Lotus Domino R5 for Linux mini–HOWTO

Mykola Buryak

<1upus@gmx.ch>

Mary Gardiner – Editing for style and consitency, conversion from text to DocBook v4.1.2 (XML)

Dan Scott – The document structure from DB2 Version 7.1 for Linux HOWTO

January 2003

Revision History

Revision 1.0	2003–01–18
Initial Release, reviewed by LDP (Tab)	
Revision 0.1.2	2003–01–13
Corrected some factual and grammatical mistakes. Submitted document to LDP.	
Revision 0.1.1	2003–01–01
Mary Gardiner converts mini–HOWTO into Docbook XML 4.1.2.	
Revision 0.1	2002–09–20
My first mini–HOWTO, wrote install instructions Lotus Domino 5.08 & 5.09a for Mandrake Linux 8.1 and SuSE 7.3 Professional.	

Table of Contents

1. Introduction....................1
- 1.1. Why a Domino R5 installation mini−HOWTO?....................1
- 1.2. Who should read this mini−HOWTO?....................1
- 1.3. About the author....................1
- 1.4. Acknowledgements....................1
- 1.5. License & Copyright....................2

2. Prerequisites....................3
- 2.1. Hardware....................3
- 2.2. Software....................3

3. Preparing your distribution for Domino R5....................4
- 3.1. Mandrake Linux 8.1....................4
- 3.2. SuSE 7.3 Professional....................5

4. Installing Domino R5....................6
- 4.1. Mandrake Linux 8.1....................6
- 4.2. SuSE 7.3 Professional....................6
- 4.3. For all Linux distributions....................7
  - 4.3.1. Run the Domino Server Setup program....................7
  - 4.3.2. Continuing setup and configuration....................8
  - 4.3.3. Starting the Domino Server....................8
  - 4.3.4. Extracting your administrator ID file....................8

5. Resources....................10

6. GNU Free Documentation License....................11
- 0. PREAMBLE....................11
- 1. APPLICABILITY AND DEFINITIONS....................11
- 2. VERBATIM COPYING....................12
- 3. COPYING IN QUANTITY....................12
- 4. MODIFICATIONS....................13
- 5. COMBINING DOCUMENTS....................14
- 6. COLLECTIONS OF DOCUMENTS....................14
- 7. AGGREGATION WITH INDEPENDENT WORKS....................15
- 8. TRANSLATION....................15
- 9. TERMINATION....................15
- 10. FUTURE REVISIONS OF THIS LICENSE....................15
- How to use this License for your documents....................16

1. Introduction

1.1. Why a Domino R5 installation mini−HOWTO?

I faced Domino for Linux in February 2002. It happened because of unstable Domino R5 functioning on an Windows NT Server with powerful hardware resources. I read the "Understanding Domino for Linux" white paper and I decided to move our Domino server to Linux. My first Linux distribution was Mandrake 8.1. I know this French distribution is one of the easiest and friendly for a newbie. Now it has worked pretty well for more than 10 months without any interference. Cool :) A few months ago the chairmen decided to implement one more Domino server at our high school; we had no money to purchase a powerful server and I made up my mind to deploy it on Linux again with existing hardware. Now we have a very stable second one on SuSE 7.3 (I have studied this distribution already) with poor hardware (CPU: Celeron 400, RAM: 192MB, HDD: 20GB IDE).

As time permits, I hope to provide hints and tips for improving performance of Domino on Linux, and for configuring the environment on various Linux distributions.

1.2. Who should read this mini−HOWTO?

If you plan to save your employer's money and get amazing stability (and save your time) you should think about Domino on Linux. This mini−HOWTO helps you to install and configure Domino on the Linux distributions supported by IBM Lotus Software (SuSE) and others (Mandrake). I describe specific prerequisites and quirks for each distribution. I do not want anyone to repeat my sleepless nights and all−day−long red eyes.

1.3. About the author

Mykola Buryak is the originator and current maintainer of this mini−HOWTO. Please send all suggestions for improvement, criticisms, or more−or−less related questions to me at <`m.b.@gmx.co.uk`> or <`lupus@gmx.ch`>. Please do not send me spam or hate mail.

