LdapCherry - Directory Management Interface

Release 0.0.1

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Contents

CHAPTER 1

Install

1.1 From the sources

Download the latest release from GitHub.

```
$ tar -xf ldapcherry*.tar.gz
$ cd ldapcherry*
$ python setup.py install
```

1.2 From Pypi

```
$ pip install ldapcherry
```

or

```
$ easy_install ldapcherry
```

1.3 Installed files

ldapCherry install directories are:

- **/etc/ldapcherry/** (configuration)
- **dist-package** or **site-packages** of your distribution (LdapCherry modules)
- **/usr/share/ldapcherry/** (static content (css, js, images...) and templates)

These directories can be changed by exporting the following variables before launching the install command:

```
#optional, default sys.prefix + 'share' (/usr/share/ on most Linux)
$ export DATAROOTDIR=/usr/local/share/
#optional, default /etc/
$ export SYSCONFDIR=/usr/local/etc/
```

CHAPTER 2

Deploy

LdapCherry aims at being as simple as possible to deploy. The Application is constituted of:

- ldapcherryd: the daemon to lauch LdapCherry
- one ini file (ldapcherry.ini by default): the entry point for the configuration, containing all the "technical" attributes
- two yaml files (roles.yml and attributes by default): the files containing the roles and attributes definition

2.1 Launch

LdapCherry is launched using the internal cherrypy server:

```
# ldapcherryd help
$ ldapcherryd -h

# launching ldapcherryd in the forground
$ ldapcherryd -c /etc/ldapcherry/ldapcherry.ini

# launching ldapcherryd as a daemon
$ ldapcherryd -c /etc/ldapcherry/ldapcherry.ini -p /var/run/ldapcherry/ldapcherry.pid -d
```

2.2 Roles and Attributes Configuration

2.2.1 Entry point in main configuration

The main configuration file (ldapcherry.ini by default) contains two parameters locating the roles and attributes configuration files:

Parameter	Section	Description	Values
attributes.file	attributes	Attributes configuration file	Path to conf file
roles.file	roles	Roles configuration file	Path to conf file

2.2.2 Attributes Configuration

The attributes configuration is done in a yaml file (attributes.yml by default).

Mandatory parameters

The mandatory parameters for an attribute, and their format are the following:

```
<attr id>:
    description: <Human readable description of the attribute>                      # (free text)
    display_name: <Display name in LdapCherry forms>                                # (free text)
    weight: <weight controlling the display order of the attributes, lower is first> # (integer)
    type: <type of the attributes>                                                  # (in ['int', 's
    backends:                                                                       # (list of backe
        - <backend id 1>: <backend 1 attribute name>
        - <backend id 2>: <backend 2 attribute name>
```

Warning: <attr id> (the attribute id) must be unique, LdapCherry won't start if it's not.

Warning: <backend id> (the backend id) must be defined in main configuration (ldapcherry.ini by default). LdapCherry won't start if it's not.

Type stringlist values

If **type** is set to **stringlist** the parameter **values** must be filled with the list of possible values:

```
<attr id>:
    description: <Human readable description of the attribute>
    display_name: <Display name in LdapCherry forms>
    weight: <weight controlling the display order of the attributes)

    type: stringlist
    values:
        - value1
        - value2
        - value3

    backends:
        - <backend id>: <backend attribute name>
```

Key attribute:

One attribute must be used as a unique key across all backends:

To set the key attribute, you must set **key** to **True** on this attribute.

Example:

```
uid:
    description: "UID of the user"
    display_name: "UID"
    search_displayed: True
    key: True                       # defining the attribute as "key"
    type: string
    weight: 50
    backends:
        ldap: uid
        ad: sAMAccountName
```

Authorize self modification

A user can modify some of it's attributes (self modification). In such case, the parameter **self** must set to **True**:

```
<attr id>:
    description: <Human readable description of the attribute>
    display_name: <Display name in LdapCherry forms>
    weight: <weight controlling the display order of the attributes)
    type: <type of the attributes>

    self: True

    backends:
        - <backend id 1>: <backend 1 attribute name>
        - <backend id 2>: <backend 2 attribute name>
```

Autofill

LdapCherry has the possibility to auto-fill fields from other fields, to use this functionnality **autofill** must be set.

