Dfterm2 0.15

Contents

Chapter 1

Introduction

Dfterm2 is a program that manages Dwarf Fortress games and allows them to be accessed remotely using Telnet and ANSI/VT102 compliant terminals, or using a browser with a flash plugin.

It has several features designed to make building public Dwarf Fortress servers feasible, such as user registration system and a chat.

It works on both Windows and Linux platforms, albeit the way the game is handled is a little different. On Windows systems, dfterm2 reads screen data from Dwarf Fortress' memory. On Linux, Dwarf Fortress must be set to use terminal text mode (i.e. [PRINT_MODE:TEXT]), and dfterm2's terminal emulator parses this output. Linux version of dfterm2 works also on other programs that use a terminal for their output.

Dfterm2 is designed to be easily deployed and configured. There are no configuration files to modify. All settings are set by logging in to it and using the text mode UI. The only exception is setting up an administrator account with which to configure it, but usually the Windows installer can handle even that.

Dfterm2 is fully usable, but there are missing features that need to be implemented before a stable version can be released. Dfterm2, as of writing of this, is under constant development and it may happen that this manual becomes out of date with the current features.

Chapter 2

Supported DF versions

Currently supported Dwarf Fortress versions on Windows are:

- 0.31.25 (SDL)
- 0.31.19 (SDL)
- 0.31.18 (SDL)
- 0.31.17 (SDL)
- 0.31.16 (SDL)
- 0.31.14 (SDL)
- 0.31.13 (SDL)
- 0.31.12 (SDL)
- 0.31.11 (SDL)
- 0.31.10 (SDL)
- 0.31.09 (SDL)
- 0.31.08 (SDL)
- 0.31.06 (SDL)
- 0.31.03
- 0.31.02
- 0.31.01
- 0.28.181.40d19.2
- 0.28.181.40d19
- 0.28.181.40d18

Usually only the most recent Dwarf Fortress versions are tested. It is possible there are changes in dfterm2 that partially break compatibility in older versions. The versions listed are Dwarf Fortress versions that each have dedicated code in dfterm2 to handle them.

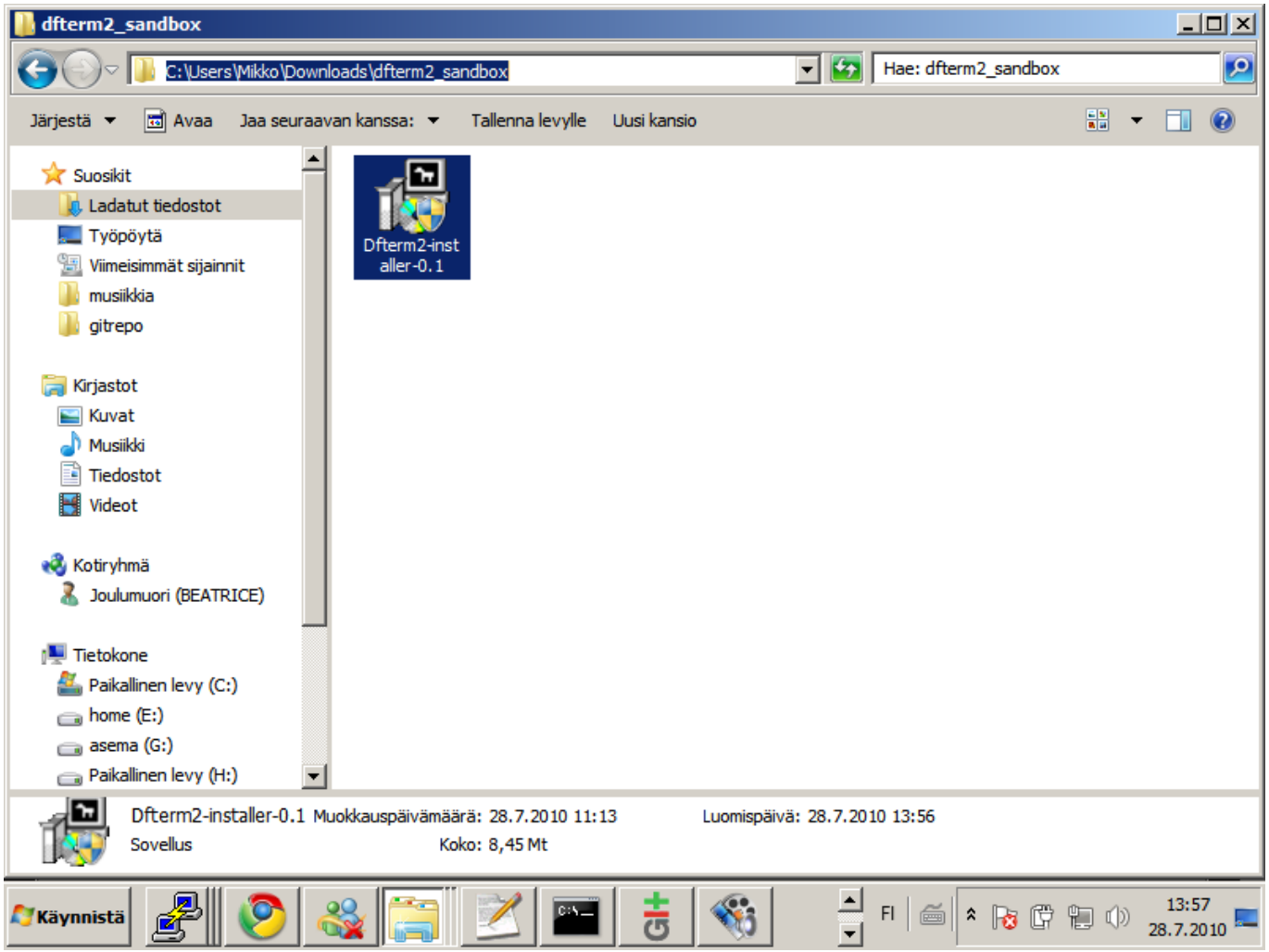
Linux version parses Dwarf Fortress' text terminal output so it supports any Dwarf Fortress version that supports [PRINT_MODE:TEXT]

Chapter 3

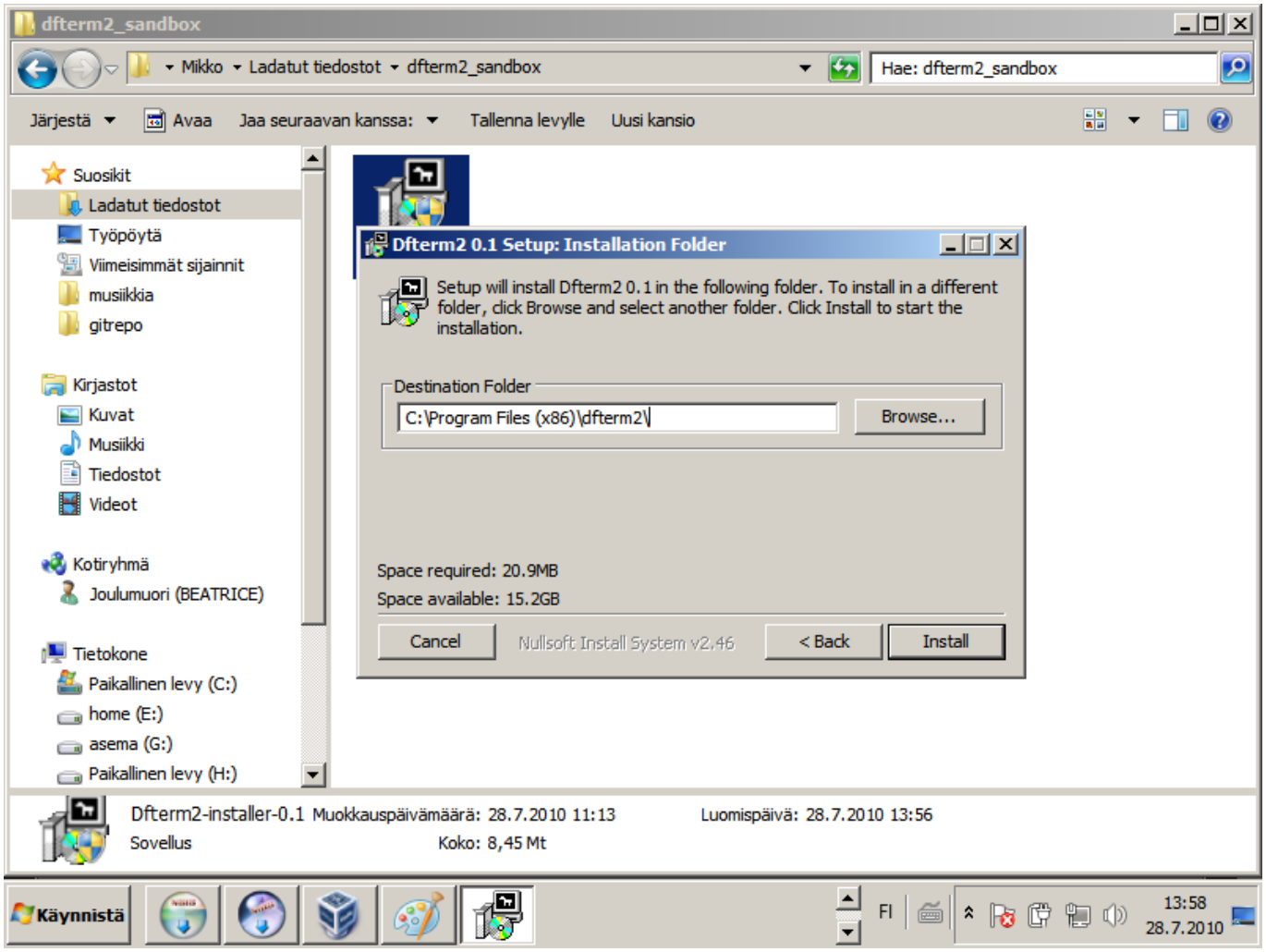
Installing on Windows

Dfterm2 is distributed using self-extracting installer packages. Using these should be straightforward. The latest file can be found from bay12 forums at `http://www.bay12forums.com/smf/index.php?topic=50643.0`.

