new section to describe the Unicode support information.
- [JavaBeans Native Replacement](#) (see page 12)—Added a new section to describe the JavaBeans replacement support information.
- [IBM i Dispatcher Enhancement](#) (see page 13)—Added a new section to describe the i Dispatcher support information.

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# Chapter 1: New and Updated Features

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This chapter documents the new and updated features for CA Plex r7.0.

This section contains the following topics:

[.NET Client Application Generator](#) (see page 9)

[Plex Packager Tool](#) (see page 10)

[Web Service Import](#) (see page 10)

[WCF Proxy](#) (see page 11)

[IBM i Unicode Support](#) (see page 12)

[JavaBeans Native Replacement](#) (see page 12)

[IBM i Dispatcher Enhancement](#) (see page 13)

[Features Removed from CA Plex r7.0](#) (see page 13)

## .NET Client Application Generator

The major new feature of CA Plex r7.0 is to generate Plex UI designs as managed C# applications. The C# applications use the Windows Presentation Foundation (WPF) operating environment, which is shipped as part of the Microsoft .NET Framework 4.0. The CA Plex .NET Client Generator ships with an updated set of OBASE and Pattern libraries with newly added variants that target each of the client-server configurations. CA Plex .NET runtime supports this .NET Client Generator.

**Note:** We recommend that for new application development, select the Patterns rather than OBASE as your base set of libraries to inherit from.

For more information about the new .NET Client Generator, refer to the following resources:

- CA Plex .NET Platform Guide
- CA Plex User Guide, Packaging and Deploying Applications
- Dot Net Client Sample Model

The Dot Net Client sample model focuses on the transformation of a WinC client, WinNTC server based application into a 100% managed code .NET application. The model is located in the \CA\Plex\7.0\Samples\Dot Net Client folder.

- Tutorial Reference Model

The CA Plex tutorial reference model has a version which has already been migrated for you and is ready to generate, build, and run. The TUTREFERCS.mdl model is located in the \CA\Plex\7.0\Tutrefer folder.

## Plex Packager Tool

CA Plex has been able to generate applications that target modern languages such as Java and C# for some time now. However, these languages come with some new implementation concepts that are not familiar to many Plex developers who use the RPG or C++ based generators. The main conceptual hurdle lies in the use of namespaces to group common functions.

The Plex Packager Tool simplifies the process by allowing a Plex developer to specify a set of criteria for automatically creating package information in their model. The set of criteria is stored so that when the packager tool is used over the same model, the package information can be updated based on the rules predefined for that local model.

For more information about the Plex Packager Tool feature, refer to the following resources:

- CA Plex User Guide, Packaging and Deploying Applications
- Dot Net Client Sample Model

The Exercise 2 in the Dot Net Client sample model uses the Packager Tool to help organize your application for generation and deployment. The model is located in the `\CA\Plex\7.0\Samples\Dot Net Client` folder.

## Web Service Import

The Web Services Import feature completes the services support in CA Plex by allowing CA Plex functions to call web services as standard Plex functions.

The Plex Web Service Import Tool lets you import external meta information and use services within a Plex local model. The tool enables you to define the name, which references a Package object, under which the services are organized in the Plex model.

CA Plex has been able to expose server functionality as EJB and WCF Services for a number of releases.

For more information about the Web Service Import feature, refer to the following resources:

- CA Plex User Guide, Importing and Using Components
- Web Service Import Sample Model

The Web Service Import sample model shows how to import and use Web services in a CA Plex application. The model is located in the `\CA\Plex\7.0\Samples\Web Service Import` folder.

## WCF Proxy

The CA Plex r6.0 and r6.1 .NET runtime uses TCP-IP as their only communication protocol with other platforms. While the TCP-IP is suitable for intranet applications, it does not scale for the web or for cloud-based server application deployments. With CA Plex r6.1, it was not possible to call Plex generated client functions and server functions running within IIS.

With CA Plex r7.0, a new WCF call interface has been added to the CA Plex .NET runtime. By deploying the CA Plex .NET Server runtime in a suitable host, you can now deploy your server applications to environments which were previously impossible, such as IIS. WCF call interface also allows you to use any communication protocol which WCF supports, such as HTTP, TCPIP, or Named Pipes.

A new Protocol has been created, named CSHARPWCF, which allows you to specify that remote calls must use WCF. After you select this protocol, the additional parameters required to configure the remote server are available for you to set.

**Note:** Only C# Client to C# Server are supported operating environments for the WCF Runtime Proxy.

For more information about the WCF Proxy feature, see the *WCF Runtime Proxy* section in the online help.

## IBM i Unicode Support

CA Plex has always supported EBCDIC (Extended Binary-Coded Decimal Interchange Code) for storage and transmission of character data on the IBM i operating environment. However, from V5R2, the IBM i5 OS now supports Unicode. The Unicode support provides simple deployment for CA Plex IBM i applications which must support multiple languages. In addition, the Unicode support allows those applications to work with a wider array of native language characters.

CA Plex supports the following client functions that connect to IBM i programs:

- WinC
- Java
- 5250 (Green Screen)
- .NET client

Java and .NET clients use Unicode. However, CA Plex WinC clients support ASCII only and 5250 supports EBCDIC only. If you implement complete Unicode client server application in CA Plex r7.0, we recommend that you select either Java or .NET for the client of that application.

The Unicode support in CA Plex r7.0 includes the following:

- Generate and build database schemas with a new Unicode data type.
- Unicode data type generation in the RPGIV generator.
- RPGIV PGM support for interoperation between Unicode and non Unicode (EBCDIC) data types.

For more information about the IBM i UNICODE support, see the *UNICODE Support* section in the online help.

## JavaBeans Native Replacement

JavaBeans are reusable GUI software components that are available from many third-party vendors. Java clients generated by CA Plex use JavaBeans. For example, the CA Plex ACTIVE pattern library includes patterns that implement selected components from CA provided set of JavaBeans.

Because Infragistics has stopped support for the Java operating environment, licenses for the jSuite controls are no longer provided. CA Plex Java runtime native controls now replace the methods supported by the Infragistics controls.

For more information about the JavaBeans Native Replacement Controls, see the *Using JavaBeans with the ACTIVE Pattern Library* section in the online help.