Mykola Buryak has been employed by National Mining University, Ukraine, as Lotus System Administrator since September 2000. Before that time he was working as Computer/Network Technician there. He has 3 year experience with Web Development, 2 year in Lotus Domino/Notes Administration, 1 year in Linux and IBM DB2 UDB. In his spare time he teaches RUP and Python at the Geoinformatics Department, National Mining University. He holds an Hon. Masters Degree in Information Control Systems and Technologies and the following certifications for the present:

- Certified Lotus Specialist − Domino R5 System Administrator
- IBM Certified Specialist − DB2 UDB V6.1/V7.1 User

1.4. Acknowledgements

Mary Gardiner did an awesome job of editing the original version for style and consistency.

Additional thanks to Dan Scott and his DB2 Version 7.1 for Linux HOWTO which I got the document structure from.

1.5. License & Copyright

2. Prerequisites

What are prerequisites? Prerequisites are what you, your machine, and your distribution require before you will be able to successfully install or use Lotus Domino R5. The required prerequisites come straight from *Notes, Domino and Domino Designer RELEASE NOTES*, Chapter 2. The suggested prerequisites come from experience. For your convenience, I've divided them into hardware and software requirements.

2.1. Hardware

CPU
: x86 compatible (for example, Intel, AMD, or Cyrix). I've successfully installed Domino Application Server 5.08 on an AMD Duron 800, Intel Celeron 400 and Enterprise Server 5.09a on an AMD Athlon 1000. Your experiences with other x86 processors would be appreciated.

RAM
: I've found 128 MB of RAM is enough to run a single Domino Application Server and test out your applications. In my case, I was working with a AMD Duron 800 processor and 128 MB of RAM. However, more memory is recommended if you're putting your application into production or running multiple services. Swap file should be 3 times the physical RAM or greater.

HDD
: For a typical non−partioned installation of the Lotus Domino R5 Application Server, you will need about 300 MB of free disk space.

2.2. Software

You must have selected the following packages during Linux install or setup:

- C Development;
- Development Libraries;
- C++ Development.
- Also you need the libjitc.so file from the IBM Developer Kit for Java 1.1.6.

3. Preparing your distribution for Domino R5

3.1. Mandrake Linux 8.1

Domino for Linux will need to be able to find a certain file with filename `libjitc.so`. This required file is absent from Mandrake Linux 8.1. You will be unable to work correctly with the Agent Manager and Statistic Agent if you ignore this section of mini−HOWTO.

1. To find out if the file is absent, you can use the **locate** command.

   First, issue the following command at the command prompt (login as "root"):

   ```
   bash# updatedb
   ```

   This command searches the hard drive and updates a database for the locate command in use. It can take a few minutes to run, but probably it will take only 20−30 seconds or so. Afterwards, issue the command:

   ```
   bash# locate libjitc.so
   ```

   If `libjitc.so` is on your hard drive somewhere, locate will find it and list where it is. If not, locate will list nothing. If libjitc.so is already there, it is probably already in your search path, until you get an error trying to work with Agent Manager and Statistic Agent indicating otherwise, just assume it is. If you do not have `libjitc.so`, you will need to get it separately; it is not included as a part of the Domino for Linux package.

   The file `libjitc.so` is included as a part of the IBM Developer Kit for Linux, which is IBM's port of Sun's JDK (Java Development Kit) 1.1.8 to Linux/x86. `libjitc.so` is the Java "Just−In−Time" compiler. The reason that this file is absent from SuSE 7.3 is that this Linux distribution comes with a different Java package named Kaffe Virtual Machine.
2. You can download the IBM Developer Kit for Linux from http://www−106.ibm.com/developerworks/java/jdk/118/linux/?dwzone=java.
3. Prepare a directory to download JDK into. Change to the `/root` directory:

   ```
   bash# cd /
   bash# cd root
   ```

   and make a new directory named `jdk118`:

   ```
   bash# mkdir jdk118
   ```
4. Download the JDK into `/root/jdk118`. Install the IBM Developer Kit for Java by issuing the following command as root:

   ```
   bash# rpm -ivh IBMJava118-SDK-1.1.8-5.0-i386.rpm
   ```
5. After successful installation of the IBM Developer Kit you need to copy `libjitc.so` to the `/lib` directory:

   ```
   bash# cp /usr/jdk118/lib/linux/native_threads/libjitc.so /lib
   ```

6. You can uninstall the IBM Developer Kit with Software or Package Manager to clean things up, but consider keeping the rpm file IBMJava118−SDK−1.1.8−5.0−i386.rpm. You may decide later that JDK 1.1.8 is something you want to install (for example, it's necessary for using the IBM DB2 UDB V7.x Linux Control Center).

