Sauron

User Guide

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Sauron: User Guide

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This manual describes Sauron, a free DNS & DHCP management system.

Revision History

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First draft

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Preface

This manual is designed to address user's questions about installing and using Sauron, free DNS & DHCP management software.

Listed below are the topics covered in this User Guide.

- Chapter 1: introduction to Sauron, and pointers to additional information about Sauron.
- Chapter 2: explains how to install and configure Sauron.
- Chapter 3: provides an overview of how to start using Sauron.
- Chapter 4: explains how to manage user accounts.
- Chapter 5: reference for Sauron web-based user interface.
- Chapter 6: reference for Sauron command-line utilities.

Chapter 1. Introduction

Sauron is a scalable system for management of DNS and DHCP services. Sauron can dynamically generate complete DNS and DHCP configurations from a central SQL-database. Automatic generation of DNS “reverse” zones (with support for smaller than C-class reverse delegations) is supported. Sauron comes with web interface and command-line interface. The web interface comes with user/group based access controls for distributed management.

1.1. History of Sauron

Sauron was originally designed and written by Timo Kokkonen at the Computing Center of University of Jyvaskyla. In 1999, when work on Sauron was started, it was meant to provide a simple web based interface for letting multiple users simultaneously manage DNS zone files, but it has since grown into a full featured DNS & DHCP management software.

Sauron is still under development, but it has been in production use since early 2001, managing the campus area network (CAN) with over 10,000 computers at University of Jyvaskyla, Finland.

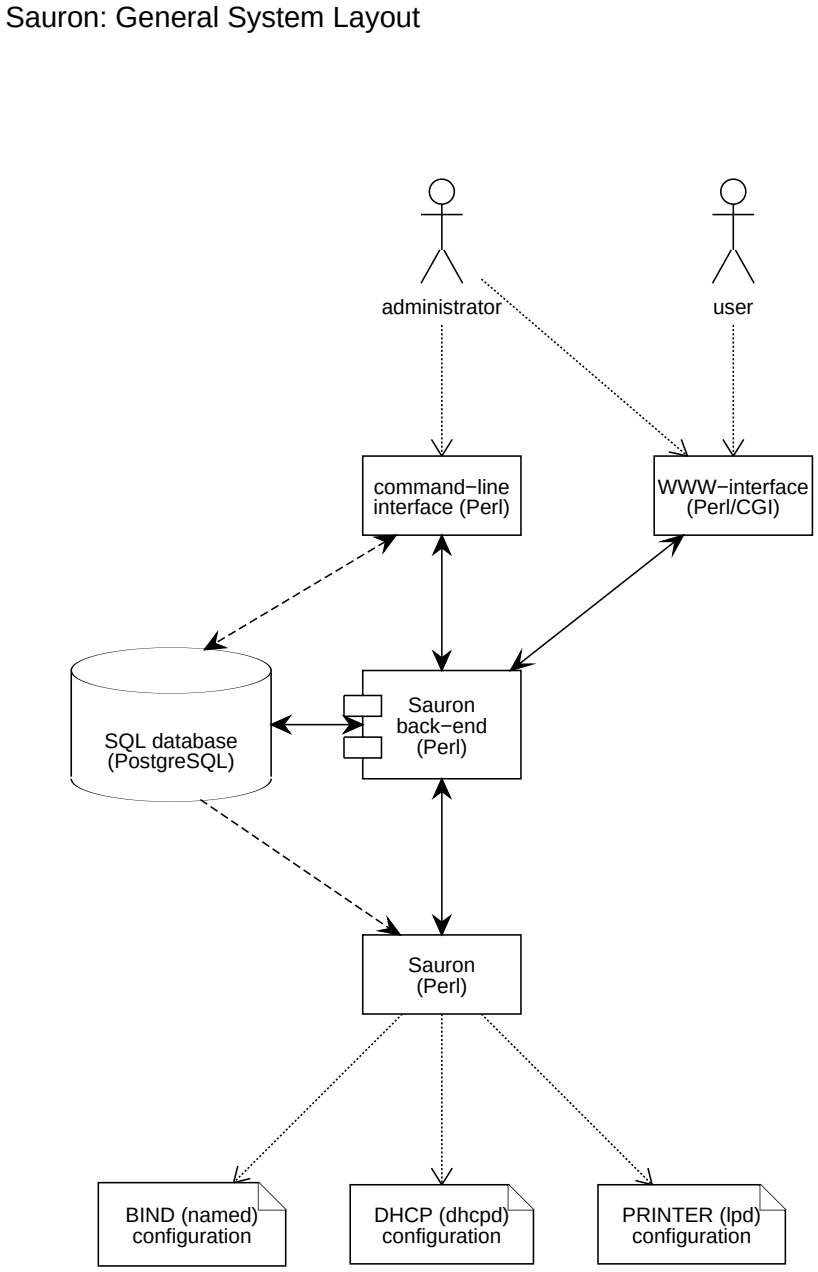
In January 2003, Sauron was publicly released under the GNU General Public License (GPL).

1.2. System Overview

Sauron is built around sauron “back-end” that is used by the command-line and web interfaces to access the data stored in a SQL-database (see Figure 1-1). Sauron is able to dynamically generate complete DNS (ISC BIND) and DHCP (ISC DHCP) configurations based on the data stored in the SQL-database. Sauron is currently written almost completely in Perl using only standard perl modules and couple of additional modules from CPAN. Web interface is stand-alone CGI script and should work with almost any WWW server that supports CGI.

Database is organized as follows; a number of servers may be defined where each server may contain several zones. At server level there may be "global" definitions for DNS & DHCP settings and a Layer-2 network map (VLAN map), which is used generating necessary topology information for dhcpd. Each server can have multiple (DNS) zones defined. Hosts belong to a zone and may contain additional information (such as asset IDs) in addition to DNS/DHCP information.

Figure 1-1. System Overview



$Id: overview.gd,v 1.2 2001/03/01 21:56:58 tjko Exp $

1.2.1. Features

Some of the main features of Sauron include:

- Generates complete BIND (DNS) configuration file set for each server
- Generates complete dhcpd (ISC's DHCP) configuration file set for each server
- Automatically generates DNS "reverse" zones
- Supports smaller than class-C "reverse" zone delegations
- Dynamic host aliases (both CNAME and A record)
- Support for dynamic DHCP address pools with access controls (requires DHCP v3)
- DHCP fail-over support (requires DHCP v3)
- MX and WKS record templates for hosts
- Groups; hosts may be assigned into a group that defines common attributes for it
- Support for most of the standard DNS RRs (resource records)
- Support for automatic validation of generated DNS and DHCP configuration file sets

1.3. Sauron Home Page

Currently Sauron homepage is located at: *http://sauron.jyu.fi/* (http://sauron.jyu.fi/)

1.4. Software Distribution Sites

Sauron can be downloaded from following sites:

Primary Site (HTTP) (http://sauron.jyu.fi/pub/sauron/)
Secondary Site (FTP) (ftp://ftp.jyu.fi/pub/sauron/)
Secondary Site (HTTP) (http://ftp.jyu.fi/ftp/pub/sauron/)

1.5. Mailing lists

- <sauron-announce@lists.jyu.fi> - new release announcements and other important messages (moderated)

- <sauron-users@lists.jyu.fi> - general discussion and help forum
- <sauron-devel@lists.jyu.fi> - development and bug tracking

To subscribe any of these mailing lists, send an empty e-mail to *<list-name>*-request@lists.jyu.fi address with subject line “subscribe” (where <list-name> is the name of the list you want to subscribe).

For example, to subscribe <sauron-users@lists.jyu.fi> you would need to send following empty e-mail:

```
To: sauron-users-request@lists.jyu.fi
Subject: subscribe
```

1.6. Acknowledgements

Special thanks for following people, who have been very helpful to the development of Sauron:

Teemu Lähteenmäki <tola@iki.fi>
Riku Meskanen <mesrik@iki.fi>
Otto J. Mäkelä <om@iki.fi>

1.7. Copyright Notice

Chapter 2. Installation

This chapter covers the general installation process for Sauron. This includes software installation and initial system configuration. Make sure you have all the required programs installed, before starting to install Sauron.

2.1. System Requirements

Sauron is developed under Linux and Solaris, but is should work pretty much on any *nix like OS (as long as you can get the required programs on your platform). Sauron is currently written entirely in Perl (with some supporting shell-scripts).

2.1.1. Required Programs

Following programs are needed to run Sauron.

- PostgreSQL v7.x or later (7.2.3 or newer recommended)
- Perl 5 or later (at least 5.6 recommended)
- Perl modules (these can be found from CPAN):
  - CGI v2.752 or later (older versions should work fine too)
  - Digest::MD5 v2.16 or later
  - Net::DNS v0.26 or later
  - Net::Netmask v1.9002 or later
  - Pg v1.9.0 or later (PostgreSQL interface)
- Apache or any other WWW server that supports CGI (for WWW interface)

2.1.2. Related Programs

To use DNS & DHCP configurations generated by Sauron you will also need *Internet Software Consortium's* (http://www.isc.org/) DNS & DHCP programs.

- BIND 8.2.x or later (9.2.x or newer recommended)
- DHCP v2 or later (3.x or newer strongly recommended)

2.2. Installing Sauron

Sauron is currently available as a source “tarball” as well as a RPM package (RPM package is made for RedHat Linux systems). Decide which version you want to use to install Sauron from and proceed to either Section 2.2.1 or Section 2.2.2.

2.2.1. Installing from the sources

First step, when installing from the source archive is to unpack the tar file into a directory and change current directory to that directory. This can be done as follows:

```
gunzip -c sauron-0.5.0.tar.gz | tar xvf -
cd sauron-0.5.0
```

Next step is to install Sauron from the sources. By default Sauron program files will be installed under `/usr/local/sauron`, and configuration files under `/usr/local/etc/sauron`. If you want to install Sauron under some other directories you need to specify `--prefix` and `--sysconfdir` arguments when invoking configure script. To install Sauron under default directories issue following commands:

```
./configure
make
make docs
make install
```

2.2.2. Installing from the RPM

To install (or update) Sauron from RPM package you can simply install the package as follows:

```
rpm -Uvh sauron-0.5.0-1.noarch.rpm
```

2.3. Sauron Configuration

Sauron configuration settings are stored in `config` file, which is usually located in `/usr/local/etc/sauron/` or in `/etc/sauron/` (if Sauron is installed from RPM). This configuration file is parsed actually as a Perl code, so it is possible to set the configuration variables conditionally if desired.

Configuration file contains common configuration settings for all Sauron components (except browser.cgi which uses it’s own configuration file `config-browser`). Here we cover only the basic

settings that you need to set before using Sauron. For more advanced settings, see the configuration file where all the advanced configuration options are documented.

General Configuration Options

DB_CONNECT

Database connection parameters string. This defines the database to connect to, and optionally database username and password to use. See Section 2.4 how to setup a database for Sauron.

To setup connection to a database named sauron in localhost, you might want to set this variable to:

```
"dbname=sauron user=foo password=bar"
```

Or, if you're connecting to a database at remote computer:

```
"host=remotehost port=5432 dbname=sauron user=foo password=bar"
```

Table 2-1. Database Connection String Parameters

Parameter	Default value	Description
host	localhost	Hostname of the database server.
port	5432	Port to connect on database server.
dbname	current user-id	Database name to connect.
user	current user-id	Database username.
password		Password.

PROG_DIR

Base directory for Sauron installation. This should be set to the directory where program files where installed. Usually this is either `/usr/local/sauron` or `/opt/sauron` (if installed from RPM).

LOG_DIR

Directory for log files. Currently only the web interface (`sauron.cgi`) uses this directory to write to `sauron.log` file in this directory. Remember to make sure that the `saurno.cgi` has permissions to write into this file.

SERVER_ID

Unique identifier for this Sauron installation. This identifier is used by the web interface to generate unique cookies names, so you can access several different Sauron web interfaces simultaneously from your browser. This identifier is also displayed by the web interface; to help you to identify which Sauron web interface you're currently connected to.

2.4. Database Configuration

To use Sauron, you need to create a database for it in PostgreSQL. Unless you plan on restoring existing Sauron database from a database dump, you also need to setup necessary tables for Sauron to use.

2.4.1. Creating database for Sauron

Choose name for your database (for example: `sauron`) and create empty database in PostgreSQL using createdb program.

```
createdb sauron
```

After creating the database, you may either restore existing Sauron database dump or start from “scratch” and create necessary tables for Sauron as described in following Sections.