Example:

```
gidNumber:
    description: "Group ID Number of the user"
    display_name: "GID Number"
    weight: 70
    type: int

    autofill:
        function: lcUidNumber # name of the function to call
        args:                 # list of arguments
            - $first-name     #
            - $name
            - '10000'
            - '40000'

    backends:
        ldap: gidNumber
```

Arguments of the **autofill** function work as follow:

- if argument starts with **$**, for example **$my_field**, the value of form input **my_field** will be passed to the function.
- otherwise, it will be treated as a fixed argument.

Available **autofill** functions:

- lcUid: generate 8 characters uid from 2 other fields (first letter of the first field, 7 first letters of the second):

```
autofill:
    function: lcUid
    args:
        - $first-name
        - $name
```

- lcDisplayName: concatenate two fields

```
autofill:
    function: lcDisplayName
    args:
```

```
        - $first-name
        - $name
```

- lcMail: generate an email address from 2 other fields and a domain (<uid>+domain)

```
autofill:
    function: lcMail
    args:
        - $first-name
        - $name
        - '@example.com'
```

- lcUidNumber: generate an uid number from 2 other fields and between a minimum and maximum value

```
autofill:
    function: lcUidNumber
    args:
        - $first-name
        - $name
        - '10000'
        - '40000'
```

- lcHomeDir: generate an home directory from 2 other fields and a root (<root>+<uid>)

```
autofill:
    function: lcHomeDir
    args:
        - $first-name
        - $name
        - /home/
```

2.2.3 Roles Configuration

The roles configuration is done in a yaml file (roles.yml by default).

Mandatory parameters

Roles are seen as an aggregate of groups:

```
<role id>:
    display_name: <Role display name in LdapCherry>
    description: <human readable role description>
    backends_groups:                                # list of backends
        <backend id 1>:                             # list of groups in backend
            - <b1 group 1>
            - <b1 group 2>
        <backend id 2>:
            - <b2 group 1>
            - <b2 group 2>
```

Warning: <role id> must be unique, LdapCherry won't start if it's not

Defining LdapCherry Administrator role

One of the declared roles must be tagged to be LdapCherry administrators.

Doing so is done by setting **LC_admins** to **True** for the selected role:

```
<role id>:
    display_name: <Role display name in LdapCherry>
    description: <human readable role description>

    LC_admins: True

    backends_groups:                                    # list of backends
        <backend id 1>:                                 # list of groups in backend
            - <b1 group 1>
            - <b1 group 2>
        <backend id 2>:
            - <b2 group 1>
            - <b2 group 2>
```

Nesting roles

LdapCherry handles roles nesting:

```
parent_role:
    display_name: Role parent
    description: The parent role
    backends_groups:
        backend_id_1:
            - b1_group_1
            - b1_group_2
        backend_id_2:
            - b2_group_1
            - b2_group_2
    subroles:
        child_role_1:
            display_name: Child role 1
            description: The first Child Role
            backends_groups:
                backend_id_1:
                    - b1_group_3
        child_role_2:
            display_name: Child role 2
            description: The second Child Role
            backends_groups:
                backend_id_1:
                    - b1_group_4
```

In that case, child_role_1 and child_role_2 will contain all groups of parent_role plus their own specific groups.

2.3 Main Configuration

2.3.1 Webserver

LdapCherry uses the embedded http server of CherryPy, however it has some limitations:

- no listening on port 80/443 (unless run as root, which is strongly discourage)
- no https

The simpler way to properly deploy LdapCherry is to run it listening only on localhost with a port above 1024 and put it behind an http server like nginx, apache or lighttpd acting as a reverse http(s) proxy.

