

A WMP GmbH Training
presented in cooperation with
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Appendix: Revision control using RCS and *vic*

written by
Klaus Weidner
(**kw@w-m-p.com**)

Why is a revision control mechanism necessary?

- **Unix does not enforce file locking - nothing prevents two administrators from editing the same file at the same time.**
 - **The version of the file kept depends on who saves it last. The other administrator's changes are lost.**
 - **There is *no* warning for either administrator that there was a conflict and that data was destroyed.**
- **There is no version history of files. If the system stops working due to an incorrect configuration file, there is no easy way to retrieve the last working version, or to check what changes were made.**
- **Any changes to a file cannot be undone - if a file is overwritten or deleted accidentally, the last (hopefully up to date) backup must be retrieved.**

RCS - the GNU Revision Control System

- The *RCS* package addresses all the issues mentioned. Unfortunately, the necessary command lines are somewhat cryptic, and improper use can have harmful side effects.
- In order to be truly effective, it is essential that the system is *always* used for important configuration files - this implies that it must be easy to use, and as automatic as possible.
- The *vic* shell script is a front end for *RCS* that, if run instead of *vi*, automatically runs the necessary version control commands, and also provides sanity checks to detect and fix any attempts to bypass the version control system.

Example: Using *vic* to edit a file that is already under version control

```
# vic /etc/hosts
```

```
RCS/hosts,v --> hosts
```

```
revision 1.3 (locked)
```

```
done
```

The VI editor is launched, and the admin adds a new host entry.

```
(s)ave and exit, (v)iew changes, (u)ndo changes, (e)dit again? [s] RETURN
```

```
RCS/hosts,v <-- hosts
```

```
new revision: 1.4; previous revision: 1.3
```

```
enter log message, terminated with single '.' or end of file:
```

```
>> kw: added host "fw.madrid.com"
```

```
>> .
```

```
done
```

Benefits of using *vic*

- **At the cost of a few additional keystrokes, the admin has gained:**
 - **A full history of all changes to the */etc/hosts* file - each changed version can be retrieved, back to the operating system installation.**
 - **A change log, showing the timestamped admin-supplied log entries associated with each change.**
 - **A central change repository in */conf*, easily usable for backup or documentation purposes.**
- **Additional choices are offered by the *vic* menu:**
 - **Undoing the changes made in this session and reverting to the previous version.**
 - **Reentering the editor, i.e. after testing the changes, without having to create an intermediate version.**
 - **Viewing a summary of the changes made to the file compared to the previous version.**

Initial use of *vic*

- **If a file has not yet been integrated into the versioning system, *vic* detects this and asks how it should configure *RCS*:**
 - **Use a local *RCS* directory for non-system files, i.e. installation notes; or when not working as *root*.**
 - **Use the central repository */conf* for all system configuration files.**
- **The selection applies to the entire directory - if in doubt, use */conf*.**
 - **The */conf* directory will contain a mirror of the directory structure, i.e.:**
 - `/conf/etc/`
 - `/conf/etc/init.d/`
 - `/conf/opt/scripts/`
 - **All necessary directories are created automatically.**

Example: Initial use of *vic*

```
# vic /etc/openldap/ldap.conf
```

```
Directory RCS does not exist - create:
```

```
(l)ocal RCS dir, (s)ymlink to '/conf/etc/openldap/', (q)uit? [s] RETURN
```

```
Doing initial checkin
```

```
RCS/ldap.conf,v <-- ldap.conf
```

```
initial revision: 1.1
```

```
done
```

```
Press return to go on...RETURN
```

```
RCS/ldap.conf,v --> ldap.conf
```

```
revision 1.1 (locked)
```

```
done
```

The VI editor is launched, and the admin does not make any changes.

```
(s)ave and exit, (v)iew changes, (u)ndo changes, (e)dit again? [s] RETURN
```

```
RCS/ldap.conf,v <-- ldap.conf
```

```
file is unchanged; reverting to previous revision 1.1
```

```
done
```

Installing *RCS* and *vic*

- **Get and install the GNU RCS package.**
 - **Source code:** <ftp://ftp.gnu.org/pub/gnu/rcs/rcs-5.7.tar.gz>
 - **Binary package:** <http://www.sunfreeware.com>
- **Copy the *vic* shell script to `/usr/local/bin/`, and make it executable.**

Lab Exercise: Installing and using *vic*

1. Get the RCS source code and *vic* script:

```
# cd /stuff/pkgs
# ftp 195.182.118.253
Name (195.182.118.253:root): ftp
230 Anonymous user logged in.
ftp> cd /pub
250 Changed to /pub
ftp> bin
200 TYPE is now 8-bit binary
ftp> mget vic-*
mget vic-1.3+rcs-5.7_Solaris2.7.tar.gz? y
ftp> bye
```

2. Unpack the tarball:

```
# cd /
# tar xvzf /stuff/pkgs/vic-1.3+rcs-5.7_Solaris2.7.tar.gz
```

3. Test it:

```
# vic /etc/hosts
```

```
Directory RCS does not exist - create:
```

```
(l)ocal RCS dir, (s)ymlink to '/conf/etc//', (q)uit? [l] s
```

```
You are now in the vi editor - add a host, save and exit.
```

```
(s)ave and exit, (v)iew changes, (u)ndo changes, (e)dit again? [s] RETURN
```

```
enter log message, terminated with single '.' or end of file:
```

```
>> [your name] Added host ...
```

```
>> .
```

```
done
```

Viewing the change log and file differences

- `rlog FILE` shows the change log comments.
- `rcsdiff FILE` shows the changes as compared to the previous version.
 - Use `-rREV` to compare to older versions. For example, compare to the first checked-in version:

```
# rcsdiff -r1.1 /etc/hosts | more
```
- Use the command `co -pREV` to view older versions.
 - Example: `co -p1.3 /etc/hosts | more`

Using *RCS* variables inside the edited file

- If any special *RCS* variables occur in the file, they are automatically replaced:
 - `$Revision:$` : the current version number.
 - `$Id:$` : full header including date and author.
 - `$Log:$` : new change log entries are automatically inserted after this line.
- These variables can be placed inside comments, i.e. for a shell script, put a '#' in front.
- If the keyword substitution is not wanted (i.e. for binary files), it can be turned off for a specific file:
`# rcs -kb FILE`

Lab Exercise: Installing and using *vic*

1. Open `/etc/hosts` using *vic*, and add the following keyword header at the top of the file:

```
# $Id: $  
#  
# $Log: $  
#
```

2. Save and exit, and make at least two more separate changes using *vic*. Make sure to add descriptive change log comments when *vic* prompts you for them. Note the changed file header.
3. View the change log using: `# rlog /etc/hosts`
4. View the original version: `# co -p1.1 /etc/hosts`

Dealing with incompatible system administrators

- **Files under RCS control will normally be read-only.**
 - **The *vi* editor will warn you when you try to change a read-only file. Please respect this warning, and use *vic* instead.**
- **If an administrator ignores the warning and changes the file despite the read-only status, this will be detected the next time *vic* is used on this file. The admin can then either accept these changes and continue editing, or stop *vic* and manually verify if the changes were authorized.**
- ***vic* will complain ("file is locked by ...") if two admins try to change a file at the same time.**
 - **If this is wrong (i.e. because an editor session crashed), the admin can "steal" the lock and continue working. Before doing this, always make sure that there really is only one person working on the file, otherwise changes will be lost.**