Athena 6.1R Release:

Changes that Affect General Users
And Program Developers

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Introduction

In February of 1989, Project Athena installed the **6.1** release of its workstation software for testing in the Athena environment. This new release contains fixes to bugs found in the **6.0R** release, as well as several new features of general interest to users. Project Athena will install the **6.1R** release on all public workstations during the latter half of March. This document describes the **6.1R** changes that may be of general interest to Athena's user/programmer community.

Section 1 describes changes of interest to general users:

- A new set of file-deletion commands allow you to remove files in such a way that you can recover them later if you change your mind about getting rid of them (Section 1.1).
- The On-Line Consulting (**olc**) system software has been revised to allow consultants to handle inquiries more efficiently. The olc Stock Answers browser has also been moved from a locker into the main release to allow easier access for general users (Section 1.2).
- The TeX and LaTeX family of text-processing tools are now available in the main release, providing an alternative to Scribe (Section 1.3).
- Several Scribe capabilities have been updated, and access to different versions of Scribe has been changed (Section 1.4).
- MATLAB mathematical modelling software is now available in a public locker (Section 1.5).
- Version 2 of the 2020 spreadsheet software is now available in a public locker (Section 1.6).
- The **discuss** conferencing system software is now available in the main release (Section 1.7).

Section 2 describes changes of interest to developers and system hackers:

- A significantly improved version of FORTRAN, *hf77*, is now available on the IBM RT/PC (Section 2.1).
- The available c compilers have been updated (Section 2.2).
- The Scheme language has been removed from the main release (Section 2.3).
- The latest release of the Version 11 X Window System development tools (Release 3) is now available, and access to all versions of the X Window System tools has been changed (Section 2.4).
- The SMS database-management programs have been significantly revised, and are now known collectively as the MOIRA system (Section 2.5).
- Some files of interest to owners of Private Workstations have been changed (Section 2.6).

1. Changes of Interest to General Users

1.1 New Commands Allow Recovery of Deleted Files

As everyone knows, "**rm** is forever": when you use **rm** to remove a file, the file is erased from the system immediately and permanently. This behavior is usually what you want, but once in a while you may accidently remove a file you wanted to keep -- the manuscript for a paper that's due the next morning, for example, or part of your thesis! Unless you have already backed up the file yourself, there is no way to recover the erased file.

To help you avoid this problem, Project Athena has created a new set of file-deletion commands that let you remove a file in a way that permits you to recover the file (within a certain amount of time) before it is permanently eliminated from the system.

The new commands are summarized in the following table. (For more information about each command, including command-line switches, see the online man pages; for example, **man delete**.)

Table 1. New File-Deletion Commands.

Command	Function
delete	Mark one or more files for permanent removal, making them invisible to the user but without actually erasing them from the disk (use **expunge** or **purge** to permanently erase a file marked for deletion)
undelete	Restore files marked for removal by **delete** (if not already expunged)
lsdel	List files marked for removal but not yet expunged
expunge	Permanently remove specific files marked for removal
purge	Permanently remove every file marked for removal in user's home directory and all subdirectories

For example, suppose you have a directory containing the following files:

```
Mail            thesis1.mss    thesis1.mss~
```

Because you are near your quota, you decide to remove the old version of your emacs file (the one ending with ~) to create some room. However, you accidently leave off the ~ from your command and thereby remove the newer version of the file from the directory:

```
athena% delete thesis1.mss
athena% ls
Mail            thesis1.mss~
```

If you had used **rm** to do this, you would not be able to recover the lost file, and would instead have to salvage what you could from the older file. However, because you used

delete instead of **rm**, you can recover the deleted file by using **undelete**:

```
athena% lsdel
thesis1.mss
athena% undelete thesis.mss
athena% ls
Mail        thesis1.mss       thesis.mss~
```

You can now remove the appropriate file, and even permanently eliminate it once you verify that you have marked the correct file for removal:

```
athena% delete thesis.mss~
athena% ls
Mail        thesis1.mss
athena% lsdel
thesis1.mss~
athena% expunge thesis.mss~
athena% lsdel
athena% ls
Mail        thesis1.mss
```

Note that the **undelete** command will only retrieve files removed with the **delete** command -- it *cannot* retrieve files eliminated by **rm**. Thus, if you want to be able to recover files, you should always use **delete** to remove them. In addition, you cannot retrieve a deleted file that has been removed by **purge** or **expunge**.

You can set up your system so that **delete** is automatically used whenever you want to remove files, rather than **rm** or **rmdir**. Just put the following lines in your **.cshrc.mine** file:

```
alias rm delete -F
alias rmdir delete -D
```

Then when you type rm filename, delete will actually be used.

Because of the way **delete** works, deleting files does not actually lower the amount of quota you are using (each file is simply renamed to a form that is invisible to your normal work, specifically from *filename* to *.#filename*). To lower your used quota, you must fully remove the deleted files from your system by using the **purge** or **expunge** commands.