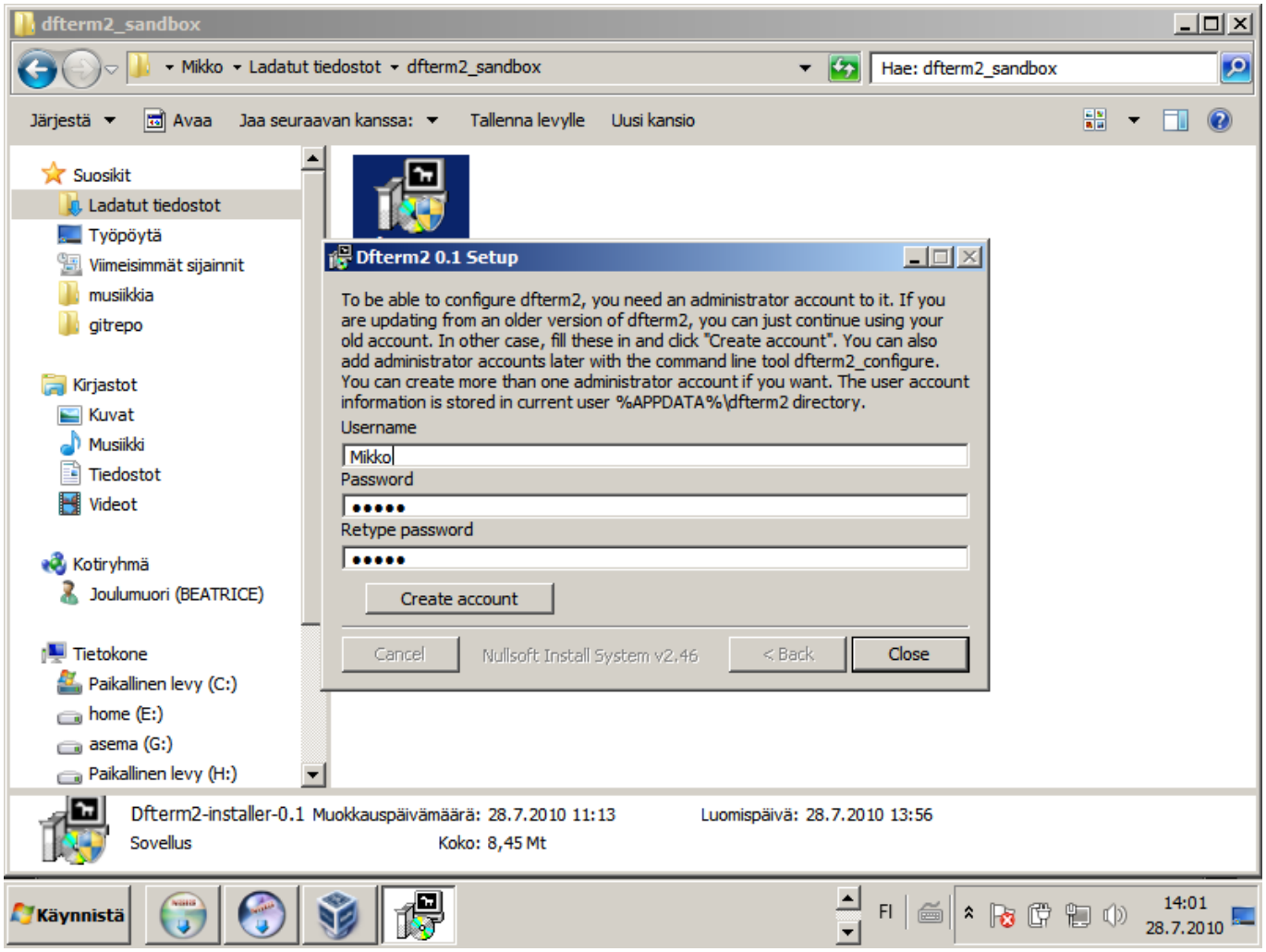
These are step-by-step instructions with screenshots to guide you to install dfterm2. The images are from Microsoft Windows 7, 64-bit version, Finnish localized on author's computer but the instructions should apply to other versions of Windows too.



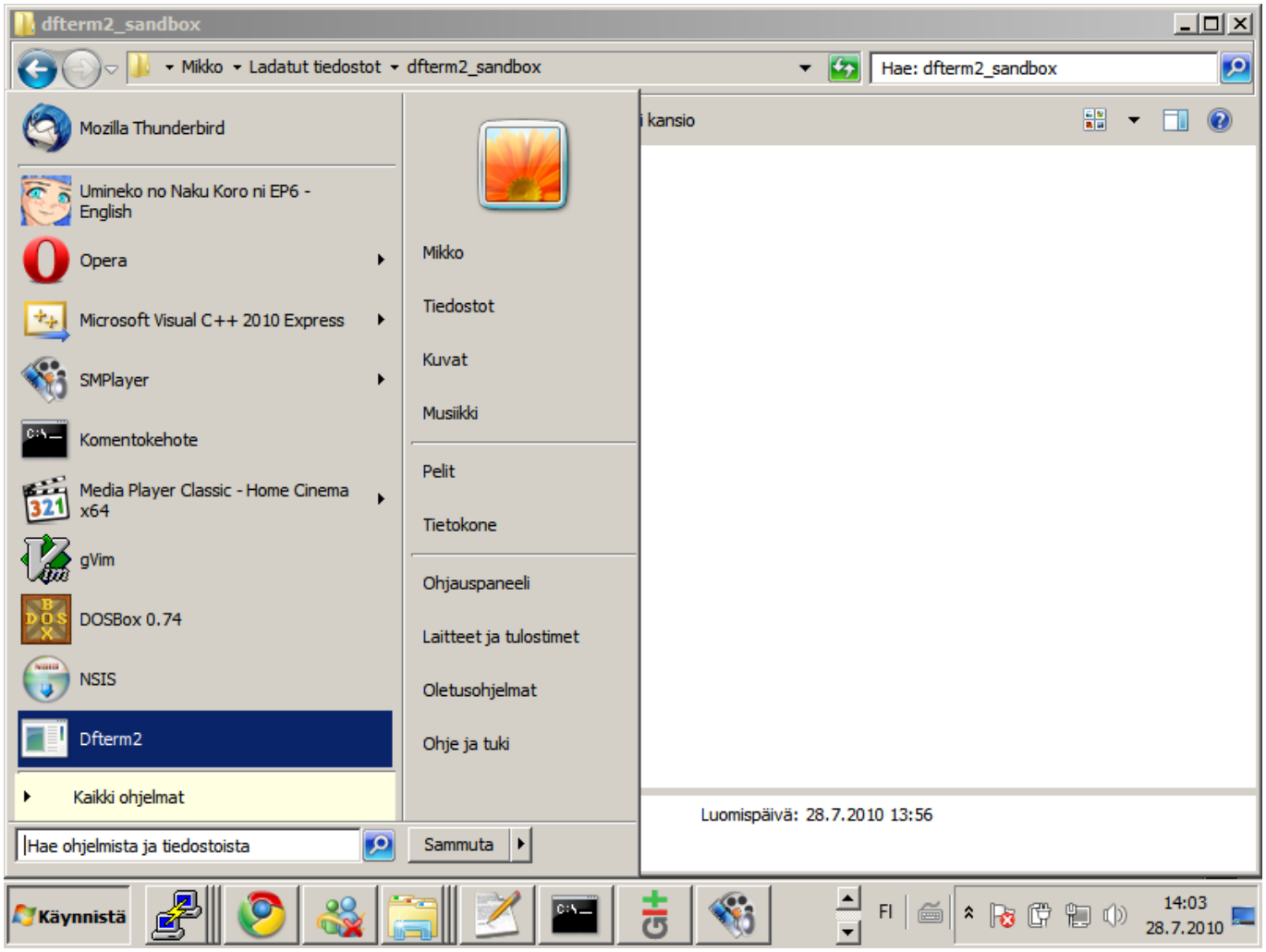
The first step to installing dfterm2. We have downloaded the installer executable and it's seen here. Double click on the installer to launch it.