## IBM i Dispatcher Enhancement

The CA Plex IBM i dispatcher implements a Socket Timeout parameter within critical sections to avoid hanging dispatcher situations when one client fails to connect.

The IBM i dispatcher feature is implemented for both the YOBSYTCP and YOBSYTCPDP dispatchers.

For more information about the IBM i Dispatcher Enhancement, see the *CA Plex TCP/IP Dispatcher Timeout* section the online help.

## Features Removed from CA Plex r7.0

CA Plex r7.0 do not have any features that are removed from this release.



# Chapter 2: Upgrading from Earlier Releases

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This chapter provides an overview of upgrade requirements for upgrading from previous releases of CA Plex.

This section contains the following topics:

[Before You Begin](#) (see page 15)

[Upgrading from CA Plex r6.0 and r6.1](#) (see page 16)

[Upgrading from CA Plex r5.5](#) (see page 18)

[Upgrading from CA Plex r5.1](#) (see page 23)

[Upgrading from CA Plex r5.0](#) (see page 28)

[Upgrading from CA Plex r4.5](#) (see page 32)

[Upgrading from CA Plex r4.0](#) (see page 34)

[Upgrading from CA Plex r3.5](#) (see page 34)

[Upgrading from CA Plex r3.1 and r3.0](#) (see page 37)

[Upgrading from CA Plex 2.51 and Earlier](#) (see page 37)

## Before You Begin

Before upgrading, check the CA Plex home page at CA Technical Support (<http://ca.com/support>) for additional information or fixes that may have been made available after this guide was published.

Multiple releases of CA Plex and its generated applications can be installed on the same machine. For example, CA Plex r7.0 and CA Plex r6.1 can be installed and run on the same machine.

## Group and Local Model Upgrade

It is a good practice to update local models to the group model regularly. Therefore, we recommend that you update the group model and make offline backups of all group and local models before you start the upgrade. Then create new local models (and build files) after upgrading the group model to the new release.

All group models and associated library models must be upgraded at the same time.

Logging in to a group model causes it to be upgraded to CA Plex r7.0. Thereafter, once you Save the group model, you will not be able to access the model with a previous release. For this reason, it is necessary for all developers in your work group to upgrade to the new release of CA Plex at the same time. Two developers cannot work on the same model simultaneously if they are using different releases of CA Plex.

## Local Model Upgrade

It is possible to upgrade a local model from an earlier release simply by opening it with the later release. This is often useful for testing purposes, however as described above this is not the recommended approach for a formal release upgrade.

## Upgrading from CA Plex r6.0 and r6.1

This section explains upgrade requirements related to upgrading from r6.0 or r6.1.

### Windows C++ Functions Upgrade Requirements

When upgrading from CA Plex r6.0 or r6.1 to CA Plex r7.0 you do *not* need to regenerate or recompile existing C++ functions.

### New Runtime .INI Search Path

To better support Windows Vista security requirements and multi-user deployments, the algorithm that the WinC runtime uses to locate and create runtime .INI files has been changed.

Review these changes carefully, especially, if you have developed custom .INI file handling or deploy CA Plex applications in server-based multi-user environments.

### Typical Example

In a typical end-user environment, your applications are installed in the Program Files folder including an .ini file. The files in Program Files are read-only for standard users.

When the Plex WinC application starts, it searches for a *writable* .INI file. If the file is not found, a new .INI file is created in the end-user's personal folder (My Documents on Windows XP, or Documents on Windows Vista). The .INI file is located in a sub-folder with the same name as the executable. For example, MyApp.exe would have the .INI file "My Documents\Myapp\Myapp.ini"

Therefore, in this example, each standard user who runs the application will have their own copy of the application's .INI file.

## .INI File Algorithm

The full set of rules is set out below and provides flexibility for other deployment scenarios dependent on the access rights of the user who runs the application:

If a Plex generated executable is called app.exe, then the respective .ini file will be app.ini.

At run time, an application app.exe searches for an app.ini file as follows:

1. In the same directory where the executable (app.exe) is located. If app.ini file is found there and has read-write (RW) access then the executable app.exe uses it.
2. Otherwise, the app.exe searches in the local user \Documents\app\ directory (where app is the name of the executable). If the file app.ini is found there and has RW access, then the executable app.exe uses it.
3. Otherwise, the executable uses the PATH statement to locate an app.ini file that has RW access.
4. If such an app.ini file is still not found, then the executable app.exe creates a new app.ini file inside the local user \Documents\app directory with RW access. This new app.ini will be a copy of the first read-only app.ini found, or, If not found, a blank app.ini is created.

## Java, C# and RPG Function Upgrade Requirements

When upgrading to CA Plex r7.0, you do not need to regenerate or rebuild existing Java, C# or RPG functions.

## .NET Server Runtime Upgrade Considerations

The following sections explain the NET Server Runtime upgrade considerations.

### Version Property

Unless you have a specific technical reason, the Version property for the .NET listener must be left blank. The value of 600 or 610 must be deleted if it is present.

At CA Plex r7.0, if this property is empty, the default version number from the Plex .NET runtime is taken.

The Version property is provided for backwards compatibility reasons. For example, to use r6.0 WinC clients to connect to the r7.0 version of .NET runtime, you must set this property to 600.

## Upgrading from CA Plex r5.5

This section explains upgrade requirements related to upgrading from r5.5 (including r5.5 SP1).

### Windows C++ Functions Upgrade Requirements

Windows functions (WinC and WinNTC) created with CA Plex releases earlier than r6.0 must be recompiled to be compatible with the CA Plex r7.0 C++ run-time system.

A single Windows application cannot contain DLLs created with different releases of CA Plex (except in the case of 6.0, 6.1, and 7.0). CA Plex includes a run-time version check whenever a generated DLL calls another. A run-time error occurs if you attempt to make a call between DLLs created with incompatible releases. In your development environment, you need to rebuild all of your application DLLs when you move from CA Plex r5.5 or earlier up to CA Plex r7.0.

For more information about run-time applications, see [Running Applications Created with Different Versions of CA Plex](#) in the online help.

For more information about the new features in CA Plex r7.0, see the chapter [New Features](#) in this guide.