3.2. SuSE 7.3 Professional

Domino for Linux will need to be able to find a certain file with filename `libjitc.so`. This required file is absent from SuSE 7.3 Professional. You will be unable to work correctly with the Agent Manager and Statistic Agent if you ignore this section of mini−HOWTO.

1. To find out if it is absent, you can use the **locate** command. First, issue the following command at the command prompt (log in as "root"):

   ```
   bash# updatedb
   ```

   This command searches the hard drive and updates a database for the locate command in use. It can take a few minutes to run, but probably it will take only 20−30 seconds or so. Then issue the command:

   ```
   bash# locate libjitc.so
   ```

   If `libjitc.so` is on your hard drive somewhere, **locate** will find it and list where it is. If not, **locate** will list nothing. If `libjitc.so` is already there, it is probably already in your search path, until you get an error trying to work with Agent Manager and Statistic Agent indicating otherwise, just assume it is. If you do not have `libjitc.so`, you will need to get it separately; it is not included as a part of the Domino for Linux package.

   The file `libjitc.so` is included as a part of the IBM Developer Kit for Linux, which is IBM's port of Sun's JDK (Java Development Kit) 1.3 to Linux/x86. libjitc.so is the Java "Just−In−Time" compiler. The reason that this file is absent from SuSE 7.3 is that this Linux distribution comes with a different Java package named Java 2 SDK, Standard Edition.
2. Install IBM Developer Kit version 1.3 with YaST2 control center. IBM Developer Kit is located on one of the seven SuSE 7.3 Professional installation CD−ROMs.
3. After successful installation of the IBM Developer Kit, you need to copy `libjitc.so` to `/lib`:

   ```
   bash# cp /usr/lib/jdk1.3/jre/bin/libjitc.so /lib
   ```

4. Installing Domino R5

4.1. Mandrake Linux 8.1

1. Log in as "root". Open a terminal session. Add a user and group to your system called `notes`:
   ```
   # adduser notes
   ```
2. Give this new user a password by entering:
   ```
   # passwd notes
   ```
3. Mount the CD−ROM, and enter the following command to install the Lotus Domino R5 package:
   ```
   # /mnt/cdrom/dom509ux/linux/install
   ```
   The install program displays a series of screens about the IBM Lotus license agreement. Use the **TAB** key to accept a setting and advance to the next screen, the **ESC** key to back up to the previous screen, the space bar to toggle through possible choices other than the default, and **ENTER** to edit a text field.
4. Select a setup type. Choose Domino Mail Server, Domino Application Server, or Domino Enterprise Server and press **TAB**.
5. Select the program file location. The default is `/opt/lotus`. Make sure you have enough space. The installed files in the program directory are approximately 70 MB. If you select a program directory other than `/opt/lotus`, then a soft link will be created from your program directory to `/opt/lotus` so that commands may be executed from that path.
6. Indicate if you plan a number of Domino servers on the current physical machine. The default is `No`.
7. Select the data file location. The default is `/local/notesdata`. If you do not have a large root partition it will not work. If so, change the directory to `/usr/local/notesdata`. If you ignore this during installation process, later you will get an error like this one:
   ```
   Error validation settings:
   There is not enough disk space for the data directory at /local/notesdata
   125889K is required, and only 95370K would be available.
   Make sure you have enough space.
   ```
   The installed files in the data directory are approximately 160 MB.
8. Select the user and group for this server. Choose the default that you set up earlier (`notes` in the example).
9. The install program displays the settings you selected. Use the **TAB** key to accept these settings and begin the installation, or press the **ESC** key to back up to change any settings. The install program will then begin installing the files.
10. During installation process you may see the warning:
    ```
    The following system commands were not located: rsh.
    ```
    It does not influence the local server installation.
11. After successful installation, this message will be displayed among others:
    ```
    The installation completed successfully.
    ```

4.2. SuSE 7.3 Professional

1. Log in as "root." Open a terminal session. Add a user and group to your system called `notes`:
   ```
   # groupadd notes
   ```

```
bash# useradd notes -g notes
```

2. Give this new user a password by entering:

```
bash# passwd notes
```

3. Mount the CD−ROM, and enter the following command to install the Lotus Domino R5 package:

```
bash# /mnt/cdrom/dom509ux/linux/install
```

The install program displays a series of screens about the IBM Lotus license agreement. Use the **TAB** key to accept a setting and advance to the next screen, the **ESC** key to back up to the previous screen, the space bar to toggle through possible choices other than the default, and **ENTER** to edit a text field.

