Evaluation Guide

CVS for iSeries 1.11.0. (CVS for iSeries) Build 2382 May 2007

March Hare Software Ltd

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In particular Tony Hoyle and Etienne Thijsse have been instrumental in the development of CVS for iSeries, its reference manual and this evaluation guide.

Who Should Read This Book

Anyone who creates files on IBM iSeries: software developers, web developers and anyone who has ever wanted to find yesterdays (or last weeks) copy of a file should read this book.

If you have a legislative or contractual requirement to track by whom or when changes are made to computer based files then this course will give you a detailed understanding of various approaches to this goal.

Anyone who wants to implement / install CVS for IBM iSeries should read this book.

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Part I – Introduction

Fundamentals

Be sure you are first familiar with CVSNT server and the various CM methodologies described in *All About CVS*.

Is CVS the best solution for iSeries CM?

Implementing Configuration Management should have clearly defined business goals linked to measurable benefits to the organisation.

CM is ultimately a business process that should deliver on those defined business goals, and various tools can be applied to automate the process. CVS for iSeries and CVSNT Server have been designed to complement modern CM best practice and specifically to support as many processes as possible.

The effectiveness CVS for iSeries depends on its ability to assist your CM process and through that deliver on your business objectives and ultimately deliver a measurable benefit to your organisation.

What is CVS for iSeries

CVS for iSeries assists OS/400 users to track of changes to file members and to co-ordinate those changes between different libraries, environments, teams and platforms. This is an essential element of Effective Configuration Management.

All of the program source code you can create and maintain in OS/400 can be versioned with CVS for iSeries including Source Physical Files (such as RPG and COBOL) and files in the IFS (such as HTML and Java).

What user interface is provided

CVS for iSeries is provided with three user interfaces, you can use any combination of these:

- Standard OS/400 menu and commands
- PDM opions from the the IBM Source Edit Utility (SEU).
- QSHELL command (usually for working with HTML and Java)

Is CVS for iSeries Native V5R1, V5R2, V5R3 and V5R4

Yes, CVS for iSeries is a native iSeries application and does not require PASE or any virtualisation. IBM OS/400 V5R1 and higher are currently supported.

Why is native important

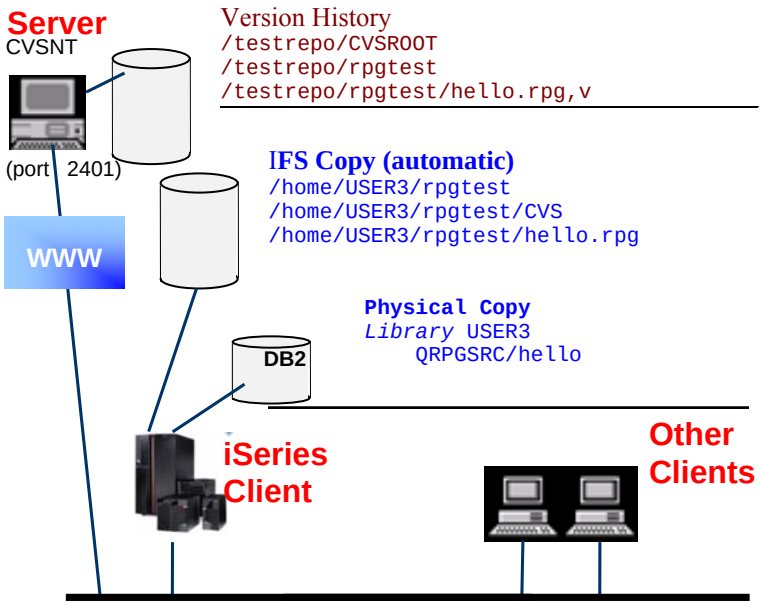
There are many version control systems available for iSeries and other platforms that version *a copy of the file*. Modern configuration management best practice tells us that this fails to ensure the integrity of your application development/deployment.

Using CVS for iSeries you can ensure that what is checked in and checked out from the versioning system is what is available and the integrity of your system is assured.

Programs that run in PASE read and write in ASCII not EBCDIC, run slower than native programs and use up greater resources.

How does it work (where are my versions stored)

CVS for iSeries .is a client/server based versioning system. You require a client and a server to get started. CVS for iSeries is an OS/400 client, and the only supported servers are CVSNT on Unix, Linux, Windows or Mac OS X.



What is the IFS used for

The IFS is used by CVS for iSeries as a temporary holding pace between the repository server (CVSNT) and the physical files (eg: QRPGSRC). The translation between them is handled automatically for the RPG programmer.

Can I have IFS files and no Physical Files

Yes you can have IFS files without physical files – you must create them using the QSHELL directly and then cannot use the menu or PDM to work on them.

What connection methods are supported

From the iSeries CVS client only PSERVER connection method is supported, however other clients can use SSH or other more secure methods to connect to the CVSNT server.

Can I synchronise between work done on Windows and OS/400

Yes you can edit the same files on windows and OS/400 and synchronise between the two when you are ready.

Can I Lock a file so only one user at a time can change it

CVS for iSeries has two modes of operation - the default one permits multiple users to change the same file at the same time which is called “concurrent development”. This is a safe and reliable method of software development.

The second mode uses the “edit”, “check in/commit” and “unedit” commands to control access to which user can have access to make changes at a specific time. This method requires additional setup and configuration of the server and is not recommended during evaluation.

Can I Lock a file so only specific users can checkout or checkin

This is a feature of CVSNT server and is not related to the operation of the client.

In an evaluation environment it is best to leave this functionality deactivated.

Can I merge changes from two development streams

Yes, this is a core feature of CVSNT, but the best way to use it depends on other CM methodology decisions you make. If you are familiar with CVS then you will already understand how easy the merge functionality is and how it is operated, if you are new to CVS then it is better to ignore this feature during evaluation.

Can I use CVS to migrate my application from Development, Test to Production

Yes, however to migrate any non-Text file (ie: a compiled program) you will require the CVS for iSeries Binary Files Option.

Can some developers work on release 1.x of our application while others work on release 2.x

Yes, this is a core feature of CVSNT, but the procedure for implementing this depends on other CM methodology decisions you make.

CVS stores a revision number with each file – this is NOT related to the releases of your application. For each application release the collection of files that make up the source code for that application are labelled with the release number. If you have two releases that need to be maintained at the same time (eg: 1.x and 2.x) then these become a *special label* sometimes called a *branch*.

Using the CHKOUTCVS command it is possible to checkout the source code with the label rel1 into one library and the source code with the label rel2 in to another library (or even on another computer).

Changes made on one *branch* can also be merged into the other, however that is outside the scope of a standard evaluation.

Preparing for the next step

To prepare for the practical evaluation please ensure that you have:

1. Have a CVSROOT (connection specification) to the CVSNT server
2. Have a login to the pre-configured IBM iSeries OS/400 client
3. Have some RPG/COBOL and other test files ready

Part II – Practical

Fundamentals

Be sure you have the items listed in *Preparing for the next step* in Part I above.

What are you evaluating?