## COM Import Upgrade Considerations

If you have used the COM Component Import feature, CA recommends that you reimport and regenerate the imported COM packages as part of the release upgrade process. This is due to fixes and improvements to the COM import and wrapper generation processes at this release. You may need to revise the wrapper attributes of the package before it compiles. Note the following:

- The COM Component Import wizard provides an option *Do not overwrite existing package*. However, clearing this option is not appropriate for upgrading previously imported COM packages.
- An alternative is to delete the COM package object before running COM Component Import. However, this will invalidate existing action diagram statements that reference the COM package.

To avoid these limitations, the following upgrade procedure is recommended:

1. Create a new group model and attach the COMPONENT library.
2. Extract a new local model and use the COM Component Wizard to import a new COM package for component you need to upgrade.
3. In Object Browser, right-click the COM package and select XML Import from the Tools menu. Export the package to a named XML file.
4. Open a local model containing the COM package that you need to upgrade.
5. From the Tools menu, select Import and then XML Import. Select the Clear option and then import the XML file you created earlier.

The above procedure will upgrade the COM package while preserving existing action diagram code.

## Java Functions Upgrade Requirements

This section discusses the upgrade requirements for Java functions.

### Upgrading from CA Plex r5.5 SP1

You do not need to regenerate existing Java functions if you are upgrading from r5.5 SP1 (Build 5.5.93).

The CA Plex r7.0 Java run time (obrun.jar) is backwards compatible with earlier releases. You can use the new runtime with functions created at r5.5 and previous releases. This enables you to take advantage of fixes and improvements in the new runtime without necessarily upgrading to the full CA Plex r7.0.

## Upgrading from CA Plex r5.5

If you regenerate a Java function at CA Plex r6.1, then you must also regenerate all other 5.5-generated functions in the call graph of that Function. This is due to changes in the parameter formats at CA Plex r5.5 SP1 and later. We recommend a full regeneration and recompilation of all Java functions when upgrading from CA Plex r5.5 (Build 5.5.63) or previous releases. This reduces the number of generated classes and identifies any source code objects that need to be modified for compatibility with the new format of generated Java code.

**Note:** This Java regeneration and rebuild requirement is only required when upgrading from CA Plex r5.5 and earlier. CA does not anticipate that future releases of the Java generator will have this requirement. No such requirement exists if you are upgrading from r5.5 SP1.

If you want to use the CA Plex r6.1 Java run time (obrun.jar) with a CA Plex r5.5 Java application, you need to have these settings in your ob600xxx.properties file:

```
Version=610
```

```
SPVersion=0
```

## Java and C# Exec SQL action diagram source code

In CA Plex 7.0, 6.1, and 6.0, the Java and C# generators generate all Exec SQL statements as prepared statements by default. The SRC SQL statement type SYS triple can be used to indicate source code objects that must not be generated with prepared statements.

Generating prepared statements may improve performance and scalability in cases where the same SQL statement is executed repeatedly. However, the results may also depend on application and DBMS-specific factors. CA recommends benchmarking with different values for SRC SQL statement type SYS for determining the optimum setting in each case.

Also, generating prepared statements assumes that all parameters to the Exec SQL statement correspond to columns in a table. This assumption is not always true because the Exec SQL statement can be used to implement a wide variety of SQL code. The SRC SQL statement type SYS triple can be used to indicate source code objects that should not be generated with prepared statements. When upgrading Java applications from r5.5 or earlier, it may be necessary to add such triples to some source code objects to avoid errors.

This change does not affect Exec SQL usage with C++.

## Java and Oracle varchar null support

Java applications that target the Oracle database and use optional varchar fields may behave differently after upgrading from r5.5 or earlier. Depending on how the varchar is modeled in Plex, unexpected optimistic locking errors may occur after upgrade. For example:

```
"Instance of .... changed by another user"
```

The typical solution is to add FLD null VAL triples to the varchar field where the target value is empty. For more information, search the CA Support Online web site for problem CPLEX 1296.

## Java Source Code when upgrading from CA Plex r5.5

The Java source code you entered into source code objects in your model may need to be modified. This is because of the changes in the structure of the Java classes created by the generator at CA Plex r5.5 SP1. The source code objects supplied in CA's pattern libraries (such as the JAVA API library) are already modified. Re-extract from the shipped JAVA API library before regenerating and compiling with CA Plex r7.0.

Problems in Java source code result in an unexpected type error at compile time. For example:

```
C:\GENJAVA\MyFunction_ObFnc.java:line number: unexpected type
```

```
required: variable
```

```
found    : value
```

To fix such problems use the assign method instead of the = operator.

Prior to r5.5 SP1, you could use the operator = to assign the return value of a method to an output parameter of your source code API. For example:

```
&(4:) = anyMethod(&(1:), &(2:), &(3:));
```

From r5.5 SP1 onwards, the code in the previous example needs to be modified to include the assign method instead of the = operator, as follows:

```
&(4:).assign(anyMethod(&(1:), &(2:), &(3:)));
```

## Windows Application Server Environment Settings

The registry keys for the CA Plex Windows Application Server environment settings have changed because of the rebranding from Advantage to AllFusion.

The CA Plex r7.0 installation program automatically copies pre-existing environment settings to the new key values. However, if you do not see the copied settings in the CA Plex Windows Application Environment Manager, execute the migration2.exe program (in the AppServer\Bin folder).

**Note:** No parameters are required to execute the migration program.

## RPG Functions Upgrade Requirements

You do not need to regenerate or rebuild existing RPG functions when upgrading to CA Plex r7.0.

### Build (.BLD) file compatibility

As discussed earlier, it is recommended that you create new local models, and therefore new build files as part of the upgrade process. If you use an old BLD file with CA Plex r6.1, CA Plex sends an error message (E-BLD-1777) each time you open the Generate and Build window. If you want to continue using the old BLD, review your Generate and Build Options to ensure they are compatible with CA Plex 6.1.

Pre 6.0 build files will cause the Build Directories section of the Generate and Build Options to be displayed using the AS/400 brand name instead of System i.

