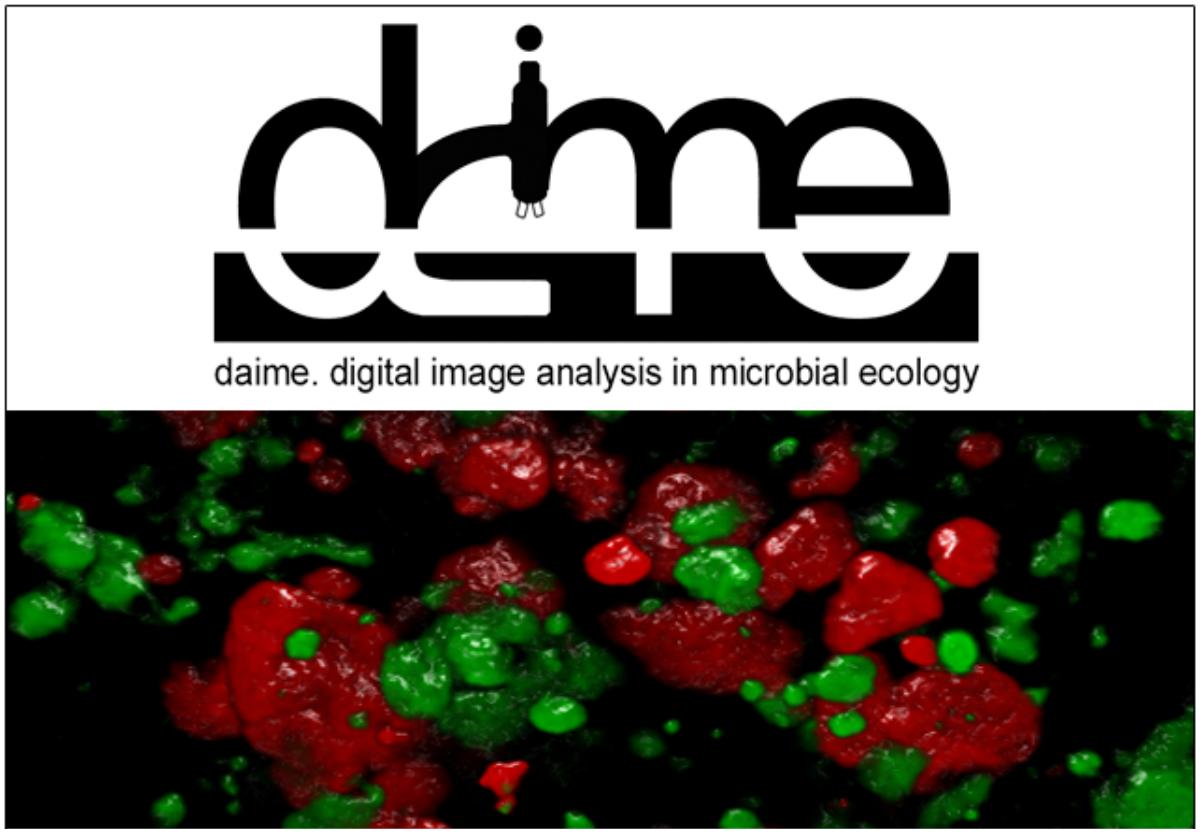

Installation Manual

for Version 1.3.1

Chapter 1

System Requirements

A computer system should meet these requirements for running DAIME:

- Personal computer (PC) with INTEL Pentium or equivalent processor. Recommended: Fast dual core or quad core processor (although DAIME uses only one processor core, a system with >1 processor cores is more responsive during time-consuming image analysis calculations).
- Operating system: A recent Linux distribution or MICROSOFT Windows 2000 / XP / Vista/7. At the moment there is no MacOS version of DAIME. However, Mac users may consider running DAIME under MS Windows (on INTEL-based Macs) or under a virtualized Windows or Linux installation.
- At least 512 MB of memory (RAM); this is the absolute minimum! Analyses of large image series and interactive 3D visualization require at least 1 GB of RAM. **Recommended:** 2-4 GB of RAM.
- A graphics card that supports hardware-accelerated 2D and 3D graphics with OpenGL. OpenGL 1.2 is needed for starting DAIME and performing non-graphics intensive image analysis tasks, but the more advanced 3D visualization features will only be available with OpenGL 2.0 (or a newer 2.x version). OpenGL 3.x is not supported, but most OpenGL 3.x-drivers automatically switch to 2.x compatibility mode. **Recommended:** A recent graphics card with at least 256 MB of video RAM (512 MB is definitely better for 3D visualization of large z-stacks). DAIME has been tested mainly with NVIDIA graphics cards and original NVIDIA graphics drivers.
- A large screen. The pixel resolution should be at least 1024 x 768 pixels. **Recommended:** 22" (or larger) TFT color display.