Parameter	Section	Description	Values	Comment
server.socket_host	global	Listening IP	IP on which to listen	Use '0.0.0.0' to listen on any interfaces.
server.socket_port	global	Listening Port	TCP Port	
server.thread_pool	global	Number of threads created by the CherryPy server	Number of threads threads	
tools.staticdir.on	/static	Serve static files through LdapCherry	True, False	These files could be server directly by an HTTP server for better performance.
tools.staticdir.dir	/static	Directory containing LdapCherry static resources (js, css, img...)	Path to static resources	

example:

```
[global]

# listing interface
server.socket_host = '127.0.0.1'
# port
server.socket_port = 8080
# number of threads
server.thread_pool = 8

# enable cherrypy static handling
# to comment if static content are handled otherwise
[/static]
tools.staticdir.on = True
tools.staticdir.dir = '/usr/share/ldapcherry/static/'
```

2.3.2 Backends

Backends are configure in the **backends** section, the format is the following:

```
[backends]

# backend python module path
<backend id>.module = 'python.module.path'

# parameters of the module instance for backend <backend id>.
<backend id>.<param> = <value>
```

It's possible to instanciate the same module several times.

2.3.3 Authentication and sessions

LdapCherry supports several authentication modes:

Parameter	Section	Description	Values	Comment
auth.mode	auth	Authentication mode	• 'and' (user must auth on all backends) • 'or' (user must auth on one of the backends) • 'none' (disable auth) • 'custom' (use custom auth module)	
auth.module	auth	Custom auth module	python class path to module	only used if auth.mode='custom'
tools.sessions.timeout	global	Session timeout in minutes	Number of minutes	

Different session backends can also be configured (see CherryPy documentation for details)

```
[global]
# session configuration
# activate session
tools.sessions.on = True
# session timeout in minutes
tools.sessions.timeout = 10
# file session storage(to use if multiple processes,
# default is in RAM and per process)
#tools.sessions.storage_type = "file"
# session
#tools.sessions.storage_path = "/var/lib/ldapcherry/sessions"

[auth]
# Auth mode
# * and: user must authenticate on all backends
# * or:  user must authenticate on one of the backend
# * none: disable authentification
# * custom: custom authentification module (need auth.module param)
auth.mode = 'or'

# custom auth module to load
#auth.module = 'ldapcherry.auth.modNone'
```

2.3.4 Logging

LdapCherry has two loggers, one for errors and applicative actions (login, del/add, logout...) and one for access logs.

Each logger can be configured to log to syslog, file or be disabled.

Logging parameters:

Parameter	Section	Description	Values	Comment
log.access_handler	global	Logger type for access log	'syslog', 'file', 'none'	
log.error_handler	global	Logger type for applicative log	'syslog', 'file', 'none'	
log.access_file	global	log file for access log	path to log file	only used if log.access_handler='file'
log.error_file	global	log file for applicative log	path to log file	only used if log.error_handler='file'
log.level	global	log level of LdapCherry	'debug', 'info', 'warning', 'error', 'critical'	

Example:

```
[global]

# logger syslog for access log
log.access_handler = 'syslog'
# logger syslog for error and ldapcherry log
log.error_handler = 'syslog'
# log level
log.level = 'info'
```

2.3.5 Other LdapCherry parameters

Parameter	Section	Description	Values
template_dir	resources	LdapCherry template directory	path to template dir

```
# resources parameters
[resources]
# templates directory
template_dir = '/usr/share/ldapcherry/templates/'
```