To prevent the error message being displayed you can add the following entry to the BLD file:

```
[Options]  
ReRelease=600
```

## Long File Names Not Truncated By Default

The Name Allocation option called Truncate Long File Names at Generation is no longer switched on by default. This means that the file names longer than 8 characters will no longer be truncated unless you explicitly select this option. This may have an upgrade impact if your model contains names that were truncated at previous releases.

## Upgrading from CA Plex r5.1

The following sections provides the upgrade requirements related to upgrading from r5.1

### Inheritance Resolution Changes in CA Plex r5.5

At r5.0 of CA Plex, the inheritance engine was changed to address limitations and bugs in inheritance behavior. Additional changes were also made to support the new Dependency Browser in r5.0. For some customers, these changes caused significant problems when the time came to upgrade to the new release. CA Plex r5.1 included some fixes for these problems, but some significant problems remained.

CA Plex r5.5 resolves the known bugs in the inheritance engine. No changes were made to the inheritance engine between r5.5 and r5.5 SP1. There are differences in inheritance engine behavior compared to earlier releases that will impact some customers. In the following sections three different cases are described.

#### Case 1: Multiple Inheritance Call Resolution

In some cases inherited function calls may be resolved differently in the action diagram with the result that a different call is created in the generated code. In a typical model, this only affects a very small percentage of functions (if any). These cases can be identified through testing of the generated application, comparisons of generated source, or comparisons of action diagram code. If you require further assistance in identifying such problems, contact CA Technical Support.

You can resolve these problems by adding the appropriate replacement triples to return the function to its required behavior. Ideally such triples can be entered in your *standards layer* model, thus minimizing the amount of changes required.

## Background

CA Plex r3.5 introduced support for multiple function inheritance by changing the behavior of the FNC is a FNC verb. As a result, even existing CA Plex functions could inherit from more than one function without keying any extra triples. Another consequence of this was to allow two or more different inherited Calls triples to be Visible in the Object Properties corresponding to the same original action diagram call. Only one call is appropriate in any inheriting action diagram and CA Plex determines which of the available functions should actually be called when it is loaded.

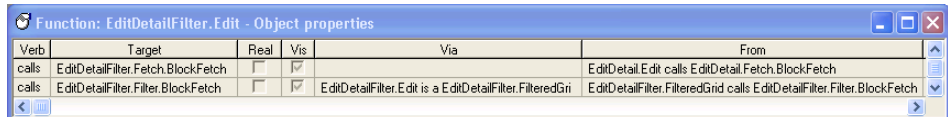
Prior to r5.0, CA Plex did not explicitly handle such action diagram calls. As a result, the resolution of the call did not always follow the usual rules of the inheritance engine. At r5.0 and later a mechanism was put in place to handle such calls. This mechanism has been refined a number of times, most recently at r5.5.

### Example 1: The Filter Pattern

A common example of multiple inherited action diagram call can be seen in instances of the Filter.FilteredGrid function. Consider these triples:

```
EditDetailFilter is a ENT STORAGE/RelationalTable
EditDetailFilter is a ENT FOUNDATI/EditDetail
EditDetailFilter is a ENT FOUNDATI/Filter
EditDetailFilter.Edit replaces FNC UIBASIC/Grid
                        ..by FNC EditDetailFilter.FilteredGrid
```

When you look at the calls for the EditDetailFilter.Edit you will see calls to two different BlockFetch functions:



Verb	Target	Real	Vis	Via	From
calls	EditDetailFilter.Fetch.BlockFetch	<input type="checkbox"/>	<input checked="" type="checkbox"/>		EditDetail.Edit calls EditDetail.Fetch.BlockFetch
calls	EditDetailFilter.Filter.BlockFetch	<input type="checkbox"/>	<input checked="" type="checkbox"/>	EditDetailFilter.Edit is a EditDetailFilter.FilteredGrid	EditDetailFilter.FilteredGrid calls EditDetailFilter.Filter.BlockFetch

Note that both calls are visible (the Vis column is checked). You can see this same behavior in r5.0 and r5.1. So which BlockFetch is actually called in the action diagram? This determination is made at action diagram load time. The result is sensitive to changes in the inheritance engine in recent CA Plex releases. The intention is that the Filter.BlockFetch should be called. To get this result at r5.5, CA has entered an additional replacement triple on the FOUNDATION pattern library:

```
FOUNDATI/Filter.FilteredGrid replaces FNC UIBASIC/UIBasic.Grid.BlockFetch
...by FNC FOUNDATI/Filter.Filter.BlockFetch
```

Previously, the BlockFetch function was not explicitly replaced. Instead the replacement was made only on the scoping view:

```
FOUNDATI/Filter.FilteredGrid replaces VW UIBASIC/UIBasic.Grid
...by VW FOUNDATI/Filter.Filter
```

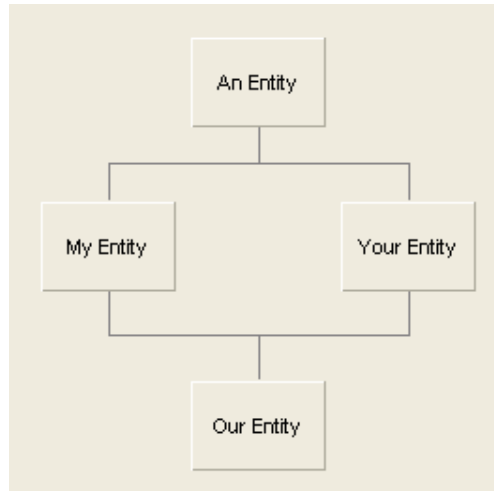
With the revised algorithm used in CA Plex r5.5, this was not sufficient to force the required function replacement to occur. By adding an additional, explicit replacement on the BlockFetch itself, CA has been able to retain the required behavior in r5.5. Similar actions may be necessary in your own functions that exhibit this behavior.