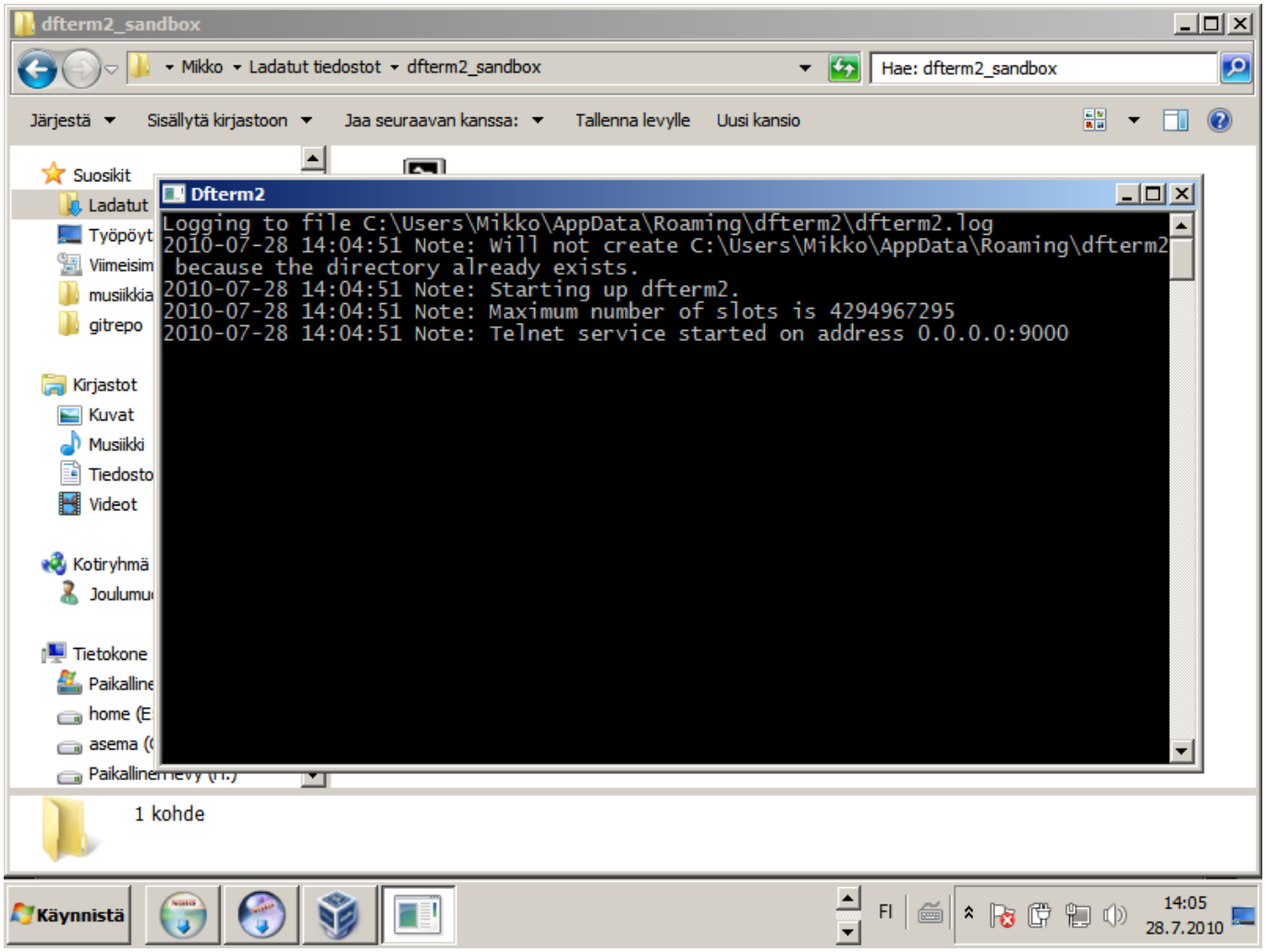
Then, just follow the instructions of the installer.



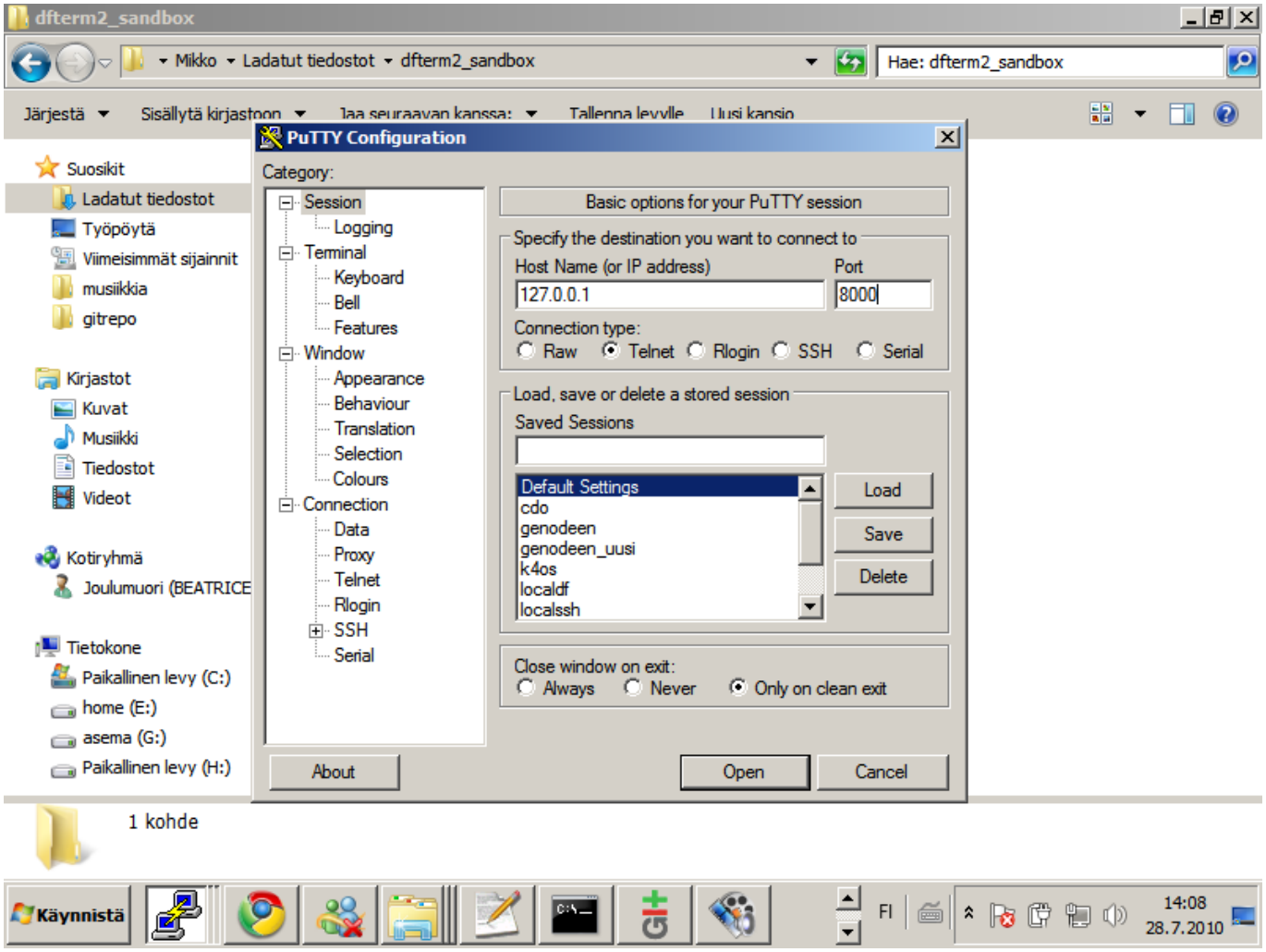
In this screen, you can create yourself an administrator account. Just do what the installer instructions tell you.



The installer should place shortcuts to the start menu for you. Note that if you want to manually create links to dfterm2, you need some parameters to dfterm2 inside the link. You can check from this automatically generated link what parameters you need.