2.4.2. Initializing Database

Before using Sauron, you need to initialized the database. For this there is **createtables** utility that is included with Sauron. To initialize the database, simply run following command in Sauron program directory:

```
./createtables
```

This command will create all the necessary tables needed by Sauron. You can check that everything worked by issuing the following command:

```
./status
```

This should produce output similar to following showing that the database connection works:

```
Sauron v0.5.0 status

Database connection:   OK
Database version:      1.0
CGI interface:         Enabled

No servers found in database!
```

It is also recommended to check that the Perl modules in use meet the requirements (see Section 2.1). This can be done by running **status** command with `--versions` option:

```
./status --versions
```

2.4.3. Initializing Global Tables

Sauron has several global tables that contain data that is used by all servers stored in a Sauron database. These tables contain a table (`ether_info`) that contains mappings of OUI's to Manufacturers that is used to display the manufacturers of NICs based on the Ethernet MAC address. There is also a table (`root_servers`) that contains global (default) root server information, and optionally also server specific root server information.

To populate OUI (`ether_info`) table with the included files, issue following commands in the Sauron top-level directory:

```
./import-ethers contrib/Ethernet.txt
./import-ethers --force contrib/additional-ether-codes.txt
```

You may also want to download IEEE's up to date public list of OUIs from *IEEE's web site* (http://standards.ieee.org/regauth/oui/index.shtml), and install it as follows:

```
./import-ethers oui.txt
```

You should also add default root servers into `root_servers` table. This can be done as follows:

```
./import-roots default contrib/named.root
```

NOTE! remember to check for newer version of this file at *ftp.rs.internic.net* (ftp://ftp.rs.internic.net/domain/).

2.5. WWW Server Configuration

To be able to use Sauron's web interface you need to make `sauron.cgi` and `browser.cgi` (if you want to use the Sauron DNS browser) available through your WWW server. To do this you typically would either make symbolic links to these files or copy these files in your `cgi-bin` directory. Note, if you're installing from the RPM package, these symbolic links are created automatically, so you only need to check that your web server configuration allow symlinks in your cgi-bin directory.

You should use your web server configuration and/or firewall to limit access to `sauron.cgi` and `browser.cgi` CGI scripts only from the machines you need to access Sauron from.

Sauron web interface uses several icons and images that are by default installed under the top-level Sauron directory. You need to make these available through your web server via `/sauron/icons/` directory (unless you're installing from the RPM which does this automatically for you). To do this you can create that directory under your WWW server root and then either make symbolic links or copy all the image files from `<sauron top-level directory>/icons/` into this directory.

Chapter 3. Getting Started

This chapter is intended as a brief overview of how to build a simple DNS & DHCP server configuration using Sauron. For those in hurry, there is also small demonstration database that can be used to test Sauron quickly (see Section 3.2.3).

3.1. Creating Administrator Account

First step before using Sauron is to create administrator account(s). Administrator accounts are normal user accounts that have superuser flag enabled. For adding accounts there is command-line utility adduser that can be used to add user accounts either interactive or batch mode. To add administrator (superuser) account interactively, invoke adduser with option `--superuser`:

```
./adduser --superuser
```

Here is sample output from adduser program:

```
Enter username: admin
Enter group name (empty for none):
Enter user description (full name): Administrator
Enter user email address: hostmaster@middle.earth
Enter optional user info:
Enter account expiration date (dd-mm-yyyy, +<n>d, +<n>y) [none]:
Enter password [JD!JqRGg]:
           Username: admin
              Group: <none>
           Longname: Administrator
              email: hostmaster@middle.earth
            comment:
         expiration: <none>
          superuser: true
Add this user [y/n]?y
User admin added successfully.
```

Normal users accounts can be added interactively by starting adduser without any arguments. Difference between superuser accounts and normal user accounts is that normal accounts need to be granted permission to access/modify desired servers/zones/hosts. See Chapter 4 for more information about managing user accounts and privileges.

3.2. Creating New Server

Sauron can manage multiple servers, where each “server” is contains its own DNS & DHCP server configuration information. This allows single Sauron system to manage multiple DNS & DHCP servers. Normally each servers are completely separate from each other, but it is possible to generate “slave”

servers that use another server as a master server, and inherit it's all master zones (as slave zones), and optionally slave server can also inherit master server's access controls (for DNS server).

There are two ways to create a new server in Sauron. One is to import existing DNS & DHCP configuration into Sauron, for easier migration into use of Sauron. Another way is to start from "scratch" and create new server and zones interactively using Sauron's web interface. Following sections show example how to do this both ways (there is also section showing how to use the included demo database to take a quick look how Sauron works; Section 3.2.3).

3.2.1. Using Web Interface

First, login using the web interface as an administrator into Sauron. You should now be in "Select server" dialog, with empty list of servers to choose from. Now select "Add" to add a new server. See Table 5-1 for information of the fields used in this dialog.

Next step is to define global DHCP server settings, by choosing Edit from Servers menu. Now you can add desired DHCP settings in the Global DHCP Settings field, one setting per line without the semicolon (;) at the end of line. Here's some typical global DHCP settings:

```
authoritative
allow bootp
use-host-decl-names on
default-lease-time 7200
max-lease-time 38400
option domain-name-servers ns1.middle.earth,ns2.middle.earth
option ntp-servers ntp1.middle.earth,ntp2.middle.earth
```

After creating a server, it's time to add networks into Networks table in Nets menu. Generate net for each network that has been delegated for your use (and you're generating "reverse" zones for). You should also generate subnets within these networks that describe your network topology. If your network is split up into VLANs / Layer-2 Networks (or "Shared Networks" as DHCP calls them), add you necessary VLANs using Add vlan before, and assign each subnet into appropriate VLAN. It is also possible to create "virtual subnets" that are used only for access control purposes by setting "DHCP" setting for these subnets to false.

Next step is to add the default zones (localhost and reverse zones for 0.0.0.0/8, 127.0.0.0/8, and 255.0.0.0/8) into the server. This can be done from Zones menu using Add Default Zones, which should produce following output:

```
Adding zone: localhost...OK (id=1)
Adding zone: 127.in-addr.arpa...OK (id=2)
Adding zone: 0.in-addr.arpa...OK (id=3)
Adding zone: 255.in-addr.arpa...OK (id=4)
```

Now its time to add your zone(s) into the server. This can be done from Zones using the Add command. See Table 5-3 for description of the fields used in this dialog. After creating a zone, edit the zone by

selecting Edit from Zones menu, and add Name server (NS) entries and other needed entries for the zone. See Table 5-4 for description of the fields used in this dialog.

Finally after creating the zone(s) you want. You may start adding hosts into your zones. Before adding hosts make sure you've selected correct server and zone (Note, you can save your current zone and server selection as defaults from Login menu using the Save Settings command). To add a new host simply select Add host from Hosts menu. If you want to make a "copy" of existing host, first select the host and press Copy button. This will fill out the new host dialog with information from the current host. See Table 5-6 for description of the fields used in this dialog.

There are also templates and groups that you may define and use when adding/modifying hosts. To makes it easier to define or change certain settings for large groups of hosts, by just modifying the related template or group. More information about these can be found in Section 5.4.

3.2.2. Using Existing DNS/DHCP Configuration

For importing existing BIND configuration files and existing DHCP configuration file there is `import` and `import-dhcp` utilities. These utilities can be used to import new server into existing Sauron database.

First step is to import your existing BIND configuration into Sauron. This can be done as follows:

```
./import ns1 /etc/named.conf
```

Where import will read your BIND configuration from `named.conf`. Import will read also master zone-files from directories specified in `named.conf`. Use `--dir=<directory>` to specify alternate location for zone-file if they're not located in the directories specified in `named.conf`.

Since BIND configuration does not contain information about your network topology nor the hardware (Ethernet) addresses of hosts, you should also import your existing DHCP configuration file `dhcpd.conf` using `import-dhcp`. This can be done as follows:

```
./import-dhcp --global ns1 /etc/dhcpd.conf
```

This will update hosts in the server "ns1" with information from dhcpd configuration file. Option `--global` causes global dhcp settings to be imported into the server record.

3.2.3. Using Demonstration Database

There is small demonstration database included with Sauron distribution. This database is a dump of Sauron database that contains sample server, which demonstrates some features of Sauron.

To use this database dump you need to create a new database in PostgreSQL and restore this dump into it using `psql` utility. This can be done as follows (from the sauron top-level directory):

```
cd test
createdb sauron-demo
psql sauron-demo -f sauron-demo.dump
```

After creating the database you need to set DB_CONNECT variable in `config` file to connect to this database.

This demonstration database has three user accounts already setup:

Table 3-1. Demo Database Accounts

account	password	description
admin	admin	sample administrator account
user1	user1	user with minimal rights
user2	user2	user with more rights

3.3. Generating DNS & DHCP Configurations

Generation of BIND and dhcpd configurations files is done using command-line utility `sauron`. Configuration files can be generated at the server where Sauron and PostgreSQL are installed, or Sauron software can be installed also in the actual DNS & DHCP server and configured to connect to PostgreSQL database over network (if connecting PostgreSQL over the network SSL connection should be used).

To generate complete BIND configuration file set as well as dhcpd configuration file, following command could be used:

```
./sauron --bind --dhcp --updateserial ns1 /opt/ns/
```

This will create configuration files for server “ns1”. Option `--updateserial` forces the update of zone SOA serial numbers. Normally Sauron tries to detect if zone serial number update is necessary and update it only when needed, but this detection routine may sometimes fail, so for now it’s recommended to use `--updateserial` option.

Sauron should always generate valid configuration files for BIND and dhcpd, but to be sure and automatically validate generated files, there is `--check` option that causes `sauron` command to check generated files. For this to work you need to set specify the locations of `dhcpd`, `named-checkconf`, and `named-checkzone` programs in Sauron configuration file. Here’s an example for enabling `--check` option to work in a RedHat Linux:

```
# set to enable dhcpd.conf validation from sauron
$SAURON_DHCP_CHK_PROG = '/usr/sbin/dhcpd';
$SAURON_DHCP_CHK_ARGS = '-q -t -cf';

# set to enable named.conf validation from sauron
$SAURON_NAMED_CHK_PROG = '/usr/sbin/named-checkconf';
$SAURON_NAMED_CHK_ARGS = '';

# set to enable zone file validation from sauron
$SAURON_ZONE_CHK_PROG = '/usr/sbin/named-checkzone';
```

```
$SAURON_ZONE_CHK_ARGS = '-q';
```

It is also possible to tell `sauron` to send e-mail notifications to users whose changes are in effect after new configuration files are put into use using the `--mail` option. For this option to work you need to configure a mailer program for Sauron to use in configuration file. Here's example how to do this in a RedHat Linux:

```
# mailer configuration (set to enable email notifications)
$SAURON_MAILER = '/usr/sbin/sendmail';
$SAURON_MAILER_ARGS = '-t';
$SAURON_MAIL_FROM = 'postmaster@middle.earth';
```

This configures Sauron to use Sendmail for sending e-mail notifications, and messages will appear to come from <`postmaster@middle.earth`>.

You can automate BIND & dhcpd configuration files generation using for example a simple shell script that is run periodically from cron. But you should use `--check` option when doing this to make sure you always end up with valid configuration files.

Chapter 4. Account Management

Currently only the Sauron's Web Interface uses user accounts and privileges. A text-based interface (to be used via SSH or locally) is planned and will use the same user accounts and privileges as the web interface.

There are two ways to assign privileges to users either directly setting privileges to a user or assigning user to a user group and then setting privileges to that user group. It is recommended to use user groups to grant users privileges, since when there is large number of user accounts, it is much easier to modify permissions of a user group than having to modify each user's permission individually.

> There is no access control when using the command-line utilities. Thus, it may be necessary protect access to the Sauron database (in PostgreSQL) and configuration file `config` (if it contains password to access the database).

4.1. Managing User Accounts

For managing user accounts there are several command-line utilities: `adduser`, `moduser`, and `deluser`. Following sections show how to do basic administrative tasks using these utilities.