CHAPTER 3

Full Configuration

3.1 Main ini configuration file

```
# global parameters
[global]

# listing interface
server.socket_host = '127.0.0.1'
# port
server.socket_port = 8080
# number of threads
server.thread_pool = 8
#don't show traceback on error
request.show_tracebacks = False

# log configuration
# /!\ you can't have multiple log handlers
#####################################
#   configuration to log in files   #
#####################################
## logger 'file' for access log
#log.access_handler = 'file'
## logger syslog for error and ldapcherry log
#log.error_handler = 'file'
## access log file
#log.access_file = '/tmp/ldapcherry_access.log'
## error and ldapcherry log file
#log.error_file = '/tmp/ldapcherry_error.log'

#####################################
#  configuration to log in syslog   #
#####################################
# logger syslog for access log
#log.access_handler = 'syslog'
## logger syslog for error and ldapcherry log
log.error_handler = 'syslog'

#####################################
#  configuration to not log at all  #
#####################################
# logger none for access log
log.access_handler = 'none'
```

```
# logger none for error and ldapcherry log
#log.error_handler = 'none'

# log level
log.level = 'info'

# session configuration
# activate session
tools.sessions.on = True
# session timeout
tools.sessions.timeout = 10
# file session storage(to use if multiple processes,
# default is in RAM and per process)
#tools.sessions.storage_type = "file"
# session
#tools.sessions.storage_path = "/var/lib/ldapcherry/sessions"

[attributes]

# file discribing form content
attributes.file = '/etc/ldapcherry/attributes.yml'

[roles]

# file listing roles
roles.file = '/etc/ldapcherry/roles.yml'

[backends]

#####################################
#   configuration of ldap backend   #
#####################################

# name of the module
ldap.module = 'ldapcherry.backend.backendLdap'

# uri of the ldap directory
ldap.uri = 'ldap://ldap.ldapcherry.org'
# ca to use for ssl/tls connexion
#ldap.ca = '/etc/dnscherry/TEST-cacert.pem'
# use start tls
#ldap.starttls = 'off'
# check server certificate (for tls)
#ldap.checkcert = 'off'
# bind dn to the ldap
ldap.binddn = 'cn=dnscherry,dc=example,dc=org'
# password of the bind dn
ldap.password = 'password'
# timeout of ldap connexion (in second)
ldap.timeout = 1

# groups dn
ldap.groupdn = 'ou=group,dc=example,dc=org'
# users dn
ldap.userdn = 'ou=people,dc=example,dc=org'
# ldapsearch filter to get a user
ldap.user_filter_tmpl = '(uid=%(username)s)'
# ldapsearch filter to get groups of a user
```

```
ldap.group_filter_tmpl = '(member=uid=%(username)s,ou=People,dc=example,dc=org)'
# filter to search users
ldap.search_filter_tmpl = '(|(uid=%(searchstring)s*)(sn=%(searchstring)s*))'

# ldap group attributes and how to fill them
ldap.group_attr.member = "%(dn)s"
#ldap.group_attr.memberUid = "%(uid)s"
# object classes of a user entry
ldap.objectclasses = 'top, person, posixAccount, inetOrgPerson'
# dn entry attribute for an ldap user
ldap.dn_user_attr = 'uid'

####################################
#   configuration of ad backend    #
####################################
#
#ad.module = 'ldapcherry.backend.backendSamba4'
#ad.auth = 'Administrator'
#ad.password = 'password'

[ppolicy]

# password policy module
ppolicy.module = 'ldapcherry.ppolicy.simple'

# parameters of the module
min_length = 8
min_upper = 1
min_digit = 1

# authentification parameters
[auth]

# Auth mode
# * and: user must authenticate on all backends
# * or:  user must authenticate on one of the backend
# * none: disable authentification
# * custom: custom authentification module (need auth.module param)
auth.mode = 'or'

# custom auth module to load
#auth.module = 'ldapcherry.auth.modNone'

# resources parameters
[resources]
# templates directory
templates.dir = '/usr/share/ldapcherry/templates/'

[/static]
tools.staticdir.on = True
tools.staticdir.dir = '/usr/share/ldapcherry/static/'
```