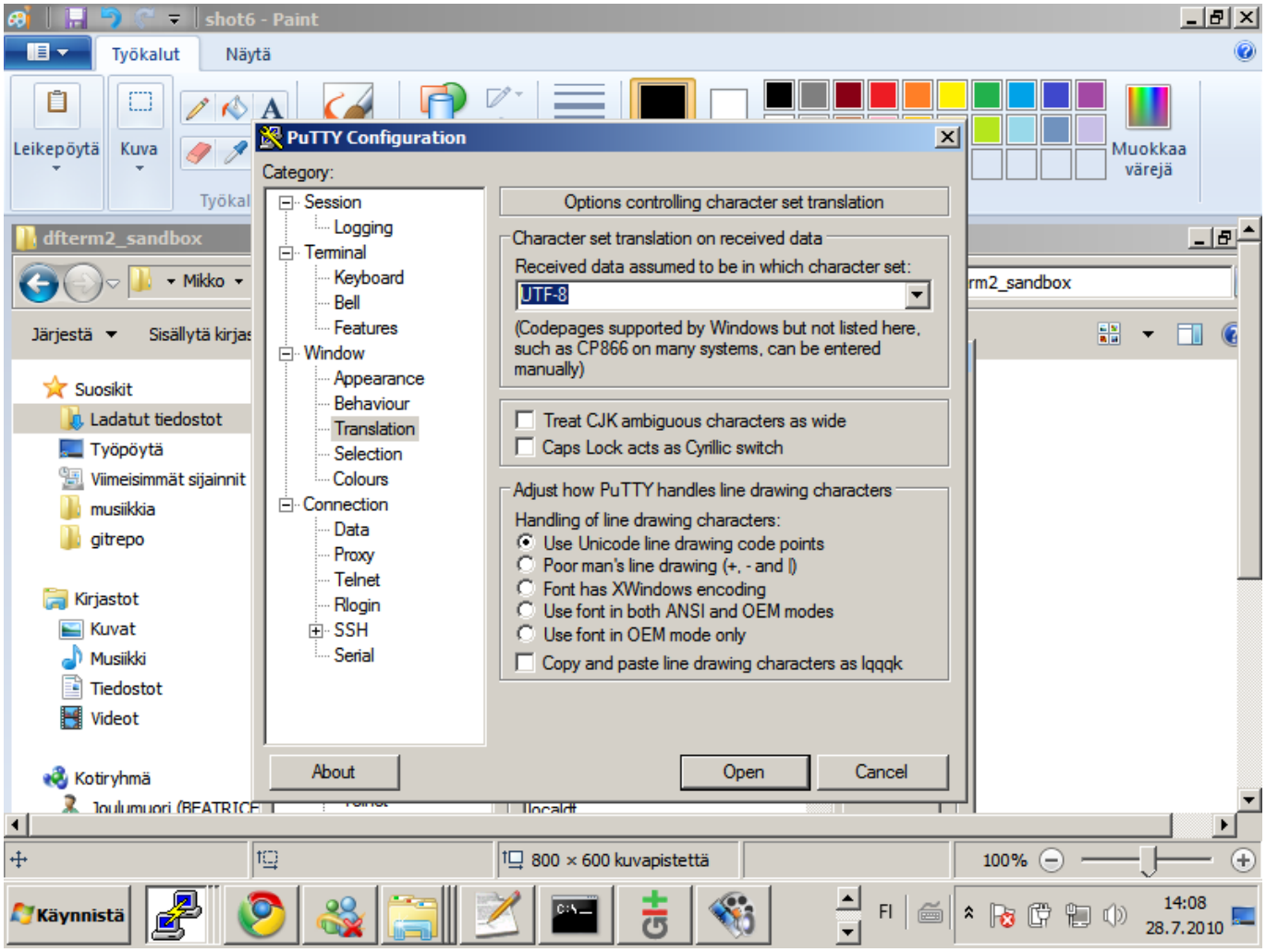


You should see something like this after launching dfterm2. If the window does not immediately go away, everything should be good.

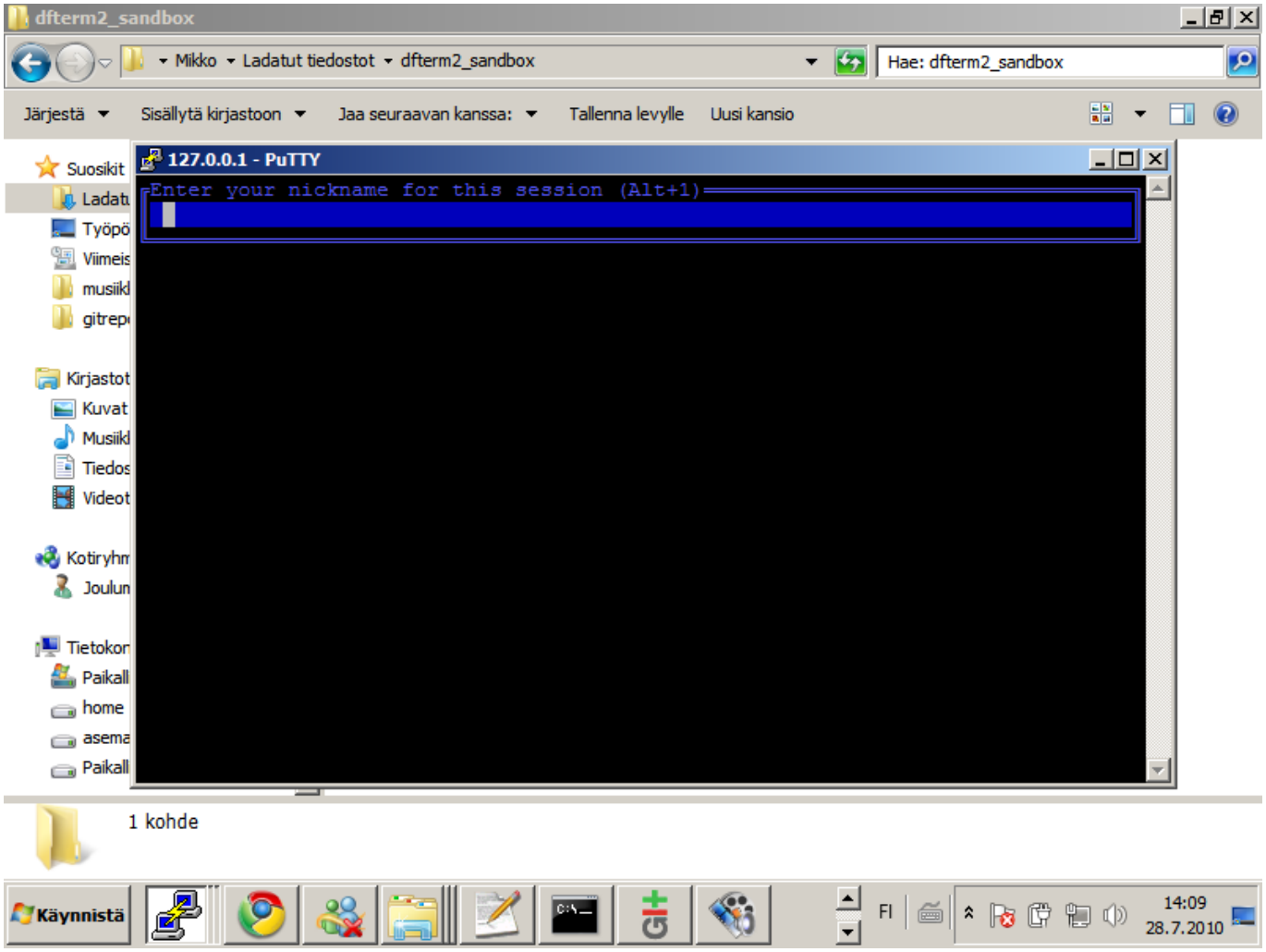


Now you should grab yourself a Telnet/Terminal client. Note that this step does not need to be done on the same computer from where you set up dfterm2. Here, we use PuTTY, which is a commonly used client on Windows. It can be downloaded from `http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html`

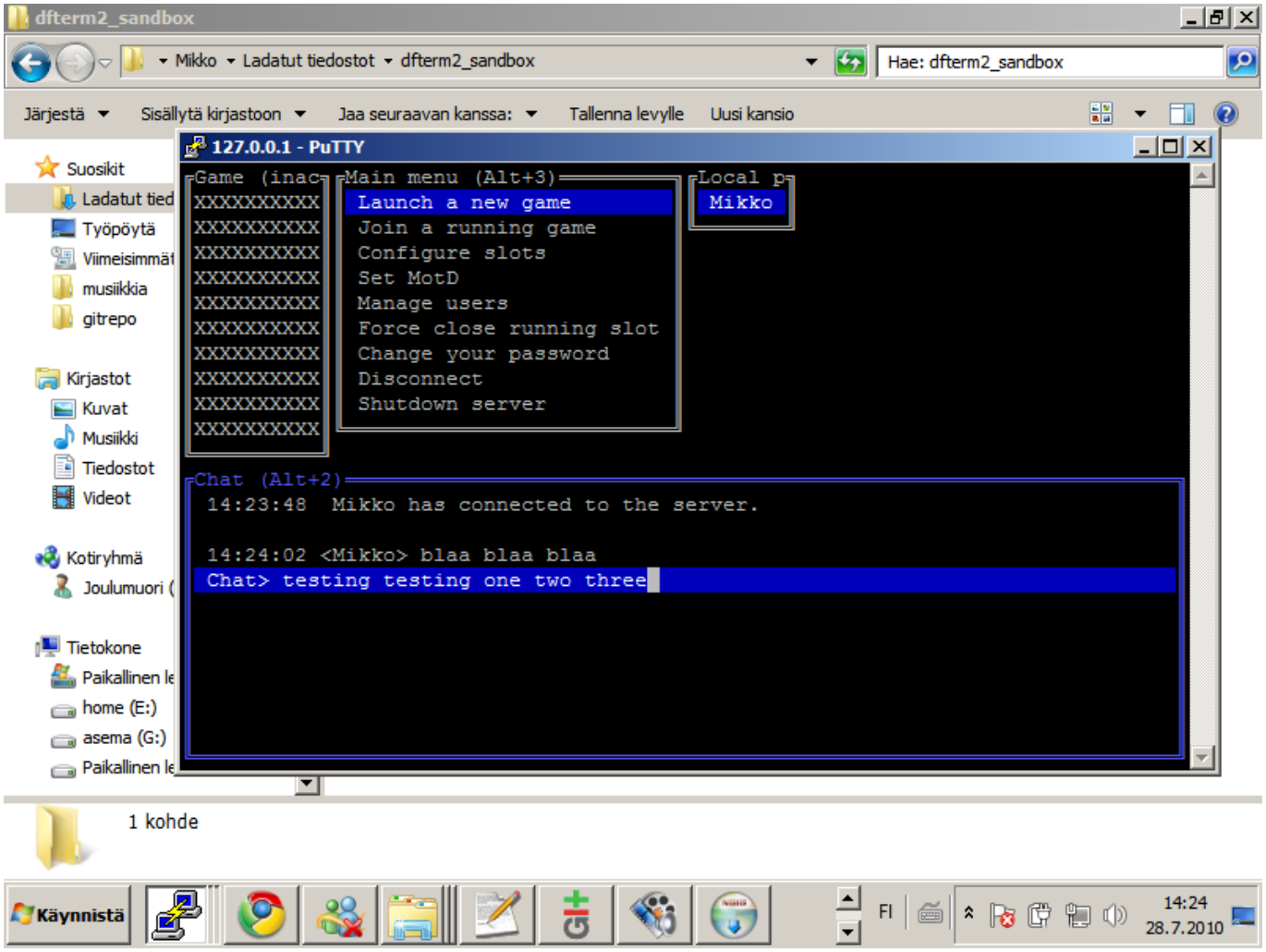
Check that the *port* is *8000*, the *address* points to the computer where dfterm2 is (in this screenshot, 127.0.0.1 is used which always points to the local computer) and that *connection type* is *Telnet*.