4.1.1. Creating User

User accounts are created using `adduser` utility. This utility allows adding user accounts either interactively or in batch mode by specifying all the required information on command-line. Following example shows how to add normal user account interactively (see Section 6.3 for information how to use this command in non-interactive mode). To add new user into Sauron simply run `adduser` command from Sauron top-level directory:

```
./adduser
```

When started without any arguments (or without `--user` and `--passwd` option), interactive mode is started. Below is an example session how to add an account:

```
Enter username: pippin
Enter group name (empty for none): hobbits
Enter user description (full name): Peregrin Took
Enter user email address: pippin@shire.middle.earth
Enter optional user info:
Enter account expiration date (dd-mm-yyyy, +<n>d, +<n>y) [none]:
Enter password [UtH4RCda]:
           Username: pippin
              Group: hobbits (GID=1)
           Longname: Peregrin Took
              email: pippin@shire.middle.earth
            comment:
         expiration: <none>
          superuser: false
```

```
Add this user [y/n]?y
User pippin added successfully.
```

When creating account and not setting group for that account, `adduser` will remind that some privileges should be set for the user, before account can be used. This is not the case when assigning user to a group, since it's assumed that group contains necessary privileges for the account. See Section 4.1.2 for more information about user privileges and how to modify them.

4.1.2. Setting Privileges

Accounts must have some privileges (except superuser/administrator accounts) for them to be useful. Privileges can be assigned directly to the user account using `moduser` utility or indirectly to a group using `modgroup` utility.

Typically user (or group) is assigned one or more "server" privileges that grant user read-only access into those server(s). Then user is assigned "zone" privileges that grant user access into all hosts inside certain zone(s). If needed, user's access into all hosts inside the zone(s) user has write access can be further limited by assigning restrictive privileges to limit users access to only a subset of hosts inside the zone(s). For this there are rules to limit access by hostname (regexp) or by IP number (either by network/subnet or by IP-mask). See Table 4-1 for complete list of available user/group privileges.

Table 4-1. Account/Group Privileges

Type	Target	Description	Value
Server	server ID	Controls the access to a server and all zones inside the server.	R=read access, RW=read/write access, RWX=read/write access (with less restrictions)
Zone	zone ID	Controls the access to a zone.	R=read access, RW=read/write access, RWX=read/write access (with less restrictions)
Net	net ID	Limits users ability to use only IP addresses within "auto assign ranges" of the networks/subnets listed by the Net rules.	
IP mask		Limits users ability to use only IP addresses to those matching the IP-mask	IP-mask (for example: 192.168.1-10.*
Hostname mask		Limits user to be able to modify only hosts with domainname matching any of Hostname mask rules.	regular expression (for example: ^\.math$)

Type	Target	Description	Value
Authorization Level		Defines user's authorization level. This can be used to control users access into templates/groups, and also to control how much information about networks is displayed to the user.	authorization level (0-999, 0=default)
Host Expiration Limit		If defined, user can only create host entries that expire in n days or sooner.	expiration limit (in days)
Default Department		Default Department field value for new hosts.	Department Name

In addition to modifying the user account itself, `moduser` utility can also be used to modify user privileges. To add privileges interactively for given account, just invoke `moduser` with `--add` option. For example:

```
./moduser pippin --add
```

After adding privileges to a user, `moduser` utility can be also used to display user's current privileges by giving only a username as argument. For example:

```
./moduser pippin
```

This should produce output similar to below displaying account details and privileges.

```
          Username: pippin (id=2)
          longname: Peregrin Took
             email: pippin@shire.middle.earth
              info:
         superuser: No
             group: hobbits (gid=1)
      passwd status: valid (CRYPT)
         last login:
 account expiration: <never>
    account created: Sat Feb 15 00:18:40 2003 by tjko
      last modified: <never>

ID     Type     Ref.                      Mode
------ -------- ------------------------- --------------------------------
[User privileges]
3      hostname \.shire$                 (hostname constraint)

[Group (hobbits) privileges]
1      server   test                      R
```

```
2       zone     test:middle.earth          RW
```

4.1.3. Removing User

User account can be removed using `deluser` utility. This utility works interactively when started without any arguments. To remove user(s) non-interactively use `--user=<username>`

To remove user account interactively, simply start `deluser` without any arguments from Sauron top-level directory:

```
./deluser
```

4.1.4. Disabling User Temporarily

It is also possible to disable (lock) user accounts without actually removing them, using `moduser` utility with `--lock` option.

Locking user account “pippin”, issue following command from Sauron top-level directory:

```
./moduser pippin --lock
```

4.1.5. Listing Users

To list all users in Sauron database, use `moduser` command with `--list` option. This will list all the users as well as user’s group, name, and email information. This can be done from Sauron top-level directory as follows:

```
./moduser --list
```

4.2. Managing User Groups

User groups are meant to ease the user privilege management, by allowing user privileges to be set for a user group and then user can be assigned to a desired user group. User inherits all the privileges from the

group she belongs to. User can still have user specific privileges defined, even if user belongs to a group. User's actual privileges are combination of user specific and group based privileges.

4.2.1. Creating Group

User groups can be created using `addgroup` utility. To add a user group interactively start `addgroup` program from Sauron top-level directory as follows:

```
./addgroup
```

Here is example how to add a group named "hobbits":

```
Enter group name: hobbits
Enter group description: Shire Hobbits
         Groupname: hobbits
         Description: Shire Hobbits
Add this group [y/n]?y
Group hobbits added successfully.
```

After creating a new group, it should be assigned some privileges as described in Section 4.2.2.

4.2.2. Setting Group Privileges

User groups (like User accounts) must have some privileges assigned to them for them to be useful. Privileges can be assigned directly to the user group using `modgroup` utility. Privileges that can be set to a user group are same as the privileges for a user. For more information about privileges see Section 4.1.2.

To add privileges for a user group interactively, start `modgroup` utility with the `--add` option. This can be done as follows from the Sauron top-level directory:

```
./modgroup hobbits --add
```

After adding desired privileges to the group, `modgroup` utility can also be used to display group's privileges by starting it with only the group name as argument.

```
./modgroup hobbits
```

This should produce output similar to following:

```
 Groupname: hobbits (id=1)
   Comment: Shire Hobbits

ID     Type     Ref.                      Mode
------ -------- ------------------------- --------------------------------
1      server   test                      R
2      zone     test:middle.earth         RW
```

4.2.3. Removing Group

User group can be removed using `delgroup` utility. This utility works interactively when started without any arguments. To remove user(s) non-interactively use `--group=<groupname>`

To remove user group interactively, simply start `delgroup` without any arguments from Sauron top-level directory:

```
./delgroup
```

4.3. External User Authentication

Normally users are authenticated against encrypted passwords stored into `users` table in Sauron database. Sauron currently uses by default standard Unix passwords. However, it is possible to use external authentication program for user authentication. Which makes it possible to authenticate users against almost any service.

To enable external user authentication, `SAURON_AUTH_PROG` in variable in Sauron configuration file must be set to point to external authentication script or program.

A sample script (`kerberos-auth`) for authenticating against a Kerberos KDC is included in the `contrib/` directory.

If `SAURON_AUTH_PROG` is set in the configuration file, Sauron will run the authentication program every time user is authenticated. Authentication program is expected to read one line from standard input that is in following format:

```
username password
```

Authentication program should then authenticate the user using the given username and password, and return with exit code 0 (zero) if authentication was successful. Otherwise a non-zero exit code should be used.

Chapter 5. Web Interface

Web based user interface for Sauron is implemented as a single CGI script (`sauron.cgi`). To use this script WWW server software that supports CGI programs is needed. Currently this interface is developed and tested using Apache, but it should work with any WWW server software, as long as it has support for CGIs.

It is recommended to setup your WWW server to use HTTPS and only allow access to the `sauron.cgi` CGI script using encrypted HTTPS connection. If your WWW server supports both unencrypted (HTTP) and encrypted (HTTPS) connections, it is recommended to setup a separate "cgi-bin" directory for HTTPS connections and place `sauron.cgi` (or symbolic link to it) only in that directory.

Although `sauron.cgi` has it's own access control mechanism, it is recommended to further improve security by restricting access to the web interface for only the hosts that need access to the Sauron using the WWW server configuration and/or a firewall.

Sauron's web interface doesn't use JavaScript, only standard HTML is used. Goal is to keep the web interface lightweight and usable by all browsers (graphical as well as text-based).

For session tracking `sauron.cgi` uses cookies. Each generated cookie contains only a MD5 hash of user's session identifier and has maximum life of a week. Normally the cookie is deleted when user logs out. Cookies are only sent back to the issuing server. Sauron supports the use of "secure cookies" via configuration file setting `SAURON_SECURE_COOKIES` (this is not enabled by default since some buggy browsers don't handle secure cookies correctly).

5.1. Servers Menu

Servers menu provides commands for creating and modifying servers for administrator. For normal user it only provides server selection command for selecting the active server.

5.1.1. Show Current

Show Current command displays the currently selected server information. It is default command when entering Servers menu.

5.1.2. Select

Select command displays list of available servers for selecting active server. For normal user's this list will include only the servers user has at least read access to.

5.1.3. Add

Add command is used to create a new server. This option is available only for administrator. See Table

5-1 for descriptions of the fields used in the command dialog.

Table 5-1. New Server Dialog

Field	Description	Example
Name	Short name of the server (this handle can contain only letters, numbers, and hyphens)	ns1
Hostname	Domainname of the server (FQDN)	ns1.middle.earth.
IP address	IP address of the server	192.168.1.1
Hostmaster	Default hostmaster email address for all zones in the server (replace "@" in the email address with ".")	hostmaster.middle.earth.
Configuration directory	Base directory for BIND configuration files	`/var/named`
Slave for	Option that allows to select a master server for this server (making it a slave). Slave server will automatically inherit all the master zones of it's master as slave zones. Slave server can also optionally inherit DNS server access controls from the master server.	None
Comment	Long description of the server (optional)	primary name server

5.1.4. Delete

Delete command allows removal of a server. This command should be used with caution, since it will remove the entire server from the database. This command is available only for administrator.

5.1.5. Edit

Edit command is used to edit existing server. This option is available only for administrator. See Table 5-2 for descriptions of the fields used in the command dialog.

Table 5-2. Edit Server Dialog

Field	Description	Example

Field	Description	Example
Server Name	Short name of the server (this handle can contain only letters, numbers, and hyphens)	ns1
Hostname	Domainname of the server (FQDN)	ns1.middle.earth.
IP address	IP address of the server	192.168.1.1
Output mode	Option for selecting wheter to generate full `named.conf` or `named.zones` file that contains only zones (to be included in your static `named.conf`).	“Generate full named.conf”
Comments	Optional field reserved for comments	
Hostmaster	Default hostmaster email address for all zones in the server (replace “@” in the email address with “.”)	hostmaster.middle.earth.
Refresh	Zone SOA record default “refresh” value	43200
Retry	Zone SOA record default “retry” value	3600
Expire	Zone SOA record default “expire” value	2419200
Minimum (negative caching TTL)	Zone SOA record default “minimum” value	86400
Default TTL	Default TTL for records in zones for this server	86400
Default zone TXT	TXT records that get automatically included for each zone in this server	
Configuration directory	Base directory for BIND configuration files	`/var/named`
Primary zone-file path	Pathname relative to configuration directory for storing master zone files	
Slave zone-file path	Pathname relative to configuration directory for storing slave zone files	NS2/
Root-server file	filename for root server (zone) file.	named.ca
pid-file path	pathname for pid-file (BIND option)	
dump-file path	pathname for dump-file (BIND option)	

Field	Description	Example
statistics-file path	pathname for statistics-file (BIND option)	
memstatistics-file path	pathname for memstatistics-file (BIND option)	
named-xfer path	pathname for named-xfer (BIND option)	
Forward (mode)	BIND forward setting; default, only, first	default
Forwarders	BIND forwarders setting (list of server IPs to forward queries to)	
Transfer source IP	Source IP address for zone transfers (for multi-homed hosts)	
Query source IP	Source IP address for DNS queries sent by server (for multi-homed hosts)	
Query source port	Source port for DNS queries sent by server	
Listen on port	Port that the server listens for DNS queries (allows setting non-standard port)	
Listen-on	BIND listen-on setting; list of IPs (interfaces) server should listen for queries	
Allow-transfer	BIND allow-transfer setting; list of CIDRs from where to allow zone transfers.	
Allow-query	BIND allow-query setting; list of CIDRs from where to allow DNS queries.	
Allow-recursion	BIND allow-recursion setting; list of CIDRs from where to allow recusive DNS queries (causes recursion to be disabled from anywhere else).	
Blackhole	BIND blackhole setting; list of CIDRs from where any requests are to be ignored by the server.	
Do not generate HINFO records	Controls whether to omit HINFO records from the generated zone files or not.	No
Do not generate WKS records	Controls whether to omit WKS records from the generated zone files or not.	No