3.2 Yaml Attributes configuration file

```
cn:
    description: "First Name and Display Name"
    display_name: "Display Name"
    type: string
    weight: 30
    autofill:
        function: lcDisplayName
        args:
            - $first-name
            - $name
    backends:
        ldap: cn
#        ad: CN
first-name:
    description: "First name of the user"
    display_name: "First Name"
    search_displayed: True
    type: string
    weight: 20
    backends:
        ldap: givenName
#        ad: givenName
name:
    description: "Family name of the user"
    display_name: "Name"
    search_displayed: True
    weight: 10
    type: string
    backends:
        ldap: sn
#        ad: sn
email:
    description: "Email of the user"
    display_name: "Email"
    search_displayed: True
    type: email
    weight: 40
    autofill:
        function: lcMail
        args:
            - $first-name
            - $name
            - '@example.com'
    backends:
        ldap: mail
#        ad: mail
uid:
    description: "UID of the user"
    display_name: "UID"
    search_displayed: True
    key: True
    type: string
    weight: 50
    autofill:
        function: lcUid
        args:
```

```
            - $first-name
            - $name
    backends:
        ldap: uid
#        ad: uid
uidNumber:
    description: "User ID Number of the user"
    display_name: "UID Number"
    weight: 60
    type: int
    autofill:
        function: lcUidNumber
        args:
            - $first-name
            - $name
    backends:
        ldap: uidNumber
#        ad: UIDNumber
gidNumber:
    description: "Group ID Number of the user"
    display_name: "GID Number"
    weight: 70
    type: int
    default: 10000
    backends:
        ldap: gidNumber
#        ad: GIDNumber
shell:
    description: "Shell of the user"
    display_name: "Shell"
    weight: 80
    self: True
    type: stringlist
    values:
        - /bin/bash
        - /bin/zsh
        - /bin/sh
    backends:
        ldap: loginShell
#        ad: LOGINSHEL
home:
    description: "Home user path"
    display_name: "Home"
    weight: 90
    type: string
    autofill:
        function: lcHomeDir
        args:
            - $first-name
            - $name
            - /home/
    backends:
        ldap: homeDirectory
#        ad: HOMEDIRECTORY
password:
    description: "Password of the user"
    display_name: "Password"
    weight: 31
```

```
    self: True
    type: password
    backends:
        ldap: userPassword
#        ad: PASSWORD
```

3.3 Yaml Roles configuration file

```
admin-lv3:
    display_name: Administrators Level 3
    description: Super administrators of the system
    backends_groups:
        ldap:
            - cn=dns admins,ou=Group,dc=example,dc=org
            - cn=nagios admins,ou=Group,dc=example,dc=org
            - cn=puppet admins,ou=Group,dc=example,dc=org
            - cn=users,ou=Group,dc=example,dc=org
#        ad:
#            - Administrators
#            - Domain Controllers
#            - Domain Users

admin-lv2:
    display_name: Administrators Level 2
    description: Basic administrators of the system
    LC_admins: True
    backends_groups:
        ldap:
            - cn=nagios admins,ou=Group,dc=example,dc=org
            - cn=users,ou=Group,dc=example,dc=org
#        ad:
#            - Domain Users
#            - Domain Controllers

developpers:
    display_name: Developpers
    description: Developpers of the system
    backends_groups:
        ldap:
            - cn=developpers,ou=Group,dc=example,dc=org
            - cn=users,ou=Group,dc=example,dc=org

users:
    display_name: Simple Users
    description: Basic users of the system
    backends_groups:
        ldap:
            - cn=users,ou=Group,dc=example,dc=org
#        ad:
#            - Domain Users
```

CHAPTER 4

Implementing cutom backends

4.1 API

The backend modules must respect the following API:

class `ldapcherry.backend.`**Backend**(*config*, *logger*, *name*, *attrslist*, *key*)

__init__(*config*, *logger*, *name*, *attrslist*, *key*)
Initialize the backend

Parameters

- **config** (*dict {'config key': 'value'}*) – the configuration of the backend
- **logger** (*python logger*) – the cherrypy error logger object
- **name** (*string*) – id of the backend
- **attrslist** (*list of strings*) – list of the backend attributes
- **key** (*string*) – the key attribute

add_to_groups(*username*, *groups*)
Add a user to a list of groups

Parameters

- **username** (*string*) – 'key' attribute of the user
- **groups** (*list of strings*) – list of groups

add_user(*attrs*)
Add a user to the backend

Parameters **attrs** (*dict ({<attr>: <value>})*) – attributes of the user

> **Warning:** raise UserAlreadyExists if user already exists

auth(*username*, *password*)
Check authentication against the backend

Parameters

- **username** (*string*) – 'key' attribute of the user
- **password** (*string*) – password of the user