Also check that UTF-8 is turned on. Dfterm2 uses UTF-8 exclusively.



Finally, after you open connection, you should see something like this. You should type in your username here and press enter. After this screen, dfterm2 will ask you for your password. Type it in and press enter.



If you see this, you've managed to log in to dfterm2 as an administrator. From here you can configure other settings, such as slots and Message of the Day (MotD). Further instructions on configuring is in chapter Configuring dfterm2

Chapter 4

Installing on Linux

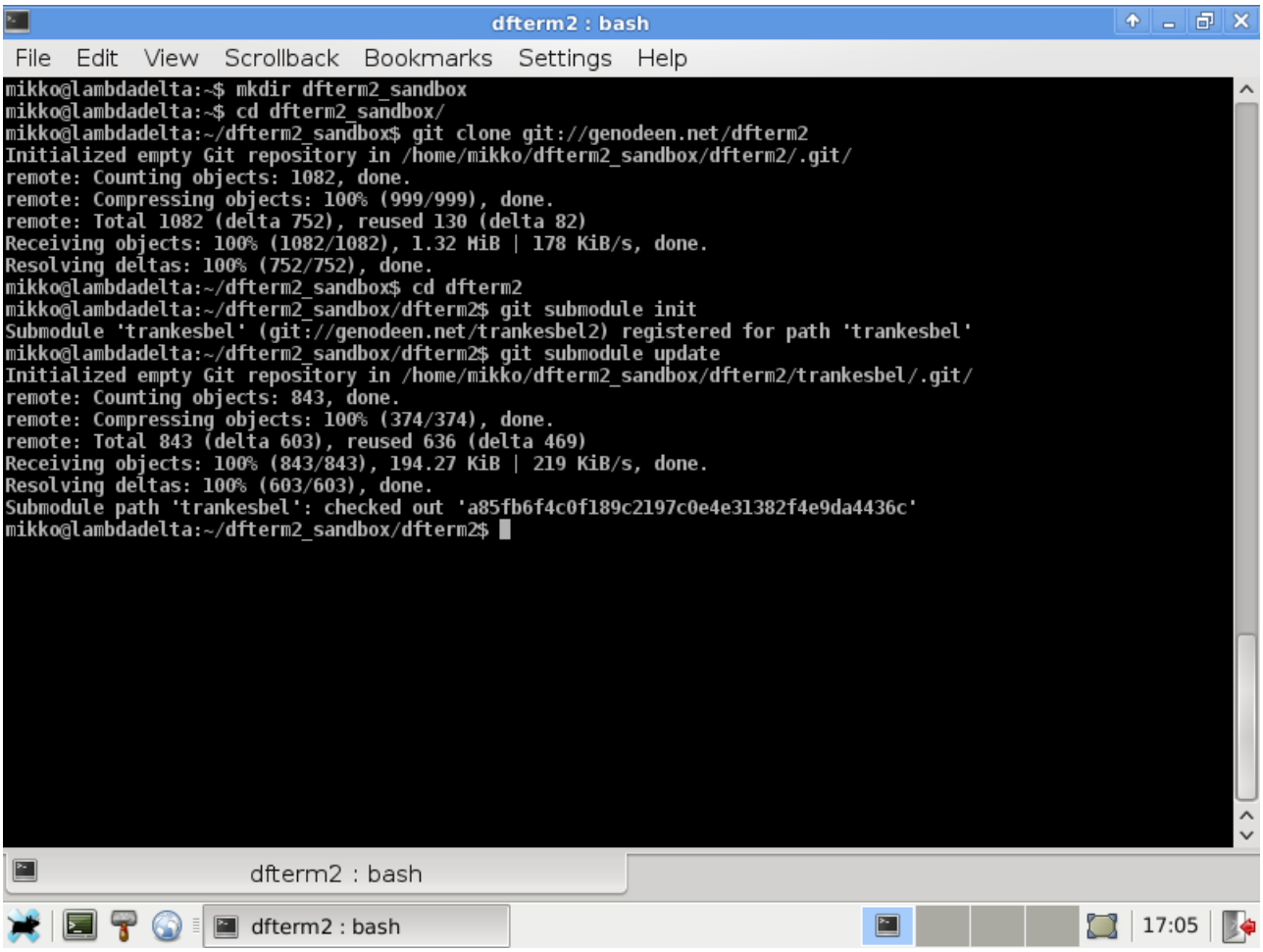
Dfterm2 for Linux has to be compiled from source. No binaries are provided.

Note that dfterm2 development is focused on Windows and less work is done to make sure Linux version stays up to the same quality. For example, there are no Linux releases, just a source code repository which always contains the latest code. It's possible that the code doesn't even compile at times. On the other hand, the author constantly also develops dfterm2 on Linux and the both platforms are supported from the same codebase.

Here is presented a step-by-step guide to set up dfterm2 for Linux. Before you start, install the following packages.

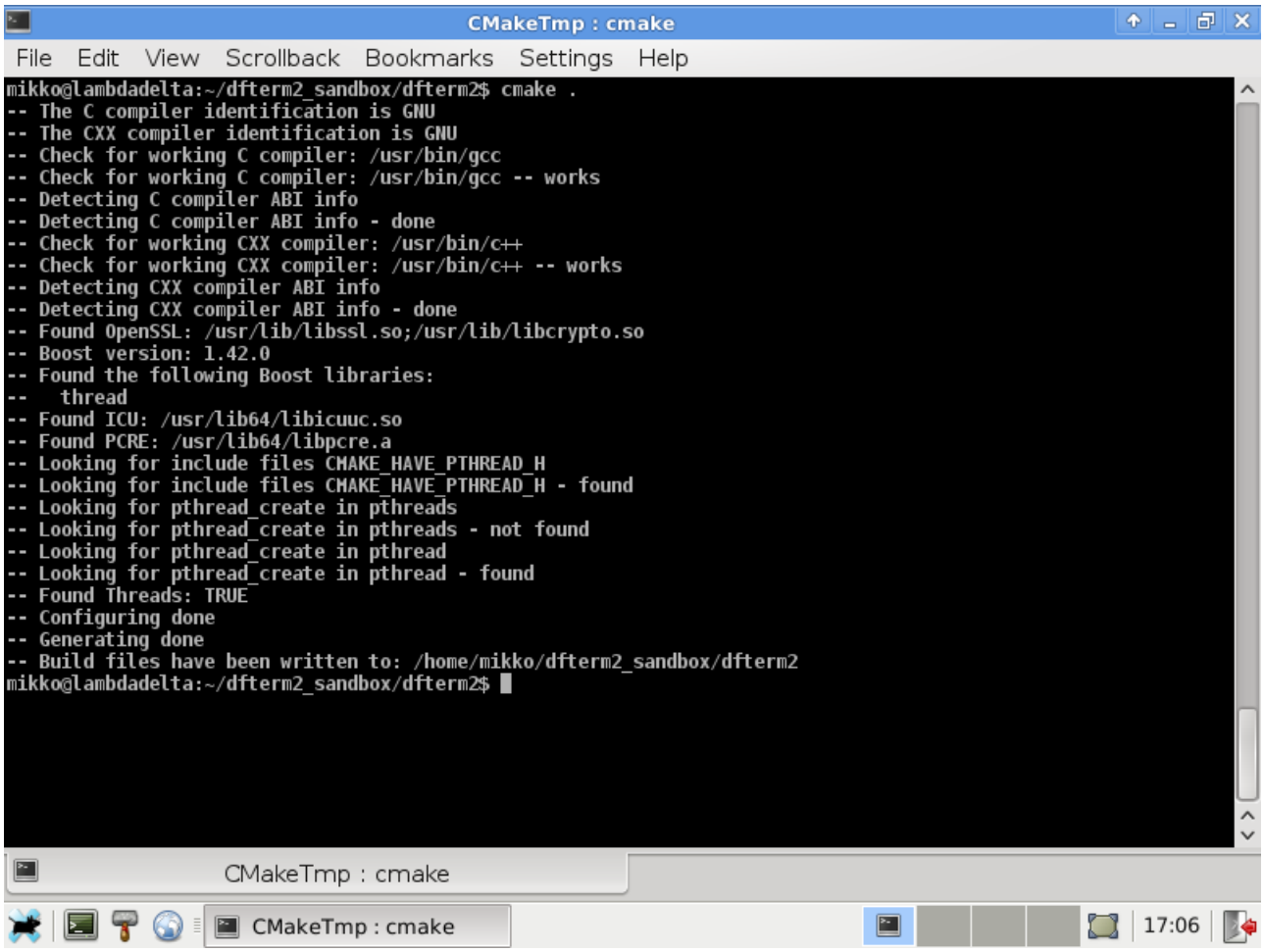
- ICU development libraries
- Boost development libraries (at least version 1.42)
- OpenSSL development libraries
- CMake
- PCRE development libraries
- g++ and usual development tools
- Lua 5.1 development files
- git

Some packages dfterm2 needs are fairly recent. For example, Debian lenny does not have recent enough packages to make dfterm2 work. These screenshots are from Debian testing (squeeze) distribution using konsole and xfce's desktop environment.