The March Hare CVS Enterprise Versioning solution contains many components:

- CVS Suite or Professional Server
  (available on HPUX, Solaris, Red Hat Linux; SuSE Linux, Window, Mac)
- CVS Suite Graphical Client
  (available for Windows and Mac – also a free version exists for Linux)
- CVS Suite or Professional Command Line Client
  (available on HPUX, Solaris, Red Hat Linux; SuSE Linux, Window, Mac)
- CVS Client for iSeries Basic Edition
  with versioning descriptions, *or*
  without versioning descriptions
- CVS Client for iSeries Basic Edition Import
  with descriptions import, *or*
  without descriptions import
- CVS Client for iSeries Binary Edition
  with versioning executables, data areas, user spaces etc
- Defect Tracking System
  to link changes to bugs/defects/issues
- Custom Workflows and Server Side Triggers

Only some of these options will be installed on your evaluation system. If you need to test a specific option that is not installed please contact your sales representative.

Starting on OS/400 or on Windows/Unix/Linux/Mac?

There are three ways to proceed with the evaluation:

- Method 1
  Windows, Mac OS X, Unix or Linux is used to import RPG/COBOL or other source code to the CVSNT server and then these are "checked out" onto the OS/400 client.
- Method 2
  A saveset is used to transfer RPG/COBOL or other source to the pre configured evaluation iSeries and restored using OS/400 then added to the CVSNT server.
- Method 3
  A saveset is used to transfer RPG/COBOL or other source to the pre configured evaluation iSeries and restored using OS/400 then imported to the CVSNT server

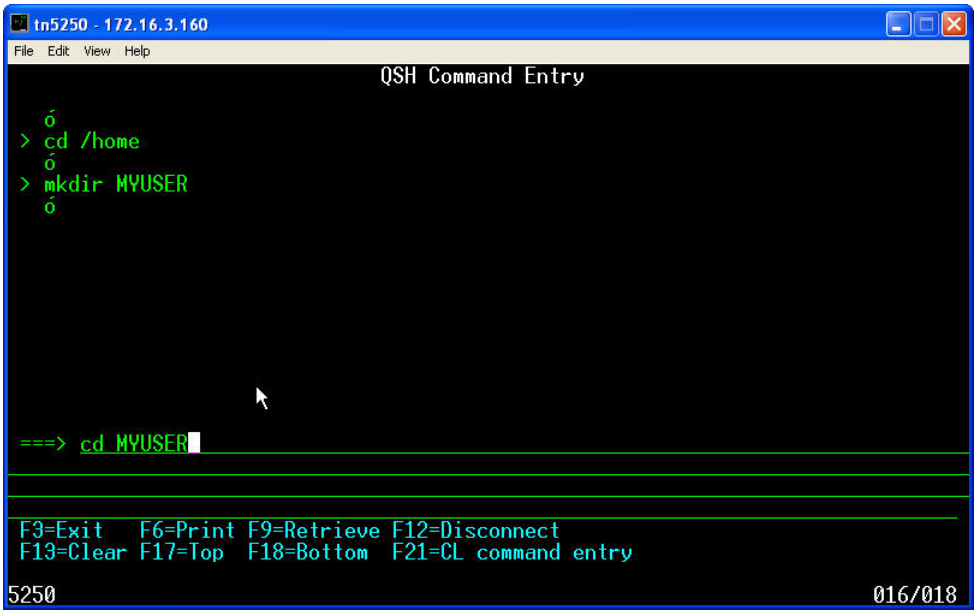
Setting and checking your environment on iSeries

When you log into OS/400 check the following:

- The CVSCMD library is in your library list.
- You have a directory in the IFS dedicated to your personal CVS temporary files.
- Your current working directory is set to the IFS dedicated to your personal CVS temporary files
- The PDM option file is set to the CVSCMD library.
- Your Coded Character Set Identifier is 37 (US EBCDIC)
- Log in to the CVSNT server

Create a directory in the IFS dedicated to your personal CVS temporary files.

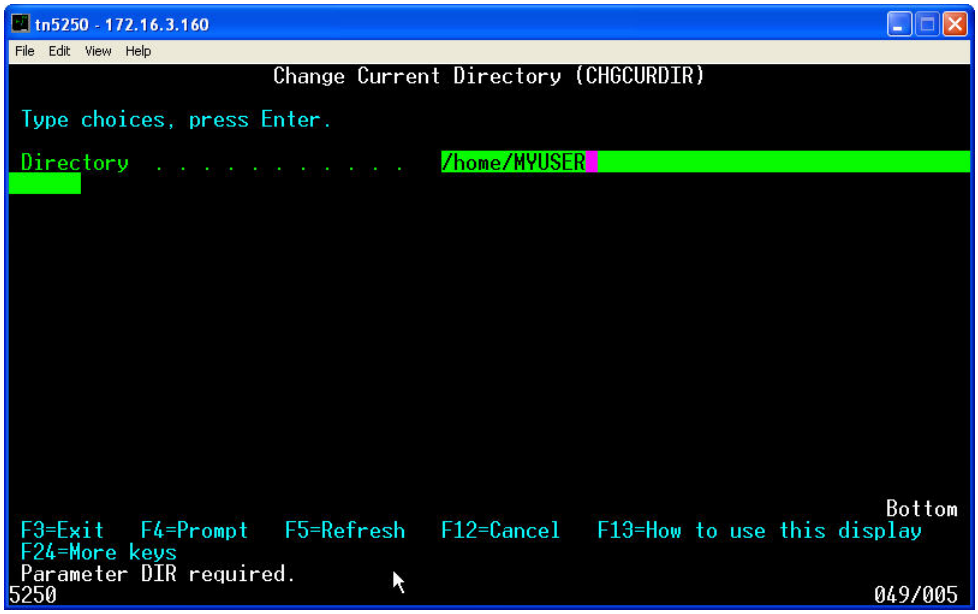
Start the QSHELL using QSH and then use the "unix" commands to create or find a directory that you can use to store your CVS temporary files:



After each command press enter and wait for it to be completed (as shown in the screenshot above). When finished use F3 to exit.

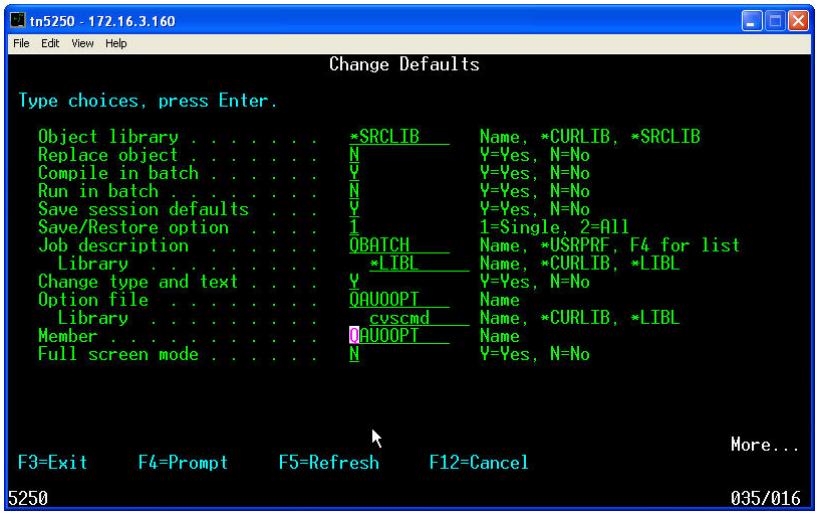
Set the current working directory to the IFS directory dedicated to your personal CVS temporary files.