### Example 2: Diamond Inheritance

Consider the following set of triples:

Our Entity.Our Function		An Entity.A Function
Function	<All>	Function
An Entity	function	A Function
A Function	calls	An Entity.A Validation Function
	function	A Validation Function
My Entity	is a	An Entity
	function	My Validation Function
		My Function
My Function	is a	My Entity.A Function
	replaces	My Entity.A Validation Function
	...by	My Entity.My Validation Function
Our Entity	is a	My Entity
		Your Entity
Your Entity	is a	An Entity
	function	Your Validation Function
		Your Function
Your Function	is a	Your Entity.A Function
	replaces	Your Entity.A Validation Function
	...by	Your Entity>Your Validation Function
	function	Our Function
Our Function	is a	Our Entity.My Function
		Our Entity>Your Function
	replaces	Our Entity.My Validation Function
	...by	Our Entity.Our Validation Function
	function	Our Validation Function

This type of scenario is known as *diamond inheritance* due to the shape of the resulting inheritance hierarchy as shown by the following diagram.



The inheritance hierarchy starts at *An Entity*, diverges, and then the two branches are brought back together at *Our Entity*. This situation is quite complex but the examples in real customer models are often even more complex with further branches and layers of inheritance involved.

If you view the Object Properties for the function *Our Entity.Our Function* then you can see the two calls triples, both visible. There are two important points to note:

- There is only one actual action diagram Call explicitly entered in this set of functions but two possible calls were resolved in Object Properties
- This scenario can be reproduced in any CA Plex release from 3.5 onwards

Verb	Target	Real	Vis
calls	Our Entity.Our Validation Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>
replaces	Our Entity.A Validation Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>
...by	Our Entity.Our Validation Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>
is a	Our Entity.My Function	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
calls	Our Entity.Your Validation Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>
is a	Our Entity.A Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>
replaces	Our Entity.Our Validation Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>
...by	Our Entity.Your Validation Function	<input type="checkbox"/>	<input checked="" type="checkbox"/>
is a	Our Entity.Your Function	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
replaces	Our Entity.My Validation Function	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
...by	Our Entity.Our Validation Function	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

The only way to determine which function is actually called is to examine the action diagram code. This example again shows the changes in the inheritance engine over recent releases: At r5.0, Our Entity.Your Validation Function is actually called, but in all other releases including r5.5 it is Our Entity.Our Validation.

## Case 2: Changes to Sequence of Parameters

In some cases the sequence of inherited parameters on a generated function call may change compared to earlier releases. In many cases, such changes have no negative consequences since all functions concerned are regenerated in the course of upgrading to the new release. However, there are cases where such changes may be significant:

- If you are exploiting the backwards compatibility of existing RPG and Java functions, then this change may require that additional functions be regenerated
- If you have hand-coded programs that integrate with programs generated by CA Plex, then those hand-coded programs may be modified to take account of the revised parameter interface

These cases can be identified by testing the generated application, comparisons of generated source, or comparisons of action diagram code. If you require further assistance in identifying such problems, contact CA Technical Support.

## Case 3: Changes to the Sequence of Events, Subroutines and Collection Points

The sequence of inherited Event constructs and Subroutines can be altered compared to previous releases. Changes to the sequence of Subroutines have no negative consequences for the generated application. In general, this is also true for Event constructs. However, the sequence of Events may be significant if you referenced the same logical event on multiple Event constructs or used an unqualified Event construct. For example:

**Events Handler**

**Event**

```
//unqualified event triggered for every event  
Go Sub Generic Event Processing
```

**Event Delete**

```
Go Sub Delete Processing
```

**Event Delete**

```
Go Sub More Delete Processing
```

If the previous sequence of Event constructs is different, then the behavior of the generated application will change. In practice, this functionality is rarely exploited and it is even rarer for the inheritance engine changes to cause significant differences in the sequence. As in other cases, such problems can be identified through testing of the generated application, comparisons of generated source or comparisons of action diagram code.

In principle, similar considerations apply to the sequence of inherited code blocks in Collection Points (Pre and Post Points). Testing by CA has not revealed examples of such results but you should be aware that the possibility exists.

## Upgrading from CA Plex r5.0

In addition to the upgrade requirements documented in the earlier sections, review the following sections when you are upgrading from r5.0.

## MFC Native Controls in Windows Clients

In r5.0 and later, CA Plex supports two sets of GUI controls in Windows clients. By default, WinC applications use MFC controls for all types of controls, except the grid. The alternative set of GUI controls is called Winwidgets, which was the default before r5.0.

There are advantages and disadvantages associated with each set of controls. Winwidgets controls have been used in all releases of CA Plex since 1.0. Consequently, they represent a mature technology that has been implemented successfully for many years by many CA Plex customers. When upgrading from an earlier release of CA Plex, it is often simpler to use the Winwidgets controls since this is likely to minimize any backwards compatibility problems.

MFC controls provide a range of advantages including:

- Compatibility with third-party testing tools
- Windows standard look and feel
- Access to the MFC API for low-level control

## Backwards Compatibility Options

With some exceptions (see the following section), all the functionality previously available with Winwidgets controls should also be available with the MFC controls. However, to safeguard against unexpected upgrade issues, run-time options are available that enable you to revert to the Winwidgets controls.

A separate option is available for each type of control:

```
[NativeControls]
;GUI controls either display as MFC controls (1) or Winwidgets (0).
;These settings have no effect on the WinC grid which is always Winwidgets
ListBox=1
SpinButton=1
SingleLineEdit=1
SingleLineEditNumeric=1
MultiLineEdit=1
ComboBox=1
RadioButton=1
CheckBox=1
PushButton=1
Statics=1
```

Set the required option to 0 if you want to revert the control concerned to Winwidgets. The MultilineEdit setting is an exception—Setting this value to 0 invokes an earlier implementation of the native control as Winwidgets do not provide a multiline edit control.

**Note:** Report any undocumented upgrade issues to CA Technical Support.

## Upgrade Issues with MFC Controls

Known upgrade issues are listed below. Report any undocumented upgrade issues to CA Technical Support if they cause a problem in your application.

- **Disabled text color.** When MFC controls are disabled, the text displays in the Windows standard color (typically, light gray). The Text Color property is ignored when controls are disabled. Note that for edit controls you can use the combination of properties

`Mode=Read-only`

and

`Disabled=No`

to define a read-only edit control that does support the Text Color property.