Field	Description	Example
Notify	BIND notify setting; default, yes, no	Default
Auth-nxdomain	BIND auth-nxdomain setting; default, yes, no	Default
Recursion	BIND recursion setting; default, yes, no	Default
Dialup mode	BIND dialup setting; default, yes, no	Default
Allow multiple CNAMEs	BIND multiple_cnames setting; default, yes, no	Default
RFC2308 Type 1 mode	BIND rfc2308_type1 setting; default, yes, no	Default
Check-names (Masters)	BIND check-names master setting; default, fail, ignore, fail	Default
Check-names (Slaves)	BIND check-names slave setting; default, fail, ignore, fail	Default
Check-names (Responses)	BIND check-names response setting; default, fail, ignore, fail	Default
Version string	If this is set then this string is that BIND will report as it's version (instead of the real version)	
Logging options	List of BIND logging options (these are placed inside "logging" section in `named.conf`)	
auto-domainnames	Controls wheter to automatically generate correct "domain-name" option for each host in `dhcpd.conf`.	No
Global DHCP Settings	List of global DHCP settings. These lines are include in the global scope of `dhcpd.conf`. Any valid global DHCP option can be used here (lines should not end with ";").	
Enable failover protocol	Controls wheter DHCP failover protocol is enabled.	No
Port number	Port to be used by DHCP failover protocol	519
Max Response Delay	Max Response Delay for DHCP failover protocol	60
Max Unacked Updates	Max Unacked Updates for DHCP failover protocol	10

Field	Description	Example
MCLT	Maximum Client Lead Time (MCLT) for DHCP failover protocol	3600
Split	Split for DHCP failover protocol	128
Load balance max	Load balance max (seconds) for DHCP failover protocol	3

5.2. Zones Menu

Zones menu contains commands for creating and modifying zones for administrator. For normal user it only provides zone selection command for selecting the active zone.

5.2.1. Show Current

Show Current command displays the currently selected zone information. It is default command when entering Zones menu. Name of the currently selected zone can be seen on the left side of the screen in “Current selections” box.

5.2.2. Show Pending

Show Pending command displays list of pending changes for hosts in this zone. This list currently displays all new or modified hosts (or aliases) since DNS configuration was last time generated.

Also when viewing a host record, there is word PENDING at the end of the “Record created” or “Last modified” fields if changes to this record are not yet in effect.

5.2.3. Select

Select command displays list of available zones in current server for selecting active zone.

5.2.4. Add

Add command is used to create a new zone. This command is only available for administrator. See Table 5-3 for descriptions of the fields used in the command dialog.

Table 5-3. New Zone Dialog

Field	Description	Example

Field	Description	Example
Zone name	Zone name (without the dot in the end)	middle.earth
Type	Zone type; Master=master zone, Slave=slave zone	Master
Reverse	Reverse zone flag; Yes=reverse zone, No=normal zone	No

5.2.5. Add Default Zones

Add Default Zones command is used to automatically add the standard zones for normal DNS server. This command will try to add following zones into current server:

```
localhost
127.in-addr.arpa
0.in-addr.arpa
255.in-arrd.arpa
```

This command is only available for administrator.

5.2.6. Copy

Copy command copies entire zone (including all the hosts in a master zone) under new name. This option can be used to use existing zone as a template when creating new zones. This command is available only for administrator.

5.2.7. Delete

Delete command allows removal of a zone. This command should be used with caution, since it will remove the entire zone from the database. This command is available only for administrator.

5.2.8. Edit

Edit command is used to edit existing zone. This command is only available for administrator. See Table 5-4 for descriptions of the fields used in the command dialog.

Table 5-4. Edit Zone Dialog

Field	Description	Example
Zone name	Zone name (without the dot in the end)	middle.earth

Field	Description	Example
Comments	optional comments about the zone	company main zone
Info TXT record auto generation	Flag that controls the automatic generation of descriptive TXT records for each host from the host info fields (User,Dept,Location,Info)	Yes
“Dummy” zone	Flag when set, causes this zone to be treated as a “dummy” zone that only appears in the `named.conf` but the zone file will not be generated by Sauron.	No
Class	Zone class; IN (Internet), CHAOS, HESIOD, HS	IN
Hostmaster	Zone specific hostmaster’s email address. If empty hostmaster’s email address from server record is used.	
Check-names	BIND’s “check-names” option; default, fail, ignore, warn	default
Notify	BIND’s “notify” option; default, yes, no	default
Refresh	SOA record refresh value. If empy, value from the server record is used instead	
Retry	SOA record retry value. If empy, value from the server record is used instead	
Expire	SOA record expire value. If empy, value from the server record is used instead	
Minimum (negative caching TTL)	SOA record minimun value. If empy, value from the server record is used instead	
Default TTL	Default TTL for RRs in this zone. If empy, value from the server record is used instead	
IP addresses (A)	Zone A record(s).	192.168.1.1
Name servers (NS)	Zone NS records (there should always be at least two name servers defined for a zone)	ns1.middle.earth ns2.middle.earth

Field	Description	Example
Mail exchanges (MX)	Zone MX records	10 mail1 10 mail2 20 mailbackup
Info (TXT)	Zone TXT records.	
Allow dynamic updates	BIND allow-update option	
Allow queries from	BIND allow-query option	
Allow zone-transfers from	BIND allow-transfer option	
[Stealth] Servers to notify	BIND also-notify option	
Zone specific DHCP entries	dhcpd options for all hosts in this zone	

5.3. Hosts Menu

Hosts menu contains commands for creating and modifying hosts. In addition, this menu provides the search commands for searching hosts within a zone.

Most of the host specific commands are not in the Hosts menu itself, but are displayed as buttons when user views a host record. Some of these buttons such as Edit or Delete are only available when user has privileges to make modifications to hosts in that zone.

5.3.1. Search

Search command is the default command when entering into Hosts menu. This command provides powerful search engine for hosts within current zone. See Table 5-5 for descriptions of the fields used in the command dialog.

Table 5-5. Search Hosts Dialog

Field	Description	Example
Record type	Limits search to specific record type; <Any Type>, Host, Host reservation, Delegation, Plain MX, Alias, AREC Alias, Glue record, DHCP only	Host
Subnet	Search only hosts within specified network	

Field	Description	Example
CIDR (block) or IP	Lmit search to given CIDR block or IP address (NOTE! this field supersedes the subnet field)	192.168.1.128/25
Domain pattern (regexp)	Limit search scope to hosts that have domainname that matches regular expression given in this field.	\.sales$
Sort order	Sort search result by IP or hostname	by IP
Entries per page	Number of hosts to display per page	256
Search field	Defines the field that is searched for pattern defined in next field (Pattern).	Ether
Pattern (regexp)	Search hosts records for this regular expression in the field defined in “Search field” field.	

5.3.2. Last Search

Last Search command performs the previous search again. This provides a quick way to redo a search you did earlier.

5.3.3. Add host

Add host command is used to create a host. This command displays slightly different dialog for administrators or users with “RWX” access to the zone than normal users who will get more restrictive dialog. See Table 5-6 for descriptions of the fields used in the command dialog.

Table 5-6. Add Host Dialog

Field	Description	Example
Hostname	Hostname (without the zonename part of the host’s FQDN)	ws001
Subnet	Select “Manual IP” for manually specifying host’s IP number, or select desired network for automatically selecting next available IP number from within that networks auto assign range.	<Manual IP>

Field	Description	Example
IP	Host's IP number (only if "Manual IP" selected in subnet field).	
Router (priority)	This field should be zero for hosts. For router interfaces, this should be set to positive priority value (1=highest priority). Priority is used for choosing "best" router interface when generating DHCP config for each subnet.	0
Group	Group which this host belongs to.	None
MX template	MX template to use for this host.	None
WKS template	WKS template to use for this host.	None
User	primary user/use for this host (informational)	Gandalf the White
Dept.	department this host belongs to (informational)	Mages Guild
Location	current location of the host (informational)	White Tower
Info	extra information about the host (informational)	
HINFO hardware	Host hardware description	PC
HINFO software	Host software (OS) description	MS-WINDOWS-2000
Ethernet address	Host NIC hardware (MAC) address (this must be unique within zone)	00:00:01:23:45:66
Asset ID	This field is reserved for organizational asset ID tag (this must be unique within server)	
Model	Host model information (informational)	
Serial no.	Host serial number (informational)	
Misc.	miscellaneous information about the host (informational)	
Expiration date	Host will automatically disappear from DNS & DHCP configurations after it has expired (`sauron` can automatically clean expired hosts from database when run with `--clean` option)	

5.3.4. Edit (button)

Edit button is used to modify existing host. This button can only be used by normal user if she has necessary privileges to make modifications to the host. See Table 5-7 for description of the fields used in this dialog.

Table 5-7. Edit Host Dialog

Field	Description	Example
Hostname	Hostname (without the zonename part of the host's FQDN)	ws001
IP address	Host's IP address.	192.168.1.100
User	primary user/use for this host (informational)	Gandalf the White
Dept.	department this host belongs to (informational)	Mages Guild
Location	current location of the host (informational)	White Tower
[Extra] Info	extra information about the host (informational)	
HINFO hardware	Host hardware description	PC
HINFO software	Host software (OS) description	MS-WINDOWS-2000
Ethernet address	Host NIC hardware (MAC) address (this must be unique within zone)	00:00:01:23:45:66
Asset ID	This field is reserved for organizational asset ID tag (this must be unique within server)	
Model	Host model information (informational)	
Serial no.	Host serial number (informational)	
Misc.	miscellaneous information about the host (informational)	
Group	Group which this host belongs to.	None
MX template	MX template to use for this host.	None
WKS template	WKS template to use for this host.	None
Expiration date	Host will automatically disappear from DNS & DHCP configurations after it has expired (`sauron` can automatically clean expired hosts from database when run with `--clean` option)	

5.3.5. Delete (button)

Delete button is used to delete a host. This button can only be used by normal user if she has necessary privileges to make modifications to the host. If a host has dynamic aliases that point to it those aliases are also automatically removed when the host is deleted.

5.3.6. Copy (button)

Copy button can be used to "copy" a host easily. This button will take the information from the current host and use this information to pre-fill Add host command dialog. If hostname contains number it is incremented, otherwise number two (2) is appended to the end of the hostname.

5.3.7. Move (button)

Move button is used to move a host into a new subnet. After selecting new subnet for this host, next available IP address within the auto assign address range of that network is suggested as new IP address for the host. This button can only be used by normal user if she has necessary privileges to make modifications to the host.

5.3.8. Alias (button)

Alias button is used to add a dynamic (CNAME or A record) alias for a host. This button can only be used by normal user if she has necessary privileges to make modifications to the host.

5.3.9. Add alias

Add alias command is used to add a static (CNAME) alias. This command is meant for adding static "out-of-zone" aliases only. Normally aliases should be added using Alias button, which will create a dynamic alias for that host. This command is available for administrator and users with "RWX" access to the zone.

5.3.10. Add MX entry

Add MX entry command is used to add plain MX record (without A records or anything). This command is available for administrator and users with "RWX" access to the zone.

5.3.11. Add delegation

Add delegation command is used to add a zone delegation (NS records). This command is available for administrator and users with "RWX" access to the zone.

5.3.12. Add glue rec.

Add glue rec. command is used to add glue records that are sometimes required for delegations where one ore more delegated zone's name servers are within that zone. This command is available for administrator and users with "RWX" access to the zone.

5.3.13. Add DHCP entry

Add DHCP entry command is used to add a "host" entry that will only appear in DHCP configuration, but not in DNS configuration. This command is available for administrator and users with "RWX" access to the zone.

5.3.14. Add SRV rec.

Add SRV rec. command is used to add a SRV records. This command is available for administrator and users with "RWX" access to the zone.

5.3.15. Add reservation

Add reservation command is used to add a host reservation. Host reservations can be used to reserve hostnames and IP numbers for future use.

5.3.16. Network Settings (button)

Network Settings button displays network settings for selected host. This will include IP address, netmask, network address, broadcast address, and default gateway for the host.

5.3.17. History (button)

History button displays history of this host record. This will include information like when the record was created, and when it was modified and by whom. This option is available for users who by default have authorization level of 1 or higher (this can be controlled via variable `ALEVEL_HISTORY` in configuration file).