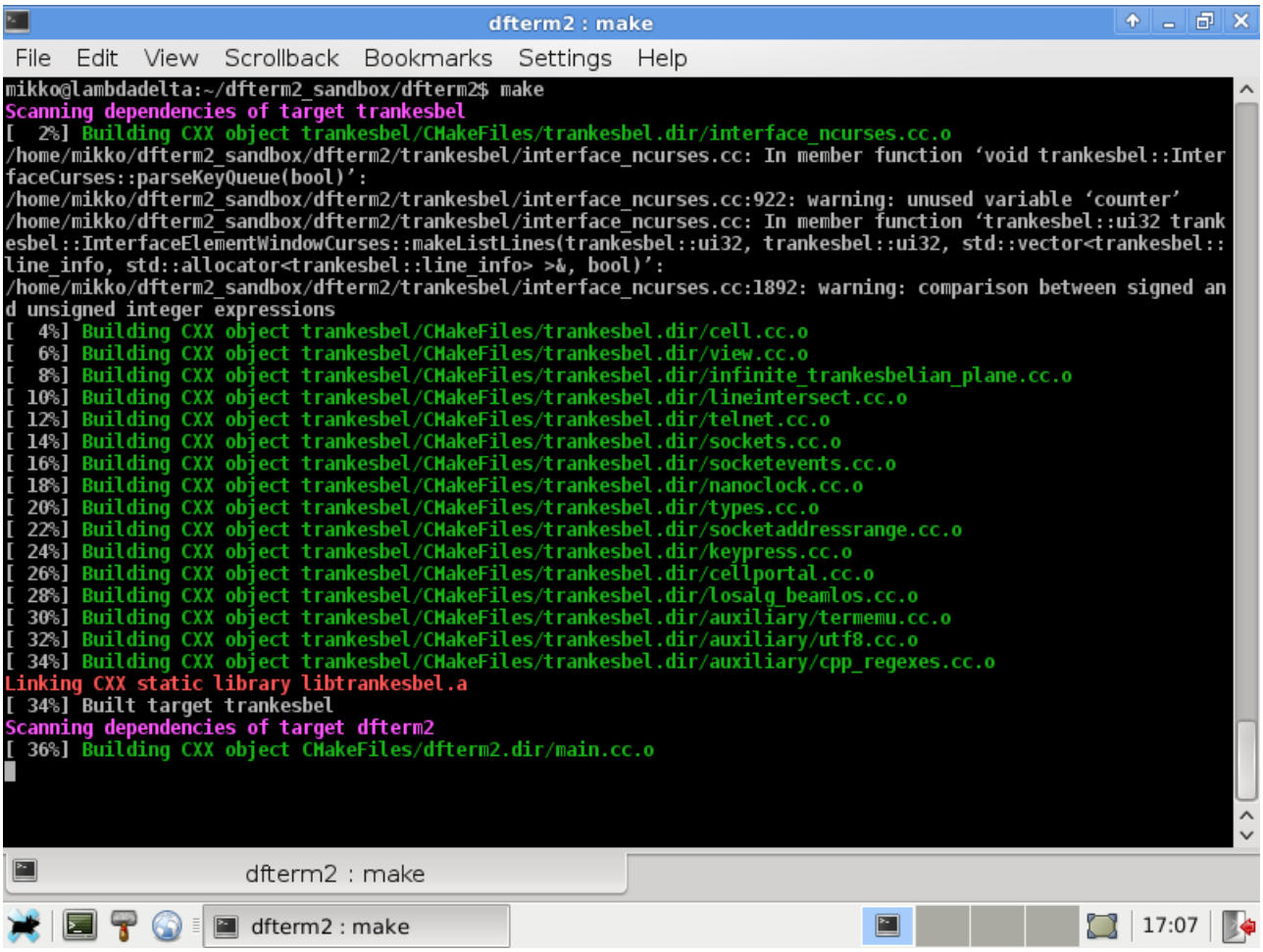
First step should be obtaining the source code. Use git for this. The exact commands are below, above is a screenshot of what should happen.

```
$ git clone git://genodeen.net/dfterm2
$ cd dfterm2
```



Second, use CMake to configure the building system.

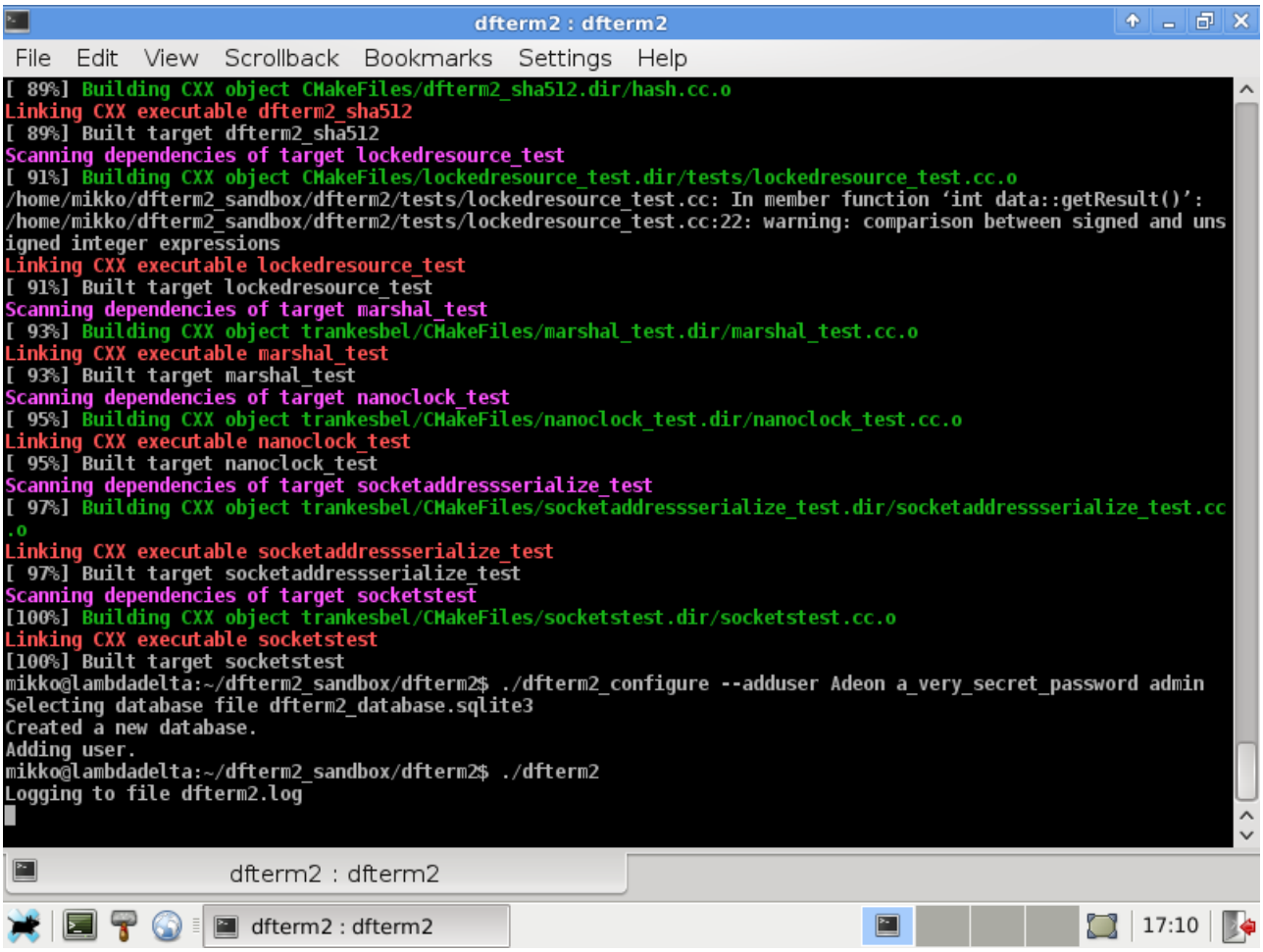
```
$ cmake .
```



Next, type make to compile dfterm2. If compilation fails, there might be a temporary code breakage in source code repository or some of your packages are incompatible. You may ask help on the bay12 forums in dfterm2 thread.

There have been changes in the dfterm2 codebase since these screenshots were taken so the output is not exactly what you see in the screenshots.

