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*ACS
Installation
Manual*

G.CHIOZZI

ALMA Common Software Installation Manual

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1 Summary

This is the Installation Manual for the ALMA Common Software (ACS) release 4.0 linux and SUN OS machines.

This document assumes that you have an overview of ACS (see also “ACS Overview” 2.5 and “ALMA Common Software Release Notes Error: Reference source not found”), UNIX know-how, and some experience in installing public domain software. Unless you are the system administrator, you may need his/her help to perform some of the installation steps.

2 Introduction

2.1 Scope

This manual covers the installation of ACS Release 4.0 for a Linux PC (Red hat 9 is the official Linux version, but ACS 4.0 works on RH 7.2 and 7.3) and a Solaris workstation (Solaris 8) and is distributed together with a CD containing all involved software.

The installation on SUN includes all software related to VxWorks needed for LCU configuration; this is left for backward compatibility.

Starting with ACS 4.0, on Linux RH9 the RTAI installation is also provided.

2.2 Preparing for installation

Even if you have installed ACS many times, we suggest that before starting a new installation or upgrade you always print the latest version of this manual (from Error: Reference source not found) and read it carefully.

During the installation, keep the printed copy on your side and use it as a logbook, checking with a pen all steps one by one while you complete them and noting down on the side any strange or unexpected results.

It is a good practice to date the cover of each installation manual and keep it in a folder for later reference.

Help and information on problems can be found in the ACS Frequently Asked Questions 2.5.

2.3 Installation procedures

We supply two procedures to install ACS: 0_InstallACS for Red Hat Linux 9 and 0_InstallACS.Sun for Solaris 8. The Linux procedure is more flexible, you will be able to

choose the tools you want to install among the ones provided with the CD. You can also change the default location (`/alma/ACS-4.0`) for the installation. In this case you cannot install the `gnu` and `tcltk` tools from our distribution (they need to be installed under the default location because of hard-coded paths in the binaries) and you have to rely on your own installation of `gnu` tools and `tcl/tk`. The versions should match with the ones officially provided. On Sun, we strongly recommend installing everything (all the tools from our distribution) under `/alma/ACS-4.0`.

For both installation procedures, the default user is `almamgr` but other users can also be chosen to perform the installation.

On Linux RH9 it is possible to install AIPS++. You need to be root to perform this installation and ~650MB of space under `/usr`.

Another important point concerns the set of environment variables: to let the installation user preserve his or her own environment we provide a simple file, `.bash_profile.acs`, which contains all the necessary environment variables to run ACS. It is up to the user to source this file before working with ACS. Note that the file assumes that you are using `bash` as the default shell.

The file belongs to a directory, `.acs`, which contains some other settings for `emacs`. This directory gets installed under the home directory of the user who performs the installation. When the ACS libraries are built (see 5), a copy of the directory is also installed under `/alma/ACS-4.0/ACSSW/config` in order to let other users who want to work with ACS on the installed machine access the same environment variables.

2.4 Glossary

<http://www.alma.nrao.edu/development/computing/docs/joint/draft/Glossary.htm>

2.5 References

- [1] ACS web pages: <http://www.eso.org/~almamgr/AlmaAcs/index.html>
- [2] ACS Overview: <http://www.eso.org/~gchiozzi/AlmaAcs/OnlineDocs/ACS-Overview.pdf>
- [3] ACS Release Notes:
<http://almasw.hq.eso.org/almasw/bin/view/ACS/ReleaseNotes>
- [4] ACS Installation Manual: (this manual):
<http://www.eso.org/~gchiozzi/AlmaAcs/OnlineDocs/ACS-Installation-Manual.pdf>
- [5] ACS Frequently Asked Questions
<http://almasw.hq.eso.org/almasw/bin/view/ACS/AcsFAQ>

[6] ACS 4.0 Distribution CDs

http://www.eso.org/~gchiozzi/AlmaAcs/Releases/ACS_4_0/Distribution/

[7] ALMA Software Development Tools and Integration Procedures:

<http://www.eso.org/~almamgr/AlmaAcs/OnlineDocs/IntGuidelines.pdf>

3 Upgrade from a previous ACS installation

An upgrade from a previous ACS release is not possible.

For releases older than ACS 3.0 no support is given any longer. It is left to the user to keep or remove them.

4 Basic installation and tools

4.1 Install Red Hat Linux 9 or Sun Solaris 2.8

4.1.1 Installation of the operating system

This version of ACS has been developed and tested on a Red Hat Linux 9 and Sun Solaris 8. Although it may also work on different configurations, we strongly recommend using the same one.