Use the CHGCURDIR command to change your default directory to the IFS directory selected for your users temporary files:



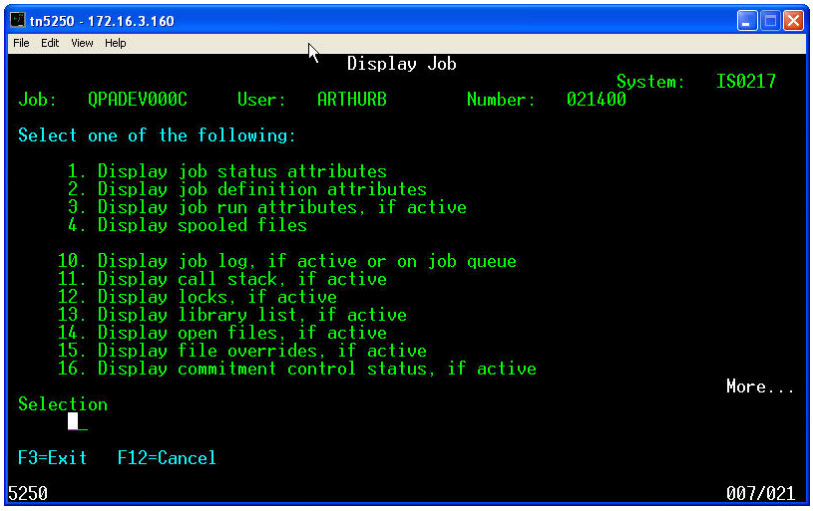
Check that the PDM options are loaded and set to the CVSPGM library

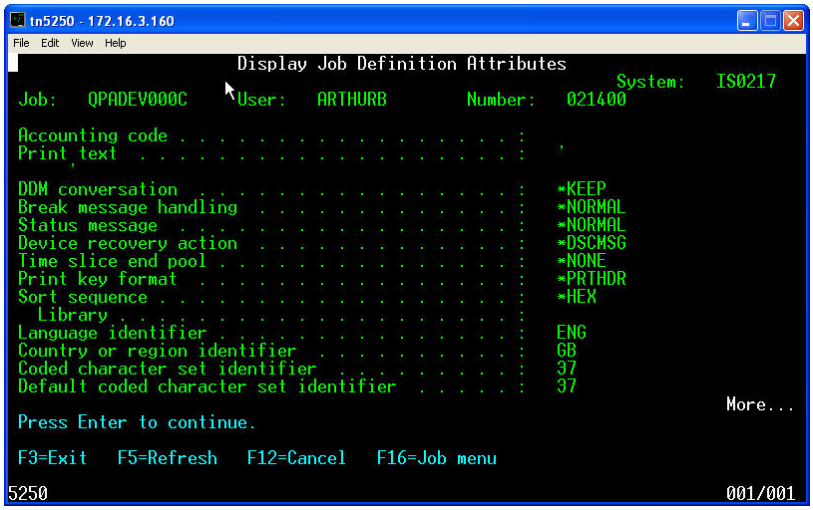
Use STRPDM then "Work with user-defined options" (option 9) then choose the file QAUOOPT in the CVSCMD library Member QAUOOPT then press F18 – Change Defaults to set the Option File to QAUOOPT and Library to CVSCMD:



Check that your Coded Character Set Identifier is 37 (US EBCDIC)

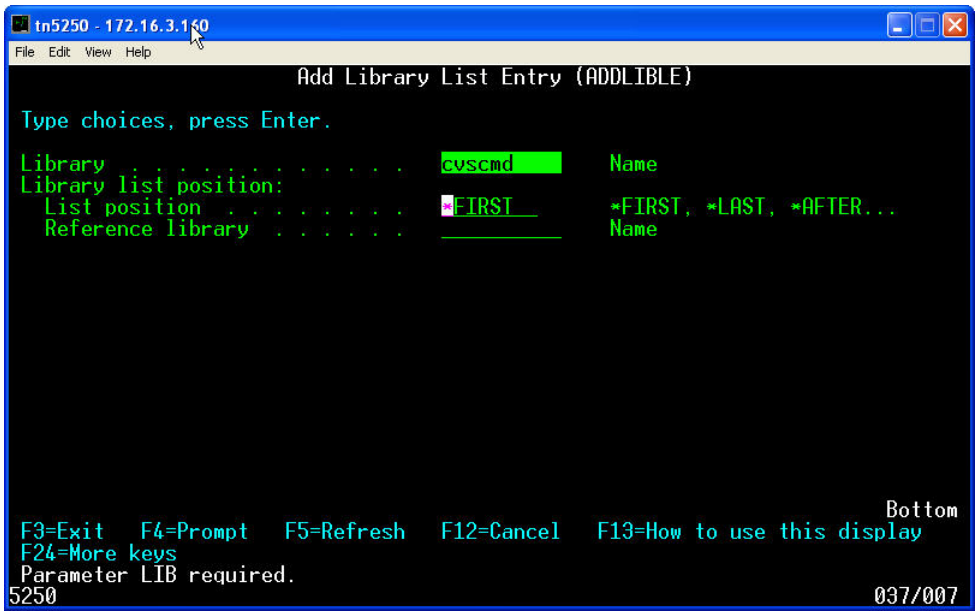
Use the DSPJOB command to check the job definitions and attributes (option 2) for the coded character set identifier (CCSID):





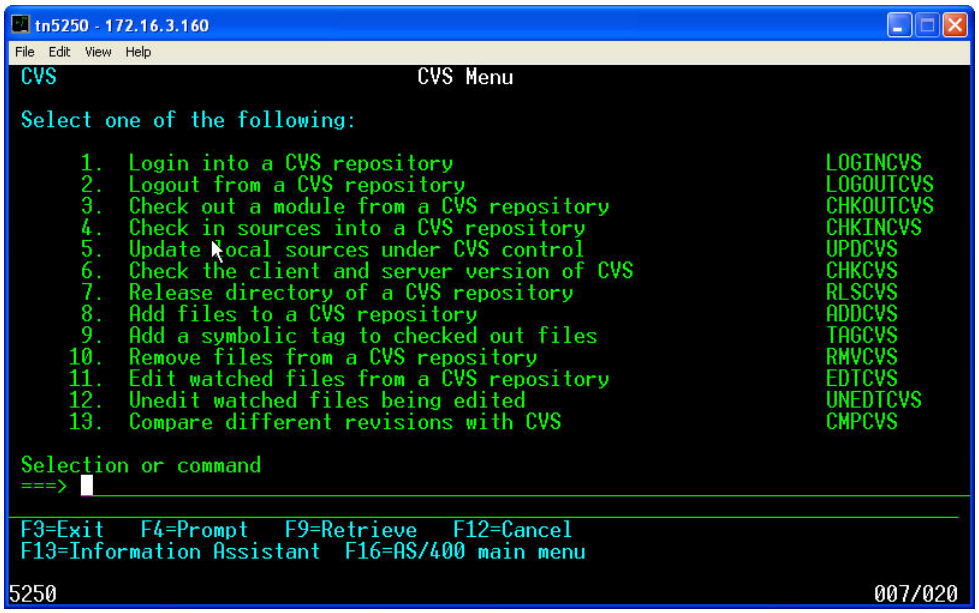
Adding the CVSCMD library is in your library list