- **Combo box size.** Unlike other control types, the size of the edit control portion of a combo box cannot be changed directly; it is determined by the font size of the text within the control. You can change the size of the edit portion at design time but it is ignored at run time. Instead, changing the size of the edit portion at design time, changes the size of the drop-down list at run time.
- **Transparency.** MFC controls do not fully support transparency. This may change the appearance of panels in cases where controls overlap.
- **z-order.** The z-order of MFC controls is reversed compared to the default z-order of Winwidgets controls. This may impact some panel designs that rely upon overlapping controls.

**Note:** To allow the z-order of design time controls to more closely match the run time, set the Clip Control property to Yes for each control concerned. This is useful when working with overlapping controls such as a frame within a frame.

## Calling Java Functions

As of CA Plex r4.5, when calling Java functions from the command line or from hand-coded Java, the function name must be prefixed with its package (`package.func`).

Note that at CA Plex r5.0 Service Pack 1 and later, there is a `PackageList.properties` file entry that can be used to provide a list of packages that are searched if no package is specified within the call. Typically, a function's package is generated directly into the code for each function call. However, this may not be the case in a dynamic partitioning scenario. For example, at generation time the target of a function call could be a Windows function (in which case no package will be included in the generated call). At run time, if the target function is switched to Java then the `PackageList` can be used to locate the function.

## Upgrading from CA Plex r4.5

This section explains upgrade requirements related to r4.5.

### Inheritance and Property Resolution Changes

CA Plex r5.0 and later includes enhancements to the inheritance engine that may change the properties of inherited objects in some circumstances.

### Replacing the Target of an Inheritance Triple

Consider the following example:

A is a B

**B is a C**

A replaces C by D

When **B is a C** arrives on A, A no longer inherits from C, as B did, but it now inherits from D.

In previous releases, anything inherited from D, which is in contention with that inherited from B, defers to the version inherited from B. In r5.0, anything contentious inherited from D takes precedence over things from B which arose from its inheritance from C. In other words **A is a D** takes precedence over **A is a B** and **B is a C**. This result is now consistent with the general rules of inheritance, where *later* triples take precedence over *earlier* triples.

### Triples for the Same Property That Have Been Entered at More Than One Level

It is possible to duplicate triples for an object by entering a triple, changing configuration to an earlier level and entering the same property. For example:

A **type** Character (Level 3)

A **type** Numeric (Level 1)

With the configuration set to the later level (Level 3 in the example) both triples would show in the Model Editor prior to r5.0 and are passed on to the inheritance engine. The last triple in sequence (as seen in the Model Editor) takes precedence. So in the previous example, A would be Numeric.

In CA Plex r5.0, the *later hides earlier* principle is applied to the levels and only A **type** Character is seen in the Model Editor and passed on for inheritance.

## Meta-Variables in RPG Internal Functions and OBASE/Set Current Date and Time

At r5.0, a fix was added so that internal RPG functions now have their own meta-variable space, and no longer share the meta-variable space of their calling functions. This change is in accordance with the published functionality regarding the scope of meta-variables (which states that a meta-variable's state only persists on calls to functions of type Meta) and is consistent with other generators.

This fix highlighted a place within the class libraries where meta-variable state information was expected to pass from an external function to an internal function. It was calling the OBASE/Set current date and time function in the OBASE variants AS400 5250 and Windows/AS400.

**Note:** OBASE/Server Set current date and time is a new function used with RPG400. It is recommended that you call this function instead of the OBASE/Set current date and time function with OBASE set in the Windows/AS400 variant and OBDATETIME set in the Windows client variant. This is exemplified in the call change in OBASE/Audited entity.Set audit fields.

To assist customers in tackling any upgrade issues associated with this fix, the following Plex.ini file option can be used in CA Plex r5.1:

```
[RPG Generator]
Share Meta-Variables With Internal Functions=1
```

An entry of 1 reverts to pre-r5.0 behavior. If no entry is present, the default setting of 0 is used, providing the same behavior as r5.0.

## Use of Single Quote Character in Java Messages and Source Code

The Java Generator at CA Plex r4.5 and earlier required two single quote characters (") to be used in messages and source code and required a single quote to be used at run time. For example, this was required when embedding parameters in the source code for use with the Exec SQL statement. This behavior was inconsistent with other generators.

This problem was corrected in CA Plex r5.0. Now only a single quote character (') is required. However, any existing messages or source code that used the previous workaround need to be edited when upgrading to r5.0.

## Use of Backslash Character in Values for Java

The Java Generator at CA Plex r4.5 and earlier required that two backslash characters (\\) be used in values whenever you required a single backslash character to be used at run time. This behavior was inconsistent with other generators.

This problem was corrected in CA Plex r5.0. Now only a single backslash character (\) is required. However, any existing values using the previous workaround will need to be edited when upgrading to r5.0.

## Upgrading from CA Plex r4.0

This section explains upgrade requirements related to r4.0.

### Replacement and Scoped Objects

CA Plex r4.5 introduced a change to the resolution of replacement triples attached to scoping objects to provide better control over replacement and performance improvements. This fix is not enabled by default. It requires a setting to be added to the Plex.ini file because it can cause significant backwards compatibility issues when it is enabled. For a full discussion, search the online help for the topic Replacement and scoped objects.

## Upgrading from CA Plex r3.5

In addition to the instructions in Upgrading from CA Plex r4.0, review the following sections.

### Change of Behavior with For Update Option

In r4.0, the behavior of the For Update option on Position and Fetch action diagram statements was changed to support pessimistic concurrency. It is possible that these changes may significantly change the behavior of ODBC-based applications (including NT BackOffice applications). For more information about backwards compatibility options, see the topic Row Locking in SQL Implementations in the online help.

## Change in CONCAT Operator in C++ Code

The documented behavior of the CONCAT operator is that trailing blanks are removed from field values. In practice, it was possible to retain trailing blanks in C++ functions in cases where the values concerned were not displayed on panels. This inconsistency was corrected in CA Plex r4.0 in that trailing blanks are now removed in all cases. The recommended technique for including blanks in concatenated strings is to use the Format Message statement with the blanks embedded in the message.

## Avoiding Run-Time Level Checks When Accessing the System i Field Values File

The YOBDDL program resides within the CA Plex library on the System i. When building the System i Field Values File within CA Plex, a copy of the YOBDDL program is created in the System i Object Library. This copy is called YOBVALSV. A copy is not made if YOBVALSV already exists.