1.2 Revised OLC Capability

A new version of the **olc** program allows consultants to handle multiple conversations at the same time. This will help consultants help more users, as they can now turn to new calls during breaks in existing calls.

In addition, the **olc** menu offers new options. Try **olc** to see these options. Remember, to get an on-line consultant in the first place, you still simply enter:

```
athena% olc
```

Note especially that the olc Stock Answer browser is now accessible through the **olc** main menu -- just choose **stock** at the "olc>" prompt.

The stock answers are now also available in the general release outside of **olc**. Simply enter the following command at the system prompt to bring up the stock answer browser:

```
athena% olc_answers
```

You do not have to attach a locker to use this command (this command was formerly only available in the consult locker).

1.3 TeX and LaTeX Provide Alternative to Scribe

The TeX and LaTeX text-formatting tools are now available as part of the Athena main release. These tools, formerly only available in the SIPB locker, provide an alternative to Scribe for creating and formatting text documents.

TeX itself is a text-formatting program that uses fairly complicated commands; however, LaTeX is a set of macros that make TeX easier to use. With LaTeX, you include simple commands in your document to produce complex formatting results (the LaTeX commands are converted into the more complex TeX expressions when you process the file with the **latex** command). LaTeX expressions are about as complicated as Scribe expressions.

Although there is currently no obvious Thesis format in TeX, this software offers several improvements over Scribe, including better equation-handling and a good document previewer.

The commands associated with this family of formatting tools are summarized in the table below. As with Scribe, you are expected to create a basic file that includes both your text and LaTeX commands *before* using the commands that create the actual formatted version of your text.

Table 2. LaTeX Commands.

Command	Function
latex	Process a file containing LaTeX commands (the file should have the suffix *.tex*), creating a formatted file (which will have the suffix *.dvi*)
tex	Process a file containing basic TeX commands (the file should have the suffix *.tex*), creating a formatted file (which will have the suffix *.dvi*); you should usually use **latex** rather than **tex**
xdvi *filename*.**dvi**	Create a separate window with options for previewing a formatted *.dvi* file
dvi2ps *filename*.**dvi**	Convert a formatted *.dvi* file to PostScript format (the resulting file will have the suffix *.PS*)

For more information about LaTeX, see the *Inessential Guide to LaTeX* available from SIPB. The Athena documentation group also plans to have an introductory guide to LaTeX ready later this Spring.

1.4 Scribe Revisions

Scribe has had new capabilities added and the location of various versions of Scribe software has been revised.

Some Scribe changes of note include the following:

- Scribe Thesis now allows users to include a copyright clause that gives MIT permission to copy and distribute the thesis (MIT requires that such a permission statement be included in any thesis copyrighted by the author). You include the clause by passing the argument 'GiveMITPermission' to the @ThesisFront command.

  This Scribe change was made possible through a change **mitfor.lib**, the standard frontpage library for Scribe Thesis. The previous version of **mitfor.lib** made no provision for the permission statement, and instead required users to hack a scribe database file to achieve the desired effect.

- Because most of the Athena-provided printers in public clusters are now PostScript printers, the default output device for Scribe is now *PostScript* (it used to be *LPTLN*). To use a non-PostScript output device, you should put a command of the form @Device(*device-type*) at the beginning of your .mss file.

- Support for landscape mode for PostScript printers has been added to the Scribe database. To use landscape mode, include a command of the form @Device(PostScriptLandscape) at the beginning of your .mss file.

- Support for grey color in Scribe documents has been added.

The latter new features are made possible by Scribe Version 6. This new version probably also solves other previous Scribe difficulties.

Scribe version 6.0 has been moved from the scribe6 locker into the main release as **/usr/athena/scribe6**. The existing scribe is likewise moved to **/usr/athena/scribe5**. Note that the command **/usr/athena/scribe** is still linked to **/usr/athena/scribe5**.

1.5 MATLAB Available

MATLAB, a mathematical modelling package from MathWorks, Inc., is now available on a trial basis in the courseware locker. MatLab (*Mat*rix *Lab*oratory) is an interactive program that can help with scientific and engineering numerical applications.

To run MATLAB, just attach the courseware locker and run the program:

```
athena% attach courseware
athena% /mit/courseware/matlab
```

The current version of MATLAB runs only in an xterm window on Vax machines (i.e., *not* on IBM RT/PC), but MathWorks will be developing a version soon that will be able to run on both Athena platforms.

1.6 New Version of 2020 Available

Version 2 of the 2020 spreadsheet software is now available in a locker. To use Version 2, attach the locker and run the software:

```
athena% attach locker?
athena% 2020
```

Version 2 includes some improvements over Version 1. (what are they?) 2020 only on Vax machines (i.e., *not* on IBM RT/PC).

1.7 Revised discuss Available in Main Release

The **discuss** conferencing system is now available in the main release. To enter the **discuss** system, simply enter the following:

```
athena% discuss
```

A copy of **discuss** is still available in the **sipb** locker, but you need not attach that locker to run the main release version.