5.3.18. Ping (button)

Ping button allows user to run "ping" command against the selected host. This option is only available when it is explicitly enabled in configuration file and user has at least the required authorization level.

5.3.19. Traceroute (button)

Traceroute button allows user to run “traceroute” command against the selected host. This option is only available when it is explicitly enabled in configuration file and user has at least the required authorization level.

5.4. Templates Menu

Templates menu contains commands for creating and modifying templates. Only “show” commands under this menu are available for normal users.

Templates are used by hosts, they can be used to specify common MX, WKS, or HINFO records for groups of hosts. Normal users can only use templates that have same or lover privilege level than the user has.

5.4.1. Show MX

Show MX command displays list of MX templates defined for this zone. To view specific MX template click on it’s name. To edit or delete a MX template use Edit or Delete buttons from the bottom of the screen when viewing a template.

5.4.2. Show WKS

Show WKS command displays list of WKS templates defined for this server. To view specific WKS template click on it’s name. To edit or delete a WKS template use Edit or Delete buttons from the bottom of the screen when viewing a template.

5.4.3. Show HINFO

Show HINFO command displays list of HINFO templates defined for this Sauron installation. To view specific HINFO template click on it’s name. To edit or delete a HINFO template use Edit or Delete buttons from the bottom of the screen when viewing a template.

5.4.4. Add MX

Add MX command is used to create a new MX template for selected zone. This command is only available for administrator.

5.4.5. Add WKS

Add WKS command is used to create a new WMX template for selected server. This command is only available for administrator.

5.4.6. Add HINFO

Add HINFO command is used to create a new HINFO template. These templates are global and available to all servers in this database (Sauron installation). This command is only available for administrator.

5.5. Groups Menu

Groups menu contains commands for creating and modifying (host) groups. Normal users can only list and view group details; all other commands are for administrator only.

Groups are used by hosts; they are used to specify common attributes for hosts. Normal users can only use groups that have same or lover privilege level than the user has. There are currently three different types of groups.

Group Types

Normal

Normal group is used to specify common DHCP and PRINTER entries for hosts.

DHCP class

This group is like normal group, but in DHCP configuration a class named after this group will be created and all hosts in this group will be "subclassed" into that class. This class can be used for example to allow only hosts in this group to use certain dynamic address pool.

Dynamic Address Pool

This group is used only for hosts (IPs) that belong to a certain IP address pool for a DHCP server. For each dynamic address pool for DHCP server, group of host entries that belong to this group should be created (IP addresses of these hosts don't necessarily have to be successive, but for each group a separate pool statement will be created in `dhcpd.conf`). When generating DHCP configuration, dynamic address pools are automatically generated for each group of this type. DHCP entries set for this group are put inside "pool" declaration in `dhcpd.conf` (these can be used to deny/allow certain classes of hosts to use this pool).

5.5.1. Show Groups

Show Groups command displays list of (host) groups defined for active server. To view details about a specific group, just click on it's name. To edit or delete a group use Edit or Delete buttons from the bottom of the screen when viewing a template.

5.5.2. Add

Add command is used to create new (host) group for currently active server. This command is only available for administrator.

5.6. Nets Menu

Nets menu contains commands for managing networks and VLANs (Layer-2 networks). Normal user can only see list of networks that have lower or same privilege level set than the user has. VLAN information is by default visible only for users with privilege level 5 or above (this can be controlled via `ALEVEL_VLANS` variable in configuration file).

Networks are divided into two types “Net” and “Subnet”. Where “Net” is used for networks that are delegated for your use (and you generate reverse zones for). “Subnet” is used for networks (subnets) within these “Nets” (networks). This information is used (along with VLAN information) to generate network topology for DHCP configuration.

VLANs are used to describe the “Layer-2 network” topology of your network. Each network can be assigned to one VLAN. All networks that don’t have VLAN set are part of virtual VLAN called “CHAOS” (normal VLAN names are always lower case).

5.6.1. Networks

Networks command lists all the networks that are defined for active server. To view details of a network, just click on the network. To edit or delete selected network use Edit or Delete buttons. For information about selected network use Net Info button that displays technical information about given network and map of IPs currently in use.

5.6.2. Add net

Add net command is used to create a new “Net” (network) for active server. This should be used only for networks that are delegated for your use. This command is only available for administrator.

5.6.3. Add subnet

Add subnet command is used to create a new “Subnet” for active server. This should be used for all subnets within your official networks. This command is only available for administrator.

5.6.4. Edit (button)

Edit button is used to modify existing network. See Table 5-8 for information about fields used in this dialog. This button is only available for administrator when viewing network details.

Table 5-8. Edit Net Dialog

Field	Description	Example
Net name	Network (subnet) name (handle that can contain only letters and numbers and hyphen)	sales-net
Description	Long description of network	Sales Deparment Network

Field	Description	Example
Net (CIDR)	Network defined as CIDR block	192.168.1.0/24
VLAN	VLAN (Layer-2 network) this network belongs to	None
Authorization level	Authorization level required for user to see this network	0
Private (hide from browser)	Private network (hide from `browser.cgi`)	No
Comment	Optional comments aobut this network	
Range start	Auto assign address range start (Sauron will automatically assign new IP addresses from a network that are inside the auto assign range).	192.168.1.1
Range end	Auto assign address range end.	192.168.1.254
DHCP	DHCP enabled flag; this network is “visible” to DHCP server only if this is enabled	Enabled
Net specific DHCP entries	DHCP configuration options lines specific to this network (don’t use semicolon at the end of these lines).	

5.6.5. VLANs

VLANs command lists all VLANs (Layer-2 networks) that are defined for active server. To view details of a VLAN, just click on the network. To edit or delete selected network use Edit or Delete buttons. This command is only available for users with sufficiently high authorization level.

5.6.6. Add vlan

Add vlan command is used to create a new VLAN (Layer-2 network) entry for active server. This command is only available for administrator.

5.7. Login Menu

Login menu contains miscellaneous commands that mainly provide commands to tune user account settings, and display information about the web interface itself.

5.7.1. User Info

User Info command displays general information about current user's account and user privileges (permissions). See Table 4-1 for description about user privileges.

5.7.2. Who

Who command displays list of currently logged on users. This list includes username, user's full name, host where user coming from, when user logged in, and how long user has been idle.

5.7.3. News (motd)

News (motd) command displays all system news (or message of day) messages. When users login they will see latest three news messages automatically.

5.7.4. Login

Login command allows user to login again using different user account.

5.7.5. Logout

Login command allows user to logout from the system. This will also try to erase session cookie from user's browser by issuing new cookie "dummy" cookie with expiration time set to "now".

5.7.6. Change password

Change password command allows user to change her own password. Password change dialog will prompt for user's current password and new password twice to reduce risk of typing mistakes in new password.

5.7.7. Edit settings

Edit settings command allows user to change her email address and toggle automatic email notifications on or off. Automatic email notifications are sent to user's email address when user's changes come to effect (new DNS configuration is generated using `sauron` command with `--mail` option).

5.7.8. Save settings

Save settings command save user's current server and zone selection. When user logs on next time, server and zone selections are recalled and user will be in Hosts menu by default.

5.7.9. Frames ON/OFF

Frames ON/OFF command allows user to toggle between frames and non-frames operation mode of the web interface. It should be noted that the non-frames mode of the web interface is currently faster and better tested.

5.7.10. Lastlog

Lastlog command displays list or resent user sessions (with links to session infos). This command is only available for administrator.

5.7.11. Session Info

Session Info command allows administrator to browse log information about user sessions by session id (SID). Log information contains information about what changes user has made to hosts. This command is only available for administrator.

5.7.12. Add news msg

Add news msg command allows administrator to add news system news messages that are displayed when to users when they log in.

Chapter 6. Command Reference

This chapter provides a reference for all the command-line utilities included with Sauron. All these utilities have built-in help, which can be displayed by invoking them with single argument `--help` (these utilities use GNU style long options).

These utilities are meant for Sauron administrators and do not implement any access control methods. To protect unauthorized access into Sauron database, restrict access to the database in PostgreSQL (and don't forget to restrict access to the Sauron configuration file if it contains sensitive information such as database password).

6.1. addgroup

This command is used to add a new user group. User groups can be used to simplify user privilege management by assigning privileges to a group and then assigning users to that group.

addgroup [--help] [--group=*`name`*] [--name=*`longname`*]

This command can be used interactively when run without any arguments, or in patch mode by specifying both `--group` and `--name` arguments on command-line.

6.2. addhosts

This command can be used to add host entries into existing zone in Sauron from a text file that is standard zone-file format.

addhosts [--help] {*`server`*} {*`zone`*} {*`file`*} [*`OPTIONS`*]

option	description
`--name=`*`regexp`*	Host name filter. Only add hosts if domainname matches to given regular expression.
`--newonly`	Add only hosts that do not already exist in Sauron database.
`--noreverse`	Do not add reverse records.
`--outofzone`	Allow out of zone records.
`--verbose`	Produce more verbose output.
`--group=`*`name`*	Assign new hosts into given group.
`--info=`*`user`*`:`*`dept`*`:`*`location`*`:`*`info`*	Set info fields for all imported host to these values.
`--force=`*`type`*	Force host record in Sauron to be this type: dhcp-only
`--commit`	Commit changes (without this no changes are made into database).

By default this program will not make any changes to Sauron database, it will only display what would be made. Use `--commit` to make changes into Sauron database.

6.3. adduser

This command is used to add a new user for Sauron web user interface.

adduser [--help] [--user=*`username`*] [--passwd=*`password`*] [--group=*`name`*] [--name=*`users-full-name`*] [--email=*`email-address`*] [--comment=*`comments`*] [--superuser] [--expiration=*`dd-mm-yyyy`*]

This command can be used interactively when run without any arguments, or in patch mode by specifying at least `--user` and `--passwd` options on command-line.

6.4. check-pending

Program to be run from cron that check for pending changes in Sauron database and sends notification of pending changes to address given on command-line.

check-pending [--help] {*`servername`*} {*`emailaddress`*}

To use this program `SAURON_MAILER` (and related settings) have to be configured in Sauron configuration file.

6.5. delgroup

This command removes user group permanently.

delgroup [--help] [--group=*`groupname`*] [--newgroup=*`groupname`*]

When run without any arguments this program runs in interactive mode prompting for group to be deleted. Groups can also be removed non-interactively by specifying `--group` option on command-line. Normally users that were in the deleted group are left without a group. If `--newgroup` is specified then any users that were in the deleted group are assigned to this group.

6.6. deluser

This command removes user account permanently. Account can also be locked using **moduser** program (see Section 6.18).

deluser [--help] [--user=*`username`*]

When run without any arguments this program runs in interactive mode prompting for user to be deleted. Users can also be removed non-interactively by specifying `--user` option on command-line.

6.7. expire-hosts

This is a utility for expiring unused (hosts that haven't been issued a DHCP lease within given time-frame) host entries.

expire-hosts [--help] {*`server`*} [*`OPTIONS`*]

option	description
`--cidr=`*`CIDR`*	Select only hosts within this CIDR block.
`--name=`*`regexp`*	Select only hostnames matching the regular expression.
`--netname=`*`regexp`*	Select only hosts in the networks matching the regular expression (selects only hosts within auto assign ranges in these networks).
`--treshold=`*`days`*	Expire hosts with no DHCP activity in last <days> days (default: 90 days).
`--norecord`	Expire only hosts wit no recorded DHCP activity.
`--edate=`*`dd-mm-yyyy`*	Set hosts to expire on this date (default: now).
`--verbose`	Make program to display more verbose output.
`--commit`	Commit changes (without this no changes are made into database).

By default this program will not make any changes to Sauron database, it will only display what would be made. Use `--commit` to make changes into Sauron database.

6.8. export-networks

This utility generates *nix `/etc/networks` format file of networks defined for given server.

export-networks [--help] [--verbose] [--comments] [--all] {*`servername`*}

This program sends generated file into standard output. Normally only networks that have `DHCP` setting set to true are included in the listing. To force listing of all networks defined for this server use `--all` option. Network names from Sauron are not included as comments into output unless `--comments` option is used.