Use the ADDLIBLE command to add the CVSCMD library to your library list:

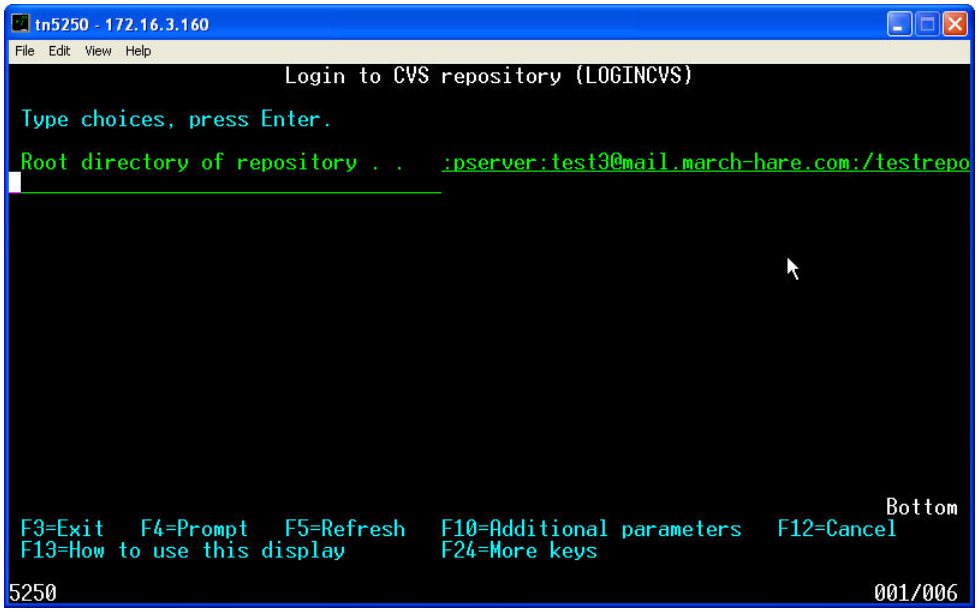


Log in to the CVSNT Server

Start the CVS menu using "GO CVS":



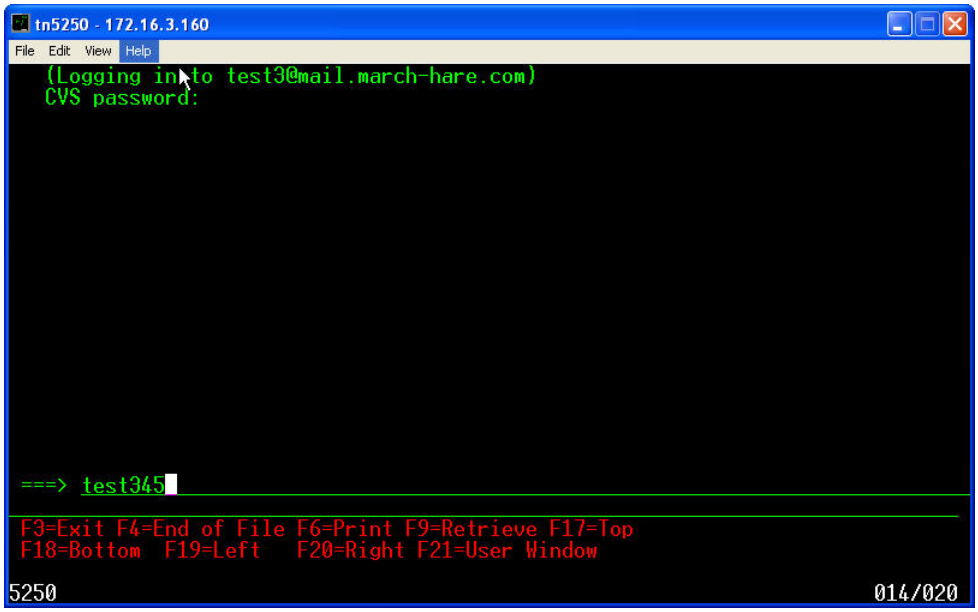
Use option 1 to login to the CVSNT server:



Specify the CVSROOT then press ENTER:

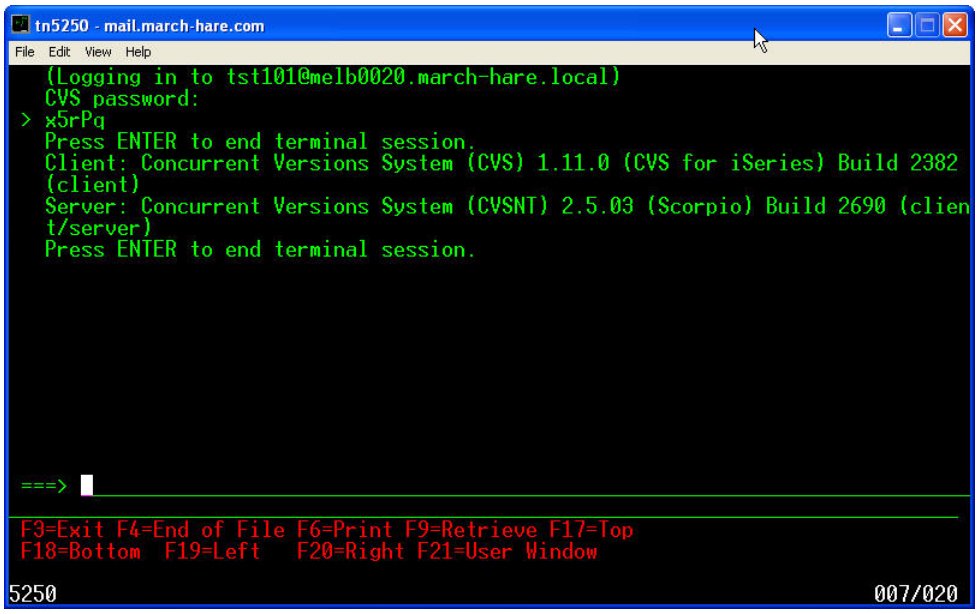
```
:pserver:test3@mail.march-hare.com:/testrepo
```

When prompted for the password; type it and press ENTER:



You are now logged in to the CVSNT server. It is possible to test that the connection to the server is working as expected using option 6 (CHKCVS). At the prompt simply press ENTER there is no need to enter the CVSROOT for each command once you are logged in.

The display should show the client and server version numbers:



Press ENTER to return to the CVS menu.

