



QAD Adaptive Applications

Installation Guide

QAD Customer Version Control

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Change Summary

Product Name Changes

Starting in September 2019, the new name for QAD's complete portfolio of products is QAD Adaptive Applications. Additionally, QAD Adaptive ERP is the new name for QAD's flagship ERP solution. QAD Adaptive ERP includes the functionality previously associated with QAD Cloud ERP and QAD Enterprise Applications - Enterprise Edition, plus the QAD Enterprise Platform and Adaptive UX which resulted from the Channel Islands program. Going forward, the terms QAD Enterprise Applications, QAD Cloud ERP, and Channel Islands will be deprecated but will remain in previous documentation and training materials. QAD's intention is to—as soon as possible—eliminate the use of the deprecated terms going forward.

Change Summary

The following table summarizes significant differences between this document and previous versions.

Date/Version	Description	Reference
March 2022/3.0.0	Updated for 3.0.0.	--
	Added instructions for upgrading CVC from 2.9.4 to 3.0.0.	page 24
	Added instructions for upgrading CVC from 2.9.0 to 2.9.4.	page 28
September 2021/2.9.0	Updated for 2.9.0.	--
	Updated instructions for CVC upgrade using the upgrade tool.	page 22
	Added instructions for upgrading CVC from 2.8.4 to 2.9.0.	page 31
	Added instructions for upgrading CVC from 2.8.0 to 2.8.4.	page 35
	Added instructions for upgrading CVC from 2.7.9 to 2.8.0.	page 37
	Added instructions for upgrading CVC from 2.7.7 to 2.7.9.	page 40
October 2020/2.8.0	Updated for 2.8.0.	--
	Added instructions for CVC upgrade using the upgrade tool.	page 22
	Added instructions for upgrading CVC from 2.7.0 to 2.7.7.	page 42
April 2019/2.7.0.60	Updated for 2.7.0.60.	--
	Added instructions for upgrading CVC from 2.6.1.0 to 2.7.0.60.	page 47
December 2018/2.6.1.0	Initial version.	--

Overview

This chapter includes an introduction to Customer Version Control (CVC) installation and the prerequisites for installation.

QAD CVC Overview 2

Provides an introduction to QAD CVC.

System Requirements 2

Describes the required tools and applications for installing QAD CVC.

QAD CVC Overview

QAD Customer Version Control, also known as QAD CVC, is a version control system (VCS) for software delivery. It provides a controlled, traceable, and secure process for the maintenance, update, and delivery of software in customer environments.

System Requirements

The following table lists the system requirements for running QAD CVC.

Type	Requirement	Version	Reason
Operating System (OS)	UNIX	N/A	Currently Windows OS is not supported.
Software	Java	1.7 or above for CVC 2.9 and earlier 1.8 or above for CVC 3.0 and later	CVC commands were written and compiled using Java. CVC 3.0 requires Java 1.8 or above. CVC 2.9 and earlier versions support Java 1.7. To support connection to the database server with SSL TLS1.2 enabled, Java 1.8 or later is required.
Software	Git	1.9.0 or above	CVC uses Git to perform version control on files. Some required <code>git</code> commands are available only in version 1.9.0 or later.
Software	Progress	N/A	CVC uses the Progress database.
CPU		N/A	CVC itself does not require too many resources. Generally, if the system meets Progress and QAD Adaptive ERP requirements, there are sufficient resources to run CVC.
Memory		N/A	
Disk	7 MB + 100 MB + 2 GB	N/A	The size of CVC source code is about 7 MB. The size of a typical database file ranges from 6 MB to 100 MB depending on how many files are version controlled. The size of the <code>.git</code> folder is about 2 GB when CVC operates in a Standard Edition (SE) or QAD Deployment Toolkit (QDT) environment, but about 10 MB when in a YAB environment. Note You do not need to perform version control on standard programs when CVC functions in a YAB environment.

Installing, Setting Up, and Upgrading CVC

This chapter describes the installation, setup, and upgrade of QAD Customer Version Control (CVC).

To install CVC, you can follow the general procedures described in “Installation” on page 5.

An upgrade tool is introduced in CVC 2.8, with which you can directly upgrade CVC from version 2.6.3.3 or later to version 2.8 and later. For details, see “Upgrade Using Upgrade Tool” on page 22.

This chapter also provides details for specific CVC upgrade scenarios, such as upgrade from 2.7.0 to 2.7.7. You can check the dedicated section for details if needed.

Installation 5

Describes how to install CVC.

Upgrade Using Upgrade Tool 22

Describes how to upgrade CVC using the upgrade tool.

Upgrading CVC 2.9.4 to CVC 3.0.0 24

Describes how to upgrade CVC from 2.9.4 to 3.0.0.

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Describes how to upgrade CVC from 2.7.0 to 2.7.7.

Upgrading CVC 2.6.1.0 to CVC 2.7.0.60 47

Describes how to upgrade CVC from 2.6.1.0 to 2.7.0.60.

Upgrading CVC 2.6.0.1 to CVC 2.6.1.0 51

Describes how to upgrade CVC from 2.6.0.1 to 2.6.1.0.

Upgrading CVC 2.5.1.0 to CVC 2.6.0.1 53

Describes how to upgrade CVC from 2.5.1.0 to 2.6.0.1.

Installation

Generally, CVC installation involves the following procedures:

- 1 Preparation for Installation
- 2 Installing CVC
- 3 Setting Up CVC

Preparation for Installation

Before installing CVC, you must finish the following pre-installation tasks:

- 1 Installing Java
- 2 Installing Git
- 3 Granting sudo Permission

This section lists all the commands you may run in Sudo. You can skip some tasks if the requirement is already met.

The commands you may need to run in the following procedures include:

- `unzip`: To install CVC, you need to run the `unzip` command to extract files to a certain directory, for example, `/usr/local/cvc`, `/opt/cvc`, or `/qond/apps/cvc`.
- `chmod`: To make CVC scripts executable, you need to run the `chmod` command.
- `ln`: To install CVC in the system path, you can create a link by using the `ln` command.

Installing Java

Before installing CVC, make sure that the required Java version (Java 1.7 or later) is installed. If the current Java version is earlier than 1.7, download the required version and install it.

To install Java 1.7 without affecting the Java that has been installed in the system, you can download and extract the `jre` package inside the `cvc tools` folder.

To make CVC use an existing Java version, you can create a link in the `cvc tools` folder to link to the existing `jdk` or `jre` folder. For example, run either of the following commands:

```
ln -s <jdk_path> /usr/local/cvc/java
```

or

```
mkdir /usr/local/cvc/java && ln -s <jre_path> /usr/local/cvc/java/jre
```

Example

To download the `jre.zip` file (Java 1.7) for Linux x64, perform the following steps:

- 1 Run the following commands:


```
$ wget http://packages.qad.com/packages/java-linux64/1.7.0.80/resources -O /tmp/jre.zip
$ ls -l /tmp/jre.zip
```
- 2 Verify that the `jre.zip` file has been downloaded successfully.

6 QAD Customer Version Control Installation Guide

- 3 Decompress the package to the `cvc tools` folder.

Installing Git

Before installing CVC, make sure that the required Git version (1.9.0 or later) is installed. If you have not installed Git 1.9.0 or later, download and install it.

The base repository provides Git 1.7.4 only. Therefore, to install Git 1.9.0+ by Yum, you should use the Yum repository in QAD.

Example

To install Git for Linux x64, and RHEL 5 and 6, perform the following steps as user root:

- 1 Run the following command:

```
$ vim /etc/yum.repos.d/qad.repo
```
- 2 Fill in the content of `/etc/yum.repos.d/qad.repo` as below:

```
[qad]
name=QAD RPM Repository
baseurl=https://cvc.qad.com/qadrpms/rhel/$releasever/RPMS/$basearch/
gpgcheck=0
enabled=1

[qad-noarch]
name=QAD RPM Repository
baseurl=https://cvc.qad.com/qadrpms/rhel/$releasever/RPMS/noarch/
gpgcheck=0
enabled=1
```
- 3 Install the Git by Yum.

```
$ yum install git -y
```
- 4 Verify that the Git version is 1.9 or later.

```
$ git --version
git version 2.1.0
```

Granting sudo Permission

CVC runs `sudo` commands to perform Linux user permission control. You need to set the `sudoers` file to allow certain groups or users to run `cvc` commands.

- 1 Modify the `/etc/sudoers.custom` file and add the following content to the end of the file:

```
Cmd_Alias VC_COMMANDS = /usr/local/cvc/cvc_operator
%qad    ALL=(mfg)    NOPASSWD: VC_COMMANDS
```

Note No password is required for you to perform this operation. After adding the content, users in the QAD group can run CVC as user `mfg`.

- 2 Generate the `/etc/sudoers` file.

```
$ cat /etc/sudoers.common /etc/sudoers.custom > /etc/sudoers
```

Installing CVC

Generally, before installing CVC, you need to download the CVC package and decompress the files to the `/usr/local/cvc` directory. You also need to create a link in the `/usr/bin` directory so that CVC becomes available in each user's system path.



To install CVC, perform the following steps:

1 Download the CVC package.

```
$ wget http://packages.qad.com/packages/cvc/<version>/resources -O /tmp/cvc.zip
```

Note You need to replace *<version>* with the CVC package version you want to install; for example, 2.6.0.1.

2 Decompress files to the `/usr/local/cvc` directory.

```
$ unzip /tmp/cvc.zip -d /usr/local/cvc
```

If you want to make CVC use an existing Java version, you can skip the following extract command. However, you need to create a link in the `cvc tools` folder to link to the existing `jdk` or `jre` folder; for example, `ln -sf <jdk_path> /usr/local/cvc/java` or `mkdir /usr/local/cvc/java && ln -s <jre_path> /usr/local/cvc/java/jre`.

```
$ mkdir /usr/local/cvc/java && unzip /tmp/jre.zip -d /usr/local/cvc/java/jre
```

```
$ chmod +x /usr/local/cvc/cvc /usr/local/cvc/cvc_operator
$ ln -sf /usr/local/cvc/cvc /usr/bin/cvc
```

3 Add required configurations.

```
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644
/usr/local/share/man/man1/cvc*
$ chown mfg.qad /usr/local/cvc/etc/config.ini
$ rm -rf /tmp/cvc.zip && rm -rf /tmp/jre.zip
```

4 Run the `cvc install` command as user `mfg` to install and configure the CVC tool correctly.

Note You need to run the `cvc install` command as user `mfg`, because you may modify the `cvc config.ini` file and create a Git repository in the environment directory.

a Switch to user `mfg`.

```
$ su - mfg
```

b Run the `cvc install` command.

```
$ cvc install
```

```
.....
Please choose your project type :
```

```
-----
SEQ Type
```

```
-----
001 core
```

```
002 qdt
```

```
003 se
```

```
004 yab
-----
```

```
Please input the sequence number:3
```

```
.....
Setting up DLC.....
```

```
Current DLC is incorrect [/qad/progress/dlc]
```

```
Please enter DLC path:/progress/dlc
```

```

.....
Checking database.....
- Checking database connection.....[fail]
Unable to setup connection to database.
Please choose a action
-----
SEQ Action
-----
001 Connect to database
002 Create a new database
003 Start an existing database
-----
Please choose the sequence number to do the action:2
Please enter the database path:/qadapps/cvc/db/cvcd
-----
Setting environment directory.....
Do you want to run the optional task [Setting environment directory]?
[Y]es/[N]o:y
Current environment directory is invalid [<initial_dir>]
Please enter environment directory:/qadapps
- Saving configurations.....[ok]
.....[ok]
Initializing git repository.....
Do you want to run the optional task [Initializing git repository]?
[Y]es/[N]o:y
- Saving configurations.....[ok]
.....[ok]
Setting up git remote.....
Do you want to run the optional task [Setting up git remote]?
[Y]es/[N]o:y
Current git remote [file:///opt/git/repos/central.git] is invalid:
Please enter git remote information:
Git remote url :http://cvc.qad.com/git/ee-lab.git
Git proxy user :ee_devel
Git proxy pass :*****
- Uploading changes to central server.....[ok]
- Saving configurations.....[ok]
.....[ok]
CVC is installed successfully!