For reference, the Red Hat Linux (VLT-MAN-ESO-17200-2009) and Sun Solaris (VLT-MAN-ESO-17200-2238) installation manuals are available at:

http://www.eso.org/projects/vlt/sw-dev/wwwdoc/add_doc.html

Just look for the document ID or the progressive number in the left colon: 8 for Linux and 6 for Sun.

Remark: This referenced document describes installations tailored for the usage with VLT Common Software. This conflicts with the ACS installation procedures because the "vlt" "vltdata" and "data" directories do not need to be created.

Be sure that your system has at least 5Gbytes free on / partition for a full Linux OS installation.

The recommended swap configuration is 2 times the system memory.

Important for Linux: For Linux machines that are not connected to Internet all the time, be sure that your network settings are configured so, that the system does not do any

"external" DNS look-up to resolve your IP (see /etc/hosts, etc.). Otherwise the system can hang or become very slow at startup or during operation.

Important for Linux: There are several ways to install RH9 on a station. If you are not performing a FULL Red Hat Linux 9 installation, make sure that the following packages, which are not installed by default for small footprint installations, are selected:

- pdksh 5.2.14-21 (Public domain Korn Shell, under System Environment -> Shells)
- glibc-devel-2.3.2-11.9
- itcl-3.2-88
- tclx-8.3-88

To check the availability of these packages in an existing system simply use:

```
> rpm -qa | grep pdksh
> rpm -qa | grep glibc-devel
> rpm -qa | grep itcl
> rpm -qa | grep tclx
```

and check that the version you have match the ones suggested in this document.

Important for Linux: You must upgrade at least glibc, glibc-common, and kernel rpms to the versions specified below (Please note that they do not come with the default RH9 installation CDs)

- glibc-2.3.2-27.9 (executing rpm -Uvh glibc-2.3.2-27.9)
- glibc-common-2.3.2-27.9 (executing rpm -Uvh glibc-common-2.3.2-27.9)
- kernel-2.4.20-28.9 (executing rpm -ivh kernel 2.4.20-28.9)

At the time of this writing it seems that these packages are no longer available from the RH web site, but you can download them from the following ACS page:

<http://almasw.hq.eso.org/almasw/bin/view/ACS/RedHat9>

NOTE: Please be aware that if you have glibc-debug-2.3.2-11.9 and glibc-utils-2.3.2-11.9 installed in you system, they will conflict with the newer versions of glibc and glibc-common, and therefore must be uninstalled before upgrading.

4.1.2 Optional packages for Linux installation only

It is suggested to install the ddd debugger from the RH 9 installation CDs.

In a full RH 9 installation, this is installed automatically. In a manual installation, the corresponding `ddd` rpm and the rpm for the `lesstif` package it depends on have to be explicitly selected.

4.1.3 Check Linux network configuration

The Linux Red Hat installation and configuration tools sometimes generate an erroneous network configuration.

Check your `/etc/hosts` file. If the `localhost/loopback` entry looks like:

```
127.0.0.1 <hostname> localhost
```

i.e. if it contains the explicit hostname, then it is WRONG.

This prevents CORBA references from being properly contacted from a remote host, since their IIOP would contain 127.0.0.1 instead of the correct host IP address. The effect is that your clients cannot get in touch with a `maciManager` running on the mis-configured host.

A correct `/etc/hosts` file looks like the following:

```
127.0.0.1          localhost.localdomain localhost
134.171.12.202    tel.hq.eso.org tel
```

i.e. it contains a generic `localhost` entry for the loopback interface and one entry for the host itself (and possibly other additional entries for other hosts).

4.1.4 IMPORTANT: special user for SUN workstations which needs to connect to LCU(s):

An additional user called "vx" has to be created (it is recommended to use as root the command "useradd").

It is used by the LCU(s) to access the VxWorks kernel at boot time.

Its home directory shall contain a `.rhosts` file that only allows access to the LCU node(s). In this file you should write an entry per each LCU you want to work with, like the following:

```
<lcu_host_name> vx
```

```
<lcu_host_name>.fully.qualified.name vx
```

The user `vx` must be local to each machine and have, for example, `/alma/vx` as `$HOME`. Example of a `vx` entry in the `/etc/passwd`:

```
vx:<your_password>:138:300:Vx,,,:/alma/vx:/bin/csh
```

4.2 Load the ACS Release 4.0 CD-ROM

All the necessary software is available on a CD. Please mount it in your system. Should the CD not be available, the files may be accessed from the ACS web pages or by ftp (please contact the Author).

In what follows, we assume that the files are available in the <cdfiles> directory and the chosen installation directory is <install_dir>.

For your convenience, the installation steps are collected in a shell script. Comments are provided inside the script to describe what is done step by step.

<install_dir> should be at least 1.5Gb on Linux (add ~300MB if you are going to install RTAI) and 2.8Gb on Sun.