Method 1: Check out from CVS & make a change on OS/400

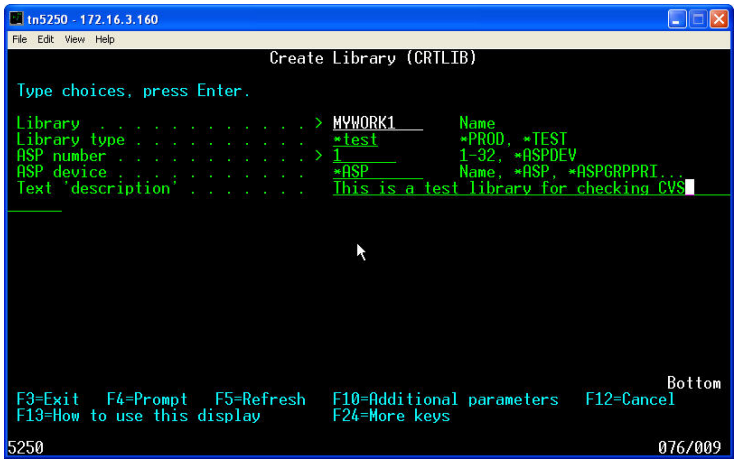
This sequence will show you how to use:

- CHKOUTCVS to copy the latest versions of file members from a *module* on the repository server to OS/400 source physical files
- PDM option CI to store changes to file members back to the repository
- A Windows client to modify the same file (using no locking or the concurrent model)
- PDM option UP to update the file member with changes made since the CHKOUTCVS was ran

Using CHKOUTCVS to copy file members to OS/400

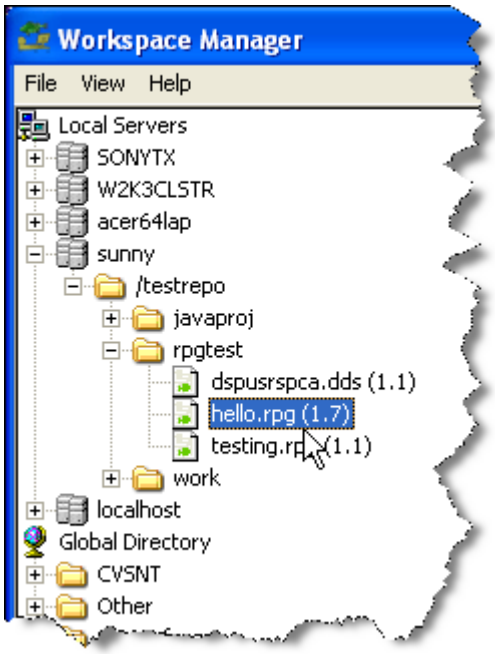
Pre: requisite:

Ensure you have logged in and set up your environment (including checking that CCSID is 37) a clean temporary area in the IFS and that you have an empty library created in OS/400 using CRTLIB.



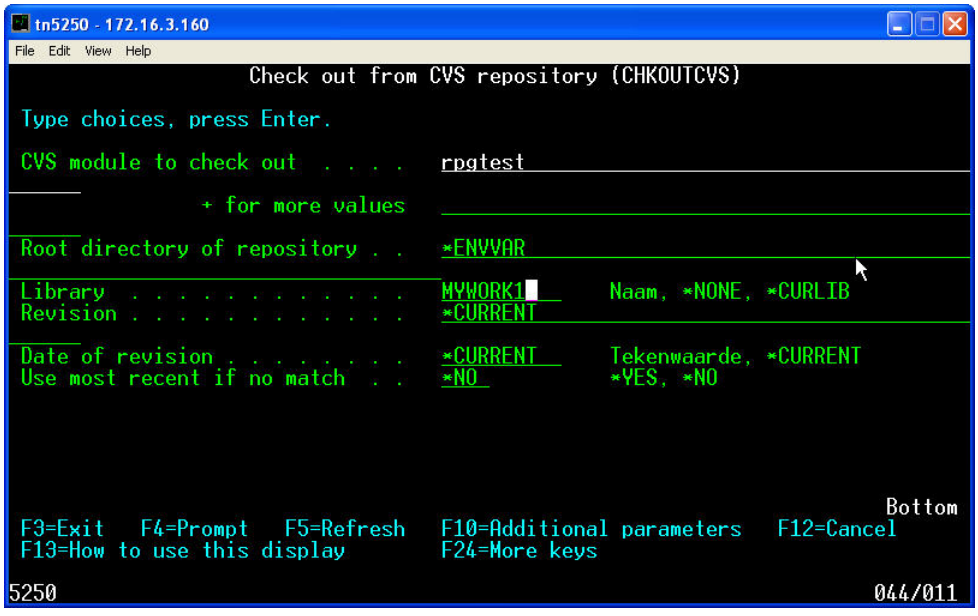
Find which module using WorkspaceManager

CVSNT Server stores files in modules (similar to directories on Unix). Use Workspace Manager on Windows to browse the CVS repository and find the module that contains the files you want to checkout to OS/400:

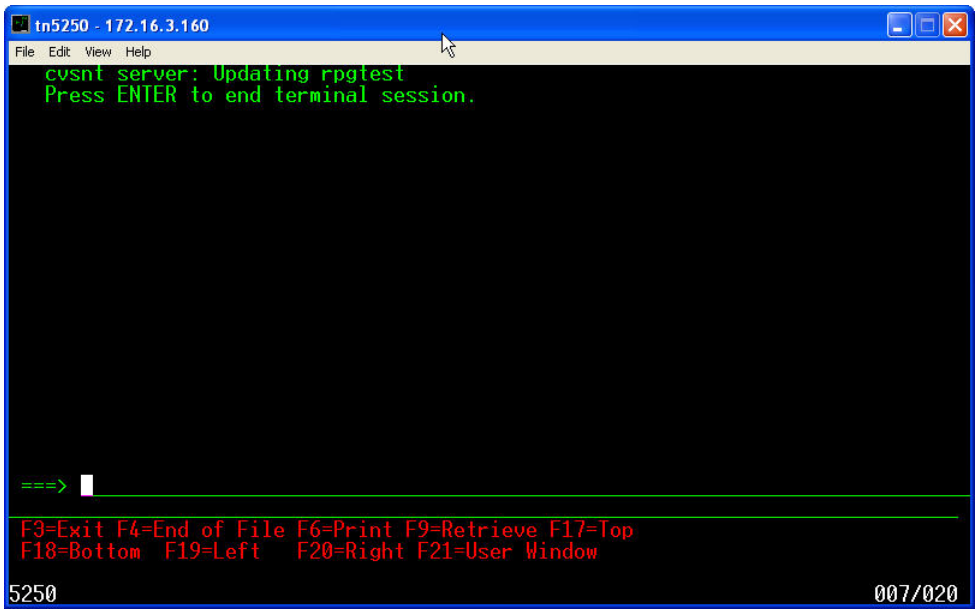


CHKOUTCVS:

From the CVS menu use option 3 or CHKOUTCVS (F4) to begin the checkout process. Enter the name of the CVS Module to checkout and the library that the source physical files and their members should be created in



The result window will be displayed to show you any messages from the CVSNT repository server (usually none). Press ENTER to dismiss the window:



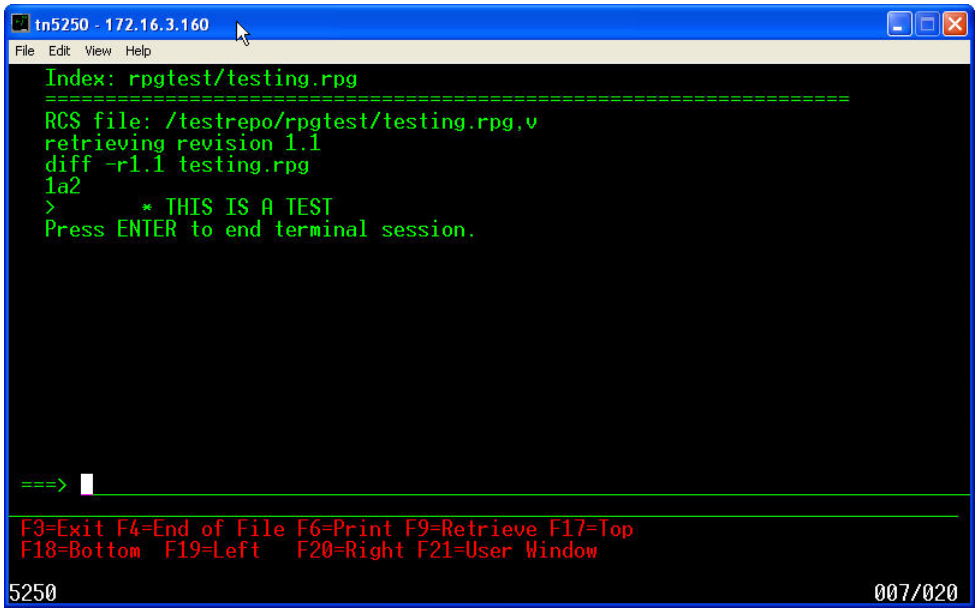
Using PDM to get the differences between the current file members to what is on the CVSNT server

Pre: requisite:

You have checked out source from a CVSNT server using CHKOUTCVS.

CP:

Use the CP PDM command in the "Opt" field of "Work with Members Using PDM" to compare the current file with the one on the CVSNT Server:



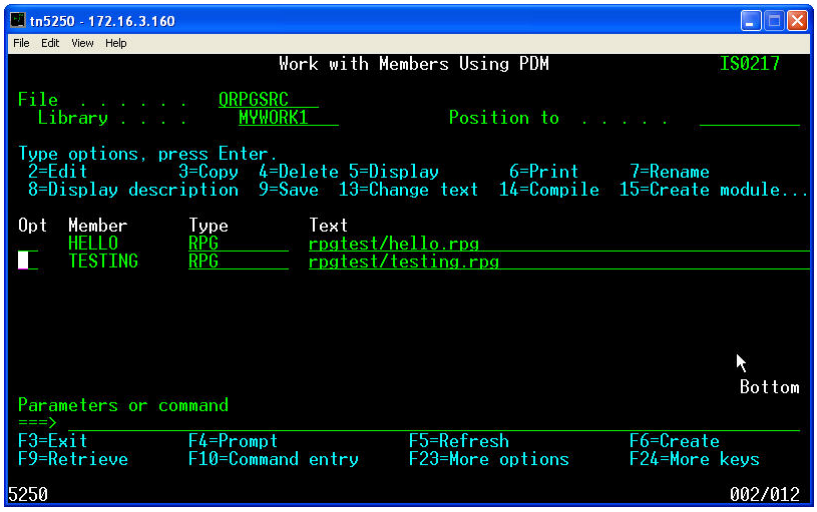
Using PDM to copy updated file members to CVSNT server

Pre: requisite:

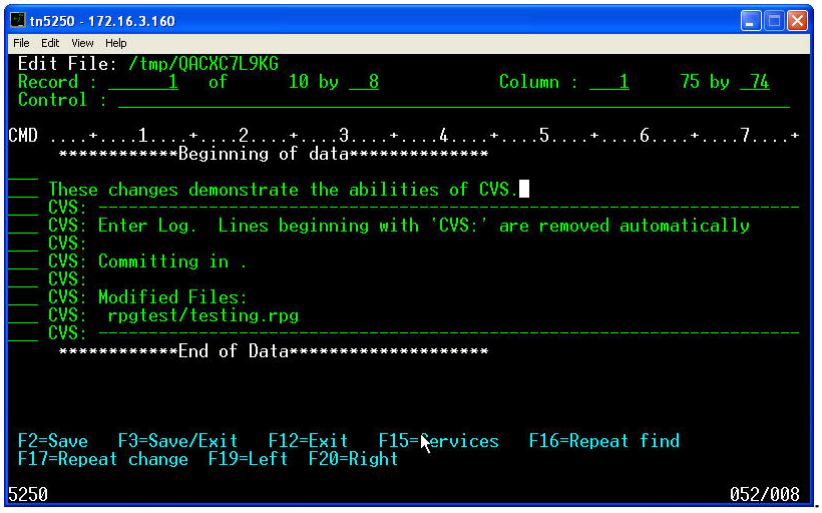
You have checked out source from a CVSNT server using CHKOUTCVS and one of the file members has been modified, eg: using STRPDM – work with members. If you are unsure use the previous step *Using PDM to get the differences between the current file members to what is on the CVSNT server* to check.

CI:

Use STRPDM then option 3 "Work with Members" to display the members. Members under the control of CVS for iSeries will have their temporary location in the IFS displayed as "Text" (see below).



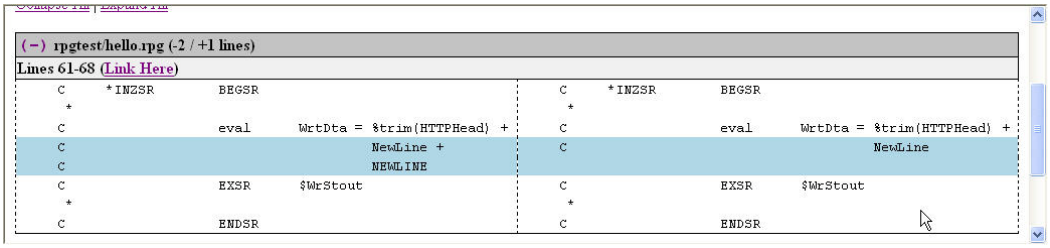
Use the CI PDM command in the "Opt" field of "Work with Members Using PDM" to "check in" (or commit) these changes to the CVSNT server. You will be prompted to enter comments to describe these changes. Comment syntax and other business rules can be defined on the server. Replace a line with a comment (ensuring that you remove the prefix CVS:), or insert a new line (if your comment includes a *bug number* then it will be automatically linked into the defect tracking system, eg: "Made changes to messages for bug 123":



Use F2 then F3 to continue. The new version number will be displayed upon successful checkin. Press enter to dismiss the results screen. *Ignore any errors like "Error inserting attachment: You have an error in your SQL syntax near ".*

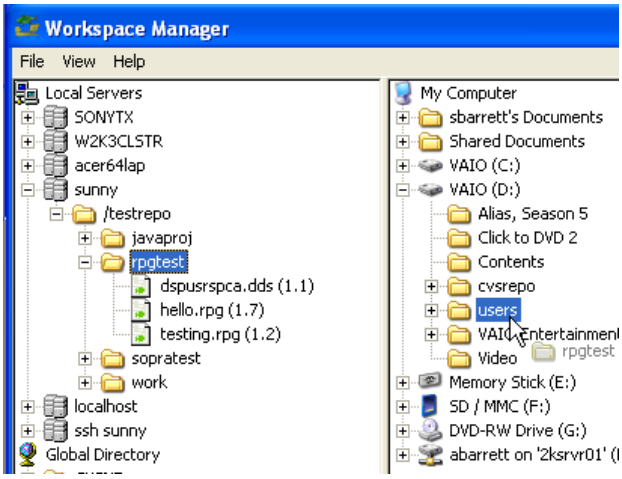
Use Bugzilla to view the differences

If a Bug number was specified in the comment then the differences can be viewed with Bugzilla:



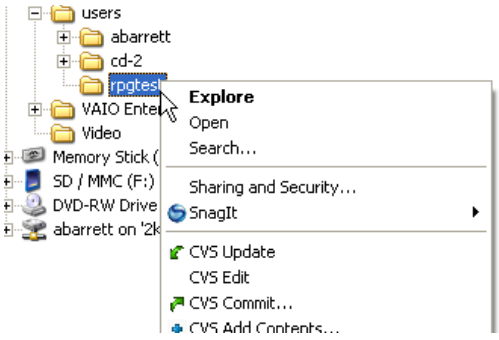
Use Workspace Manager on Windows to modify the same file (using no locking or the concurrent model)

Find the module with the iSeries source and drag it (or an individual file) to the local hard disk (from left to right):

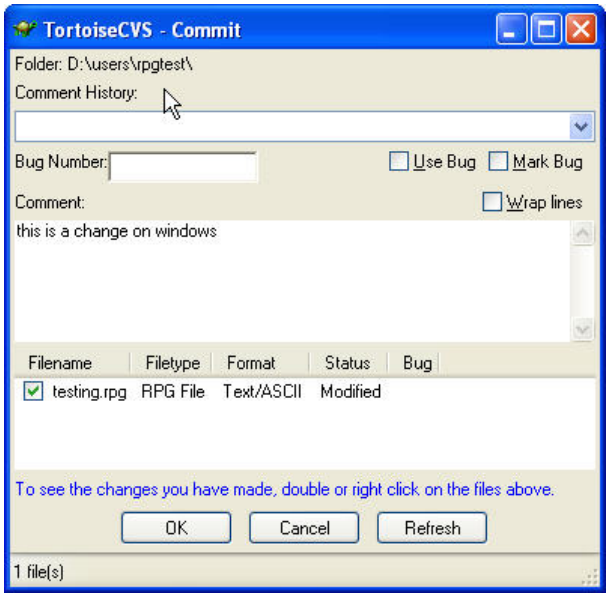


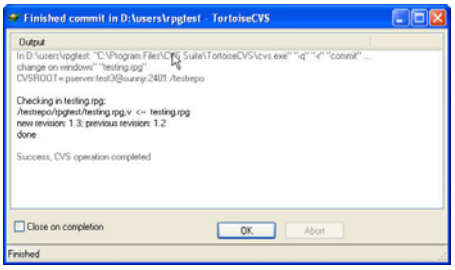
Now modify the file using any windows editor (eg: Notepad).

When the changes are complete right click the directory in Workspace Manager and select "CVS Commit"



Enter a Comment and press OK, then OK when the commit completes:





Use PDM option UP to update the file member with changes made since the CHKOUTCVS was ran

Pre: requisite:

You have checked out source from a CVSNT server using CHKOUTCVS and one of the file members has been modified on another computer, eg: using Windows.

CI:

Use STRPDM then option 3 “Work with Members” to display the members. Use UP to make the physical member up to date.

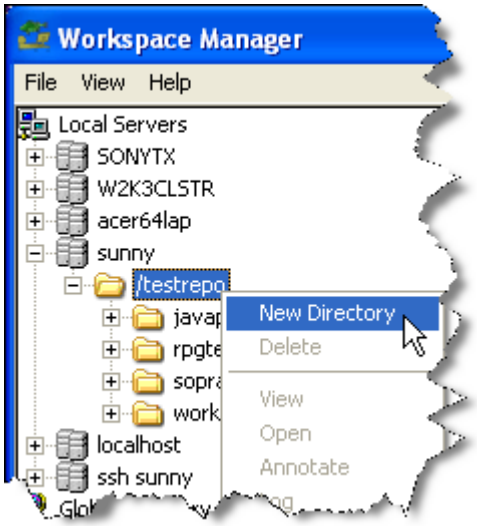
Method 2: Add new library to CVS from OS/400

This sequence will show you how to use:

- Workspace Manager Windows client to create an empty *module* on the repository server.
- CHKOUTCVS to copy the empty *module* on the repository server to OS/400 source physical files
- PDM option AC to mark the the individual file members to be added.
- PDM option CI to store the new file members to the repository.

Using Workspace Manager Windows client to create an empty module on the repository server

On Windows start Workspace Manager and navigate to the CVSNT server and open the repository so that the existing modules are displayed. Right click on the respoitory name (eg: /testrepo) and select the "New Directory" option. Name the new directory.



If the following error is displayed it can usually be ignored. Close the repository and open it again using the + symbol and the new directory should be displayed:

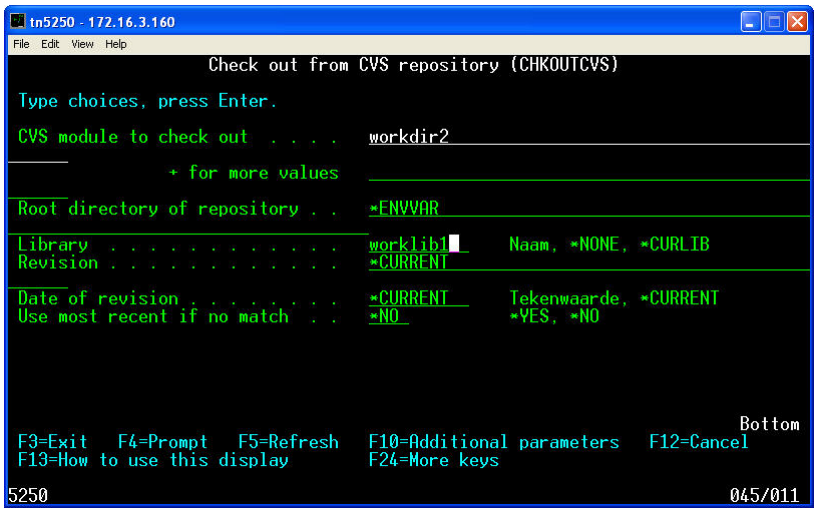
Use CHKOUTCVS to copy the empty module on the repository server to OS/400

Pre-Requisites:

The library and source physical file containing the file members is already restored

CHKOUTCVS:

From the CVS menu use option 3 or CHKOUTCVS (F4) to begin the checkout process. Enter the name of the CVS Module you just created in the previous step to checkout and the library that the source physical files and their members are in



Using PDM option AC to mark the the individual file members to be added.