4. Select a setup type. Choose Domino Mail Server, Domino Application Server, or Domino Enterprise Server and press **TAB**.
5. Select the program file location. The default is `/opt/lotus`. Make sure you have enough space. The installed files in the program directory are approximately 70 MB. If you select a program directory other than `/opt/lotus`, then a soft link will be created from your program directory to `/opt/lotus` so that commands may be executed from that path.
6. Indicate if you plan a number of Domino servers on the current physical machine. The default is `No`.
7. Select the data file location. The default is `/local/notesdata`. It works perfectly. Make sure your have enough space. The installed files in the data directory are approximately 160 MB.
8. Select the user and group for this server. Choose the default that you set up earlier (`notes` in the example).
9. The install program displays the settings you selected. Use the **TAB** key to accept these settings and begin the installation, or press the **ESC** key to back up to change any settings. The install program will then begin installing the files.
10. After successful installation, this message will be displayed among others:

```
The installation completed successfully.
```

4.3. For all Linux distributions

4.3.1. Run the Domino Server Setup program

1. Log on to Linux as the user you established earlier (`notes` in the example).
2. Change to the directory `/usr/local/notesdata` (`/local/notesdata` for SuSE) by entering:

```
bash# cd /
bash# cd /usr/local/notesdata
and then enter the following:
bash# /opt/lotus/bin/http httpsetup
```

3. A series of messages indicate the start of the Domino server. For example:

```
05/09/2002 8:39:09 PM Created new log file as
/usr/local/notesdata/log.nsf
05/09/2002 8:39:09 PM
***************************************
* Lotus Domino Server Setup           *
* To setup this server, please connect*
* your web browser to port 8081       *
* Example: http://example.com:8081    *
***************************************
05/09/2002 8:39:09 AM JVM: Java Virtual Machine initialized.
```

```
        05/09/2002 8:39:10 AM HTTP Web Server started
```

4.3.2. Continuing setup and configuration

1. You begin the configuration process by connecting to your Linux server with a Web browser, either from an external machine, or the Linux machine.

   To perform setup from another machine, enter:

   ```
   http://example.com:8081
   ```

   To perform setup from the Linux machine, enter:

   ```
   http://localhost:8081
   ```

   or

   ```
   http://linux:8081
   ```
   for SuSE 7.3 Professional.

   where `example.com` is either the IP address or DNS name of your Linux server. At this point, the standard Domino configuration screens are displayed in your browser. Follow the instructions on these screens and click the Finish button on the final screen to complete the initial configuration. Online help is available on each of these screens.
2. The HTTP Setup program will have created `SERVER.ID` and `CERT.ID` files in `/usr/local/notesdata`. The `USER.ID` file is attached to a person document in `NAMES.NSF`.

4.3.3. Starting the Domino Server

Before starting your Domino server, make sure no other Web server is running because it will block the Domino HTTP task from operating correctly, and you will be unable to use a Web browser to administer your server after the initial setup.

1. Log on to Linux as the user you established earlier (`notes` in the example).
2. From the `/usr/local/notesdata` directory (`/local/notesdata` for SuSE), enter:
   ```
         /opt/lotus/bin/server
   ```
   The server starts and the usual server console messages appear.

4.3.4. Extracting your administrator ID file

Before you can perform any more administration on your Domino for Linux server, you will need to extract the administrator ID file and move it to the machine you plan to use for administration.

1. After the HTTP Web Server task has started, switch to your administration machine and use a Web browser to connect to your new server:
   ```
   http://example.com
   ```

where `example.com` is either the IP address or DNS name of your Linux server. The default Lotus Domino navigator screen displays.

2. Now open the address book by entering:

```
http://example.com/names.nsf
```

3. Click to the People view and open the Person document for the administrator you created earlier and download the `USER.ID` file to your administration machine. If you are using a Netscape browser, you may have to rename the id file to `USER.ID`.

5. Resources

Lotus Developer Domain: The Documentation Library
: This web site contains white papers, redbooks, FAQs etc., published by IBM about Lotus Domino/Notes.

Lotus Developer Domain: Downloads
: You can download a 90−day trial version of Domino/Notes and other Lotus products here.

Lotus Developer Domain: Domino for Linux Feedback Forum
: Very useful, but archived Lotus Domino for Linux Feedback Forum.