```

Setting Up CVC

After CVC is installed successfully, you need to set up the CVC tool with the correct environment, module, role, and user.

When setting up CVC, you must finish the following tasks:

- 1 Updating the .gitignore File
- 2 Updating config.ini Settings in CVC
- 3 Updating Environment Settings in CVC
- 4 Adding Roles in CVC
- 5 Adding Users in CVC
- 6 Defining and Registering Modules in CVC
- 7 Performing Regular Customization in CVC

Updating the .gitignore File

To update the .gitignore file, perform the following steps:

- 1 Update the .gitignore file in the root directory of the environment—for example, /devl/apps/.gitignore—to identify the files for which version control is not required. You can also add other files or directories that do not need to be version controlled.
- 2 Commit the .gitignore file by running the `cvc commit-git` command:
\$ `cvc commit-git`

Updating config.ini Settings in CVC

You need to update the `jiraStatusAllowed` settings in the `/usr/local/cvc/etc/config.ini` file. This field controls the ticket status relationships with CVC commands. CVC users are only allowed to use commit-related commands with a ticket in the specified status. When configuring the `jiraStatusAllowed` settings, note that this field is case-sensitive and should not have unnecessary spaces.

```
# a mapping of the jira ticket status and checkin/checkout/add commands
# the configure should separate by "command1->status,command2->status,command3->other-status"
# case sensitive and should not have unnecessary space
jiraStatusAllowed = checkin->Work,checkout->Work,add->Work
```

Updating Environment Settings in CVC

The following are some basic command examples in different environments:

- YAB

You need to configure `Dir` and `Deploy Tool Directory` correctly for each environment. `Deploy Tool Directory` should be set to the one that contains the YAB program. You can obtain the YAB path by running the `which yab` command.

```
$ cvc env -s
```

These are the environments in system:

Environment	Git branch	Dir	Deploy Tool Directory	Pre Env	Hotfix
devl	devl	/devl/apps	/devl/apps/qdt		no
prod	prod	<initial_dir>	/devl/apps/qdt	test	no
test	test	<initial_dir>	/devl/apps/qdt	devl	no

```
$ cvc env -u -e devl -tdir /usr/local/yab # update deploy tool directory for devl environment
```

Successfully updated environment [devl].

The details of environment [devl]:

Environment	Git branch	Dir	Deploy Tool Directory	Pre Env	Hotfix
devl	devl	/devl/apps	/usr/local/yab		no

```
$ cvc env -u -e test -dir /test/apps -tdir /qad/local/scripts
```

```
$ cvc env -u -e prod -dir /prod/apps -tdir /qad/local/scripts
```

```
$ cvc env -s
```

These are the environments in system:

Environment	Git branch	Dir	Deploy Tool Directory	Pre Env	Hotfix
devl	devl	/devl/apps	/usr/local/yab		no
prod	prod	/prod/apps	/usr/local/yab	test	no
test	test	/test/apps	/usr/local/yab	devl	no

• QDT

You need to configure **Dir**, **Deploy Tool Directory**, and **QDT Env** correctly for each environment. **Deploy Tool Directory** should be set to the installation directory of QDT. **QDT env** refers to the directory that contains the correct **pf** file.

For example, if QDT is installed in the `/devl/apps/qdt` directory and the `batchCompile.pf` file for compiling QAD Enterprise Applications is `/devl/apps/qdt/envs/devldb/scripts/batchCompile.pf`, **QDT env** should be set to `devldb` and the `compile pf` field for the QAD Enterprise Applications module should be `scripts/batchCompile.pf`.

```
$ cvc env -s
```

These are the environments in system:

Environment	Git branch	Dir	Deploy Tool Directory	QOT Env	Pre Env	Hotfix
dev1	dev1	/dev1/apps	/dev1/apps/qdt	dev1		no
prod	prod	<initial_dir>	/dev1/apps/qdt	prod	test	no
test	test	<initial_dir>	/dev1/apps/qdt	test	dev1	no

```
$ cvc env -u -e dev1 -tdir /dev1/apps/qdt --qdt-env devldb # update deploy tool directory for dev1 environment
```

Successfully updated environment [dev1].

The details of environment [dev1]:

Environment	Git branch	Dir	Deploy Tool Directory	QOT Env	Pre Env	Hotfix
dev1	dev1	/dev1/apps	/dev1/apps/qdt	devldb		no

```
$ cvc env -u -e test -dir /test/apps -tdir /test/apps/qdt --qdt-env testdb
```

```
$ cvc env -u -e prod -dir /prod/apps -tdir /prod/apps/qdt --qdt-env proddb
```

```
$ cvc env -s
```

These are the environments in system:

Environment	Git branch	Dir	Deploy Tool Directory	QOT Env	Pre Env	Hotfix
dev1	dev1	/dev1/apps	/dev1/apps/qdt	devldb		no
prod	prod	/prod/apps	/prod/apps/qdt	proddb	test	no
test	test	/test/apps	/test/apps/qdt	testdb	dev1	no

- SE

You need to configure `Dir` and `Deploy Tool Directory` correctly for each environment. `Deploy Tool Directory` should be the installation directory of MFGUTIL, where the `langxref.ini` file is located.

```
$ cvc env -s
```

These are the environments in system:

Environment	Git branch	Dir	Deploy Tool Directory	Pre Env	Hotfix
devl	devl	/qadapps	/devl/apps/qdt		no
prod	prod	<initial_dir>	/devl/apps/qdt	test	no
test	test	<initial_dir>	/devl/apps/qdt	devl	no

```
$ cvc env -u -e devl -tdir /qadapps/qea # update deploy tool directory for devl environment
```

Successfully updated environment [devl].

The details of environment [devl]:

Environment	Git branch	Dir	Deploy Tool Directory	Pre Env	Hotfix
devl	devl	/qadapps	/qadapps/qea		no

```
$ cvc env -u -e test -dir /qadapps -tdir /qadapps/qea
```

```
$ cvc env -u -e prod -dir /qadapps -tdir /qadapps/qea
```

```
$ cvc env -s
```

These are the environments in system:

Environment	Git branch	Dir	Deploy Tool Directory	Pre Env	Hotfix
devl	devl	/qadapps	/qadapps/qea		no
prod	prod	/qadapps	/qadapps/qea	test	no
test	test	/qadapps	/qadapps/qea	devl	no

Adding Roles in CVC

You can run the `cvc role` command to view all roles in the system. You can also add more CVC roles by using the `cvc role --add` command.

```
$ cvc role -s
```

These are the cvc roles in system:

SEQ Role	Command
001 admin	encrypt-password,environment,role,user
002 developer	add,check-env,checkin,checkout,config,dev-compile,module-show,report,status
003 releaseManager	add,analyze-rcode,backout,check-consistency,check-env,checkin,checkout,clean-env,config,dev-compile,module,module-show,promote,register,report,source,status

```
$ cvc role --add --role reporter --command module-show,report,status
```

Successfully added role [reporter].

The details of role [reporter]:

SEQ Role	Command
001 reporter	module-show,report,status

Adding Users in CVC

You can run the `cvc user` command to view all users who are able to use the `cvc` command. You can also add more CVC users by using the `cvc user --add` command.

```
$ cvc user -s
The details of user [root]:
```

SEQ Login ID	Full Name	Email	Active Role
001 root	Initial User	who@localhost	Yes releaseManager,developer,admin

```
$ cvc user --add --login-id test --full-name "Test User" --email "test@qad.com" --roles "developer"
Successfully added user [test].
The details of user [test]:
```

SEQ Login ID	Full Name	Email	Active Role
001 test	Test User	test@qad.com	Yes developer

Defining and Registering Modules in CVC

You also need to define and register modules in CVC.

Note Commands involved in the section requires the “release manager” role in CVC. You can run the `cvc user --show` command to see the list of CVC users and user roles.

Defining Modules

Before defining a module in CVC, you need to add the module in CVC and then view module settings in CVC. However, the fields you need to set vary according to the environment type (YAB, QDT, or SE).

- YAB

1 Add the module in CVC.

- a** Create the directories for the module to be added.

If you want to add a module, you have to create the directories for the module first. For example, before adding module `CUSTOM-MFG`, you need to specify the root directory, work directory, YAB compile process, YAB code instance name, and so on.

Below is an example of the command:

```
$ cvc module --add --module CUSTOM-MFG --root-dir customizations/mfg/default/src --
work-dir customizations/mfg/work/src --yab-process "code-mfg-customizations-update" --
code-instance "mfg-customizations" --before-compile "" --after-compile ""
```

The `yab-process` and `code-instance` fields are dedicated for compiling the code by YAB.

- When compiling customization codes for the YAB project, use `yab-process` of the program files' module. For example, if the module's `yab-process` is set to `code-mfg-update`, run the `yab code-mfg-update` command to compile the program files of the module and update the YAB environment.

- The `code-instance` field is used to generate the compile proppath. For example, if the module's `code-instance` is set to `mfg`, you can obtain the module proppath by running the `yab config code.mfg.proppath` command.
- To have the module compiled correctly by YAB, you must set the `yab-process` and `code-instance` fields correctly.

b Run the `cvc env --show` command to obtain environment information.

The following is an example:

```
$ cvc env --show
```

These are the environments in system:

Environment	Git branch	Dir	Deploy Tool Directory	Pre Env	Hotfix
devl	devl	/devl/apps	/qad/local/scripts		no
prod	prod	/prod/apps	/qad/local/scripts	sup	no
sup	sup	/sup/apps	/qad/local/scripts	test	yes
test	test	/test/apps	/qad/local/scripts	devl	no

In the example above, the absolute path of those directories are like the following:

root directory: `/devl/apps/customizations/mfg/default/src`

work directory: `/devl/apps/customizations/mfg/work/src`

Note Before adding a module, make sure that you have created all the directories required.

- c** Make sure that the YAB tool is available in the deploy tool directory so that the YAB process can compile module files.

2 View module settings in CVC.

You can run the `cvc module --show` command to view all modules in system. You can also use this command to obtain all the module settings in the system.

The following is an example:

```
$ cvc module --show
These are the modules in system:
```

Module	Root dir	Work dir	Yab Compile Process	Code Instance	Before Compile	After Compile
CUSTOM-FIN	customizations/fin		code-fin-customizations-update	fin		
CUSTOM-MFG	customizations/mfg/default/src	customizations/mfg/work/src	code-mfg-customizations-update	mfg-customizations		
PATCH-EAM	patches/eam/default/src/		code-eam-update			
PATCH-EAM-DATA	patches/eam/default/data					
PATCH-MFG	patches/mfg/default/src/		code-mfg-update	mfg		
PATCH-MFG-DATA	patches/mfg/default/data/					
PATCH-QXTEND-ADAPTER	patches/qxtend/qxtadpt/default/src		code-qxi-update			
PATCH-QXTEND-OUTBOUND	patches/qxtend/qxoserver/default/src		code-qxo-update			

- QDT

1 Add the module in CVC.

a Create the directories for the module to be added.