6.9. generatehosts

This is a utility for generating number of similar host entries into Sauron database with one command.

generatehosts [--help] {*server*} {*zone*} {*hostname*} {*starting-IP*} {*count*} [*OPTIONS*]

option	description
`--noreverse`	Do not add reverse records.
`--outofzone`	Allow out of zone records.
`--verbose`	Produce more verbose output.
`--seqstart=`*n*	Start sequence numbering from n.
`--group=`*name*	Assign new hosts to this group.
`--info=`*user*`:`*dept*`:`*location*`:`*info*	Set info fields for all hosts to these values.
`--commit`	Commit changes (without this no changes are made into database).

By default this program will not make any changes to Sauron database, it will only display what would be made. Use `--commit` to make changes into Sauron database.

Hostname argument serves as a template for hostname of generated hosts. Following tags can be used in `hostname`:

:N:	current sequence number
:IP1:	first octet of current IP-number
:IP2:	second octet of current IP-number
:IP3:	third octet of current IP-number
:IP4:	fourth octet of current IP-number

6.10. import

Utility for importing complete BIND configuration file set into Sauron. This program parses BIND configuration files and generates new server and related zones into Sauron. See also Section 3.2.2.

import [--help] [*OPTIONS*] {*servername*} {*named.conf file*}

option	description
`--orphans=`*zonename*	Zone for 'orphan' PTR record hosts.
`--notransaction`	Do not use transactions when updating database (potentially dangerous, but speeds up things).
`--dir=`*directory*	Directory where configuration files are located (if not in the directory specified in named.conf).

option	description
`--verbose`	Make program to display more verbose output.

By default **import** expects to find zone-files in the locations specified in the `named.conf`, but `--dir` option can be used to explicitly specify location for zone-files. After importing server from existing BIND configuration, related DHCP configuration should be imported using **import-dhcp** command.

6.11. import-dhcp

This utility can be used after importing existing DNS configuration using **import** utility to add information (Ethernet addresses and network map) from DHCP configuration into a server.

import-dhcp [--help] [*OPTIONS*] {*servername*} {*dhcpd.conf file*}

option	description
`--dir=`*directory*	Directory where included files are located (if not in the directory specified in dhcpd.conf).
`--chaosnet=`*name*	Treat this shared-network as default VLAN (default is “CHAOS”).
`--global`	Import "global" entries into server DHCP settings.
`--verbose`	Make program to display more verbose output.

When using this program after importing existing DNS configuration using **import**, `--global` should be used to import global DHCP settings into the server DHCP settings.

6.12. import-ethers

Utility for assigning OUI (Ethernet card manufacturer) information into global table `ether_info`. This table enables Sauron to recognize and display Network card (NIC) manufacturer information.

import-ethers [--help] [--force] {*file*}

This program currently understands OUI information in old `Ethernet.txt` format and in the IEEE’s OUI list format (`oui.txt`). Normally this utility only adds new OUIs into database, but using `--force` option allows updating all OUIs.

6.13. import-roots

Utility for importing root server hints into Sauron. Sauron has global table for root servers. But it is also possible to import server specific root servers which override global root servers table.

import-roots [--help] [--update] [*servername* | default] {*file*}

This program imports standard root server (hint) zone-file. To import global root servers use “default” as the server name.

6.14. import-zone

This a utility for importing DNS zones into existing server. Zones can be read either from a zone file or fetched directly from DNS using zone transfer.

import-zone [--help] [*OPTIONS*] {*servername*} {*zone*} [*zone file*]

option	description
`--nameserver=`*server*	Use this nameserver for zone transder (argument must be either IP number or domainname).
`--zone=`*name*	Insert hosts into this parent zone, instead of generating new zone.
`--group=`*name*	Assign new hosts into this group.
`--verbose`	Make program to display more verbose output.

Normally **import-zone** command generates a new zone in Sauron, but with `--zone` option it is possible to import only the hosts from a zone into that zone’s parent zone (which must already exist in Sauron).

6.15. last

Utility for listing “lastlog” information about Sauron WWW-interface users. This command is similar to *nix **last** command.

last [-h] [-*num*] [*username*]

Option -*num* can be used to limit how many entries to display. To list only lastlog entries of a specific user enter that user name as the last argument.

6.16. modgroup

This is utility for modifying user groups. This utility can also be used to list all user groups. User groups can be assigned all the same privileges as a user, but assigning privileges to groups and then users make privilege management more manageable with large number of users. See also Section 4.1.2.

modgroup [--help] {*groupname*} [*OPTIONS*]

option	description
`--list`	List all groups and exit.

option	description
`--add`	Add interactively privileges to given group.
`--add=server,`*`servername,mode`*	Add server privilege (mode=R|RW|RWX).
`--add=zone,`*`servername:zonename,mode`*	Add zone privilege (mode=R|RW|RWX).
`--add=net,`*`servername:net`*	Add net (IP-range) restriction.
`--add=host,`*`regexp`*	Add hostname mask (restriction).
`--add=ipmask,`*`ipmask`*	Add IP-mask restriction.
`--add=level,`*`level`*	Add privilege level.
`--add=elimit,`*`days`*	Add host expiration limit.
`--add=def_dept,`*`string`*	Add default department for adding hosts.
`--del=`*`id`*	Delete privilege by it's ID number.
`--delall`	Delete all privileges.

This program can be used to list all available groups by specifying only `--list`. Privileges can be added either interactively by specifying short form of `--add` or non-interactively by using long form.

6.17. modhosts

Simple utility for modifying or deleting several hosts at a time.

modhosts [--help] {*`server`*} {*`zone`*} [*`OPTIONS`*]

option	description
`--cidr=`*`CIDR`*	Select only hosts within this CIDR block.
`--name=`*`regexp`*	Select only hostnames matching the regular expression.
`--info=`*`regexp`*	Select only hosts with matching info (this looks for pattern in User, Dept, Location, and Info fields).
`--type=`*`type`*	Select only hosts of this type (available types: host, cname, arc, srv).
`--ether=`*`regexp`*	Select only hosts with matching Ethernet (MAC) address.
`--etherempty`	Select only hosts without Ethernet (MAC) address.
`--delete`	Delete matching hosts.
`--move=`*`CIDR,IP`*	Move host into given network (starting from IP within that network).
`--rename=`*`regexp`*	Rename hosts using given "substitution" regular expression.
`--setedate=`*`days`*	Set host expiration dates to: today+*`days`*.
`--setgroup=`*`groupname`*	Assign hosts to this group.

option	description
`--commit`	Commit changes (without this no changes are made to database).

By default this program will not make any changes to Sauron database, it will only display what would be made. Use `--commit` to make changes into Sauron database.

6.18. moduser

This is utility for modifying user accounts. This utility can also be used to list all users. This utility can also be used to modify user account privileges, but it's recommended to use user groups rather than assigning privileges directly to user accounts. For more information about user privileges see Section 4.1.2.

moduser [--help] {*username*} [*OPTIONS*]

option	description
`--name="`*user's name*`"`	Set user's full name.
`--email=`*address*	Set user's email address.
`--comment=`*text*	Set user comments.
`--expiration=`*dd-mm-yyyy* `| NONE`	Set account expiration date.
`--superuser=yes | no`	Toggle superuser flag for user.
`--passwd`	Set user password interactively.
`--passwd=`*password*	Set user password.
`--group=`*groupname* `| NONE`	Set user's group.
`--list`	List all users and exit.
`--lock`	Lock user account.
`--unlock`	Unlock user account.
`--add`	Add interactively privileges to given group.
`--add=server,`*servername,mode*	Add server privilege (mode=R|RW|RWX).
`--add=zone,`*servername:zonename,mode*	Add zone privilege (mode=R|RW|RWX).
`--add=net,`*servername:net*	Add net (IP-range) restriction.
`--add=host,`*regexp*	Add hostname mask (restriction).
`--add=ipmask,`*ipmask*	Add IP-mask restriction.
`--add=level,`*level*	Add privilege level.
`--add=elimit,`*days*	Add host expiration limit.
`--add=def_dept,`*string*	Add default department for adding hosts.
`--del=`*id*	Delete privilege by it's ID number.
`--delall`	Delete all privileges.

This program can be used to list all users by specifying only `--list`. Privileges can be added either

interactively by specifying short form of `--add` or non-interactively by using the long form.

6.19. runsql

Utility for sunning SQL code from a file into Sauron database. This utility is used by **createtables** to initialize Sauron database.

runsql [--help] [--separate] *`filename`*...

Normally all files given as arguments are processed inside on transaction. To process each file as a separate transaction use `--separate` option.

6.20. sauron

This is the program for generating DNS and DHCP configuration files from Sauron database for given server.

sauron [--help] [*`OPTIONS`*] {*`servername`*} [*`target directory`*]

option	description
`--all`	Generate all (DNS & DHCP) configuration files.
`--bind`	Generate BIND (named) configuration files.
`--dhcp`	Generate DHCP (dhcpd) configuration files.
`--printer`	Generate PRINTER (lpd) configuration files (not yet implemented).
`--clean`	Cleanup expired host records from the server. By default host records that have been expired over 30 days are removed, but this can be controlled using configuration file option `SAURON_REMOVE_EXPIRED_DELAY`.
`--updateserial`	force SOA serial number update on master zones.
`--check`	Check validity of generated DNS & DHCP configuration files. (see Section 3.3).
`--dhcp2`	Enable DHCP v2 compatibility mode.
`--mail`	Enable email notification sending.

Option `--updateserial` forces the update of zone SOA serial numbers for master zones. Normally Sauron tries to detect if zone serial number update is necessary and update it only when needed, but this detection routine may sometimes fail, so for now it's recommended to use `--updateserial` option.

6.21. status

Utility for listing database connection status and the WWW user interface status information including currently logged in users.

status [--help] [*OPTIONS*]

option	description
`--pending`	Display number of host changes pending for each server.
`--pending=`*`servername`*	Display pending host changes for given server.
`--cgi-disable=`*`message`*	Disable WWW interface and set message to be displayed when users try to access the WWW interface.
`--cgi-enable`	Enable WWW interface.
`--quiet`	Display less verbose output.
`--versions`	Display module version numbers.

This command can be easily used from shell scripts to test for pending changes for a server by using `--pending=`*`servername`* (and optionally `--quiet` option) which returns exit code 2 if there are pending hosts (0=no pending hosts, 1=error).

6.22. update-dhcp-info

Utility designed to be run from cron that parses logs generated by **dhcpd** and updates “Last lease issued by DHCP server” fields for hosts.

update-dhcp-info [--help] [--verbose] [--year=*`yyyy`*] {*`servername`*} *`logfile`*

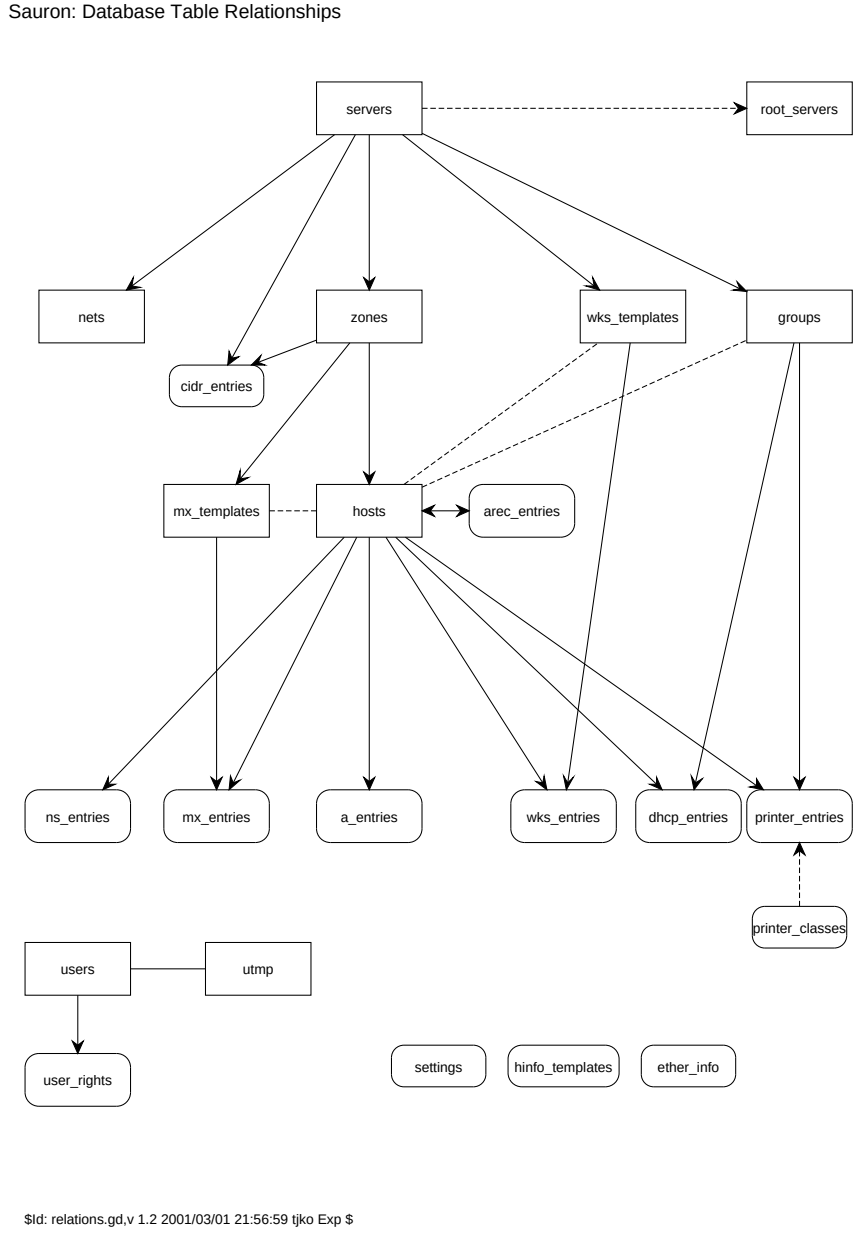
Since normal syslog logfiles have timestamps without year information, option `--year` can be used to specify the year to be used if parsing logfiles from previous year. Normally **update-dhcp-info** assumes that the logfile is from current year.