HOWTO Install Lotus Domino Server 5.0.9 on Caldera OpenLinux '99 Server Release 3.1.1
: This HOWTO explains how to install Domino Server on the Caldera OpenLinux Server3.1.1.

Advisor Magazine
: *Advisor* presents the unmatched advice of top experts in a full range of media, including magazines, journals, e−mail newsletters, conferences, seminars, workshops, CDs, on−site training, and dozens of Web sites. The expertise presented by *Advisor* comes from hard−won hands−on involvement with the leading technology products (as Lotus Domino/Notes) and services, and technical and business practices.

SearchDomino.com: The Domino Specific Search Engine
: It's a Domino Specific Search Engine. Recommended for all Lotus Domino/Notes newbies.

---

6. GNU Free Documentation License

Version 1.1, March 2000

0. PREAMBLE

The purpose of this License is to make a manual, textbook, or other written document "free" in the sense of freedom: to assure everyone the effective freedom to copy and redistribute it, with or without modifying it, either commercially or noncommercially. Secondarily, this License preserves for the author and publisher a way to get credit for their work, while not being considered responsible for modifications made by others.

This License is a kind of "copyleft", which means that derivative works of the document must themselves be free in the same sense. It complements the GNU General Public License, which is a copyleft license designed for free software.

We have designed this License in order to use it for manuals for free software, because free software needs free documentation: a free program should come with manuals providing the same freedoms that the software does. But this License is not limited to software manuals; it can be used for any textual work, regardless of subject matter or whether it is published as a printed book. We recommend this License principally for works whose purpose is instruction or reference.

1. APPLICABILITY AND DEFINITIONS

This License applies to any manual or other work that contains a notice placed by the copyright holder saying it can be distributed under the terms of this License. The "Document", below, refers to any such manual or work. Any member of the public is a licensee, and is addressed as "you".

A "Modified Version" of the Document means any work containing the Document or a portion of it, either copied verbatim, or with modifications and/or translated into another language.

A "Secondary Section" is a named appendix or a front−matter section of the Document that deals exclusively with the relationship of the publishers or authors of the Document to the Document's overall subject (or to related matters) and contains nothing that could fall directly within that overall subject. (For example, if the Document is in part a textbook of mathematics, a Secondary Section may not explain any mathematics.) The relationship could be a matter of historical connection with the subject or with related matters, or of legal, commercial, philosophical, ethical or political position regarding them.

The "Invariant Sections" are certain Secondary Sections whose titles are designated, as being those of Invariant Sections, in the notice that says that the Document is released under this License.

The "Cover Texts" are certain short passages of text that are listed, as Front−Cover Texts or Back−Cover Texts, in the notice that says that the Document is released under this License.

A "Transparent" copy of the Document means a machine−readable copy, represented in a format whose specification is available to the general public, whose contents can be viewed and edited directly and straightforwardly with generic text editors or (for images composed of pixels) generic paint programs or (for drawings) some widely available drawing editor, and that is suitable for input to text formatters or for automatic translation to a variety of formats suitable for input to text formatters. A copy made in an otherwise Transparent file format whose markup has been designed to thwart or discourage subsequent modification by readers is not Transparent. A copy that is not "Transparent" is called "Opaque".

Examples of suitable formats for Transparent copies include plain ASCII without markup, Texinfo input format, LaTeX input format, SGML or XML using a publicly available DTD, and standard−conforming simple HTML designed for human modification. Opaque formats include PostScript, PDF, proprietary formats that can be read and edited only by proprietary word processors, SGML or XML for which the DTD and/or processing tools are not generally available, and the machine−generated HTML produced by some word processors for output purposes only.

The "Title Page" means, for a printed book, the title page itself, plus such following pages as are needed to hold, legibly, the material this License requires to appear in the title page. For works in formats which do not have any title page as such, "Title Page" means the text near the most prominent appearance of the work's title, preceding the beginning of the body of the text.

2. VERBATIM COPYING

You may copy and distribute the Document in any medium, either commercially or noncommercially, provided that this License, the copyright notices, and the license notice saying this License applies to the Document are reproduced in all copies, and that you add no other conditions whatsoever to those of this License. You may not use technical measures to obstruct or control the reading or further copying of the copies you make or distribute. However, you may accept compensation in exchange for copies. If you distribute a large enough number of copies you must also follow the conditions in section 3.