If you want to add a module, you have to create the directories for the module first. For example, to add a module, you need to specify the root directory, unencrypted source directory, encrypted source directory, rcode directory, work directory, the propath for compile, the compile .pf file, the module type, the languages code to compile module, the rcode layout, and the source layout.

Below is an example of the command:

```
$ cvc module --add --module mfgpro_cust --type custom --root-dir mfgpro/xxsrc --src-dir
src -work mfgpro/xxsrc/work -rcode mfgpro -propath
mfgpro/xxsrc/src,mfgpro/xrc,mfgpro/xrc/proxy,mfgpro/fin/proxy.pl,mfgpro/xrc/validation
-pf scripts/cvc/compile_mfgpro_cust.pf --languages us -rl staggered -sl twoletter -bc
"" -ac ""
```

If you have not specified the compile .pf file for the module, CVC does not compile all the files linked to the module.

The src dir, xrc dir, type, compile propath, rcode dir, compile pf, rcode layout, source layout, and languages fields are dedicated for customizing and compiling the code by QDT.

- The src dir and xrc dir fields are used to specify the directories containing unencrypted source code and encrypted code separately. When using the cvc check-consistency command, you can check if the code in those folders is from the same source code.
- The type field is used to identify whether the files in the module can be checked out and made customization. CVC only allows checkout from custom modules.
- The compile propath, rcode dir, and compile pf fields are used for compiling and deploying rcode files by QDT. The content of the compile .pf file is used when you compile the files in the module.

- Three options are available to the `rcode layout` field: `staggered`, `flat`, and `source`. Option `staggered` indicates that the `rcode` is placed into the staggered directories; for example, `us/so/sosomt.r`. Option `flat` indicates that the `rcode` is placed into the destination directory directly; for example, `sosomt.r`. Option `source` indicates that the `rcode` is stored into the source directory.

Note Generally, set the `rcode layout` field of the QDT modules to `staggered`.

- Two options are available to the `source layout` field: `twoletter` and `flat`. Option `twoletter` indicates that the source code files are listed in the two-letter subdirectories; for example, `us/so/sosomt.p`. Option `flat` indicates that the source code files are in the flat source code directory; for example, `sosomt.p`.

Note Generally, set the `source layout` field of the QDT modules to `twoletter`.

- The `languages` field is used for deploying `rcode` files into correct language directories. This field supports a comma-separated list of languages. For example, when `source layout` is set to `twoletter` and `rcode layout` is set to `staggered`, if the `language` field is set to `us,jp`, for the `sosomt.p` file in the `src` folder, CVC compiles with two languages and deploys the `rcode` file to `us/so/sosomt.r`.

b Run the `cvc env --show` command to obtain environment information.

The following is an example:

```
$ cvc env --show
```

These are the environments in system:

Environment	Git branch	Dir	Deploy Tool Directory	QDT Env	Pre Env	Hotfix
dev1	dev1	/dev1/apps	/dev1/apps/qdt	dev1		no
prod	prod	/prod/apps	/dev1/apps/qdt	prod	sup	no
sup	sup	/sup/apps	/dev1/apps/qdt	sup	test	yes
test	test	/test/apps	/dev1/apps/qdt	test	dev1	no

In the example above, the root directory is `mfgpro/xxsrc`, and therefore the absolute paths of those directories are like following (you can obtain the report by running the `cvc report -m mfgpro_cust` command):

```
$ cvc report -m mfgpro_cust
```

The details of the module:

Key	Value
Module	mfgpro_cust
Type	custom

```

Root dir      /devl/apps/mfgpro/xxsrc
Src dir       /devl/apps/mfgpro/xxsrc/src
Xrc dir       /devl/apps/mfgpro/xxsrc/xrc
Work dir      /devl/apps/mfgpro/xxsrc/work
Rcode dir     /devl/apps/mfgpro
Compile propath /devl/apps/mfgpro/xxsrc/src,/devl/apps/mfgpro/xrc,
               /devl/apps/mfgpro/xrc/proxy,/devl/apps/mfgpro/fin/proxy.pl,
               /devl/apps/mfgpro/xrc/validation,/devl/apps/mfgpro/src
Compile pf    scripts/batchCompile.pf
Lang          us
Rcode Layout  staggered
Source Layout twoletter
Before Compile
After Compile

```

Note Before adding a module, make sure that you have created all the directories required.

- c** Make sure that the compile .pf file is available in the deploy tool directory so that QDT can compile module files. The pf file path consists of: *env deploy tool dir + envs + env qdt env name + module compile pf path*. QAD recommends you create a folder cvc under the /devl/apps/qdt/envs/devl/scripts directory to hold all compile .pf files of the CVC module. Then you can set the compile pf file field to scripts/cvc/ compile_mfg.pf.

The following is an example of the absolute pf file path:

compile pf file path : /devl/apps/qdt/envs/devl/scripts/cvc/compile_mfg.pf

The following is an example of the content of the pf file:

```

-db /devl/apps/mfgpro/db/mfgempty -ld qaddb -trig triggers -R0
-db /devl/apps/mfgpro/db/srcempty -ld srcline -trig triggers -R0
-db /devl/apps/mfgpro/db/admemory -ld qadadm -trig triggers -R0
-db /devl/apps/mfgpro/db/hlpempty -ld qadhelp -trig triggers -R0
-inp      32000
-tok      4096
-l        1000
-c        500
-s        32000
-D        50
-TM       5
-TB       2
-B        10
-yy       1920
-d        mdy
-h        7
-cprcodeout utf-8
-cpinternal utf-8

```

```
-cpstream      utf-8
```

2 View module settings in CVC.

You can run the `cvc module --show` command to view all modules in system. You can also use this command to obtain all the module settings in the system.

The following is an example:

```
$ cvc module --show
These are the modules in system:
```

Module	Type	Root dir	Src dir	Xrc dir	Work dir	Rcode dir	Compile propath	Compile pf	Lang	Rcode Layout	Source Layout	Before Compile	After Compile
mfgpro_cust	custom	mfgpro/xxsrc	src		mfgpro/xxsrc/work	mfgpro	mfgpro/xxsrc/src, mfgpro/xrc, mfgpro/xrc/proxy, mfgpro/fin/proxy.pl, mfgpro/xrc/validation, mfgpro/src	scripts/batchCompile.pf	us	staggered	twoletter		
mfgpro_src	standard	mfgpro	src	xrc		mfgpro	mfgpro/xrc, mfgpro/xrc/proxy, mfgpro/fin/proxy.pl, mfgpro/xrc/validation	scripts/batchCompile.pf	us	staggered	twoletter		

- SE

1 Add the module in CVC.

a Create the directories for the module to be added.

If you want to add a module, you have to create the directories for the module first. For example, to add a module, you need to specify the root directory, unencrypted source directory, encrypted source directory, rcode directory, work directory, the propath for compile, the compile .pf file, the module type, the languages code to compile module, the rcode layout, and the source layout.

The following is an example of the command:

```
$ cvc module --add --module mfgpro_cust --type custom --root-dir qea/xxsrc --src-dir src
-work qea/xxsrc/work -rcode qea -propath qea/xxsrc/src,qea/xrc,qea/src -rl staggered -
sl flat --languages us -pf compile_mfg.pf
```

If you have not specified the compile .pf file for the module, CVC does not compile all the files linked to the module.

The `src dir`, `xrc dir`, `type`, `compile propath`, `rcode dir`, `compile pf`, `rcode layout`, `source layout`, and `languages` fields are dedicated for customizing and compiling the code by MFGUTIL.

- The `src dir` and `xrc dir` fields are used to specify the directories containing unencrypted source code and encrypted code separately. When using the `cvc check-consistency` command, you can check if the code in those folders is from the same source code.
- The `type` field is used to identify whether the files in the module can be checked out and made customization. CVC only allows checkout from custom modules.
- The `compile propath`, `rcode dir`, and `compile pf` fields are used for compiling and deploying rcode files by MFGUTIL. The content of the compile .pf file is used when you compile the files in the module.

- Three options are available to the `rcode layout` field: `staggered`, `flat`, and `source`. Option `staggered` indicates that the rcode is placed into the staggered directories; for example, `us/so/sosomt.r`. Option `flat` indicates that the rcode is placed into the destination directory directly; for example, `sosomt.r`. Option `source` indicates that the rcode is stored into the source directory.

Note Generally, set the `rcode layout` field of the SE modules to `staggered`.

- Two options are available to the `source layout` field: `twoletter` and `flat`. Option `twoletter` indicates that the source code files are listed in the two-letter subdirectories; for example, `us/so/sosomt.p`. Option `flat` means the source code files are in the flat source code directory; for example, `sosomt.p`.

Note Generally, set the `source layout` field of the SE modules to `flat`.

- The `languages` field is used for deploying rcode files into correct language directories. This field supports a comma-separated list of languages. For example, when `source layout` is set to `flat`, and `rcode layout` set to `staggered`, if the `language` field is set to `us,jp`, for the `sosomt.p` file in the `src` folder, CVC compiles and deploys the two different language rcode files to `us/so/sosomt.r` and `jp/so/sosomt.r`, separately.

b Run the `cvc env --show` command to obtain environment information.

The following is an example:

```
$ cvc env --show
```

These are the environments in system:

Environment	Git branch	Dir	Deploy Tool Directory	Pre Env	Hotfix
devl	devl	/qadapps	/qadapps/qea		no
prod	prod	/qadapps	/qadapps/qea	sup	no
sup	sup	/qadapps	/qadapps/qea	test	yes
test	test	/qadapps	/qadapps/qea	devl	no

In this example, the root directory is `qea/xxsrc`, and therefore the absolute paths of those directories are like following (you can obtain the report by running the `cvc report -m mfg_cust` command):

```
$ cvc report -m mfg_cust
```

The details of the module:

Key	Value
Module	mfg_cust
Type	custom
Root Dir	/qadapps/qea/xxsrc
Src dir	/qadapps/qea/xxsrc/src
Xrc dir	

```

Work dir      /qadapps/qea/xxsrc/work
Rcode dir     /qadapps/qea
Compile propath /qadapps/qea/xxsrc/src,/qadapps/qea/xrc,/qadapps/qea/src
Compile pf    compile_mfg.pf
Lang          us
Rcode Layout  staggered
Source Layout flat
Before Compile
After Compile

```

Note Make sure that you have created all required directories before adding a module.

- c** Make sure that the compile .pf file is available in the deploy tool directory so that MFGUTIL can compile module files.

```
compile pf file path : /qadapps/qea/compile_mfg.pf
```

The following is an example of the content of the compile .pf file:

```

-db /qadapps/qea/db/mfgempty -ld qaddb -RO -trig triggers
-db /qadapps/qea/db/admempty -ld qadadm -RO -trig triggers
-db /qadapps/qea/db/hlpempty -ld qadhlp -RO -trig triggers
-db /qadapps/qea/db/audempty -ld qadaud -RO -trig triggers

```

2 View module settings in CVC.

You can run the `cvc module --show` command to view all modules in the system. You can also use this command to obtain all the module settings in the system.

The following is an example:

```
$ cvc module --show
```

These are the modules in system:

Module	Type	Root dir	Src dir	Xrc dir	Work dir	Rcode dir	Compile propath	Compile pf	Lang	Rcode Layout	Source Layout	Before Compile	After Compile
mfgpro_cust	custom	qea/xxsrc	src		qea/xxsrc/work	qea	qea/xxsrc/src,qea/xrc, qea/src	compile_mfg.pf	us	staggered	flat		
mfgpro_src	standard	qea	src	xrc		qea	qea/xrc,qea/src	compile_mfg.pf	us	staggered	flat		

Registering Modules

To register a module, perform the following steps:

- 1** Make sure that you have cleaned up the environment. This means no backup files or garbage files are available.
- 2** Run the `cvc register` command to specify the relationships between files and modules. This means you need to identify which files belong to each module.