2. Changes of Interest to Programmers

2.1 New Robust Fortran Compiler on the RT/PC

hf77, a new FORTRAN compiler developed by IBM, is now available on the IBM RT/PC. *hf77* is significantly more robust than the FORTRAN compilers previously available for the RT, and also provides more explicit error messages.

The **f77** command is now symbolically linked to use *hf77*, which becomes the only FORTRAN compiler Athena officially supports on IBM machines. In addition, a new Fortran library has been installed.

The old version of *f77* is still available, as **/usr/bin/f77.old**. However, this old version is no longer supported by Athena.

The new *hf77* compiler has one known bug that may affect previously-developed applications: the compiler dumps core if you use variable names or subroutine names that are more than 11 characters long. (This comes out as "Termination Code 139" in the compilation stage.) FORTRAN convention has always required that variable names be shorter than 12 characters, but the FORTRAN compiler previously available on the RT did not enforce this requirement. With the new compiler, you must use variable names shorter than 12 characters long.

2.2 c Programmer Updates

The c compilers available in the Athena environment have been updated, and a workaround for a Berkeley 4.3 Unix error is now available. Both are explained below.

A new version of the High C compiler has been installed as the executable **/bin/hc2**. The advantage of this new compiler (the offically supported compiler for IBM ACIS) is that it compiles all of X -- if you are building the X Toolkit, the new compiler will definitely work, whereas the older compilers may not. The compiler changes are associated with recent IBM-provided kernel changes (including a new floating point scheme) for the RT/PC.

Note that the standard call **/bin/cc** will still point to **/bin/hc**, even though the latter has been de-supported, and the new compiler (**/bin/hc2**) will *not* be used to build any component on this release. In addition, a symbolic link on VAX systems now links **/bin/pcc** to **/bin/cc**, for compatibility with the RT/PC environment.

Note to programmers: An error in Berkeley 4.3 Unix as originally implemented on both RT and VAX systems allowed a common C programming error (reading through a NULL pointer) to go undetected. Although the RT environment no longer allows this error to go undetected, the VAX environment still allows code with this error to fully compile.

Although software containing this error may still work on Athena (only on VAXes), such code will *not* work when ported to any other environment. Therefore, if you would like to be able to port your code to other systems, you must make sure the code does not contain the

NULL-pointer error. To detect this error, compile the code using the **-Z** option to the **ld** command. If the code contains the NULL-pointer error, this switch to catch this error and prevent full compilation.

2.3 Scheme Removed From Release

To avoid having to maintain multiple versions of the Scheme programming language in the Athena environment, Project Athena has decided to remove the executables for Scheme from the main release. These executables are still available in the **scheme** locker, but Project Athena no longer supports Scheme as a standard release feature.

2.4 New Homes for X Toolkit Files

In conjunction with the appearance of a new version of the X Window System, the organization of the X Window System development environments has been completely revised. In particular, the development environment, libraries, and include files for the X Window System have been relocated to predictably named lockers. Specifically:

- the X11R2 include files and libraries have been removed from the main release and placed in a locker named **X11R2**.
- the X11R3 include files and libraries now appear for the first time, in a locker named **X11R3**.
- The directory /usr/new has finally been purged of all X Window System clients. This may affect users whose .login or .cshrc files call **xclock**, **xinit**, etc., from /usr/new rather than /usr/athena.

See System Development's document on Release 6.1R for more specific information on the new file reorganization.

The reorganization of the X development directories in some ways is meant to force developers to be explicit about their expectations. In particular, *developers should convert all applications using the X toolkit to use the X11R3 development sources as soon as possible*. With Release 3 of X11, the Toolkit intrinsics become stable with respect to the formal processes of the X consortium, so code is much more likely to be useable under future releases. (A document on converting widgets to X11R3 is available from Athena Systems Development.)

2.5 Revised SMS is MOIRA

The SMS programs have been significantly updated and renamed MOIRA, after some greek goddess. See the Development Guide for more info.

2.6 Private Workstation Owners: Take Note

Owners of Private Workstations should note that the automatic update procedure for workstations has been revised in ways that may affect you.

For example, **/etc/rc** has been changed so that now, if the variable PUBLIC is set to "true" in the file **/etc/rc.conf**, the executable **/etc/rc** will delete all of the files in the /tmp partition.

Also, for Release 6.1R, the default file modes of the directores /usr/tmp and /tmp have been reset to 1777.

For more information on these and other changes, see the document (?).

3. For More Information About 6.1R

If you are a systems hacker or someone else who would like to know the technical details of the changes made in Release **6.1R**, you can look at the **6.1R** release document written by Athena's System Development Group. To do so, use the **attach** command to attach the *release* locker, move to the directory */mit/release/6.1*, and use the *viewdoc* program to examine the contents of the file *sysnotes.PS*:

```
athena% attach release
athena% cd /mit/release/6.1
athena% viewdoc sysnotes.PS &
```

This document contains an exhaustive list of the technical changes made to the Athena environment as part of Release **6.1R**.

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