The YOBDDL program was modified for r4.0 of CA Plex. For this reason, the old versions of YOBVALSV need to be deleted from each of your System i Object Libraries. Enter the following command on the System i:

```
DLTPGM PGM(Object-Library/YOBVALSV)
```

The new version of YOBVALSV needs to be placed in to each of the System i Object Libraries. This can be done by either:

- Rebuilding the System i Field Values File
- Creating a duplicate object by entering the following command on the System i:

```
CRTDUPOBJ OBJ(YOBDDL) FROMLIB(PLEX)  
OBJTYPE(*PGM)  
TOLIB(Object-Library) NEWOBJ(YOBVALSV)
```

Failure to perform these steps results in a level-check at run time when attempting to access the field values selection list.

## Dynamic Application Partitioning APIs

If you have used the `GetLocationInformation` and `SetLocationInformation` APIs, note that the structure `ObLocationInfo` was changed for CA Plex r4.0. If you have created source code objects that implement these APIs, you must edit the code to avoid compile errors.

The following three fields are removed:

```
ObLongFld m_fDataConv
ObLongFld m_fObTran
ObCharFld m_ObTranDLL
```

and replaced with the following single field:

```
ObLongFld m_iDataConv
```

See the `Odap.mdl` sample model for examples of the required source code.

## Linker Options in Upgraded Local Models

CA Plex r4.0 introduced a new feature called custom C++ build options. The linker option `/OPT:NOWIN98` is used by default. Without this option the size of compiled DLLs is significantly increased. If your local model was created before r4.0 of CA Plex, this option does not appear by default and should be added manually. For more information, see the online help topic `Customizing C++ Builds`.

## Loading the Run-Time Property DLL

The source code required to load the run-time property DLL was changed in CA Plex r4.0. If your application uses the `SetProperty` API, change the source code that loads the run-time property DLL, as follows:

```
#ifdef _DEBUG
    ObPropertyAPI::SetValue(Ob600Prpd.dll,
                           OB_ATOM_ATOM_INSTALL, 0, 0)
#else
    ObPropertyAPI::SetValue(Ob600Prp.dll,
                           OB_ATOM_ATOM_INSTALL, 0, 0)
#endif
```

## User Data (in BSUPPORT) and Business Contacts (in BCONTACT) Patterns

The functions with panels were moved from the container Services to the container UI in CA Plex r4.0. If you have previously used one of these patterns in CA Plex r3.5, you must rescope some of these functions inherited from that pattern. After extracting from the new version of the library, you can see your existing panel functions in the Object Browser under Services as real (in yellow), and new functions with the same names under UI (not yet real, in gray). Rescope the existing panel functions by dragging them from the Services function and dropping them onto the UI function. (Note that the UI function must be made real before doing this.)

## Upgrading from CA Plex r3.1 and r3.0

In addition to the instructions in Upgrading from CA Plex r4.0 and Upgrading from CA Plex r3.5, note that CA Plex r3.1 was the last release of CA Plex that supported the creation of 16-bit Windows applications.

## Upgrading from CA Plex 2.51 and Earlier

You cannot upgrade CA Plex 2.51 or earlier without first upgrading to CA Plex r3.0. Follow the upgrade instructions published with CA Plex r3.0.



# Chapter 3: System Requirements

---

The following requirements comprise the minimum hardware and software requirements for developing an application with CA Plex.

This section contains the following topics:

- [PC Development Environment](#) (see page 39)
- [Platform-Specific System Requirements](#) (see page 39)
- [Windows C++ Client \(WinC Generator\)](#) (see page 40)
- [System i \(System i 5250 and System i Client/Server Generators\)](#) (see page 40)
- [C# Server Generator](#) (see page 41)
- [C# Client Generator](#) (see page 41)
- [Java Generator](#) (see page 41)
- [EJB Option](#) (see page 42)
- [Windows C++ Server \(WinNTC Generator\)](#) (see page 42)
- [Deployment System Requirements](#) (see page 42)

## PC Development Environment

This specification is a recommendation rather than a strict requirement.

- 1 GHz 32-bit (x86) or 64-bit (x64) processor
- Windows 7, Windows XP (SP2 or SP3) or Windows Vista SP1 or Windows Server 2008

**Note:** The Server Core version of Windows is not supported for development or deployment of Plex applications.

- At least 1 GB RAM
- 40 GB hard drive or larger; at least 4 GB of free space is recommended
- A CD-ROM drive
- A 17-inch color monitor capable of running at 1024 x 768 resolution or greater

Customers developing Windows C++ applications should also review the requirements for Visual Studio 2005 at <http://www.microsoft.com>.

## Platform-Specific System Requirements

The system requirements depend on the platforms on which you intend to deploy your generated applications. The platform requirements change regularly as vendors release new versions of operating systems, compilers, and databases.

## Windows C++ Client (WinC Generator)

Following are the requirements for Windows C++ Client:

- Microsoft Visual Studio 2005 Standard, Professional or Architect edition

**Notes:**

- Visual Studio Express edition is not compatible with Plex C++ Builds because it does not include the MFC libraries
  - Visual Studio 2005 SP1 is also required (available for download <http://www.microsoft.com> )
  - Visual Studio 2008 and 2010 are NOT compatible with CA Plex C++ builds. Multiple releases of Visual Studio may be installed and run side-by-side on the same PC.
- CA Plex WinC Run-Time System
  - ODBC Driver and Database (if client-side data access is required)
  - Deployment platforms:
    - Microsoft Windows XP SP2 or SP3
    - Microsoft Windows Vista SP1
    - Microsoft Windows 7

## System i (System i 5250 and System i Client/Server Generators)

Following are the requirements for System i 5250 and System i Client/Server Generator:

- TCP/IP
- CA Plex System i libraries
- RPG III or RPG IV compiler
- V5R4, 6.1 or 7.1
- CA License key for 5250 generator (if required)

## C# Server Generator

Following are the requirements for C# Server generator:

- Microsoft .NET Framework Version 4.0 (can be installed from the CA Plex installation CD). Both 32-bit and 64-bit .NET Frameworks are supported.
- DBMS (Microsoft SQL Server 2008, Oracle 11g, and IBM DB2 9.5) and OLE DB Provider.
- ODBC driver for database builds, not required at run time

**Note:** Microsoft Visual Studio is *not* required for C# development. Optionally, you may find Visual Studio useful for debugging and other development activities.