Note QAD highly recommends that you run the `cvc register` command in simulate mode first.

The following is a sample simulate command that you can run to register all the files in the root directory of the Custom-QAD module:

```
cvc register --ticket CVC-100 --module "Custom-MFG" --note "Simulating register" --
```



```
simulate 'src.*'
```

You can find the simulated whole list once the command is completed.

After verifying the results, you can register the files by removing the `--simulate` option:

```
cvc register --ticket CVC-100 --module "Custom-MFG" --note "Register Custom-QAD" 'src.*'
```

Note When running the `cvc register` command, you register only file information in the CVC database. If you have set incorrect values when running this command, you could run it again with the `--list-file` option:

```
cvc register --ticket CVC-100 --module "Custom-MFG" --note "Correct last register" --list-file register.lst --simulate
```

Example

The following is an example of the `register.lst` file, which is used to register all files under the `root_dir` module:

```
include .*
```

The following is another example of the `register.lst` file, which is used to register only the files in the `src/dc` and `src/pp` directory under the `root_dir` module:

```
exclude .*
include src/dc/*.
include src/pp/*.
```

Performing Regular Customization in CVC

This section describes some regular customization operations you can perform when using CVC.

Such operations include but are not limited to:

- Adding customization files

You can run the `cvc add` command to add files in the ticket folder to a specified module.

- Checking out existing files from a customization folder

You can run the `cvc co` or `cvc checkout` command to check out the file that you want to customize and specify where the custom module is located. After checkout, you can find the file in the ticket folder in the same directory layout as in the customer environment.

For example, if you check out the `us/xx/xxsosomt.p` file, the layout in the ticket folder is `HDS-XXX/us/xx/xxsosomt.p`.

- Making some changes for customization

You can modify a file after checking it out.

- (Optional) Compiling files locally

Before checking in a customized file to the customer environment, you can use the `cvc dev-compile` command to compile the file in the current ticket folder and view the compile result. This is an optional operation, and you can skip it.

- Checking in files

You can run the `cvc ci` or `cvc checkin` command to check in a customized file to the customer environment. After checkin, the file in the current ticket folder is removed.

Upgrade Using Upgrade Tool

Using the upgrade tool introduced in CVC 2.8, you can directly upgrade CVC from version 2.6.3.3 or later to version 2.8 and later. This upgrade tool helps manage the upgrade of CVC schema, configurations, and installation files. It also automates CVC data conversion. You can follow the guidelines in this section to upgrade CVC with minimum user intervention.

Note To upgrade CVC to a version earlier than 2.8—from example, from 2.6 to 2.7—you cannot use the upgrade tool as this tool applies only to CVC upgrade from version 2.6.3.3 or later to version 2.8 and later. For a specific CVC upgrade scenario, such as an upgrade from 2.7.0 to 2.7.7, you can check the dedicated section for details if needed.

CVC upgrade through the upgrade tool consists of the following procedures:

- 1 Backing Up CVC Database
- 2 Downloading Target CVC Package
- 3 (Optional) Making CVC Enter the Maintenance Mode
- 4 Upgrading Main CVC Instance
- 5 Upgrading Other CVC Instances
- 6 (Optional) Making CVC Enter the Normal Mode
- 7 Verifying CVC Upgrade

Backing Up CVC Database

Database schema changes may be involved in the CVC upgrade. Therefore, you need to back up the CVC database before performing the upgrade.

Downloading Target CVC Package

In Cloud environments, you can download the target CVC package from the Cloud catalog.

In other environments, you can run the following command to download the target package (for example, 2.8.0.0) from QAD Package Repository (packages.qad.com):

```
$ wget http://packages.qad.com/packages/cvc/2.8.0.0/resources -O cvc-2.8.0.0.zip
```

(Optional) Making CVC Enter the Maintenance Mode

Note Perform this procedure only when the current version of CVC is later than 2.9.0.0.

Run the following command to make CVC enter the maintenance mode:

```
$ cvc system-config maintenanceMode true
```

Upgrading Main CVC Instance

The main CVC instance refers to the environment where the CVC database is located. The upgrade process must be started from the environment where the CVC database is located since schema changes may be involved in the upgrade.



The commands for upgrading the main CVC instance are listed below, which require root permission. Therefore, make sure that you run the `cvc upgrade` command with `sudo` commands. Besides, make sure that the CVC database remains online during the upgrade.

```
$ unzip cvc-2.8.0.0.zip -d cvc-2.8.0.0
$ cd cvc-2.8.0.0
$ chmod a+x ./cvc_upgrade
$ sudo ./cvc_upgrade
```

Upgrade logs are saved in the `cvc-upgrade.log` file. When any error occurs during the upgrade, the upgrade tool rolls back the CVC installation and configurations to the original status. You can try fixing the issue and then perform the upgrade again.

Note The upgrade tool may print out some guidelines for additional manual steps that are required to take after the main upgrade process. You need to check the command output carefully.

Upgrading Other CVC Instances

After the main CVC instance is upgraded, you can start to upgrade CVC in other environments. Make sure that you are using the same CVC version in all environments that connect to the same CVC database.

The upgrade commands you can run for upgrading the other CVC instances are the same as those used for upgrading the main CVC instance:

```
$ unzip cvc-2.8.0.0.zip -d cvc-2.8.0.0
$ cd cvc-2.8.0.0
$ chmod a+x ./cvc_upgrade
$ sudo ./cvc_upgrade
```

Note To avoid Git conflicts, upgrade the environments one by one.

(Optional) Making CVC Enter the Normal Mode

Note Perform this procedure only when the current version of CVC is later than 2.9.0.0.

Run the following command to make CVC enter the normal mode:

```
$ cvc system-config maintenanceMode false
```

Verifying CVC Upgrade

To verify the new CVC version and configuration, perform the following steps:

- 1 Validate the CVC version.
\$ cvc -v
- 2 Validate the environment configuration and Git status.
\$ cvc check-env

Upgrading CVC 2.9.4 to CVC 3.0.0

This section guides you in upgrading CVC 2.9.4 to CVC 3.0.0.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying and Applying Schema Changes
- 5 Installing Target CVC Package
- 6 Updating Related Settings

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.9.4.

Downloading Target CVC Package

To upgrade CVC from 2.9.4 to 3.0.0, you need to obtain the CVC package 3.0.0, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 3.0.0 and 2.9.4 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade
$ unzip old.zip -d old_cvc
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

In this procedure, you need to back up the old `config.ini` file, modify it, and save it as a new one, `new_config.ini`. Then copy the `new_config.ini` file back after replacing the CVC main program files.

Perform the following steps:

- 1 Back up the old `config.ini` file.


```
$ cp /usr/local/cvc/etc/config.ini ~/cvc_upgrade
```
- 2 Compare the `config.ini` files in the existing and target CVC packages:


```
$ cd ~/cvc_upgrade
## config.ini file diff 44a45
> databaseLoginTimeout = 10
75c76
< programPattern = \\. (p|i|w|t|cls|v)$
---
> programPattern = \\. (p|i|w|t|cls|v|html)$
76a78
> compileDefaultExcludes = **/*.i, **/*.v
78c80
< sourceMappingFilePattern = \\. (p|i|w|t|cls|v|xml)$
```

```

---
> sourceMappingFilePattern = \\. (p|i|w|t|cls|v|xml|html)$
96a99,100
> # the jira rest api url for get project key
> jiraProjectKeyAPI = https://projects.qad.com/rest/api/latest/project/${projectKey}
100a105,120
> # whether to add ticket comment
> addTicketComment = true
> # the jira rest api url for adding ticket comment (use ${ticket} as token for ticket)
> jiraTicketCommentRestAPI =
https://projects.qad.com/rest/api/latest/issue/${ticket}/comment
125,138c145,150
< logLevel = summary
---
> # whether to turn on debug mode
> debugMode = false
> # the global read only config entries that will be shown in the cvc config command
> configReadOnly =
defaultEnvironment,enableNoCompileOption,enforceJiraValidation,gitRemoteURL,jiraProjectKey,jiraStatusAllowed,noCompile,xrefEnabled
> # the user accessible config entries that can be maintained by cvc config command
> configUserLocal = debugMode,enforceLog

```

3 Save the old `config.ini` file as a new one, namely, `new_config.ini`.

```
$ cp config.ini new_config.ini
```

4 Open the `new_config.ini` file, set the required fields correctly, and save the changes. Then copy the file back for the changes to take effect.

```

$ vim new_config.ini
$ cp new_config.ini /usr/local/cvc/etc/config.ini && chown mfg.qad
/usr/local/cvc/etc/config.ini

```

As shown in the example above, you need to set the following fields correctly in the `new_config.ini` file:

- Set the `databaseLoginTimeout` field so that the database connection in CVC will not be suspended when a connection issue occurs.
- Set the `programPattern` field to add `html` to the end of the pattern. In this way, the `html` files are compiled in CVC. Note that you need to update `sourceMappingFilePattern` accordingly.
- Set the `compileDefaultExcludes` field so that the include files and validation files will be skipped during the compilation process.
- Set the `jiraProjectKeyAPI` field so that CVC can access the valid JIRA project key from the JIRA restful API.
- Set the `addTicketComment` field so that the `cvc promote` and `cvc backout` commands can add comments in the corresponding tickets.
- Set the `jiraTicketCommentRestAPI` field so that CVC can access the JIRA restful API to add ticket comments.
- Delete the `logLevel` entry since CVC 3.0.0 no longer uses this configuration. You can set the `debugMode` value to `true` if you want to print log entries at the debug level.
- Set the `configReadOnly` field so that these read-only configuration entries can be shown in the `cvc config` command.
- Set the `configUserLocal` field so that the user-accessible configuration entries can be maintained in the `cvc config` command.

Identifying and Applying Schema Changes

Some database schema changes are required during the upgrade. Test the conversion script completely before running it in live environments.

Note that you must back up the CVC database before running the conversion script in case any error happens.

Note Update the `sqlxp` command options with your own database user, host, port, and database name. You can easily find the settings in the `/usr/local/cvc/etc/config.ini` file.