4.3 ACS Installation

4.3.1 Prepare the system

Create almagr account

If not already existing, create the "alma" group and the "almagr" user belonging to it.

```
> groupadd -g 335 alma
> useradd -g 335 -u 3060 -d /home/almagr \
    -m -s /bin/bash almagr
> passwd almagr
Changing password for user almagr
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully
```

uid and gid as appropriate for your system. The minimum disk space requirement for this account on Linux is ~450MBytes. The ACS sources are unpacked under the home directory of almagr. They are ~170Mb but they increase up to 450Mb during compilation. On Sun they could increase up to 1.150Mb. These values are reached when compiling the software with "make build" (see later in the manual), but can be considerably reduced compiling with "make build_clean" who does a clean before leaving every directory of the source code.

Note: on Redhat 7.2, the password length must be not longer than 8 characters. We discovered anyway that whenever the password is longer, to log into the system you must type up to 8 characters. If not the login is not allowed.

UPGRADE: you should have already defined this user in your previous installation. You can skip this step.

In what follows, we assume that you are using almagr to perform the installation.

Create the installation directory

The default installation directory is /alma/ACS-4.0. If you preserve the same directory for your installation you need a root intervention to create /alma and give `almamgr` write access. Note that for SUN this step is necessary.

4.3.2 Install the ACS Tools

Unpack the CD

A script will unpack all products provided as binary files, namely: some general purpose tools, (like `tat` for testing, `doc` and `doxygen` for man pages and documentation etc.), TAO, Java, Ant and JacORB, Python, OMNIORB distribution, Mico and Tomcat and the ACS sources. Supply to the script the directory where the files are available (`<cdfiles>`, typically `/mnt/cdrom`) and the directory name where the software will be installed. If the latter does not exist, it will be created by the script. Just make sure you have write access on it!

As `almamgr`:

- on Linux:

```
> <cdfiles>/INSTALL/0_InstallACS <cdfiles> <install_dir>
```

- on Sun

```
> <cdfiles>/INSTALL/0_InstallACS.Sun <cdfiles> <install_dir>
```

where `<install_dir>` on Sun shall be `/alma/ACS-3.1.`

4.3.3 Configure the `almamgr` account

The installation script will install the directory `.acs` under `~almamgr`. To get all the necessary environment variables for using the ACS software you are supposed to source the file `~almamgr/.acs/.bash_profile.acs`; just run the command:

```
. ~almamgr/.acs/.bash_profile.acs
```

You can also add this command in you `~almamgr/.bash_profile` in order to have the environment ready at every new login.

The above step 4.3.3, plus the configuration of an integration area (that will be performed later in this procedure, see INTROOT, section 7) are necessary for every new user that will work with the system.

5 Build the ACS libraries

In this step the actual ACS code is built and installed in the ACSROOT area.

The ACS tar files you have unpacked in the previous steps contain the complete ACS source tree to be built. It has been unpacked to the `~almamgr/ACS` directory.

This allows you to build the official ACS distribution without accessing the software archive.

If instead you want to build an updated version of ACS, for example because it contains fixes/extensions that are important for you, then you have to take a newer source tree from the archive.

The ACS distribution pages 2.5 contain a list of ACS software releases that can be used. They correspond to a TAG in the CVS server, indicated in what follows as `<ReleaseTag>`. Select the one you want (most typically the last one) and perform the following steps:

```
> rm -rf ~/ACS
> cvs export -r<ReleaseTag> ACS
```

and continue as described in the following paragraphs.

Important remark:

For a proper installation of the ACS software, the INTROOT variable shall **NOT** be defined. If you defined it, please add the line:

```
unset INTROOT
```

in your `.bash_profile.acs` file. Then log out and in again. After the ACS build is finished, you can define again your INTROOT.

By default ACS is built with full debugging information (`-G` compiler option) and optimization. If you want to compile ACS without debugging information and no optimization just set:

```
> export OPTIMIZE=0
```

at this point before starting the actual build. This will save a lot of disk space and would improve both build and run time performance on machines with little memory (less than 512Mb). Then, as almamgr execute the following steps:

```
> cd ~/ACS
```

```
> make build_clean
```

Important remark:

Please be certain you are using the correct version of gcc before executing the command above:

```
gcc -v
```

The output of this must be 3.3 for Linux and 3.2.1 on Sun. If not, please uncomment the line in `.bash_profile.acs` where `/usr/bin` is searched before the rest of `$PATH` and source it again.

With this command, in every module of the ACS sources you will also run “make clean” after the normal compilation. It could be useful to prevent the sources from expanding excessively.

(It is also possible to perform the compilation using the command:

```
> make build
```

In this case the “make clean” after “make” is not executed).

After the compilation is finished, you can have a look at the results in the file `~/ACS/build.log`.