You may also lend copies, under the same conditions stated above, and you may publicly display copies.

3. COPYING IN QUANTITY

If you publish printed copies of the Document numbering more than 100, and the Document's license notice requires Cover Texts, you must enclose the copies in covers that carry, clearly and legibly, all these Cover Texts: Front−Cover Texts on the front cover, and Back−Cover Texts on the back cover. Both covers must also clearly and legibly identify you as the publisher of these copies. The front cover must present the full title with all words of the title equally prominent and visible. You may add other material on the covers in addition. Copying with changes limited to the covers, as long as they preserve the title of the Document and satisfy these conditions, can be treated as verbatim copying in other respects.

If the required texts for either cover are too voluminous to fit legibly, you should put the first ones listed (as many as fit reasonably) on the actual cover, and continue the rest onto adjacent pages.

If you publish or distribute Opaque copies of the Document numbering more than 100, you must either include a machine−readable Transparent copy along with each Opaque copy, or state in or with each Opaque copy a publicly−accessible computer−network location containing a complete Transparent copy of the Document, free of added material, which the general network−using public has access to download anonymously at no charge using public−standard network protocols. If you use the latter option, you must take reasonably prudent steps, when you begin distribution of Opaque copies in quantity, to ensure that this Transparent copy will remain thus accessible at the stated location until at least one year after the last time you distribute an Opaque copy (directly or through your agents or retailers) of that edition to the public.

It is requested, but not required, that you contact the authors of the Document well before redistributing any large number of copies, to give them a chance to provide you with an updated version of the Document.

4. MODIFICATIONS

You may copy and distribute a Modified Version of the Document under the conditions of sections 2 and 3 above, provided that you release the Modified Version under precisely this License, with the Modified Version filling the role of the Document, thus licensing distribution and modification of the Modified Version to whoever possesses a copy of it. In addition, you must do these things in the Modified Version:

A. Use in the Title Page (and on the covers, if any) a title distinct from that of the Document, and from those of previous versions (which should, if there were any, be listed in the History section of the Document). You may use the same title as a previous version if the original publisher of that version gives permission.
B. List on the Title Page, as authors, one or more persons or entities responsible for authorship of the modifications in the Modified Version, together with at least five of the principal authors of the Document (all of its principal authors, if it has less than five).
C. State on the Title page the name of the publisher of the Modified Version, as the publisher.
D. Preserve all the copyright notices of the Document.
E. Add an appropriate copyright notice for your modifications adjacent to the other copyright notices.
F. Include, immediately after the copyright notices, a license notice giving the public permission to use the Modified Version under the terms of this License, in the form shown in the Addendum below.
G. Preserve in that license notice the full lists of Invariant Sections and required Cover Texts given in the Document's license notice.
H. Include an unaltered copy of this License.
I. Preserve the section entitled "History", and its title, and add to it an item stating at least the title, year, new authors, and publisher of the Modified Version as given on the Title Page. If there is no section entitled "History" in the Document, create one stating the title, year, authors, and publisher of the Document as given on its Title Page, then add an item describing the Modified Version as stated in the previous sentence.
J. Preserve the network location, if any, given in the Document for public access to a Transparent copy of the Document, and likewise the network locations given in the Document for previous versions it was based on. These may be placed in the "History" section. You may omit a network location for a work that was published at least four years before the Document itself, or if the original publisher of the version it refers to gives permission.
K. In any section entitled "Acknowledgements" or "Dedications", preserve the section's title, and preserve in the section all the substance and tone of each of the contributor acknowledgements and/or dedications given therein.
L. Preserve all the Invariant Sections of the Document, unaltered in their text and in their titles. Section numbers or the equivalent are not considered part of the section titles.
M. Delete any section entitled "Endorsements". Such a section may not be included in the Modified Version.
N. Do not retitle any existing section as "Endorsements" or to conflict in title with any Invariant Section.

If the Modified Version includes new front−matter sections or appendices that qualify as Secondary Sections and contain no material copied from the Document, you may at your option designate some or all of these sections as invariant. To do this, add their titles to the list of Invariant Sections in the Modified Version's license notice. These titles must be distinct from any other section titles.

You may add a section entitled "Endorsements", provided it contains nothing but endorsements of your Modified Version by various parties−−for example, statements of peer review or that the text has been approved by an organization as the authoritative definition of a standard.