- 1 Run the following command to generate the `upgrade.sql` file:

```
$ vim upgrade.sql
```

The following shows the content of the `upgrade.sql` file:

```
alter table cvc_user add group int not null default 0;
create index idx_user_group on cvc_user (group) area "CVC_INDEX";
update cvc_user set group = 1 where email like '%@qad.com';
```

- 2 Run the following command to connect to the database as user `mfg`:

```
$ sqlxp -user "mfg" -url "jdbc:datadirect:openedge://localhost:30000;databaseName=
cvcd;defaultSchema=pub;" # record the config table data
Connecting user "mfg" to URL "jdbc:datadirect:openedge://localhost:30000;databaseName=
cvcd;defaultSchema=pub;"... (8920)
```

- 3 Run the `upgrade.sql` file and then exit.

```
SQLExplorer>@RUN upgrade.sql;
SQLExplorer>commit;
```

```
SQLExplorer>exit;
```

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:

- `cvc.jar` file
- `cvc-operator.jar` file
- `cvc.version` file
- Files in the `/usr/local/cvc/lib`, `/usr/local/cvc/etc/schema`, and `/usr/local/cvc/etc/man-pages` folders

To install the new CVC package, perform the following steps:

- 1 Put the previously mentioned files into the system.

```
$ cp -f ~/cvc_upgrade/new_cvc/cvc /usr/local/cvc/cvc
$ cp -f ~/cvc_upgrade/new_cvc/cvc_operator /usr/local/cvc/cvc_operator
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/lib/* /usr/local/cvc/lib/
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644
/usr/local/share/man/man1/cvc*
```

- 2 Verify the CVC version, module settings, and environment settings.

```
$ cvc -v
$ cvc module -s
$ cvc env -s
```



Updating Related Settings

Role Permission Settings

This release supports several new commands. Therefore you need to run the following commands to update the role permission settings for the new commands:

```
$ cvc role -u -r admin -ac "check-data,fix-data" -e devl
$ cvc role -u -r admin -ac "check-data,fix-data" -e test
$ cvc role -u -r admin -ac "check-data,fix-data" -e prod
```

Upgrading CVC 2.9.0 to CVC 2.9.4

This section guides you in upgrading CVC 2.9.0 to CVC 2.9.4.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying and Applying Schema Changes
- 5 Installing Target CVC Package

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.9.0.

Downloading Target CVC Package

To upgrade CVC from 2.9.0 to 2.9.4, you need to obtain the CVC package 2.9.4, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 2.9.4 and 2.9.0 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade
$ unzip old.zip -d old_cvc
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

In this procedure, you need to back up the old `config.ini` file, modify it, and save it as a new one, `new_config.ini`. Then copy the `new_config.ini` file back after replacing the CVC main program files.

Perform the following steps:

- 1 Back up the old `config.ini` file.


```
$ cp /usr/local/cvc/etc/config.ini ~/cvc_upgrade
```
- 2 Compare the `config.ini` files in the existing and target CVC packages:


```
$ cd ~/cvc_upgrade
21c21
< reportPreviews = 50
---
> reportPreviews = 100
92c92
< jiraAccount = bWF5bFdZd0ZWYWo5bWR5TW5MMk56WwtwemFGWldlNEpqYlFWMLJZTLFOPT0=
---
> jiraAccount =
bWF5bFdZd0ZWYWo5bWR6TW5MMk56WVhwR2FqbEhhaGRYZXZsV2R2ZDNaNElHZDV4R1p3Vl daazUyY3U5MmRsaG
1jNVYzYjNWV1kwNUdkbDltYjFSQ2M9RQ==
```
- 3 Save the old `config.ini` file as a new one, namely, `new_config.ini`.

```
$ cp config.ini new_config.ini
```

- 4 Open the `new_config.ini` file, set the required fields correctly, and save the changes. Then copy the file back for the changes to take effect.

```
$ vim new_config.ini
$ cp new_config.ini /usr/local/cvc/etc/config.ini && chown mfg.qad
/usr/local/cvc/etc/config.ini
```

As shown in the example above, you need to set the following fields correctly in the `new_config.ini` file:

- Change the value of the `reportPreviews` field from 50 to 100 as the original value 50 is too small to browse through the large amount of content.
- Set the `jiraAccount` field correctly to use the new JIRA service account.

Identifying and Applying Schema Changes

Some database schema changes are required during the upgrade. You need to test the conversion script completely before running it in live environments.

Note that you must back up the CVC database before running the conversion script in case any error happens.

Note Update the `sqlxp` command options with your own database user, host, port, and database name. You can easily find the settings in the `/usr/local/cvc/etc/config.ini` file.

- 1 Run the following command to generate the `upgrade.sql` file:

```
$ vim upgrade.sql
```

The following shows the content of the `upgrade.sql` file:

```
create index idx_file_mapping_type_name on cvc_file_mapping ("type", source_name) area
"CVC_INDEX";
create index idx_file_mapping_type_path on cvc_file_mapping ("type", source_path) area
"CVC_INDEX";
```

- 2 Run the following command to connect to the database as user `mfg`:

```
$ sqlxp -user "mfg" -url "jdbc:datadirect:openedge://localhost:30000;databaseName=
cvcdB;defaultSchema=pub;" # record the config table data
Connecting user "mfg" to URL "jdbc:datadirect:openedge://localhost:30000;databaseName=
cvcdB;defaultSchema=pub;"... (8920)
```

- 3 Run the `upgrade.sql` file and then exit.

```
SQLExplorer>@RUN upgrade.sql;
SQLExplorer>commit;
```

```
SQLExplorer>exit;
```

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:

- `cvc.jar` file
- `cvc-operator.jar` file
- `cvc.version` file
- Files in the `/usr/local/cvc/lib`, `/usr/local/cvc/etc/schema`, and `/usr/local/cvc/etc/man-pages` folders

To install the new CVC package, perform the following steps:

1 Put the previously mentioned files into the system.

```
$ cp -f ~/cvc_upgrade/new_cvc/cvc /usr/local/cvc/cvc
$ cp -f ~/cvc_upgrade/new_cvc/cvc_operator /usr/local/cvc/cvc_operator
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/lib/* /usr/local/cvc/lib/
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644
/usr/local/share/man/man1/cvc*
```

2 Verify the CVC version, module settings, and environment settings.

```
$ cvc -v
$ cvc module -s
$ cvc env -s
```

Upgrading CVC 2.8.4 to CVC 2.9.0

This section guides you in upgrading CVC 2.8.4 to CVC 2.9.0.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying and Applying Schema Changes
- 5 Installing Target CVC Package
- 6 Updating Related Settings and Clearing Invalid Source File Mappings

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.8.4.

Downloading Target CVC Package

To upgrade CVC from 2.8.4 to 2.9.0, you need to obtain the CVC package 2.9.0, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 2.9.0 and 2.8.4 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade
$ unzip old.zip -d old_cvc
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

In this procedure, you need to back up the old `config.ini` file, modify it, and save it as a new one, `new_config.ini`. Then copy the `new_config.ini` file back after replacing the CVC main program files.

Perform the following steps:

- 1 Back up the old `config.ini` file.


```
$ cp /usr/local/cvc/etc/config.ini ~/cvc_upgrade
```
- 2 Compare the `config.ini` files in the existing and target CVC packages:


```
$ cd ~/cvc_upgrade
21c21
< reportPreviews = 500
---
> reportPreviews = 50
23a24,25
> # default report file location (use ${user} as token for user)
> reportDir = /tmp/cvc_report_${user}
25a28,33
> # default extended report days for file history report
> reportDaysExtended = 365
```

```

> # default months to keep records of activity logs
> keepActivityLogMonths = 12
> # default activity logs archive dir (use ${env_dir} as token for environment root dir)
> activityLogArchiveDir = ${env_dir}/cvc/activity_logs
65c73
< cvcIgnoredFilesPattern = .*\\.(r|bak|orig|log|swp|sw|cpt|crpt)
---
> cvcIgnoredFilesPattern = .*\\.(r|bak|orig|log|swp|sw|cpt|crpt)$
67,68c75,78
< programPattern = \\.(p|i|w|t|cls|v)
< includeProgramPattern = \\.(i|v)
---
> programPattern = \\.(p|i|w|t|cls|v)$
> includeProgramPattern = \\.(i|v)$
> # when cvc adds source file mappings, it will find out the files matches the pattern
below
> sourceMappingFilePattern = \\.(p|i|w|t|cls|v|xml)$
90c100
< jiraStatusAllowed = register->DEVL-APPROVED,checkin->DEVL-APPROVED,checkin->DEVL-
WORK,delete->DEVL-APPROVED,checkout->DEVL-WORK,add->DEVL-WORK,add->DEVL-
APPROVED,backout->DEVL-CANCEL,source->DEVL-WORK
---
> jiraStatusAllowed = add->DEVL-WORK,checkin->DEVL-WORK,checkout->DEVL-WORK,delete-
->DEVL-WORK,register->DEVL-WORK,revert->DEVL-WORK,source->DEVL-WORK,backout->DEVL-
CANCEL

```

3 Save the old `config.ini` file as a new one, namely, `new_config.ini`.

```
$ cp config.ini new_config.ini
```

4 Open the `new_config.ini` file, set the required fields correctly, and save the changes. Then copy the file back for the changes to take effect.

```

$ vim new_config.ini
$ cp new_config.ini /usr/local/cvc/etc/config.ini && chown mfg.qad
/usr/local/cvc/etc/config.ini

```

As shown in the example above, you need to set the following fields correctly in the `new_config.ini` file:

- Update the `reportPreviews` field as the original value 500 is too large to browse through the content.
- Set the `reportDir` field to a specific directory so the whole report content can be recorded in the specified directory. CVC provides `/tmp/cvc_report_${user}` as the default value.
- Set the `reportDaysExtended` field because other reports, such as the recent file change report and the environment report, may already use `reportDays` as the report days. This configuration is used to configure the file history report days.
- Set the `keepActivityLogMonths` field to determine the activity logs within how many months can be kept in the CVC database. (The default value is 12 months.)
- Set the `activityLogArchiveDir` field because the CVC command `clean-activity-` log archives the activity logs to be cleaned up in the configurable archive directory.
- Update the `cvcIgnoredFilesPattern` value by adding `$` to the end of the pattern so as to match the file correctly. Note that `programPattern` and `includeProgramPattern` should be updated accordingly.
- Set the `sourceMappingFilePattern` field because when CVC adds source file mappings, it finds all files that match this pattern.
- Set the `jiraStatusAllowed` field correctly according to the updated JIRA workflow.

Identifying and Applying Schema Changes

Some database schema changes are required during the upgrade. You need to test the conversion script completely before running it in live environments.

Note that you must back up the CVC database before running the conversion script in case any error happens.

Note Update the `sqlxp` command options with your own database user, host, port, and database name. You can easily find the settings in the `/usr/local/cvc/etc/config.ini` file.

- 1 Run the following command to generate the `upgrade.sql` file:
\$ `vim upgrade.sql`

The following shows the content of the `upgrade.sql` file:

```
create table cvc_system_config (
  config_key    varchar(30)    not null,
  config_value  varchar(30)    not null,
  primary key (config_key)
) area "CVC_DATA";

alter table cvc_module add file_extensions varchar(512);

alter table cvc_file add status int not null default 0;

drop table cvc_env_lock;
create table cvc_env_lock (
  id            bigint          not null,
  environment   varchar(30)     not null,
  process_id    int            not null,
  process_env   varchar(30)     not null,
  command       varchar(30)     not null,
  login_id      varchar(50)     not null,
  lock_date     bigint          not null,
  primary key (id)
) area "CVC_DATA";
create index idx_env_lock_env on cvc_env_lock (environment) area "CVC_INDEX";
create index idx_env_lock_process_env on cvc_env_lock (process_env) area "CVC_INDEX";

alter table cvc_oper_log add status int not null default 0;
drop index idx_oper_log_type on cvc_oper_log;
create index idx_oper_log_status on cvc_oper_log (status) area "CVC_INDEX";
create index idx_oper_log_env_status on cvc_oper_log (environment, status) area "CVC_INDEX";
```

- 2 Run the following command to connect to the database as user `mfg`:
\$ `sqlxp -user "mfg" -url "jdbc:datadirect:openedge://localhost:30000;databaseName=cvcdb;defaultSchema=pub;" # record the config table data`
Connecting user "mfg" to URL "jdbc:datadirect:openedge://localhost:30000;databaseName=cvcdb;defaultSchema=pub;"... (8920)
- 3 Run the `upgrade.sql` file and then exit.
SQLExplorer>@RUN upgrade.sql;
SQLExplorer>commit;