It is recommended to add the following to the `PATH`, `LD_LIBRARY_PATH` and `IDL_PATH` environment variables:

```
PATH=../bin:${PATH}
```

```
LD_LIBRARY_PATH=../lib:${LD_LIBRARY_PATH}
```

```
IDL_PATH="-I../idl ${IDL_PATH}"
```

```
PYTHONPATH=../lib/python/site-packages:${PYTHONPATH}
```

```
export PATH LD_LIBRARY_PATH IDL_PATH PYTHONPATH
```

It is enough to uncomment these settings in the `$HOME/.acs/.bash_profile.acs` file to make everything work correctly.

It is suggested to run after the installation:

```
> acsConfigReport
```

This command will generate a detailed report of your ACS installation.

6 Test the software

6.1 Quick test

To test the installation, run the following commands:

```
> acsStart
```

Open a new xterm and run:

```
> acsStartContainer -cpp bilboContainer
```

This process is responsible for starting COBs (servants) on request from clients or at startup. A couple of COBs configured in the test environment will be started.

Open the following applications and play with them:

```
> objexp &
```

```
> acsStartJava alma.acsbeans.examples.PSPanel.PSPanel
```

This panel allows interacting with the PBEND_B_01 Power Supply defined by the test configuration database.

After the test, to shutdown everything, close the `objexp` and the `abeansStart` window. Then run:

```
> acsStop
```

6.2 Complete test

A complete test suite is included with ACS. To run this suite execute the following commands:

```
> cd ~/ACS
```

```
> make test
```

NOTE: It will take a couple of hours (or more depending on the CPU you are using) to complete all tests. Please be aware that the environment variable `DISPLAY` must be set correctly otherwise some test in the `acssim` module may fail.

7 Setup the INTRoot for development

In the previous steps, the ACS software has been built and installed in the \$ACSROOT directory tree.

During development, \$ACSROOT should not be touched and development software shall be installed in an Integration Area, i.e. an \$INTRoot. Every developer/group can have its own \$INTRoot, while ACSROOT is the sacred official distribution.

To create an \$INTRoot do the following:

```
> cd <parent directory for INTRoot, for example $HOME>
> getTemplate
```

In the new popup window named "ACS SOFTWARE - TEMPLATES"

- type or cut and paste from the listed set of options:
directoryStructure
and press <ENTER>
- type or cut and paste from the list of options
createINTRootArea
and press <ENTER>
- to the prompt "type the integration root directory or press <ENTER> to quit:", enter
introut (or the name you want to give it)
and press <ENTER> <ENTER> <ENTER> <ENTER>.

To configure the user environment to access the new \$INTRoot, edit the file \$HOME/.acs/.bash_profile.acs and uncomment the line:

```
INTRoot=$HOME/introut
```

Then login again.

For more details, see:

```
man Makefile
```

It is strongly suggested to periodically clean up the integration root and create a clean one. The integration root should at least be wiped and re-created whenever new software is installed in \$ACSROOT.

8 Configure a user account for ACS

Once you have installed ACS, you can and should configure other user accounts for development. It is suggested NOT to do ACS development directly from the `almamgr` account but from user accounts.

8.1 Create the account

If not already existing, create the account for your user. It should belong to the same group of `almamgr` and shall use the bash shell.

The following commands show the typical way to create the account, assuming that `almamgr` belongs to the `alma` group, with group ID 335 (for user and group IDs get in touch with your system administrators):

```
> useradd -g 335 -u 3070 -d /home/<myuser> \
    -m -s /bin/bash <myuser>

> passwd <myuser>
Changing password for user <myuser>
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully
```

8.2 Configure the environment

The build of the ACS libraries should have installed the directory `.acs` into `$ACSRROOT/config`. To have properly set the environment, every user needs to source the file `$ACSRROOT/config/.acs/.bash_profile.acs`. Be aware that before sourcing the environment the variable `$ACSRROOT` is not yet known, so the real complete path must be provided.

8.3 Configure the INTROOT for the user

It is suggested that each user work with a private integration area.

Follow the steps described in section 7 for the creation and configuration of an integration area.

8.4 cvs configuration

In order to be able to use cvs, users must configure a cvs account.

- Simply request to alma-sw-semgr@eso.org a cvs account.
- Set the following environment variable in your `.bash_profile.acs` file:
 - `CVSROOT= :pserver: <user_name>@cvssrv:/project2/CVS`

Substitute <user_name> with the login name of the user you are using and export it!

Appendix I. Environment Variables

Please refer to 2.5 for a detailed list and explanation of the environment variables used by ACS. You can produce a full report for your installation by running the `acsConfigReport` utility included with ACS.

Appendix II. Verification logs

To verify your ACS installation, please run the full test battery as described in section 6.2. If your installation is OK, all the tests should pass.