Return type boolean (True is authentication success, False otherwise)

del_from_groups (*username*, *groups*)
Delete a user from a list of groups

Parameters

- **username** (*string*) – 'key' attribute of the user
- **groups** (*list of strings*) – list of groups

> **Warning:** raise GroupDoesntExist if group doesn't exist

del_user (*username*)
Delete a user from the backend

Parameters **username** (*string*) – 'key' attribute of the user

get_groups (*username*)
Get a user's groups

Parameters **username** (*string*) – 'key' attribute of the user

Return type list of groups

get_user (*username*)
Get a user's attributes

Parameters **username** (*string*) – 'key' attribute of the user

Return type dict ({<attr>: <value>})

> **Warning:** raise UserDoesntExist if user doesn't exist

search (*searchstring*)
Search backend for users

Parameters **searchstring** (*string*) – the search string

Return type dict of dict ({<user attr key>: {<attr>: <value>}})

set_attrs (*username*, *attrs*)
Set a list of attributes for a given user

Parameters

- **username** (*string*) – 'key' attribute of the user
- **attrs** (*dict ({<attr>: <value>})*) – attributes of the user

4.2 Configuration

Configuration for your backend is declared in the main ini file, inside [backends] section:

For example with the configuration:

```
[backends]

# class path to module
b_id.module = "my.backend.module"
```

```
b_id.param1 = "my value 1"
b_id.param2 = "my value 2"
```

Note: One module can be instanciated several times, the prefix b_id permits to differenciate instances and their specific configuration.

The following hash will be passed as configuration to the module constructor as parameter config:

```
{
    'param1': "my value 1",
    'param2': "my value 2",
}
```

After having set **self.config** to **config** in the constructor, parameters can be recovered by **self.get_param**:

class ldapcherry.backend.**Backend**(*config*, *logger*, *name*, *attrslist*, *key*)

get_param(*param*, *default=None*)
Get a parameter in config (handle default value)

Parameters

- **param** (*string*) – name of the parameter to recover
- **default** (*string or None*) – the default value, raises an exception if param is not in configuration and default is None (which is the default value).

Return type the value of the parameter or the default value if not set in configuration

4.3 Exceptions

The following exception can be used in your module

exception ldapcherry.exceptions.**UserDoesntExist**(*user*, *backend*)
Bases: exceptions.Exception

exception ldapcherry.exceptions.**UserAlreadyExists**(*user*, *backend*)
Bases: exceptions.Exception

exception ldapcherry.exceptions.**GroupDoesntExist**(*group*, *backend*)
Bases: exceptions.Exception

These exceptions permit a nicer error handling and avoid a generic message to be thrown at the user.