## C# Client Generator

Following are the requirements for C# Client generator:

- Microsoft .NET Framework Version 4.0 (can be installed from the CA Plex installation CD). Both 32-bit and 64-bit .NET Frameworks are supported.
- CA License Key for .NET Client generator.

## Java Generator

Following are the requirements for Java generator:

- Sun J2SE Development Kit 6.0. Both 32-bit and 64-bit Java Runtime Environments are supported.
- Apache ANT 1.8.2 (automatically installed with CA Plex)
- Third-party DBMS, such as, Oracle, Microsoft SQL Server, or any third-party DBMS and JDBC driver
- ODBC driver for database builds, not required at run time

## EJB Option

In addition to the requirements for the Java generator, following are the requirements for the EJB option:

- Java EE Application Server, such as, Oracle GlassFish, Oracle WebLogic, JBoss, or IBM WebSphere
  - Java EE 6 SDK
- Note:** The application must be packed by J2EE 1.3.
- CA License Key for EJB Connector generation.

## Windows C++ Server (WinNTC Generator)

Following are the requirements for Windows C++ Server:

- CA Plex Windows Application Server.
- Microsoft Visual Studio 2005 Standard or Professional edition. For more information about Visual Studio, see the Windows C++ Client (WinC Generator) section in this guide.
- DBMS (Microsoft SQL Server 2008, Oracle 11g, or IBM DB2 9.5). The latest available service packs are generally recommended.
- Microsoft Windows Server 2003 or Microsoft Windows Server 2008.

**Note:** The Windows C++ Server generator is provided only for maintenance of existing WinNTC applications. CA strongly recommends the use of C# or Java generators for the development of new applications for the Windows Server platform.

## Deployment System Requirements

As with development, the deployment system requirements vary depending on the target platform. You can find the details of currently supported deployment platforms by going to CA Support Online and clicking the Compatibility Matrix link on the CA Plex Product Home page at <http://ca.com/support>.

# Chapter 4: Installation Considerations

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You can find installation and upgrade procedures for this release of CA Plex in the *Getting Started*.

You can also perform a silent install of CA Plex. For more information about the silent installation of CA Plex, see the *Getting Started*.

This section contains the following topics:

[Microsoft Help Compiler Installation](#) (see page 43)

## Microsoft Help Compiler Installation

Microsoft Visual Studio 2005 does not include the help compiler for creating HLP format help files.

To compile HLP files with Plex, you must download and install the help compiler separately. You can find Windows 95 Help Authoring Kit (hwcsetup.exe) available for download at <http://www.microsoft.com>. You must install the MS help compiler to its default location: C:\Program Files\Help Workshop.

The minimum requirement for successful help topic compilation is to have two files—HCRTF.EXE and HWDLL.DLL present in the folder C:\Program Files\Help Workshop.



# Chapter 5: Published Fixes

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You can find the complete list of published bug fixes for this product through Published Solutions on the CA Technologies support site.



# Chapter 6: Known Issues

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This section describes known issues, workarounds, and solutions for this release of CA Plex. For additional information, search the Knowledge Base on CA Support Online at <http://ca.com/support>.

This section contains the following topics:

[Modification of Internal Tables](#) (see page 47)

[C++ Build Performance with Visual Studio 2005](#) (see page 47)

## Modification of Internal Tables

Although it is possible to edit internal tables in CA Plex internal tables to add your own object types and verbs, this is an undocumented and unsupported feature. CA does not guarantee to support models that have been modified in this way. It is strongly recommended that you do *not* modify the internal tables in CA Plex in any way.

Similarly, manual editing of any group model table files is also not supported. This includes the lib.tab file that contains sensitive data that controls aliasing of group model IDs.

## C++ Build Performance with Visual Studio 2005

You may experience slow C++ build performance compared with previous releases. For tips on improving the performance of WinC and WinNTC compiles using Visual Studio 2005, see the Technical Document *TEC415593* in the Knowledge Base on CA Support Online at <http://ca.com/support>.



# Chapter 7: International Support

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An internationalized product is an English product that runs correctly on local language versions of the required operating system and required third-party products, and supports local language data for input and output. Internationalized products also support the ability to specify local language conventions for date, time, currency and number formats.

A translated product (sometimes referred to as a localized product) is an internationalized product that includes local language support for the product's user interface, online help and other documentation, as well as local language default settings for date, time, currency, and number formats.

In addition to the English release of this product, CA supports only those languages listed in the following table.

Language	Internationalized	Translated
Brazilian-Portuguese	Yes	No
Chinese (Simplified)	Yes	No
Chinese (Traditional)	Yes	No
Czech	Yes	No
Danish	Yes	No
Dutch	Yes	No
Finnish	Yes	No
French	Yes	No
German	Yes	No
Greek	Yes	No
Hungarian	Yes	No
Italian	Yes	No
Japanese	Yes	Yes
Korean	Yes	No
Norwegian	Yes	No
Polish	Yes	No
Russian	Yes	No
Spanish	Yes	No

<b>Language</b>	<b>Internationalized</b>	<b>Translated</b>
Swedish	Yes	No
Turkish	Yes	No

Limited testing has been performed on languages other than English. This limited testing may comprise testing by CA partners or customers or be based on historical testing of prior releases of CA Plex.

This certification means that this English release will run on the non-English operating systems on those machines. It is not intended to mean that the product is localized for those markets and languages.

# Chapter 8: Documentation

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The following guides are automatically installed with the product and available at <http://ca.com/support>:

- *Plex\_Getting\_Started\_ENU.pdf*
- *Plex\_Release\_Summary\_ENU.pdf*
- *Plex\_Tutorial\_for\_System\_i\_ENU.pdf*
- *Plex\_Tutorial\_for\_Windows\_ENU.pdf*

To view PDF files, you must install the Adobe Reader if it is not already installed on your computer.

**Note:** Updated guides for this release are available under the CA brand drop-down list on the Documentation page at <http://ca.com/support>.