 DAIME uses the OpenGL graphics library for rendering 2D and 3D graphics. Therefore, a current OpenGL driver is required. This driver is specific for the graphics card and operating system. It must be installed before DAIME can be used. Most graphics cards are delivered with drivers for MS Windows. The installation of Linux 3D (OpenGL) graphics drivers can be quite complex, and is not covered by this manual. If needed, ask an experienced Linux system administrator for assistance. Instructions can also be found online (e. g., look at the website of your Linux distribution). Fortunately, most newer Linux distributions install and enable the correct OpenGL driver automatically if a supported graphics card was found during the installation of the Linux operating system.

Chapter 2

Installation of DAIME on Microsoft Windows operating systems

The installation of DAIME for Windows 2000 / XP / Vista is straightforward:

1. If an older version of DAIME is already installed on your computer: Use the uninstall feature to automatically remove the older version. In order to remove DAIME 1.1, which did not come with an automatic uninstaller, simply delete the disk folder that contains DAIME 1.1.
2. Download the current version of DAIME for Windows from **www.microbial-ecology.net/daime**. The name of the file is **setup_daime_1_3_1.exe** for DAIME version 1.3.1. Copy this file to the local hard disk of your computer.
3. Double-click at the downloaded file, then follow the on-screen instructions to install DAIME.
4. **Note:** A User Manual is already included and will automatically be installed. It needs not be downloaded separately.


In order to uninstall DAIME 1.3.1 for Windows, choose the **Uninstall** option in the DAIME Start Menu folder and follow the on-screen instructions.

Chapter 3

Installation of DAIME on Linux operating systems

There are two ways to install DAIME on a Linux operating system:

- Try running the pre-compiled DAIME for Linux binary on your system.
- Compile DAIME from the C++ source code.

3.1 The pre-compiled DAIME binary

We offer a pre-compiled binary of DAIME for Linux. The main purpose of doing this is to help users, who wish to use DAIME under a free operating system, but have no or little experience with compiling a program from its source code.

 We do **absolutely not guarantee** that the pre-compiled DAIME binary will run on every Linux system. In fact, it may **not** run on many Linux distributions. There are many different flavours of Linux. It would be practically impossible for us to offer a pre-compiled binary of DAIME for every Linux distribution out there, so we have decided to offer **one** binary that **may** (or may not!) run on a user's Linux installation. It can happen that some functions of DAIME work, but others do not, if the pre-compiled binary is used. In other cases, the pre-compiled DAIME will not even start at all, and finally there are those situations (yes!) where it works just perfectly. If it does not work as expected, do not be too disappointed. There still is the option of compiling DAIME from the source code (see below).

 The pre-compiled DAIME binary was made on an Ubuntu Linux 8.04 LTS ("Hardy Heron") system. Thus, chances are highest that it works on Ubuntu 8.04 systems, other Ubuntu versions, and other Linux distributions that are also based on Debian.

 3D Visualization may not work correctly (or optimally) if the pre-compiled DAIME binary is used. If visualization is important for you, definitely consider compiling DAIME for Linux from the source code.

 Please understand that we cannot provide any support to make the pre-compiled DAIME binary run on a particular Linux system. This binary either works on your system, or it does not. If it does not work, then do not email us, do not blame us, do not ... just download the DAIME source code and compile it yourself. If this is done correctly, chances are very high that everything will work fine.

Installation of the pre-compiled DAIME binary:

1. Download the file **daime_1_3_1_binary.tar.gz** and save it on your hard disk, for example in your home directory.

2. Open a command shell (terminal), and switch to the folder that contains the downloaded file. Now enter the command:
tar zxf daime_1_3_1_binary.tar.gz

3. This will unpack the DAIME binary as well as some additional files, which are libraries needed by DAIME. All unpacked files are stored in a newly created sub-folder called **daime_1_3_1_binary**.