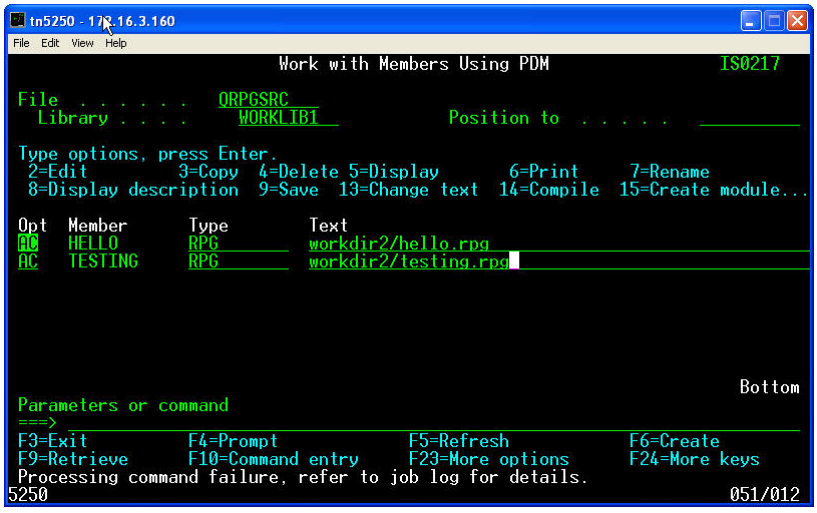
Pre: requisite:

A new module has been created and checked out using CHKOUTCVS.

AC:

Firstly enter the name and extension for the file in the "Text" field – ensuring that you use the module name created earlier, eg: workdir2/hello.rpg

Use the AC PDM command in the "Opt" field of "Work with Members Using PDM" to schedule the current file member to be added to the repository. Note: this command does not actually add the file member to the repository. NOTE: you will receive an error if you do not specify the name of a module that has already been created using CHKOUTCVS.



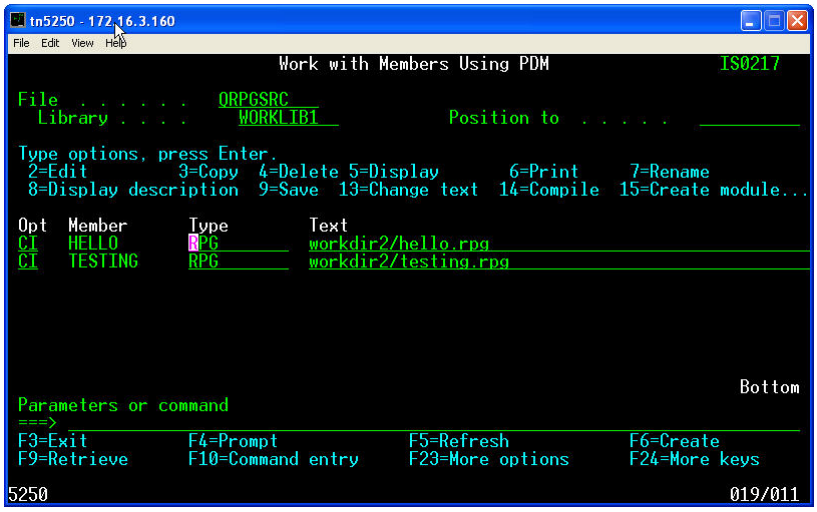
Use PDM option CI to store the new file members to the repository

Pre-Requisites:

The library and source physical file containing the file members is already restored to OS/400 and you have used it as the target for a CHKOUTCVS and you have added each file member using AC.

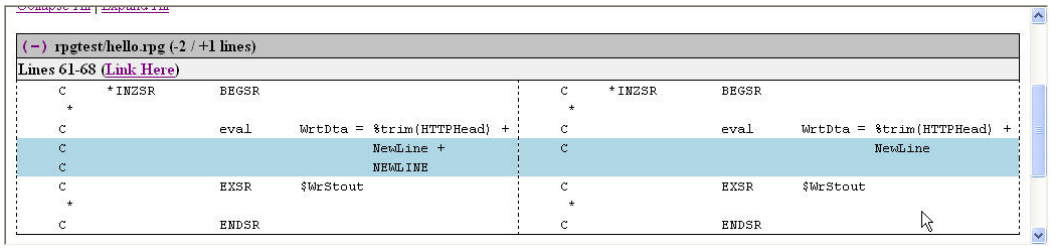
CI:

Use the CI PDM command in the "Opt" field of "Work with Members Using PDM" to checkin the scheduled file member to be added to the repository.



Use Bugzilla to view the differences

If a Bug number was specified in the comment then the differences can be viewed with Bugzilla:



Note about Using PDM options AC and CI when there are many members.

If many members need to be added and/or checked in (committed) then you can use ADDCVS and CHKINCVS to specify the names of each member. Note that the evaluation programs do not support *ALL – this is available during consulting to initially migrate your source code to CVS.

Using the QSHELL

You may also use CVS from the QSHELL (eg: for working with Java source). You should create a symbolic link to the CVSNT.PGM in the CVSCMD.LIB to a directory that is on your PATH. Eg:

```
PATH=$PATH:$HOME
export PATH
ln -s /QSYS.LIB/CVSCMD.LIB/CVSNT.PGM  $HOME/cvs
```

Consult the CVS 1.11 reference for commands that you can use. Here is a basic sample:

Reference

CVS Command List

You can use "GO CVS" or these individual commands:

LOGINCVS	Login into a CVS repository
LOGOUTCVS	Logout from a CVS repository
CHKOUTCVS	Check out a module from a CVS repository
CHKINCVS	Check in sources into a CVS repository
UPDCVS	Update local sources under CVS control
CHKCVS	Check the client and server version of CVS
RLSCVS	Release directory of a CVS repository
ADDCVS	Add files to a CVS repository
TAGCVS	Add a symbolic tag to checked out files
RMVCVS	Remove files from a CVS repository
EDTCVS	Edit watched files from a CVS repository
UNEDTCVS	Unedit watched files being edited
CMPCVS	Compare different revisions with CVS

CVS PDM Command List

AC	ADDCVS	Add files to a CVS repository
CI	CHKINCVS	Check in sources into a CVS repository
CP	CMPCVS	Compare different revisions with CVS
ED	EDTCVS	Edit watched files from a CVS repository
RM	RMVCVS	Remove files from a CVS repository
TG	TAGCVS	Add a symbolic tag to checked out files
UE	UNEDTCVS	Unedit watched files being edited
UP	UPDCVS	Update local sources under CVS control

Part III – Evaluation Summary

Executive Summary

CVS for iSeries allows you to version changes made natively on OS/400 to RPG/COBOL file members as well as Java and HTML files in the IFS.

The versions are stored in a separate physical environment on Unix, Linux, Windows or Mac OS X servers by the CVSNT server, where all changes are audited and subject to stringent security controls and business rules.

Changes made by different teams in different environments can be controlled by a common set of business rules and audited centrally.

CVS for iSeries is a part of a CM solution that together with CVSNT server and clients for other systems can contribute to fulfilling business goals such as:

Reducing Cost

CVS for iSeries can work effectively at reducing software development cost:

- Software developers can use inexpensive desktop platforms for code development
- Changes can be copied quickly between multiple code releases

Improving Quality

A CM process including CVS for iSeries and CVSNT server can improve quality:

- Software developers can see the relationship between code changes and project documentation including test sets, functional specifications and project plans
- Quality managers can clearly see when changes have and have not been applied to modules

Ensuring Compliance

CVSNT server can be used as a part of a corporate governance strategy to ensure that changes to your software are accurately and comprehensively audited.