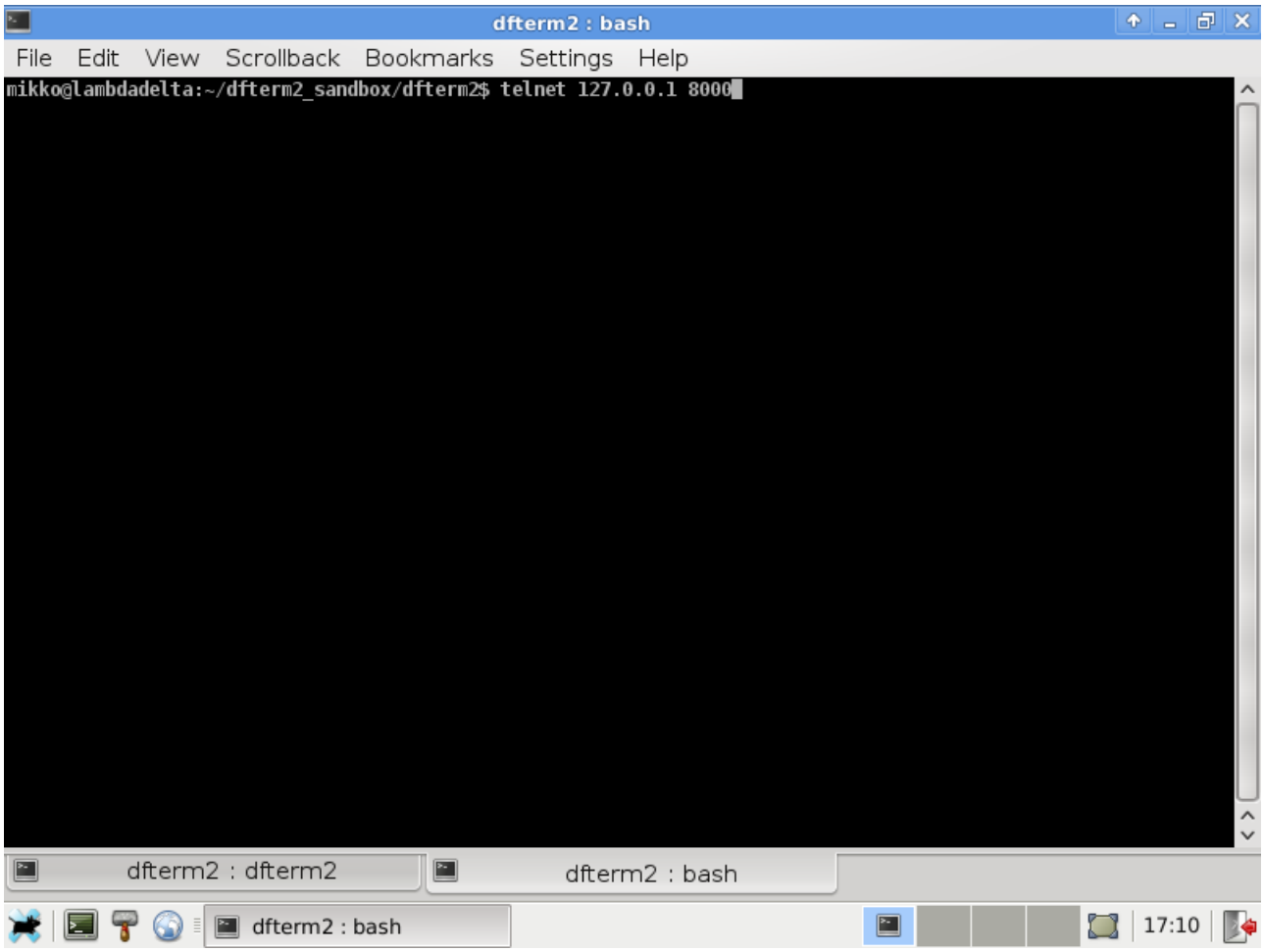
```
$ make
```



And finally, dfterm2 has been compiled. The Linux version does not support installing out of box yet, so you run dfterm2 from the source directory. Add an administrator account using "dfterm2_configure --adduser (username) (password) admin". You may want to use "history -c" to clear command history so that the password does not stay there. Also, you probably want to change the password from inside dfterm2 once you have logged in for the first time.

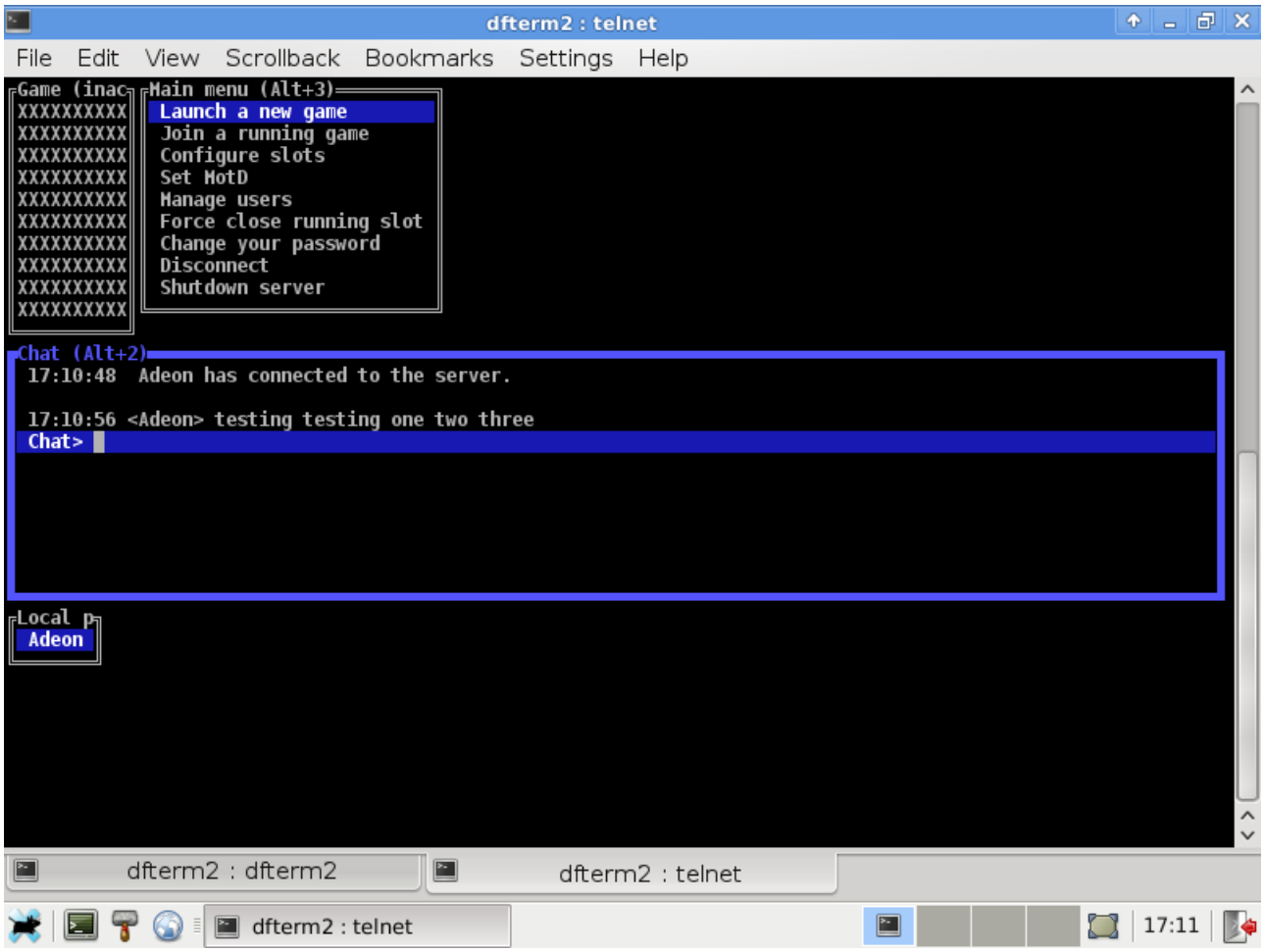
Dfterm2 has some parameters that influence ports, logs and the database dfterm2 uses. You can refer to these by typing "dfterm2 --help"

```
$ ./dfterm2_configure --adduser Mikko mikkos_very_secret_p4ssw0rd admin
$ ./dfterm2
```



Next, you may want to try logging in. By default, dfterm2 listents on port 8000. Using telnet, you can connect to it and log in. You don't need to run telnet on the same computer as where dfterm2 runs. You can even use a Windows machine and PuTTY to connect to Linux dfterm2 or a telnet in Linux to a Windows dfterm2.

```
$ telnet 127.0.0.1 8000
```



Once you have telnetted to dfterm2, it should ask you about your username and password. Just type them in. If everything went ok, you should see a screen that looks like this. Further instructions on configuring is in chapter Configuring dfterm2.

Chapter 5

Configuring dfterm2

Dfterm2 can be configured in various ways. For example, if you want to play Dwarf Fortress through it, you need to tell it where it can find Dwarf Fortress on your computer.

Refer to the interface chapter to see how to navigate in the UI.

In dfterm2, there's a concept of *slot profiles* and *slots*.

Slot profile contains information on what show to in a slot. Typical settings are game executable and working directory, and maximum number of slots of a slot profile.

Slots are created from slot profiles. You could say they are instances of slot profiles. A slot is created when a user selects *"Launch a new game"*. This usually launches the game and it can be seen through the slot. Users see the slot in the *Game window*. When they are not watching a slot, the game window is filled with X letters.

5.1 Main menu

The main menu items are as follows.

Launch a new game

From here, you can launch a new slot from a slot profile.

Join a running game

From here you can select the slot you want to watch.

Configure slots

Administrator only. From here you can configure slot profiles. There's more information on them later.

Set MotD

Administrator only. You can write a message here to show to anyone who connects to the server. The message will appear in the chat window.

Manage users

Administrator only. You can see a list of currently connected people here. Selecting them will allow you to show their IP address and hostname and you can also disconnect them. If you select *Show user accounts* here, you can see registered users and delete them or change their passwords if you like. Note that you can't see the passwords of the users because they are hashed with SHA512.

Manage connection restrictions

You can set restrictions on what address ranges are allowed to connect to dfterm2 from here. See section on "Connection restrictions" for more information.

Force close running slot

If you select this, the slot you are currently watching will be immdiately closed and the program in it will be killed. You need to have force closer privileges for the slot.