4. Switch to the folder daime_1_3_1_binary, then enter the following commands:
chmod a+x daime
chmod a+x daime.sh
(if your system administration policy requires other permission settings, modify these commands accordingly)

5. Now enter the following command to start DAIME (i. e., give it a test!):
./daime.sh

6. Hold your breath, and watch out for the DAIME startup screen or any error messages. If the startup screen and the main window of DAIME appear, chances are high that most features of DAIME will work out of the box (perhaps except 3D visualization). If you get an error message reading "Segmentation fault", this means that the DAIME binary will not work on your system (sorry!). If it says that some libraries are missing, try to figure out if these libraries can be installed on your Linux system (e. g., use the package manager of your Linux distribution). When the missing libraries have been installed, the DAIME binary may run without (major) problems.

7. If the binary works on your system: From now on, DAIME can be started from a command shell by going into the folder, which contains the binary, and entering the ./daime.sh comand. Alternatively, you may create a launcher on your desktop that will start DAIME when clicked at.

3.2 Compilation from the DAIME source code

If the pre-compiled DAIME binary does not run as expected on your Linux system, you must compile the program from its source code. If you have never compiled a program on Linux, you may better stop at this point and ask an experienced colleague or system administrator for help.

3.2.1 Requirements

We recommend that you use the package manager of your Linux distribution to install any missing but required components. Do not forget that the **header files** of the various libraries are needed, too! Many package managers call those files the "development" packages of a libary. Make sure to install these packages along with the respective library itself.

1. A recent version of he GNU C++ compiler (gcc), and the complete set of tools needed to compile and link a C++ project (make, ld, the standard C and C++ libraries, etc.). All this should be part of your Linux distribution, but sometimes these components are not installed by default.

2. A correctly installed X Server. This includes the X libraries and also their header files, which are needed for developing applications that use the X Window system. On most Linux systems an X Server is already running and only the header files of the libraries must be installed before compiling DAIME.

3. An OpenGL-compliant graphics library (libGL, libGLU, libGLcore). Direct (hardware-accelerated) rendering should be enabled (otherwise, graphics output in DAIME would be quite slow). To check this, open a command shell and enter the command **glxinfo**. One line at the top of the output should read "direct rendering: Yes". If it reads "direct rendering: No", hardware-accelerated graphics is not enabled on your system. This applies also if you get an error message after entering the glxinfo command. Enabling hardware-accelerated graphics on a Linux system can be tricky, but modern distributions usually should do this automatically during Linux installation.

4. The Qt library, version 4.3.4. Newer 4.x versions of Qt are likely to work with DAIME, too, but have not been tested. If your Linux distribution does not contain any Qt 4 version, download Qt 4 from **http://qt.nokia.com**. Under Linux, the installation of Qt requires compilation of the Qt source code.

Follow the instructions given by the manufacturers of Qt. Important: The installed Qt library **must support OpenGL**. Setting up Qt this way is only possible if the core OpenGL libraries (plus their header files!) are already installed (see point 3 above). If an already installed Qt library has not been configured for OpenGL, it must be re-configured and re-compiled. Given the complexity of Qt this can be a little complicated, but it works in the hands of an experienced user or system administrator.