4.4 Example

Here is the ldap backend module that comes with LdapCherry:

```
# -*- coding: utf-8 -*-
# vim:set expandtab tabstop=4 shiftwidth=4:
#
# The MIT License (MIT)
# LdapCherry
# Copyright (c) 2014 Carpentier Pierre-Francois

import cherrypy
```

```
import ldap
import ldap.modlist as modlist
import ldap.filter
import logging
import ldapcherry.backend
from ldapcherry.exceptions import UserDoesntExist, GroupDoesntExist
import os
import re


class DelUserDontExists(Exception):
    def __init__(self, user):
        self.user = user
        self.log = "cannot remove user, user <%(user)s> does not exist" % \
            {'user': user}


class CaFileDontExist(Exception):
    def __init__(self, cafile):
        self.cafile = cafile
        self.log = "CA file %(cafile)s don't exist" % {'cafile': cafile}

NO_ATTR = 0
DISPLAYED_ATTRS = 1
LISTED_ATTRS = 2
ALL_ATTRS = 3


class Backend(ldapcherry.backend.Backend):

    def __init__(self, config, logger, name, attrslist, key):
        self.config = config
        self._logger = logger
        self.backend_name = name
        self.binddn = self.get_param('binddn')
        self.bindpassword = self.get_param('password')
        self.ca = self.get_param('ca', False)
        self.checkcert = self.get_param('checkcert', 'on')
        self.starttls = self.get_param('starttls', 'off')
        self.uri = self.get_param('uri')
        self.timeout = self.get_param('timeout', 1)
        self.userdn = self.get_param('userdn')
        self.groupdn = self.get_param('groupdn')
        self.user_filter_tmpl = self.get_param('user_filter_tmpl')
        self.group_filter_tmpl = self.get_param('group_filter_tmpl')
        self.search_filter_tmpl = self.get_param('search_filter_tmpl')
        self.dn_user_attr = self.get_param('dn_user_attr')
        self.objectclasses = []
        self.key = key
        for o in re.split('\W+', self.get_param('objectclasses')):
            self.objectclasses.append(self._str(o))
        self.group_attrs = {}
        for param in config:
            name, sep, group = param.partition('.')
            if name == 'group_attr':
                self.group_attrs[group] = self.get_param(param)

        self.attrlist = []
```

```
        for a in attrslist:
            self.attrlist.append(self._str(a))

    def _exception_handler(self, e):
        et = type(e)
        if et is ldap.OPERATIONS_ERROR:
            self._logger(
                severity=logging.ERROR,
                msg="cannot use starttls with ldaps://"
                    " uri (uri: " + self.uri + ")",
            )
        elif et is ldap.INVALID_CREDENTIALS:
            self._logger(
                severity=logging.ERROR,
                msg="Configuration error, wrong credentials,"
                " unable to connect to ldap with '" + self.binddn + "'",
            )
        elif et is ldap.SERVER_DOWN:
            self._logger(
                severity=logging.ERROR,
                msg="Unable to contact ldap server '" +
                    self.uri +
                    "', check 'auth.ldap.uri'"
                    " and ssl/tls configuration",
                )
        elif et is ldap.FILTER_ERROR:
            self._logger(
                severity=logging.ERROR,
                msg="Bad search filter, check '" +
                    self.backend_name +
                    ".*_filter_tmpl' params",
                )
        elif et is ldap.NO_SUCH_OBJECT:
            self._logger(
                severity=logging.ERROR,
                msg="DN doesn't exist, check '" +
                    self.backend_name +
                    ".userdn'or '" +
                    self.backend_name +
                    ".groupdn'",
                )
        elif et is ldap.OBJECT_CLASS_VIOLATION:
            info = e[0]['info']
            desc = e[0]['desc']
            self._logger(
                severity=logging.ERROR,
                msg="Configuration error, " + desc + ", " + info,
                )
        elif et is ldap.INSUFFICIENT_ACCESS:
            self._logger(
                severity=logging.ERROR,
                msg="Access error on '" +
                    self.backend_name +
                    "' backend, please check your acls in this backend",
                )
        elif et is ldap.ALREADY_EXISTS:
            desc = e[0]['desc']
            self._logger(
```

```
                severity=logging.ERROR,
                msg="adding user failed, " + desc,
                )
        else:
            self._logger(
                severity=logging.ERROR,
                msg="unknow ldap exception in ldap backend",
                )
