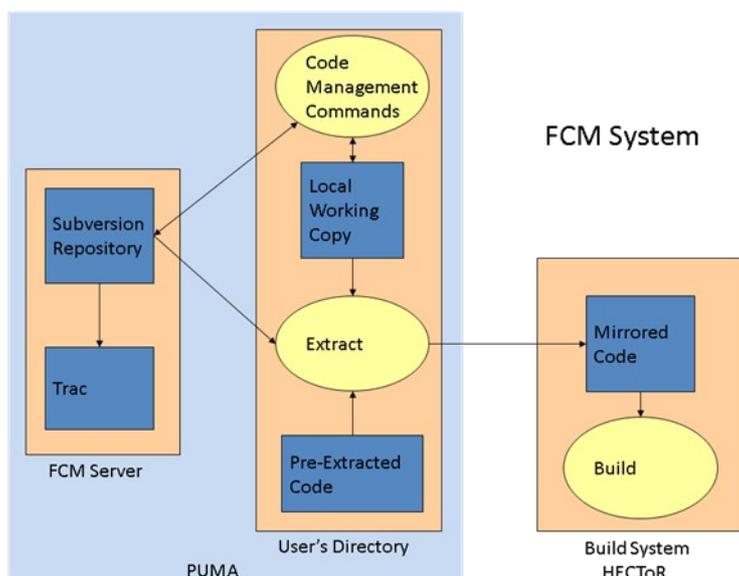


Overview of the FCM System for the UM

The way in which you interact with the UM is different from version 7.1 onwards. NUPDATE and mods are no longer used. The Met Office has designed a system called “Flexible Configuration Management” or FCM, for short, which has been designed to simplify the task of managing and building source code. It consists of three components:

- Integrated Configuration Management, Wiki and Issue Tracking System:**
 The UM source code and its history are stored in a central database, which is referred to as the repository. Version control is provided by the revision control system *Subversion*. Via the use of wrapper scripts and enforcing conventions FCM enables source code changes to be made in a controlled and easy manner. Changes are viewed and documented using the web-based tool *Trac*, which is located at <http://puma.nerc.ac.uk/trac/UM>
- Build System:**
 This part of the system compiles the source code and builds the model executable. It performs full dependency analysis, automatic generation of the Makefiles, flexible control over compiler flags, amongst others.
- Extract System:**
 This component is the interface between the Code Management and Build system. Code is extracted from the UM Repository and presented in the required form for the build system. The source code is then mirrored to HECToR to be built.

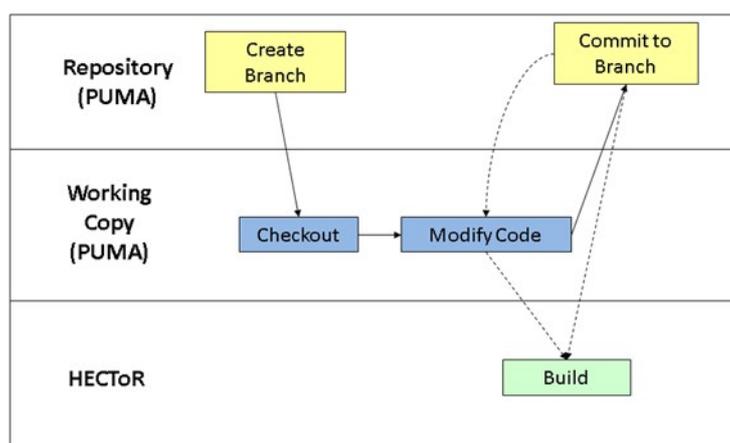
The following diagram illustrates how these components fit together.



One big difference with FCM is that the UM source code resides in a subversion repository on PUMA, the NCAS server which provides centralised access to the UMUI. Users then edit the UM source code directly on PUMA. Interaction with the repository is via a set of “FCM code management commands”.

Before giving an overview of the typical workflow, some new terminology needs to be introduced.

- The **trunk** is the consolidated code which we receive from the Met Office. The only changes NCAS make to the trunk is when a new UM version is received from the Met Office.
- A **release** is a specific revision of the trunk. A release is identified by a keyword. E.g. keyword vn7.1 is associated with a specific revision number.
- A **branch** is the method of making and tracking changes. Branches are held in the repository. Branches allow code to be shared with other users.
- A **working copy** is a local copy of a branch, which may have changes to it.



The above diagram illustrates the typical workflow; how you interact with the code repository to modify the code and test your changes. Firstly you need to create a new branch from the trunk, at a particular UM version. This results in a copy of the UM version, made in the repository. In order to make changes to the code, you next need to *checkout* the branch to create a *working copy*. This will create an ordinary directory tree in your PUMA directory. You can then modify the UM code in your *working copy*. At this point your code changes are local and are not visible in the repository until you issue the *commit* command. To test out your changes in a UM job you now have a choice.

1. To test out your changes before you *commit* them to the repository you can reference your working directory in your UM job via the UMUI, this is useful for debugging work (Note: you can only include one working copy per job). Once you are happy with your changes you commit them to the repository where they become permanent. Once committed to the repository your changes can be shared with other users.
2. You can commit your changes back to the repository and then include your branch in the UM job.

You then repeat the cycle of modifying the code and committing to the repository as many times as is needed.

If you are planning a large number of changes, you are encouraged to commit regularly to your branch. This way you have a history of your changes and should you want/need to back out a change it is easy to revert to a previous revision. An in-depth Tutorial taking you through running a UM job and making code changes is available at http://puma.nerc.ac.uk/trac/UM_TUTORIAL

Further Information:

FCM System User Guide, *Met Office* - available from the Met Office & NCAS-CMS websites.

References:

FCM User Guide, *Met Office, January 2008*

FCM Training Course Presentation, *Met Office, 2008*