You may add a passage of up to five words as a Front−Cover Text, and a passage of up to 25 words as a Back−Cover Text, to the end of the list of Cover Texts in the Modified Version. Only one passage of Front−Cover Text and one of Back−Cover Text may be added by (or through arrangements made by) any one entity. If the Document already includes a cover text for the same cover, previously added by you or by arrangement made by the same entity you are acting on behalf of, you may not add another; but you may replace the old one, on explicit permission from the previous publisher that added the old one.

The author(s) and publisher(s) of the Document do not by this License give permission to use their names for publicity for or to assert or imply endorsement of any Modified Version.

5. COMBINING DOCUMENTS

You may combine the Document with other documents released under this License, under the terms defined in section 4 above for modified versions, provided that you include in the combination all of the Invariant Sections of all of the original documents, unmodified, and list them all as Invariant Sections of your combined work in its license notice.

The combined work need only contain one copy of this License, and multiple identical Invariant Sections may be replaced with a single copy. If there are multiple Invariant Sections with the same name but different contents, make the title of each such section unique by adding at the end of it, in parentheses, the name of the original author or publisher of that section if known, or else a unique number. Make the same adjustment to the section titles in the list of Invariant Sections in the license notice of the combined work.

In the combination, you must combine any sections entitled "History" in the various original documents, forming one section entitled "History"; likewise combine any sections entitled "Acknowledgements", and any sections entitled "Dedications". You must delete all sections entitled "Endorsements."

6. COLLECTIONS OF DOCUMENTS

You may make a collection consisting of the Document and other documents released under this License, and replace the individual copies of this License in the various documents with a single copy that is included in the collection, provided that you follow the rules of this License for verbatim copying of each of the documents in all other respects.

You may extract a single document from such a collection, and distribute it individually under this License, provided you insert a copy of this License into the extracted document, and follow this License in all other respects regarding verbatim copying of that document.

7. AGGREGATION WITH INDEPENDENT WORKS

A compilation of the Document or its derivatives with other separate and independent documents or works, in or on a volume of a storage or distribution medium, does not as a whole count as a Modified Version of the Document, provided no compilation copyright is claimed for the compilation. Such a compilation is called an "aggregate", and this License does not apply to the other self−contained works thus compiled with the Document, on account of their being thus compiled, if they are not themselves derivative works of the Document.

If the Cover Text requirement of section 3 is applicable to these copies of the Document, then if the Document is less than one quarter of the entire aggregate, the Document's Cover Texts may be placed on covers that surround only the Document within the aggregate. Otherwise they must appear on covers around the whole aggregate.

---

8. TRANSLATION

Translation is considered a kind of modification, so you may distribute translations of the Document under the terms of section 4. Replacing Invariant Sections with translations requires special permission from their copyright holders, but you may include translations of some or all Invariant Sections in addition to the original versions of these Invariant Sections. You may include a translation of this License provided that you also include the original English version of this License. In case of a disagreement between the translation and the original English version of this License, the original English version will prevail.

---

9. TERMINATION

You may not copy, modify, sublicense, or distribute the Document except as expressly provided for under this License. Any other attempt to copy, modify, sublicense or distribute the Document is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

---

10. FUTURE REVISIONS OF THIS LICENSE

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. See http://www.gnu.org/copyleft/.

Each version of the License is given a distinguishing version number. If the Document specifies that a particular numbered version of this License "or any later version" applies to it, you have the option of following the terms and conditions either of that specified version or of any later version that has been published (not as a draft) by the Free Software Foundation. If the Document does not specify a version number of this License, you may choose any version ever published (not as a draft) by the Free Software Foundation.

How to use this License for your documents

To use this License in a document you have written, include a copy of the License in the document and put the following copyright and license notices just after the title page:

> Copyright (c) YEAR YOUR NAME. Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.1 or any later version published by the Free Software Foundation; with the Invariant Sections being LIST THEIR TITLES, with the Front−Cover Texts being LIST, and with the Back−Cover Texts being LIST. A copy of the license is included in the section entitled "GNU Free Documentation License".

If you have no Invariant Sections, write "with no Invariant Sections" instead of saying which ones are invariant. If you have no Front−Cover Texts, write "no Front−Cover Texts" instead of "Front−Cover Texts being LIST"; likewise for Back−Cover Texts.

If your document contains nontrivial examples of program code, we recommend releasing these examples in parallel under your choice of free software license, such as the GNU General Public License, to permit their use in free software.