SQLExplorer>exit;

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:

- `cvc.jar` file

- `cvc-operator.jar` file
- `cvc.version` file
- Files in the `/usr/local/cvc/lib`, `/usr/local/cvc/etc/schema`, and `/usr/local/cvc/etc/man-pages` folders

To install the new CVC package, perform the following steps:

- 1 Put the previously mentioned files into the system.


```
$ cp -f ~/cvc_upgrade/new_cvc/cvc /usr/local/cvc/cvc
$ cp -f ~/cvc_upgrade/new_cvc/cvc_operator /usr/local/cvc/cvc_operator
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/lib/* /usr/local/cvc/lib/
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644 /usr/local/share/man/man1/cvc*
```
- 2 Verify the CVC version, module settings, and environment settings.


```
$ cvc -v
$ cvc module -s
$ cvc env -s
```

Updating Related Settings and Clearing Invalid Source File Mappings

Role Permission Settings

This release supports several new commands. Therefore you need to run the following commands to update the role permission settings for the new commands:

```
$ cvc role -u -r developer -ac "revert" -e devl
$ cvc role -u -r releaseManager -ac "revert" -e devl
$ cvc role -u -r admin -ac "analyze-rcode,clean-activity-log,system-config" -e devl
$ cvc role -u -r admin -ac "analyze-rcode,system-config" -e test
$ cvc role -u -r admin -ac "analyze-rcode,system-config" -e prod
```

Clearing Invalid Source File Mappings

As this release introduces a function of clearing all invalid source file mappings, you need to run the following command to clear all invalid source file mappings in the current environment:

```
$ cvc file-mapping -ca -inv -y
```

Upgrading CVC 2.8.0 to 2.8.4

This section guides you in upgrading CVC 2.8.0 to 2.8.4.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying and Applying Schema Changes
- 5 Installing Target CVC Package

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.8.0.

Downloading Target CVC Package

To upgrade CVC from 2.8.0 to 2.8.4, you need to obtain the CVC package 2.8.4, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 2.8.4 and 2.8.0 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade
$ unzip old.zip -d old_cvc
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

No `config.ini` change is involved for this upgrade. Please skip this procedure.

Identifying and Applying Schema Changes

No schema change is involved for this upgrade. Please skip this procedure.

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:

- `cvc.jar` file
- `cvc-operator.jar` file
- `cvc.version` file
- Files in the `/usr/local/cvc/lib`, `/usr/local/cvc/etc/schema`, and `/usr/local/cvc/etc/man-pages` folders

To install the new CVC package, perform the following steps:

1 Put the previously mentioned files into the system.

```
$ cp -f ~/cvc_upgrade/new_cvc/cvc /usr/local/cvc/cvc
$ cp -f ~/cvc_upgrade/new_cvc/cvc_operator /usr/local/cvc/cvc_operator
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/lib/* /usr/local/cvc/lib/
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644
  /usr/local/share/man/man1/cvc*
```

2 Verify the CVC version, module settings, and environment settings.

```
$ cvc -v
$ cvc module -s
$ cvc env -s
```

Upgrading CVC 2.7.9 to CVC 2.8.0

This section guides you in upgrading CVC 2.7.9 to CVC 2.8.0.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying and Applying Schema Changes
- 5 Installing Target CVC Package

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.7.9.

Downloading Target CVC Package

To upgrade CVC from 2.7.9 to 2.8.0, you need to obtain the CVC package 2.8.0, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 2.8.0 and 2.7.9 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade
$ unzip old.zip -d old_cvc
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

In this procedure, you need to back up the old `config.ini` file, modify it, and save it as a new one, `new_config.ini`. Then copy the `new_config.ini` file back after replacing the CVC main program files.

Perform the following steps:

- 1 Back up the old `config.ini` file.

```
$ cp /usr/local/cvc/etc/config.ini ~/cvc_upgrade
```
- 2 Compare the `config.ini` files in the existing and target CVC packages:

```
$ cd ~/cvc_upgrade
90c90
< jiraStatusAllowed = register->DEVL-APPROVED,checkin->DEVL-APPROVED,checkin->DEVL-
WORK,delete->DEVL-APPROVED,checkout->DEVL-WORK,add->DEVL-WORK,add->DEVL-
APPROVED,backout->DEVL-CONFLICT,backout->DEVL-CANCEL,source->DEVL-WORK
---
> jiraStatusAllowed = register->DEVL-APPROVED,checkin->DEVL-APPROVED,checkin->DEVL-
WORK,delete->DEVL-APPROVED,checkout->DEVL-WORK,add->DEVL-WORK,add->DEVL-
APPROVED,backout->DEVL-CANCEL,source->DEVL-WORK
```
- 3 Save the old `config.ini` file as a new one, namely, `new_config.ini`.

```
$ cp config.ini new_config.ini
```

- 4 Open the `new_config.ini` file, set the required fields correctly, and save the changes. Then copy the file back for the changes to take effect.

```
$ vim new_config.ini
$ cp new_config.ini /usr/local/cvc/etc/config.ini && chown mfg.qad
/usr/local/cvc/etc/config.ini
```

As shown in the example above, you need to set the following field correctly in the `new_config.ini` file:

- Set `jiraStatusAllowed` correctly according to the updated JIRA workflow.

Identifying and Applying Schema Changes

Some database schema changes are required during the upgrade. You need to test the conversion script completely before running it in live environments.

Note that you must back up the CVC database before running the conversion script in case any error happens.

Note Update the `sqlxp` command options with your own database user, host, port, and database name. You can easily find the settings in the `/usr/local/cvc/etc/config.ini` file.

- 1 Run the following command to generate the `upgrade.sql` file:

```
$ vim upgrade.sql
```

The following shows the content of the `upgrade.sql` file:

```
create table cvc_whole_index (
  id          bigint      not null,
  environment  varchar(30) not null,
  path        varchar(512) not null,
  ticket      varchar(20)  not null,
  has_whole_index int      not null default 0,
  last_modified bigint     not null,
  first_ticket varchar(20)  not null,
  first_author varchar(50)  not null,
  primary key (id)
) area "CVC_DATA";
create unique index idx_whole_index_env_path_ticket on cvc_whole_index (environment,
path, ticket) area "CVC_INDEX";
create index idx_whole_index_env_ticket on cvc_whole_index (environment, ticket) area
"CVC_INDEX";
create index idx_whole_index_env_path_time on cvc_whole_index (environment, path,
last_modified) area "CVC_INDEX";
```

- 2 Run the following command to connect to the database as user `mfg`:

```
$ sqlxp -user "mfg" -url "jdbc:datadirect:openedge://localhost:30000;databaseName=
cvcd;defaultSchema=pub;" # record the config table data
Connecting user "mfg" to URL "jdbc:datadirect:openedge://localhost:30000;databaseName=
cvcd;defaultSchema=pub;"... (8920)
```

- 3 Run the `upgrade.sql` file and then exit.

```
SQLExplorer>@RUN upgrade.sql;
SQLExplorer>commit;
```

```
SQLExplorer>exit;
```

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:



- `cvc.jar` file
- `cvc-operator.jar` file
- `cvc.version` file
- Files in the `/usr/local/cvc/lib`, `/usr/local/cvc/etc/schema`, and `/usr/local/cvc/etc/man-pages` folders

To install the new CVC package, perform the following steps:

1 Put the previously mentioned files into the system.

```
$ cp -f ~/cvc_upgrade/new_cvc/cvc /usr/local/cvc/cvc
$ cp -f ~/cvc_upgrade/new_cvc/cvc_operator /usr/local/cvc/cvc_operator
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/lib/* /usr/local/cvc/lib/
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644
/usr/local/share/man/man1/cvc*
```

2 Verify the CVC version, module settings, and environment settings.

```
$ cvc -v
$ cvc module -s
$ cvc env -s
```

Upgrading CVC 2.7.7 to 2.7.9

This section guides you in upgrading CVC 2.7.7 to 2.7.9.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying and Applying Schema Changes
- 5 Installing Target CVC Package
- 6 Reviewing File Overlaps

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.7.7.

Downloading Target CVC Package

To upgrade CVC from 2.7.7 to 2.7.9, you need to obtain the CVC package 2.7.9, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 2.7.9 and 2.7.7 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade  
$ unzip old.zip -d old_cvc  
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

No `config.ini` change is involved for this upgrade. Please skip this procedure.

Identifying and Applying Schema Changes

No schema change is involved for this upgrade. Please skip this procedure.

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:

- `cvc.jar` file
- `cvc-operator.jar` file
- `cvc.version` file
- Files in the `/usr/local/cvc/lib`, `/usr/local/cvc/etc/schema`, and `/usr/local/cvc/etc/man-pages` folders



To install the new CVC package, perform the following steps:

1 Put the previously mentioned files into the system.

```
$ cp -f ~/cvc_upgrade/new_cvc/cvc /usr/local/cvc/cvc
$ cp -f ~/cvc_upgrade/new_cvc/cvc_operator /usr/local/cvc/cvc_operator
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/lib/* /usr/local/cvc/lib/
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644
  /usr/local/share/man/man1/cvc*
```

2 Verify the CVC version, module settings, and environment settings.

```
$ cvc -v
$ cvc module -s
$ cvc env -s
```

Reviewing File Overlaps

This new release includes a bug fix upon the overlap detecting function in the purpose of avoiding detecting source files in the custom modules' src and work directories. Therefore, you need to run the following command to review the new overlap report and resolve the overlaps if needed:

```
$ cvc report -o
```

Upgrading CVC 2.7.0 to CVC 2.7.7

This section guides you in upgrading CVC 2.7.0 to CVC 2.7.7.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying and Applying Schema Changes
- 5 Installing Target CVC Package
- 6 Updating Related Settings

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.7.0.

Downloading Target CVC Package

To upgrade CVC from 2.7.0 to 2.7.7, you need to obtain the CVC package 2.7.7, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 2.7.7 and 2.7.0 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade
$ unzip old.zip -d old_cvc
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

In this procedure, you need to back up the old `config.ini` file, modify it, and save it as a new one, `new_config.ini`. Then copy the `new_config.ini` file back after replacing the CVC main program files.

Perform the following steps:

- 1 Back up the old `config.ini` file.


```
$ cp /usr/local/cvc/etc/config.ini ~/cvc_upgrade
```
- 2 Compare the `config.ini` files in the existing and target CVC packages:


```
$ cd ~/cvc_upgrade
37c37,40
< # file extension used to mark conflicts in cvc-checkout
---
> databaseSslEnabled = false
> # password value should be encrypted by cvc password
> databaseSecurityParams =
> # file extension used to mark conflicts in cvc checkout
72a76,77
> # for Yab commands, it is better to use `sudo -iu $user` which will initiate with all
environment variables of $user
```

```
> runAsYabCommand = sudo -iu mfg
112,113c117,126
< # jira attachment naming convention (use %s as token for ticket)
< jiraAttachmentName = %s_codereview.*
---
# jira attachment naming convention (use ${ticket} as token for ticket)
jiraAttachmentName = ${ticket}_codereview.*
# whether to upload xref analysis result
uploadXrefResult = true
# the jira rest api url for uploading attachment
jiraAttachmentUploadRestAPI =
https://projects.qad.com/rest/api/latest/issue/%s/attachments
# the xref analysis result file pattern which will be uploaded to the jira system as
attachments (separated by commas)
xrefResultPattern = .*WholeIndex.*
# the archived xref analysis result (use ${ticket} as token for ticket, ${datetime} as
token for archive created date, ${commit} as token for referred commit id)
xrefResultArchive = ${ticket}_xrefresult_${datetime}_${commit}.zip
# log level [summary, verbose]
logLevel = summary
```

3 Save the old `config.ini` file as a new one, namely, `new_config.ini`.

```
$ cp config.ini new_config.ini
```

4 Open the `new_config.ini` file, set the required fields correctly, and save the changes. Then copy the file back for the changes to take effect.

```
$ vim new_config.ini
$ cp new_config.ini /usr/local/cvc/etc/config.ini && chown mfg.qad
/usr/local/cvc/etc/config.ini
```

As shown in the example above, you need to set the following fields correctly in the `new_config.ini` file:

- Set `databaseSslEnabled` based on whether SSL is enabled in the environment. You can set this field to `true` so as to connect to the SSL-enabled CVC database.
- Set `databaseSecurityParams` to a value like `encryptionMethod=ssl;CryptoProtocolVersion=TLSv1.2;EnableCipherSuites=TLS_RSA_WITH_AES_128_CBC_SHA256,TLS_RSA_WITH_AES_256_CBC_SHA256;validateServerCertificate=true;TrustStore=/qond/apps/mfgpro/build/work/keystore/keystore-odqad.jks;TrustStorePassword=changeit`.