Change your password

You can change your password here. You need to know your old password.

Disconnect

If you select this, the server disconnects you.

Shutdown server

Administrator only. Makes dfterm2 close, closing all games and connections.

5.2 Slot profile configuration

Slot profiles are created from *"Configure slots"* menu. You can set the maximum amount of slots that can be run at the same time in this menu. From here, select *"Add a new slot profile"* to go in the slot profile creation menu.

There are a few parameters that can be configured for a new slot profile. Here they are listed with descriptions on what they do.

Slot profile name

This is the name of the slot profile. The name will appear in *"Launch a new game"* menu for users. You need to put something here.

Method of screen scraping

This describes how dfterm2 will obtain the symbol data from dfterm2. On Windows, this can be either launching a new Dwarf Fortress process or using an already running Dwarf Fortress process. On Linux, there's only launching a program in a terminal.

Game executable path

This should point directly to the Dwarf Fortress executable file. On Windows, it could be something like "C:\df_31_12_win\Dwarf% Fortress.exe" and on Linux it could be "/home/mikko/df_linux/df"

% character is used as an escape character for certain patterns. To include a space bar in the executable name, use "% " (like in the Windows example in previous paragraph). Otherwise a space character is a separator for executable name and argument list.

%% will give you a single %. %u turns into the username of the launcher. So, if you use "/home/dfterm2/bin/nethack -u %u" as a name, it will turn into "/home/dfterm2/bin/nethack -u Adeon", if the launcher's name was Adeon. You can use this to make underlying process know who launched it (has been found essential for public NetHack servers).

Game working directory

This should point to the directory from where game executable is run. On Windows, it could be something like "C:\df_31_12_win" and on Linux it could be "/home/mikko/df_linux"

The same escaping code (%) character issues apply, but if you use arguments in the working directory string, they will all be ignored and discarded.

Allowed watchers/launchers/players/force closers

This is fine-grained access control on how users can interact with slots created from this slot profile. Under these menus, you can select which users can do the specific action. Watching refers to seeing what's in the slot. Launching refers to being able to launch the slot from *"Launch a new game"*. Playing refers to being able to give input to the slot. Force closer refers to the ability to forcefully close the slot from main menu.

Forbidden watchers/launchers/players/force closers

The opposite of their allowed counterparts. If you set users in these groups, they will not be allowed to do the specific action. The forbidden user groups always override allowed user groups.

Width and height

Set the width and height of the slot window. These are *ignored* on Windows but they are used on Linux to set the terminal size.

Maximum slots

Set the maximum number of slots that can be created of this slot profile. For Dwarf Fortress, you probably only want to allow one to avoid players accidentally messing each other's save files when two Dwarf Fortress processes are running in the same directory. If you want to run many Dwarf Fortress processes on the same computer, create separate slot profiles for them (with different directories).

Create slot profile

Select this and the slot profile will be created. You can later modify the slot profile in slot configuration menu.

5.3 Connection restrictions

You can access this menu from main menu, selecting "Manage connection restrictions".

If you mess up here, and accidentally firewall yourself off of dfterm2, you can use the command line tool dfterm2_configure to purge all connection restriction settings.

Example on Windows, on author's computer. You need to know where dfterm2 has its database. This purges connection restrictions.

```
$ dfterm2_configure --database c:\users\mikko\appdata\roaming\dfterm2\dfterm2.database -- ↩
    removeaddressrestrictions
```

Back to main menu (Don't save)

Goes back to the main menu, discarding all changes you made.

Default action for connections

This is the default action for new connections. By default, all connections are allowed so this is set to "allow". If you set it to "forbidden", then you need to add manually some address ranges to connect from or all connections are immediately refused.

Set allowed addresses

Set forbidden addresses

You can set allowed and forbidden addresses from these menus. You can add addresses for individual IP-addresses or regexes that match the hostname or IP-address of a connecting client.

There are some caveats at using regexes for hostname based matching. You should not use hostname regexes for allowing connections. For example, you can't use them for allowing connections in an environment where the connection would normally be forbidden. This is because dfterm2 can't resolve the address of a connecting host immediately, so for a short time the hostname of a connecting client is not known. During this time, only IP-based matching works, and if the IP-address of the client is forbidden, the client is disconnected.

Using allowing regexes for matching IP-addresses is just fine though.

You can use hostname based forbidding though. Dfterm2 will disconnect any client that has a hostname that matches a forbidden regex. This comes with a small delay, until dfterm2 reverse looks up the address of a connecting client.

Save and apply

Saves all settings and applies them. Everyone who is connecting from an address in the forbidden list is disconnected immediately.

Chapter 6

User interface

You navigate through the UI in dfterm2 by using arrow keys and ALT+number keys (or ESC+number keys). Dfterm2 has a simple windowed interface. Windows are automatically arranged and will not overlap unless you are short on terminal screen space.

Currently focused window has a blue border. Other windows have gray border. If the currently focused window is also locked, the border is red.

You can use CTRL+F to enlarge currently focused window to fullscreen and CTRL+L to lock a window. Locking can be particularly useful in game window where some of the keys used by dfterm2 might conflict with the keys the game uses.

CTRL+R can be used to remove the borders of currently focused window.

CTRL+X is used to hide a window. You can unhide the window by pressing CTRL+X again while focused on it. This is useful if, for example, you don't use the chat dfterm2 provides. You can press CTRL+X when focused on chat window and it goes away.

There is a chat in dfterm2 you can access after logging in. In chat, you just type in your message and press enter. You can navigate old chat history by using arrow keys or pgup/pgdown.

6.1 Remapping keys for the interface

It is possible to change the keys used for the interface. This is one of the few things in dfterm2 that are configured by modifying a configuration file.

There are some limitations in remapping the keys. The keys cannot be remapped per user. In other words, the keymapping configuration will be the same for everyone connecting to your server.

Another limitation is that the interface windows still say "Alt+1", "Alt+2" etc. in their titles, even though these may be mapped to something completely different.

Finally, know that some characters cannot be transmitted through a terminal. Most notably, shift+arrow keys or shift+return don't work. You may need some trial and error to see what works and what doesn't.

The keymapping configuration file is called *interface_keymappings.conf*. You can edit this with any text editor, such as Windows' notepad. Instructions on modifying this file is in the file itself.

Chapter 7

dfterm2_configure command line tool

Dfterm2 is bundled with a command line tool called dfterm2_configure. You configure some aspects of dfterm2 with it. It is the only way to create new admin accounts, apart from dfterm2 installer on Windows. It must be used on Linux systems to create an admin account.

Dfterm2 uses an sqlite3 database file to store all its settings. Dfterm2_configure writes to this database. You should not run dfterm2_configure, while dfterm2 itself is running.

Dfterm2_configure should be where dfterm2 is. On Windows, it is installed in the same directory (e.g. C:\Program Files\dfterm2). Use the Windows command line program (cmd.exe) to navigate there. On Linux, dfterm2_configure sits in the same directory where dfterm2 was compiled.

You can get help of all command line parameters by using the --help switch.

```
C:\Program Files\dfterm2> dfterm2_configure --help    (Windows)
$ ./dfterm2_configure --help                          (Linux)
```

On Windows, the database is located in %APPDATA\dfterm2\dfterm2.database For example, on author's computer, this is C:\Users\Mikko\AppData\Roaming\dfterm2 (Windows 7). To use dfterm2_configure with it, you would write this, if you wanted to clear all address restriction settings.

```
C:\Program Files\dfterm2> dfterm2_configure --database C:\Users\Mikko\AppData\Roaming\ ↩
    dfterm2\dfterm2.database  --removeaddressrestrictions
```

On Linux, the default database is in the current directory where dfterm2 runs with the name dfterm2_database.sqlite3. Dfterm2_configure also uses this file by default.

```
$ ./dfterm2_configure --removeaddressrestrictions
```

Chapter 8

Security considerations

Dfterm2 strives to be secure in itself but it can't guarantee the safety of the programs that it runs. For example, if there's a way in Dwarf Fortress to format the C-drive from inside it, dfterm2 can't do anything about it.

In Linux, be extra careful that there is no way for the program you run in a slot to escape to a shell. For example, don't run telnet in a slot, because ! key escapes to shell. From there, malicious users can do pretty much anything they want. Chrooted enviroments and narrow privileges are recommended.

Dfterm2 uses telnet for connections. This means all the passwords are transmitted in plain text and are not encrypted in any way. It is not recommended that you connect administrators to dfterm2 over insecure links. On Linux, stolen administrator password lets the attacker to access a shell and then do anything they want from there. Dfterm2 may have a built-in SSH server in it in the future.

Dfterm2 has some limits on it that somewhat mitigate DoS attacks made against it. These limits are in header file dfterm2_limits.hpp. The limits are as follows.

- Maximum number of slots running at a time is 30
- Maximum number of slot profiles is 30
- Maximum number of registered users is 50
- Maximum number of Telnet connections at a time is 50
- Maximum number of HTTP connections at a time is 50
- Largest file dfterm2 will serve through HTTP is 1000000 bytes.
- Configuration file can be at most 100000 bytes long.

Chapter 9

Known issues

When disconnecting from the server, the terminal is not cleared.

Chapter 10

Licenses

Dfterm2 is licensed under a 3-clause BSD license. Dfterm2 includes soiled, a flash telnet and terminal client, which is distributed under GPLv3 license.

The license for dfterm2 is in license.txt and for other programs included or distributed with dfterm2 in license_other.txt

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