Appendix A. Technical Details

This appendix describes the Sauron database layout. Sauron database contains database version number stored in `settings` table. This database version number must match with the version Sauron “back end” was made for. If database format changes in future versions, the database version number will be incremented and a conversion script from previous version will be shipped with Sauron.

Current Sauron Database version is 1.0

Figure A-1. Table Relations



A.1. Sauron: SQL table descriptions

Tables:

- common_fields
- settings
- servers
  - zones(zones.server -> servers.id)
    - hosts(hosts.zone -> zones.id)
      - dhcp_entries(dhcp_entries.ref -> hosts.id)
      - mx_entries(mx_entries.ref -> hosts.id)
      - ns_entries(ns_entries.ref -> hosts.id)
      - printer_entries(printer_entries.ref -> hosts.id)
      - a_entries(a_entries.host -> hosts.id)
      - txt_entries(txt_entries.ref -> hosts.id)
      - srv_entries(srv_entries.ref -> hosts.id)
      - wks_entries(wks_entries.ref -> hosts.id)
      - arec_entries(arec_entries.host -> hosts.id)
      - arec_entries(arec_entries.arec -> hosts.id)
    - cidr_entries(cidr_entries.ref -> zones.id)
    - dhcp_entries(dhcp_entries.ref -> zones.id)
    - mx_entries(mx_entries.ref -> zones.id)
    - mx_templates(mx_templates.zone -> zones.id)
      - hosts(hosts.mx -> mx_templates.id)
    - ns_entries(ns_entries.ref -> zones.id)
    - txt_entries(txt_entries.ref -> zones.id)
  - groups(groups.server -> servers.id)
    - hosts(hosts.grp -> groups.id)

    - dhcp_entries(dhcp_entries.ref -> groups.id)
    - printer_entries(printer_entries.ref -> groups.id)

  - nets(nets.server -> servers.id)
    - dhcp_entries(dhcp_entries.ref -> nets.id)

  - cidr_entries(cidr_entries.ref -> servers.id)
  - dhcp_entries(dhcp_entries.ref -> servers.id)
  - txt_entries(txt_entries.ref -> servers.id)
  - wks_templates(wks_templates.server -> servers.id)
    - hosts(hosts.wks -> wks_templates.id)
    - wks_entries(wks_entries.ref -> wks_templates.id)

  - root_servers(root_servers.server -> servers.id)
  - vlans(vlans.server -> servers.id)
    - nets(nets.vlan -> vlans.id)

- ether_info
- printer_classes
  - printer_entries(printer_entries.ref -> printer_classes.id)

- users
  - user_rights(user_rights.ref -> users.id)
  - utmp(utmp.uid -> users.id)

- user_groups
  - users(users.gid -> user_groups.id)
  - user_rights(user_rights.ref -> user_groups.id)
  - utmp(utmp.gid -> user_groups.id)

- hinfo_templates
- history
- lastlog
- news

A.1.1. Table Descriptions

A.1.1.1. common_fields

virtual table; generic fields for most of the tables

field	type	comments
cdate	INT4	creation date
cuser	CHAR(8) DEFAULT 'unknown'	creating user
mdate	INT4	modification date
muser	CHAR(8) DEFAULT 'unknown'	last changed by this user
expiration	INT4	expiration date

A.1.1.2. settings

global settings table

field	type	comments
key	TEXT NOT NULL CHECK(key <> '')	name os setting tuple
value	TEXT	string value of setting
ivalue	INT4	interger value of setting
CONSTRAINT	global_key PRIMARY KEY (key)	

A.1.1.3. servers

This table contains servers that are managed with this system. For each server named/dhcpd/printer configuration files can be automagically generated from the database.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
name	TEXT NOT NULL CHECK(name <> '')	server name
zones_only	BOOL DEFAULT false	if true, generate named.zones file otherwise generate complete named.conf
no_roots	BOOL DEFAULT false	if true, no root server (hint)zone entry is generated

field	type	comments
dhcp_mode	INT DEFAULT 1	DHCP subnet map creation mode: 0 = use VLANs,1 = use networks
dhcp_flags	INT DEFAULT 0	DHCP option flags: 0x01 = auto-generate domainnames0x02 = enable failover protocol
named_flags	INT DEFAULT 0	named option flags: 0x01 = access control from master (slave only) 0x02 = include also slave zones from master (slave only) 0x04 = do NOT generate HINFO records0x08 = do NOT generate WKS records
masterserver	INT DEFAULT -1	dynamically add slave zonesfor all zones in master server
		named.conf options...more to be added as needed...
version	TEXT	version string to display (optional)
directory	TEXT	base directory for named (optional)
pid_file	TEXT	pid-file pathname (optional)
dump_file	TEXT	dump-file pathname (optiona)
named_xfer	TEXT	named-xfer pathname (optional)
stats_file	TEXT	statistics-file pathname (optional)
memstats_file	TEXT	memstatistics-file pathname (optional)
named_ca	TEXT DEFAULT 'named.ca'	root servers filename
pzone_path	TEXT DEFAULT ''	relative path for masterzone files
szone_path	TEXT DEFAULT 'NS2/'	relative path for slave zone files
query_src_ip	TEXT	query source ip (optional) (ip | '*')
query_src_port	TEXT	query source port (optional) (port | '*')
listen_on_port	TEXT	listen on port (optional)
transfer_source	INET	transfer-source (optional)
forward	CHAR(1) DEFAULT 'D'	forward: D=defaultO=only, F=first
		check-names: D=default, W=warn, F=fail, I=ignore
checknames_m	CHAR(1) DEFAULT 'D'	check-names master
checknames_s	CHAR(1) DEFAULT 'D'	check-names slave

field	type	comments
checknames_r	CHAR(1) DEFAULT 'D'	check-names response
		boolean flags: D=default, Y=yes, N=no
nnotify	CHAR(1) DEFAULT 'D'	notify
recursion	CHAR(1) DEFAULT 'D'	recursion
authnxdomain	CHAR(1) DEFAULT 'D'	auth-nxdomain
dialup	CHAR(1) DEFAULT 'D'	dialup
multiple_cnames	CHAR(1) DEFAULT 'D'	multiple-cnames
rfc2308_type1	CHAR(1) DEFAULT 'D'	rfc2308-type1
		default TTLs
ttl	INT4 DEFAULT 86400	default TTL for RR records
refresh	INT4 DEFAULT 43200	default SOA refresh
retry	INT4 DEFAULT 3600	default SOA retry
expire	INT4 DEFAULT 2419200	default SOA expire
minimum	INT4 DEFAULT 86400	default SOA minimum (negative caching ttl)
		IPv6
ipv6	TEXT	reserved
		DHCP failover
df_port	INT DEFAULT 519	listen port
df_max_delay	INT DEFAULT 60	max-response-delay
df_max_uupdates	INT DEFAULT 10	max-unacked-updates
df_mclt	INT DEFAULT 3600	mlct
df_split	INT DEFAULT 128	split
df_loadbalmax	INT DEFAULT 3	load balance max seconds
		defaults to use in zones
hostname	TEXT	primary servername for sibling zone SOAs
hostaddr	INET	primary server IP address
hostmaster	TEXT	hostmaster name for sibling zone SOAsunless overided in zone
comment	TEXT	
CONSTRAINT	servers_name_key UNIQUE(name)	

A.1.1.4. zones

This table contains zone definitions of a server.

field	type	comments
id	SERIAL	unique ID

field	type	comments
server	INT4 NOT NULL	ptr to a record in servers table-->servers.id
active	BOOL DEFAULT true	zone active flag (only active zones are included innamed configuration)
dummy	BOOL DEFAULT false	dummy zone flag
type	CHAR(1) NOT NULL	zone type: (H)int, (M)aster, (S)lave, (F)orward
reverse	BOOL DEFAULT false	true for reverse (arpa) zones
noreverse	BOOL DEFAULT false	if true, zone not used in reversemap generation
flags	INT DEFAULT 0	zone option flags: 0x01 = generate TXT records fromuser,dept,location,info fields
forward	CHAR(1) DEFAULT 'D'	forward: D=default, O=only, F=first
nnotify	CHAR(1) DEFAULT 'D'	notify: D=default, Y=yes, N=no
chknames	CHAR(1) DEFAULT 'D'	check-names: D=default, W=warn, F=fail,I=ignore
class	CHAR(2) DEFAULT 'in'	zone class (IN)
name	TEXT NOT NULL CHECK (name <> '')	zone name
hostmaster	TEXT	hostmaster (email) (optional; if not defined value from server tableis used instead)
serial	CHAR(10) DEFAULT '1999123001'	zone serial number(automagically updated)
serial_date	INT4 DEFAULT 0	zone serial last update date
refresh	INT4	zone SOA refresh time
retry	INT4	zone SOA retry time
expire	INT4	zone SOA expire time
minimum	INT4	zone SOA minimum (negative caching) time
ttl	INT4	default TTL for RRs in this zone (if not defined, value from servers record isused instead)
zone_ttl	INT4	unused
comment	TEXT	
reversenet	CIDR	contains CIDR of the reverse zone(if applicaple)
parent	INT4 DEFAULT -1	unused
CONSTRAINT	zones_key PRIMARY KEY (name,server)	

A.1.1.5. hosts

This table contains host entries for a zone.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
zone	INT4 NOT NULL	ptr to a zone table record-->zones.id
type	INT4 DEFAULT 0	host type: 0=misc, 1=host, 2=subdomain (delegation), 3=mx entry, 4=alias (cname), 5=printer, 6=glue record, 7=alias (arec), 8=srv entry, 9=dhcp only, 10=zone, 101=host reservation
domain	TEXT NOT NULL CHECK(domain <> ”)	host domain name
ttl	INT4	TTL for host records, default if NULL
class	CHAR(2) DEFAULT ’IN’	class (IN)
grp	INT4 DEFAULT -1	ptr to group-->groups.id
alias	INT4 DEFAULT -1	ptr to another host record(for CNAME alias)
cname_txt	TEXT	CNAME value for out-of-zone alias
hinfo_hw	TEXT	HINFO hardware
hinfo_sw	TEXT	HINFO software
loc	TEXT	LOC record value
wks	INT4 DEFAULT -1	ptr to wks_templates table entry-->wks_templates.id
mx	INT4 DEFAULT -1	ptr to mx_templates table entry-->mx_templates.id
rp_mbox	TEXT DEFAULT ’.’	RP mbox
rp_txt	TEXT DEFAULT ’.’	RP txt
router	INT4 DEFAULT 0	router if > 0, also router priority(1 being highest priority)
prn	BOOL DEFAULT false	true for virtual printer entries
flags	INT4 DEFAULT 0	reserved
ether	CHAR(12)	Ethernet address (MAC)
ether_alias	INT4 DEFAULT -1	ptr to another host record(for ETHER address)
dhcp_date	INT4	last time host requested IP
dhcp_info	TEXT	reserved

field	type	comments
info	TEXT	Host info (appears as TXT record)
location	TEXT	Host location info
dept	TEXT	Department name
huser	TEXT	User info
model	TEXT	host model info
serial	TEXT	serial number
misc	TEXT	misc info
asset_id	TEXT	asset ID
comment	TEXT	comment
CONSTRAINT	hostname_key UNIQUE (domain,zone),	
CONSTRAINT	ether_key UNIQUE(ether,zone),	
CONSTRAINT	asset_key UNIQUE(asset_id,zone)	