The value can be obtained through the `yab config dbserver.cvcdb.jdbc.securityparams` command. `TrustStorePassword` should be encrypted by the `cvc pass` command. If KMS is enabled in the environment, you need to run the `yab kms-decrypt <TrustStorePassword>` command to decrypt `TrustStorePassword` before encrypting it with the `cvc pass` command.

```
$ yab config kms.enabled
kms.enabled=true
$ yab config dbserver.cvcdb.jdbc.securityparams
dbserver.qadcvc.jdbc.securityparams=encryptionMethod=ssl;CryptoProtocolVersion=
TLSv1.2;EnableCipherSuites=
TLS_RSA_WITH_AES_128_CBC_SHA256,TLS_RSA_WITH_AES_256_CBC_SHA256;validateServerCertificate=true;TrustStore=/dr01/certificates/keystore.jks;TrustStorePassword=
{cipher}eyJrawQiOiIwMTEyOTJlNS1jOGIxLTRjNGQtOTcyNy1kYzk5NDU1Njc5NmEiLCJlbmMiOiJBMjU2R0NNIiwiaWxnIjoiaQTI1NktXIn0.opYQGD3N-fBAIoZSSzcctRzjnkG9bxUctBkhwKTypVqgl6GxMNVvTQ.5ZzlfI3updPAU8KG.NX1t0HErn8g.Gzx1L8B
PgAfJRryjy2QFhA
$ yab kms-decrypt
{cipher}eyJrawQiOiIwMTEyOTJlNS1jOGIxLTRjNGQtOTcyNy1kYzk5NDU1Njc5NmEiLCJlbmMiOiJBMjU2R0NNIiwiaWxnIjoiaQTI1NktXIn0.opYQGD3N-fBAIoZSSzcctRzjnkG9bxUctBkhwKTypVqgl6GxMNVvTQ.5ZzlfI3updPAU8KG.NX1t0HErn8g.Gzx1L8B
```

```
PgAfJRryjy2QFhA
changeit

BUILD SUCCESSFUL (1.490 s)
$ cvc pass changeit
aGNuYWVndGk=
```

- Set the value of `runAsYabCommand` to `sudo -iu mfg`.
In this way, when CVC runs yab commands, it has all of user mfg's environment variables with its login shell. This command is used to run all yab commands.
- Update the value of `jiraAttachmentName` since the token pattern has been updated.
- Set the `uploadXrefResult` field in order to enable the upload xref result function.
- Set the `jiraAttachmentUploadRestAPI` value correctly. In addition, set the `xrefResultPattern` and `xrefResultArchive` fields accordingly.

Identifying and Applying Schema Changes

Some database schema changes are required during the upgrade. You need to test the conversion script completely before running it in live environments.

Note that you must back up the CVC database before running the conversion script in case any error happens.

Note Update the `sqlxp` command options with your own database user, host, port, and database name. You can easily find the settings in the `/usr/local/cvc/etc/config.ini` file.

- 1 Run the following command to generate the `upgrade.sql` file:
\$ `vim upgrade.sql`

The following shows the content of the `upgrade.sql` file:

```
drop index idx_file_mapping_file_type_path on cvc_file_mapping;
create index idx_file_mapping_file_type_path on cvc_file_mapping (file_id, type,
source_path) area "CVC_INDEX";
```

- 2 Run the following command to connect to the database as user mfg:
\$ `sqlxp -user "mfg" -url "jdbc:datadirect:openedge://localhost:30000;databaseName=cvcdb;defaultSchema=pub;"`
Connecting user "mfg" to URL "jdbc:datadirect:openedge://localhost:30000;databaseName=cvcdb;defaultSchema=pub;"... (8920)
- 3 Run the `upgrade.sql` file and then exit.
SQLExplorer>`@RUN upgrade.sql;`
SQLExplorer>`commit;`

SQLExplorer>`exit;`

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:

- `cvc.jar` file
- `cvc-operator.jar` file
- `cvc.version` file

- Files in the `/usr/local/cvc/lib`, `/usr/local/cvc/etc/schema`, and `/usr/local/cvc/etc/man-pages` folders

To install the new CVC package, perform the following steps:

- 1 Put the previously mentioned files into the system.

```
$ cp -f ~/cvc_upgrade/new_cvc/cvc /usr/local/cvc/cvc
$ cp -f ~/cvc_upgrade/new_cvc/cvc_operator /usr/local/cvc/cvc_operator
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/lib/* /usr/local/cvc/lib/
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644
/usr/local/share/man/man1/cvc*
```

- 2 Verify the CVC version, module settings, and environment settings.

```
$ cvc -v
$ cvc module -s
$ cvc env -s
```

Updating Related Settings

Role Permission Settings

This release supports a new command. Therefore you need to run the following command to update the role permission settings for the new command.

```
$ cvc role -u -r releaseManager -c "add,analyze-rcode,backout,check-consistency,check-env,checkin,checkout,config,delete,dev-compile,diff,download,file-mapping,id,module,module-show,promote,register,rel-compile,report,resolve,resolve-all,source,status" -e devl
```

Java Settings

Previously, the default Java version in use was 1.7, which did not support TLS1.2. CVC requires Java 1.8 or later to connect to the database cvcdb with SSL enabled. Therefore if you want to enable database security with SSL TLSv1.2 for the CVC database, you need to remove the default Java 1.7 from the CVC installation directory and then install Java 1.8 in the system. If there is no Java installed in the CVC installation directory, CVC then uses the environment variable `JAVA_HOME` to determine the Java location and add it to the environment path automatically.

sudo Permission Settings

Previously, the `sudo -u mfg -H` command was used to trigger all yab commands. It would not initiate with user mfg's environment variables, so some predefined YAB or Java options were not used. In this version, a new field `runAsYabCommand` is added and set to `sudo -iu mfg` by default. This field is used to run all yab commands with user mfg's environment variables. It requires the following changes to the sudo settings:

- 1 Edit the `/etc/sudoers.custom` file and add the following text to the end of the file:

```
## Allow user in qad group to run qad cvc operator as mfg user
## without password

Cmdnd_Alias VC_COMMANDS = \
    /usr/local/cvc/cvc_operator, \
    /bin/bash -c /usr/local/cvc/cvc_operator *
%qad    ALL=(mfg)    NOPASSWD: VC_COMMANDS
```

- 2 Run the following command to generate the `/etc/sudoers` file:

```
$ cat /etc/sudoers.common /etc/sudoers.custom > /etc/sudoers
```

Upgrading CVC 2.6.1.0 to CVC 2.7.0.60

This section guides you in upgrading CVC 2.6.1.0 to CVC 2.7.0.60.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying and Applying Schema Changes
- 5 Installing Target CVC Package
- 6 Initializing File Mappings

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.6.1.0.

Downloading Target CVC Package

To upgrade CVC from 2.6.1.0 to 2.7.0.60, you need to obtain the CVC package 2.7.0.60, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 2.7.0.60 and 2.6.1.0 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade
$ unzip old.zip -d old_cvc
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

In this procedure, you need to back up the old `config.ini` file, modify it, and save it as a new one, `new_config.ini`. Then copy the `new_config.ini` file back after replacing the CVC main program files.

Perform the following steps:

- 1 Back up the old `config.ini` file.

```
$ cp /usr/local/cvc/etc/config.ini ~/cvc_upgrade
```
- 2 Compare the `config.ini` files in the existing and target CVC packages:

```
$ cd ~/cvc_upgrade
$ diff old_cvc/etc/config.ini new_cvc/etc/config.ini
23a24,25
> # default report days
> reportDays = 100
105c107,113
< enforceWholeIndexValidation = true
---
> enforceWholeIndexValidation = false
```

```
> # whether to keep xref in the environment during compile
> keepXref = false
> # whether to validate jira attachment [false, warning, error]
> enforceJiraAttachmentValidation = false
> # jira attachment naming convention (use %s as token for ticket)
> jiraAttachmentName = %s_codereview.*
```

- 3 Save the old `config.ini` file as a new one, namely, `new_config.ini`.

```
$ cp config.ini new_config.ini
```

- 4 Open the `new_config.ini` file, set the required fields correctly, and save the changes. Then copy the file back for the changes to take effect.

```
$ vim new_config.ini
$ cp new_config.ini /usr/local/cvc/etc/config.ini && chown mfg.qad
/usr/local/cvc/etc/config.ini
```

As shown in the example above, you need to set four fields correctly in the `new_config.ini` file:

- Change the value of `enforceWholeIndexValidation` from the default one (`true`) to `false`.

Then by default, CVC only displays a warning message when whole-index issues are found in the files to be committed.

- Set `keepXref` to `false`.

Then by default, CVC does not keep the xref files generated during the compilation process. (In YAB environments, the xref files are reserved if the `keepXref` flag is set from YAB configurations.)

- Set the `reportDays` option correctly.

This option is newly added, allowing you to set the default report data duration.

- If you want to validate JIRA attachments for the code review output files, you need to set `enforceJiraAttachmentValidation` to `true` and set the `jiraAttachmentName` field correctly.

Identifying and Applying Schema Changes

Some database schema changes are required during the upgrade. You need to test the conversion script completely before running it in live environments.

Note that you must back up the CVC database before running the conversion script in case any error happens.

Note Please update the `sqlexp` command options with your own database user, host, port, and database name. You can easily find the settings in the `/usr/local/cvc/etc/config.ini` file.