5. The TIFF library (libtiff).

6. You may need to install additional libraries (this depends on your Linux distribution). Here we provide a dependency list of DAIME 1.3.1 (the output of the **ldd** command). This list tells a system administrator what must be installed.

```
linux-gate.so.1 => (0xb7f53000)
libtiff.so.4 => /usr/lib/libtiff.so.4
libresolv.so.2 => /lib/tls/i686/cmov/libresolv.so.2
libQtOpenGL.so.4 => /usr/local/Trolltech/Qt-4.3.4/lib/libQtOpenGL.so.4
libQtGui.so.4 => /usr/local/Trolltech/Qt-4.3.4/lib/libQtGui.so.4
libpng12.so.0 => /usr/lib/libpng12.so.0
libSM.so.6 => /usr/lib/libSM.so.6
libICE.so.6 => /usr/lib/libICE.so.6
libXi.so.6 => /usr/lib/libXi.so.6
libXrender.so.1 => /usr/lib/libXrender.so.1
libXrandr.so.2 => /usr/lib/libXrandr.so.2
libXfixes.so.3 => /usr/lib/libXfixes.so.3
libXcursor.so.1 => /usr/lib/libXcursor.so.1
libXinerama.so.1 => /usr/lib/libXinerama.so.1
libfreetype.so.6 => /usr/lib/libfreetype.so.6
libfontconfig.so.1 => /usr/lib/libfontconfig.so.1
libXext.so.6 => /usr/lib/libXext.so.6
libX11.so.6 => /usr/lib/libX11.so.6
libQtCore.so.4 => /usr/local/Trolltech/Qt-4.3.4/lib/libQtCore.so.4
libz.so.1 => /usr/lib/libz.so.1
libgthread-2.0.so.0 => /usr/lib/libgthread-2.0.so.0
librt.so.1 => /lib/tls/i686/cmov/librt.so.1
libglib-2.0.so.0 => /usr/lib/libglib-2.0.so.0
libdl.so.2 => /lib/tls/i686/cmov/libdl.so.2
libGLU.so.1 => /usr/lib/libGLU.so.1
libGL.so.1 => /usr/lib/libGL.so.1
libpthread.so.0 => /lib/tls/i686/cmov/libpthread.so.0
libstdc++.so.6 => /usr/lib/libstdc++.so.6
libm.so.6 => /lib/tls/i686/cmov/libm.so.6
libgcc_s.so.1 => /lib/libgcc_s.so.1
libc.so.6 => /lib/tls/i686/cmov/libc.so.6
libjpeg.so.62 => /usr/lib/libjpeg.so.62
libexpat.so.1 => /usr/lib/libexpat.so.1
libXau.so.6 => /usr/lib/libXau.so.6
libxcb-xlib.so.0 => /usr/lib/libxcb-xlib.so.0
libxcb.so.1 => /usr/lib/libxcb.so.1
/lib/ld-linux.so.2 (0xb7f54000)
libpcre.so.3 => /usr/lib/libpcre.so.3
libGLcore.so.1 => /usr/lib/libGLcore.so.1
libXdmcp.so.6 => /usr/lib/libXdmcp.so.6
```

These components should be installed at standard locations in the Linux file system (/usr/lib, /usr/bin, etc.). They must be in the system search paths for executables, shared libraries, and C/C++ headers. Usually, these requirements are met if the package manager of the your Linux distribution is used to install the various components.

Please note: DAIME needs a running X server, but does not depend on any particular window manager or desktop environment. It works with KDE or with Gnome or other desktops, given that the libraries listed above are installed on the system.

 The only exception is the Compiz window manager. Compiz does not work well with many programs that use hardware-accelerated graphics, and DAIME belongs to this group. We recommend to disable Compiz when DAIME is used.

3.2.2 Compilation

1. Save the downloaded DAIME source code archive (**daime_1_3_1.tar.gz**) into any folder on your local hard disk.
2. Open a command shell and switch to the folder that contains the source code archive, then enter the command:
   tar zxf daime_1_3_1.tar.gz
3. Switch to the automatically created sub-folder **daime_1_3_1**.
4. To create the makefiles, enter the command:
   qmake daime.pro
5. To compile the program, enter the command:
   make
6. If compilation finishes without error messages, you can copy the file **daime** (this is the binary) to /usr/local/bin or to any other convenient place (you probably must log in as root in order to copy the file to /usr/local/bin). The executable can also be kept at any other place, for example in your /home folder or in a sub-folder of /home.
7. You may wish to create a launcher for the DAIME binary on the desktop.
8. The folder with the source code can be deleted once the binary has been copied to a different place.
9. Now DAIME can be started and used as described in the User Manual. If the text in dialog windows is too large (the labels are only partially visible), use the **qtconfig** program (it comes with the Qt library) to set a smaller font for Qt applications. Then restart DAIME.

 If the makefile generation (step 5) or the compilation (step 6) fail with error messages, this usually means (a) that your system does not meet all the requirements listed above; or (b) that the Qt-specific tools (such as the qmake program) are not found in the system's search path.

 If compilation fails with error messages about functions starting with the letters "gl", such as "glBlendEquation(...)", open the file **daimeglobal.h** with any text editor and change the line reading "#define DAIME_MESA" to "// #define DAIME_MESA". Save the file and start the compilation again. If it works now, DAIME will most likely be fully functional. If it still fails, open **daimeglobal.h** again and undo the previous change. Then change the line "#define DAIME_GL_SHADERS" to "// #define DAIME_GL_SHADERS". Save the file and try to compile again. If it works now: DAIME will run, but the 3D volume rendering engine with pixel shaders will not be available, because the Linux distribution is quite old and/or does not support compiling graphics programs that use OpenGL 2.0 (or newer).

 DAIME has been developed on a Linux system. If compiling does not at all work on your Linux installation, please check all the requirements listed above.