A.1.1.6. groups

Group descriptions, linked to server record. Hosts can "belong" to one group and get DHCP/printer/etc definitions from that group.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
server	INT4 NOT NULL	ptr to a servers table record-->servers.id
name	TEXT NOT NULL CHECK(name <> ”)	group name
type	INT NOT NULL	group type: 1 = normal group, 2 = dynamic address pool,3 = DHCP client class
alevel	INT4 DEFAULT 0	required authorization level
comment	TEXT	
CONSTRAINT	groups_key UNIQUE(name,server)	

A.1.1.7. nets

Net/subnet descriptions, linked to server record. Used mainly for generating subnet map for DHCP and access control/user friendliness in front-ends.

field	type	comments
id	SERIAL	unique ID

field	type	comments
server	INT4 NOT NULL	ptr to a servers table record-->servers.id
netname	TEXT	(sub)net name
name	TEXT	descriptive name of the (sub)net
net	CIDR NOT NULL	net CIDR
subnet	BOOL DEFAULT true	subnet flag
vlan	INT4 DEFAULT -1	ptr to vlans table record-->vlans.id
alevel	INT4 DEFAULT 0	required authorization level
type	INT4 DEFAULT 0	network type/option flags:0x01 = private (hidden from browser)
ipv6	TEXT	reserved
rp_mbox	TEXT DEFAULT '.'	RP mbox
rp_txt	TEXT DEFAULT '.'	RP txt
no_dhcp	BOOL DEFAULT false	no-DHCP flag
range_start	INET	auto assign address range start
range_end	INET	auto assign address range end
comment	TEXT	comment
CONSTRAINT	nets_key PRIMARY KEY (net,server)	

A.1.1.8. cidr_entries

This table contains CIDRs used in server various contexts.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
type	INT4 NOT NULL	type: 1=server (allow-transfer) 2=zone (allow-update) 3=zone (masters) 4=zone (allow-query) 5=zone (allow-transfer) 6=zone (also-notify) 7=server (allow-query) 8=server (allow-recursion) 9=server (blackhole) 10=server (listen-on) 11=server (forwarders)12=zone (forwarders)
ref	INT4 NOT NULL	ptr to table speciefied by type field -->servers.id-->zones.id
ip	CIDR	CIDR value
comment	TEXT	

A.1.1.9. dhcp_entries

This table contains DHCP options user in various contexts.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
type	INT4 NOT NULL	type: 1=server, 2=zone, 3=host, 4=net, 5=group6=vlan (shared-network)
ref	INT4 NOT NULL	ptr to table speciefied by type field -->servers.id -->zones.id -->hosts.id -->nets.id-->groups.id
dhcp	TEXT	DHCP entry value (without trailing ';')
comment	TEXT	

A.1.1.10. ether_info

This table contains Ethernet adapter manufacturer codes.

field	type	comments
ea	CHAR(6) PRIMARY KEY	manufacturer code (6 bytes in hex)
info	TEXT	manufacturer name & info

A.1.1.11. mx_entries

This table contains MX record entries.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
type	INT4 NOT NULL	type: 1=zone (not used anymore!), 2=host,3=mx_templates
ref	INT4 NOT NULL	ptr to table speciefied by type field -->zones.id -->hosts.id-->mx_templates
pri	INT4 NOT NULL CHECK (pri >= 0)	MX priority
mx	TEXT	MX domain (FQDN)
comment	TEXT	

A.1.1.12. mx_templates

MX entry templates, hosts may link to one entry in this table. Entries are zone specific.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
zone	INT4 NOT NULL	ptr to a zone table record-->zones.id
alevel	INT4 DEFAULT 0	required authorization level
name	TEXT	template name
comment	TEXT	

A.1.1.13. ns_entries

This table contains NS resource record definitions.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
type	INT4 NOT NULL	type: 1=zone (not used anymore!),2=host
ref	INT4 NOT NULL	ptr to table speciefied by type field -->zones.id-->hosts.id
ns	TEXT	value of NS record (FQDN)
comment	TEXT	

A.1.1.14. printer_classes

Global table to store printer classes (printcap stuff) these classess maybe referred to in PRINTER fields in other tables.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
name	TEXT UNIQUE NOT NULL CHECK(name <> ”)	class name
comment	TEXT	

A.1.1.15. printer_entries

This table contains printer definition entries.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID

field	type	comments
type	INT4 NOT NULL	type: 1=group, 2=host,3=printer_class
ref	INT4 NOT NULL	ptr to table speciefied by type field -->groups.id -->hosts.id-->printer_classes.id
printer	TEXT	printcap entry
comment	TEXT	

A.1.1.16. a_entries

Addresses (A records) for hosts, linked to a host record.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
host	INT4 NOT NULL	ptr to hosts table id-->hosts.id
ip	INET	IP number
ipv6	TEXT	reserved
type	INT4 DEFAULT 0	reserved
reverse	BOOL DEFAULT true	generate reverse (PTR) record flag
forward	BOOL DEFAULT true	generate (A) record flag
comment	CHAR(20)	

A.1.1.17. txt_entries

This table contains TXT record entries and miscellaneous text entries.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
type	INT4 NOT NULL	type: 1=zone (not used anymore!), 2=host, 3=server10=server (BIND logging entry)
ref	INT4 NOT NULL	ptr to table speciefied by type field -->zones.id -->hosts.id-->servers.id
txt	TEXT	value of TXT record
comment	TEXT	comments

A.1.1.18. srv_entries

This table contains MX record entries.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
type	INT4 NOT NULL	type:1=host
ref	INT4 NOT NULL	ptr to table speciefied by type field-->hosts.id
pri	INT4 NOT NULL CHECK (pri >= 0)	priority
weight	INT4 NOT NULL CHECK (weight >= 0)	weight
port	INT4 NOT NULL CHECK (port >= 0)	port
target	TEXT NOT NULL DEFAULT '.'	target
comment	TEXT	comment

A.1.1.19. users

This table contains (user interface) user account information.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
gid	INT4 DEFAULT -1	ptr to user group -->user_groups.id
username	TEXT NOT NULL CHECK(username <> '')	login name
password	TEXT	encrypted password (MD5 or Crypt)
name	TEXT	long user name
email	TEXT	user email address
superuser	BOOL DEFAULT false	superuser flag
server	INT4 DEFAULT -1	default server id
zone	INT4 DEFAULT -1	default zone id
last	INT4 DEFAULT 0	last login time
last_pwd	INT4 DEFAULT 0	last password change time
last_from	TEXT	last login host
search_opts	TEXT	default search options
flags	INT4 DEFAULT 0	user account flasgs:0x01 = email notifications on
comment	TEXT	

field	type	comments
CONSTRAINT	username_key UNIQUE(username)	

A.1.1.20. user_rights

This table contains record defining user rights.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
type	INT NOT NULL	type: 1=user_group2=users
ref	INT NOT NULL	ptr to users table specified by type -->user_groups.id-->users.id
rtype	INT NOT NULL	type: 1=server, 2=zone, 3=net, 4=hostnamemask 5=IP mask 6=authorization level 7=host expiration limit (days)8=default for dept
rref	INT NOT NULL	ptr to table specified by type field
rule	CHAR(40)	R,RW,RWS or regexp

A.1.1.21. user_groups

This table contains records defining user groups.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
name	TEXT NOT NULL CHECK (name <> ”)	group name
comment	TEXT	comments
CONSTRAINT	user_groups_name_key UNIQUE(name)	

A.1.1.22. wks_entries

This table contains WKS record entries.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
type	INT4 NOT NULL	type: 1=host,2=wks_template
ref	INT4 NOT NULL	ptr to table speciefied by type field -->hosts.id-->wks_templates.id
proto	CHAR(10)	protocol (tcp,udp)

field	type	comments
services	TEXT	services (ftp,telnet,smtp,http,...)
comment	TEXT	

A.1.1.23. wks_templates

WKS entry templates, hosts may link to one entry in this table. Entries are server specific.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
server	INT4 NOT NULL	ptr to a server table record-->servers.id
alevel	INT4 DEFAULT 0	required authorization level
name	TEXT	template name
comment	TEXT	

A.1.1.24. utmp

This table contains "utmp" data of currently logged in www-interface users.

field	type	comments
cookie	CHAR(32) PRIMARY KEY	session id cookie (MD5)
uid	INT4	ptr to users table record-->users.id
gid	INT4	ptr to user_groups table record-->user_groups.id
sid	INT4	session ID
uname	TEXT	username
addr	CIDR	user’s IP address
superuser	BOOL DEFAULT false	superuser flag
auth	BOOL DEFAULT false	user authenticated flag
mode	INT4	current status of user
w	TEXT	last command user excecuted
serverid	INT4 DEFAULT -1	current server id
server	TEXT	current server name
zoneid	INT4 DEFAULT -1	current zone id
zone	TEXT	current zone name
login	INT4 DEFAULT 0	login time
last	INT4 DEFAULT 0	last activity time
searchopts	TEXT	current search options

field	type	comments
searchdomain	TEXT	current search domain
searchpattern	TEXT	current search pattern

A.1.1.25. hinfo_templates

HINFO templates table contains list of default values for HINFO records.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
hinfo	TEXT NOT NULL CHECK(hinfo <> ”) UNIQUE	HINFO value
type	INT4 DEFAULT 0	type: 0=hardware, 1=software
pri	INT4 DEFAULT 100	priority (defines the order in whichentries are displayed in user interfaces)

A.1.1.26. arec_entries

pointers to A record aliased hosts, linked to a host record.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
host	INT4 NOT NULL	ptr to hosts table id-->hosts.id
arec	INT4 NOT NULL	ptr to aliased host id -->hosts.id

A.1.1.27. root_servers

This table contains root server definitions.

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
server	INT4 NOT NULL	ptr to server table id-->servers.id
ttl	INT4 DEFAULT 3600000	
domain	TEXT NOT NULL	domainname
type	TEXT NOT NULL	A,NS,...
value	TEXT NOT NULL	value

A.1.1.28. history

history table contains "log" data of modifications done to the databse

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
sid	INT NOT NULL	session ID
uid	INT NOT NULL	user ID
date	INT NOT NULL	date of record
type	INT NOT NULL	record type: 1=hosts table modification, 2=zones 3=servers 4=nets5=users
ref	INT	optional reference
action	CHAR(25)	operation performed
info	CHAR(80)	extra info

A.1.1.29. lastlog

lastlog table contains "lastlog" data of database users

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
sid	INT NOT NULL	session ID
uid	INT NOT NULL	user ID
date	INT NOT NULL	date of record
state	INT NOT NULL	record type: 1=logged in 2=logged out 3=idle timeout4=reconnect
ldate	INT DEFAULT -1	logout date
ip	INET	remote IP
host	CHAR(40)	remote host

A.1.1.30. news

This table contains motd/news to be displayed when user logs in...

field	type	comments
id	SERIAL PRIMARY KEY	unique ID
server	INT DEFAULT -1	ptr to server or -1 for globalnews messages
info	TEXT NOT NULL	news/motd message

A.1.1.31. vlans

"VLAN" (Layer-2 networks/shared networks) descriptions, linked to server record. Used mainly for generating of shared-network map for DHCP.

field	type	comments
id	SERIAL	unique ID
server	INT4 NOT NULL	ptr to a servers table record-->servers.id
name	TEXT NOT NULL CHECK(name <> ”)	name of vlan
description	TEXT	long name
comment	TEXT	comments
CONSTRAINT	vlans_key PRIMARY KEY (name,server)	

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    under certain conditions; type ‘show c’ for details.
```

The hypothetical commands ‘show w’ and ‘show c’ should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than ‘show w’ and ‘show c’; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

```
  Yoyodyne, Inc., hereby disclaims all copyright interest in the program
  ‘Gnomovision’ (which makes passes at compilers) written by James Hacker.

  <signature of Ty Coon>, 1 April 1989
  Ty Coon, President of Vice
```

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.