- 1 Run the following command to generate the `upgrade.sql` file:

```
$ vim upgrade.sql
```

The following shows the content of the `upgrade.sql` file:

```
drop table cvc_program_reference;
drop table cvc_rcode_analyze_hist;
create table cvc_file_mapping (
  id          bigint          not null,
  file_id     bigint          not null,
  type        int             not null,
  source_name varchar(200)    not null,
  source_path varchar(512)    not null,
  checksum    varchar(40)     not null,
```

```

        last_modified    bigint          not null,
        primary key (id),
        foreign key (file_id) references cvc_file(id)
    ) area "CVC_DATA";
create index idx_file_mapping_fileid on cvc_file_mapping (file_id) area "CVC_INDEX";
create index idx_file_mapping_type on cvc_file_mapping (type) area "CVC_INDEX";
create index idx_file_mapping_path on cvc_file_mapping (source_path) area "CVC_INDEX";
create unique index idx_file_mapping_file_type_path on cvc_file_mapping (file_id, type,
source_path) area "CVC_INDEX";
create unique index idx_file_mapping_file_type_name on cvc_file_mapping (file_id, type,
source_name) area "CVC_INDEX";

create table cvc_file_mapping_hist (
    id                bigint          not null,
    file_id           bigint          not null,
    type              int             not null,
    source_name       varchar(200)    not null,
    source_path       varchar(512)    not null,
    checksum          varchar(40)     not null,
    last_modified     bigint          not null,
    primary key (id),
    foreign key (file_id) references cvc_file_hist(id)
) area "CVC_DATA";
create index idx_file_mapping_hist_fileid on cvc_file_mapping_hist (file_id) area
"CVC_INDEX";

```

2 Run the following command to connect to the database as user mfg:

```

$ sqlexp -user "mfg" -url "jdbc:datadirect:openedge://localhost:30000;databaseName=
cvcd;defaultSchema=pub;"
Connecting user "mfg" to URL "jdbc:datadirect:openedge://localhost:30000;databaseName=
cvcd;defaultSchema=pub;"... (8920)

```

3 Run the upgrade.sql file and then exit.

```

SQLExplorer>@RUN upgrade.sql;
SQLExplorer>commit;

SQLExplorer>exit;

```

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:

- cvc.jar file
- cvc-operator.jar file
- dde-build-core.jar file
- cvc.version file
- Files in the etc/man-pages folder

To install the new CVC package, perform the following steps:

1 Put the previously mentioned files into the system.

```

$ cp -f ~/cvc_upgrade/new_cvc/lib/cvc.jar /usr/local/cvc/lib/cvc.jar
$ cp -f ~/cvc_upgrade/new_cvc/lib/cvc-operator.jar /usr/local/cvc/lib/cvc-operator.jar
$ cp -f ~/cvc_upgrade/new_cvc/lib/dde-build-core.jar /usr/local/cvc/lib/dde-build-
core.jar
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644
/usr/local/share/man/man1/cvc*

```

2 Verify the CVC version, module settings, and environment settings.

```

$ cvc -v

```

```
$ cvc module -s
$ cvc env -s
```

Initializing File Mappings

This release supports a new feature, overlap detecting, as well as some new commands. Therefore you need to run the following commands to initialize the file mappings and update the role permission settings for the new commands.

```
$ cvc role -u -r developer -c "add,backout,check-env,checkin,checkout,config,delete,dev-compile,diff,download,id,module-show,report,resolve,source,status" -e devl
$ cvc role -u -r releaseManager -c "add,analyze-rcode,backout,check-consistency,check-env,checkin,checkout,config,delete,dev-compile,diff,download,file-mapping,id,module,module-show,promote,register,rel-compile,report,resolve,source,status" -e devl
$ cvc role -u -r admin -c "clean-env,commit-git,config,encrypt-password,environment,file-mapping,id,patch,release-lock,revert,role,sql,user" -e devl

$ cvc file-mapping --initialize -e devl
$ cvc analyze-rcode -e devl
$ cvc analyze-rcode -e test
$ cvc analyze-rcode -e prod
```

Upgrading CVC 2.6.0.1 to CVC 2.6.1.0

This section guides you in upgrading CVC 2.6.0.1 to CVC 2.6.1.0.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying Schema Changes
- 5 Installing Target CVC Package

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.6.0.1.

Downloading Target CVC Package

To upgrade CVC from 2.6.0.1 to 2.6.1.0, you need to obtain the CVC package 2.6.1.0, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 2.6.1.0 and 2.6.0.1 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade  
$ unzip old.zip -d old_cvc  
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

No `config.ini` change is involved for this upgrade. Please skip this procedure.

Identifying Schema Changes

No schema change is involved for this upgrade. Please skip this procedure.

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:

- `cvc.jar` file
- `cvc-operator.jar` file
- `dde-build-core.jar` file
- `cvc.version` file
- Files in the `etc/man-pages` folder

To install the new CVC package, perform the following steps:

1 Put the previously mentioned files into the system.

```
$ cp -f ~/cvc_upgrade/new_cvc/lib/cvc.jar /usr/local/cvc/lib/cvc.jar
$ cp -f ~/cvc_upgrade/new_cvc/lib/cvc-operator.jar /usr/local/cvc/lib/cvc-operator.jar
$ cp -f ~/cvc_upgrade/new_cvc/lib/dde-build-core.jar /usr/local/cvc/lib/dde-build-core.jar
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644 /usr/local/share/man/man1/cvc*
```

2 Verify the CVC version, module settings, and environment settings.

```
$ cvc -v
$ cvc module -s
$ cvc env -s
```

Upgrading CVC 2.5.1.0 to CVC 2.6.0.1

This section guides you in upgrading CVC 2.5.1.0 to CVC 2.6.0.1.

The upgrade involves the following tasks:

- 1 Checking CVC Version
- 2 Downloading Target CVC Package
- 3 Identifying and Applying config.ini Changes
- 4 Identifying Schema Changes
- 5 Installing Target CVC Package

Checking CVC Version

To check the CVC version, run the following command:

```
$ cvc --version
```

The system displays the version of the current CVC; for example, 2.5.1.0.

Downloading Target CVC Package

To upgrade CVC from 2.5.1.0 to 2.6.0.1, you need to obtain the CVC package 2.6.0.1, and then decompress both the old and target CVC packages. For example, you can download the packages for CVC 2.6.0.1 and 2.5.1.0 as `new.zip` and `old.zip` separately.

Run the following commands:

```
$ mkdir ~/cvc_upgrade && cd ~/cvc_upgrade
$ unzip old.zip -d old_cvc
$ unzip new.zip -d new_cvc
```

Identifying and Applying config.ini Changes

You need to back up the old `config.ini` file, modify it, and save it as a new one, `new_config.ini`. Then copy the `new_config.ini` file back after applying configuration changes.

Perform the following steps:

- 1 Back up the old `config.ini` file.


```
$ cp /usr/local/cvc/etc/config.ini ~/cvc_upgrade
```
- 2 Compare the `config.ini` files in the existing and target CVC packages:


```
$ cd ~/cvc_upgrade
$ diff old_cvc/etc/config.ini new_cvc/etc/config.ini
91a92,103
> # whether to run xref index analysis tools
> xrefEnabled = true
> # the process-xref script location
> xrefProcessScript =
> # the exemption file location for process-xref script
> xrefExemptionFile =
> # the check-indexes script location
> xrefCheckIndexesScript =
> # the QAD database location for check-indexes script (separated by commas, without the
.db extension)
> xrefDbLocation =
```

```
> # the relative path of the QAD application root directory in YAB, should be inside the
environment directory
> yabEnvRootDir =
> # enforce WHOLE-INDEX validation
> enforceWholeIndexValidation = true
```

- 3 Save the old `config.ini` file as a new one, namely, `new_config.ini`.

```
$ cp config.ini new_config.ini
```

- 4 Open the `new_config.ini` file, set the required fields correctly, and save the changes. Then copy the file back for the changes to take effect.

```
$ vim new_config.ini
$ cp new_config.ini /usr/local/cvc/etc/config.ini && chown mfg.qad
/usr/local/cvc/etc/config.ini
```

As shown in the example above, you need to set seven fields correctly in the `new_config.ini` file:

- Set `xrefEnabled` to `true` to run `xref` index analysis tools.
- Set `xrefProcessScript`, `xrefExemptionFile`, `xrefCheckIndexesScript`, and `xrefDbLocation` correctly.
- Set `enforceWholeIndexValidation` to `true` to enforce whole-index validation during check-in and registration. If this field is set to `false`, CVC only displays a warning message when whole-index issues are found in the files to be committed.
- If you want to specify the QAD application root directory in YAB as a sub directory of the CVC environment root directory, you need to set `yabEnvRootDir` to the relative path correctly.

Identifying Schema Changes

No schema change is involved for this upgrade. Please skip this procedure.

Installing Target CVC Package

You can update the CVC package with required changes only.

The files that need to be updated are as follows:

- `cvc.jar` file
- `cvc-operator.jar` file
- `dde-build-core.jar` file
- `cvc.version` file
- Files in the `etc/man-pages` folder

To install the new CVC package, perform the following steps:

- 1 Put the previously mentioned files into the system.

```
$ cp -f ~/cvc_upgrade/new_cvc/lib/cvc.jar /usr/local/cvc/lib/cvc.jar
$ cp -f ~/cvc_upgrade/new_cvc/lib/cvc-operator.jar /usr/local/cvc/lib/cvc-operator.jar
$ cp -f ~/cvc_upgrade/new_cvc/lib/dde-build-core.jar /usr/local/cvc/lib/dde-build-
core.jar
$ cp -f ~/cvc_upgrade/new_cvc/cvc.version /usr/local/cvc/cvc.version
$ cp -f ~/cvc_upgrade/new_cvc/etc/schema/* /usr/local/cvc/etc/schema/
$ cp -f ~/cvc_upgrade/new_cvc/etc/man-pages/* /usr/local/cvc/etc/man-pages/
$ cp -f /usr/local/cvc/etc/man-pages/* /usr/local/share/man/man1 && chmod 644
/usr/local/share/man/man1/cvc*
$ cp ~/cvc_upgrade/new_config.ini /usr/local/cvc/etc/config.ini && chown mfg.qad
/usr/local/cvc/etc/config.ini
```



- 2 Verify the CVC version, module settings, and environment settings.

```
$ cvc -v
$ cvc module -s
$ cvc env -s
```

- 3 Update the role permission settings for the two commands introduced in CVC 2.6.0.1, that is, `cvc diff` and `cvc download`.

```
$ cvc role -u -r developer -c "add,backout,check-env,checkin,checkout,config,delete,dev-compile,diff,download,id,module-show,report,source,status" -e devl
$ cvc role -u -r releaseManager -c "add,analyze-rcode,backout,check-consistency,check-env,checkin,checkout,config,delete,dev-compile,diff,download,id,module,module-show,promote,register,rel-compile,report,source,status" -e devl
$ cvc role -u -r reporter -c "config,diff,id,module-show,report,status" -e devl
```

```
$ cvc role -u -r developer -c "config,diff,download,id,module-show,report" -e test
$ cvc role -u -r releaseManager -c "analyze-rcode,backout,check-consistency,check-env,config,diff,download,id,module,module-show,promote,register,rel-compile,report" -e test
$ cvc role -u -r reporter -c "config,diff,id,module-show,report" -e test
```

```
$ cvc role -u -r developer -c "config,diff,download,id,module-show,report" -e prod
$ cvc role -u -r releaseManager -c "analyze-rcode,backout,check-consistency,check-env,config,diff,download,id,module,module-show,promote,register,rel-compile,report" -e prod
$ cvc role -u -r reporter -c "config,diff,id,module-show,report" -e prod
```

- 4 Run the `cvc role -s` command to verify that the settings are correct.



Product Information Resources

QAD offers a number of online resources to help you get more information about using QAD products.

[QAD Forums \(community.qad.com\)](https://community.qad.com)

Ask questions and share information with other members of the user community, including QAD experts.

[QAD Knowledgebase \(knowledgebase.qad.com\)*](https://knowledgebase.qad.com)

Search for answers, tips, or solutions related to any QAD product or topic.

[QAD Document Library \(documentlibrary.qad.com\)](https://documentlibrary.qad.com)

Get browser-based access to user guides, release notes, training guides, and so on; use powerful search features to find the document you want, then read online, or download and print PDF.

[QAD Learning Center \(learning.qad.com\)*](https://learning.qad.com)

Visit QAD's one-stop destination for all courses and training materials.

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