        raise e

    def _connect(self):
        ldap_client = ldap.initialize(self.uri)
        ldap.set_option(ldap.OPT_REFERRALS, 0)
        ldap.set_option(ldap.OPT_TIMEOUT, self.timeout)
        if self.starttls == 'on':
            ldap.set_option(ldap.OPT_X_TLS_DEMAND, True)
        else:
            ldap.set_option(ldap.OPT_X_TLS_DEMAND, False)
        if self.ca and self.checkcert == 'on':
            if os.path.isfile(self.ca):
                ldap.set_option(ldap.OPT_X_TLS_CACERTFILE, self.ca)
            else:
                raise CaFileDontExist(self.ca)
        if self.checkcert == 'off':
            # this is dark magic
            # remove any of these two lines and it doesn't work
            ldap.set_option(ldap.OPT_X_TLS_REQUIRE_CERT, ldap.OPT_X_TLS_NEVER)
            ldap_client.set_option(
                ldap.OPT_X_TLS_REQUIRE_CERT,
                ldap.OPT_X_TLS_NEVER
                )
        else:
            # this is even darker magic
            ldap_client.set_option(
                ldap.OPT_X_TLS_REQUIRE_CERT,
                ldap.OPT_X_TLS_DEMAND
                )
            # it doesn't make sense to set it to never
            # (== don't check certifate)
            # but it only works with this option...
            # ... and it checks the certificat
            # (I've lost my sanity over this)
            ldap.set_option(
                ldap.OPT_X_TLS_REQUIRE_CERT,
                ldap.OPT_X_TLS_NEVER
                )
        if self.starttls == 'on':
            try:
                ldap_client.start_tls_s()
            except Exception as e:
                self._exception_handler(e)
        return ldap_client

    def _bind(self):
        ldap_client = self._connect()
        try:
            ldap_client.simple_bind_s(self.binddn, self.bindpassword)
        except Exception as e:
```

```
            ldap_client.unbind_s()
            self._exception_handler(e)
        return ldap_client

    def _search(self, searchfilter, attrs, basedn):
        if attrs == NO_ATTR:
            attrlist = []
        elif attrs == DISPLAYED_ATTRS:
            # fix me later (to much attributes)
            attrlist = self.attrlist
        elif attrs == LISTED_ATTRS:
            attrlist = self.attrlist
        elif attrs == ALL_ATTRS:
            attrlist = None
        else:
            attrlist = None

        ldap_client = self._bind()
        try:
            r = ldap_client.search_s(
                basedn,
                ldap.SCOPE_SUBTREE,
                searchfilter,
                attrlist=attrlist
                )
        except Exception as e:
            ldap_client.unbind_s()
            self._exception_handler(e)

        ldap_client.unbind_s()
        return r

    def _get_user(self, username, attrs=ALL_ATTRS):

        username = ldap.filter.escape_filter_chars(username)
        user_filter = self.user_filter_tmpl % {
            'username': username
        }

        r = self._search(user_filter, attrs, self.userdn)

        if len(r) == 0:
            return None

        if attrs == NO_ATTR:
            dn_entry = r[0][0]
        else:
            dn_entry = r[0]
        return dn_entry

    def _str(self, s):
        return s.encode('utf-8')

    def _uni(self, s):
        return s.decode('utf-8')

    def auth(self, username, password):
```

```
        binddn = self._get_user(username, NO_ATTR)
        if binddn is not None:
            ldap_client = self._connect()
            try:
                ldap_client.simple_bind_s(binddn, password)
            except ldap.INVALID_CREDENTIALS:
                ldap_client.unbind_s()
                return False
            ldap_client.unbind_s()
            return True
        else:
            return False

    def add_user(self, attrs):
        ldap_client = self._bind()
        attrs_str = {}
        for a in attrs:
            attrs_str[self._str(a)] = self._str(attrs[a])
        attrs_str['objectClass'] = self.objectclasses
        dn = \
            self.dn_user_attr +\
            '=' +\
            attrs[self.dn_user_attr] +\
            ',' +\
            self.userdn
        ldif = modlist.addModlist(attrs_str)
        try:
            ldap_client.add_s(dn, ldif)
        except Exception as e:
            ldap_client.unbind_s()
            self._exception_handler(e)
        ldap_client.unbind_s()

    def del_user(self, username):
        ldap_client = self._bind()
        dn = self._get_user(username, NO_ATTR)
        if dn is not None:
            ldap_client.delete_s(dn)
        else:
            raise DelUserDontExists(username)
        ldap_client.unbind_s()

    def set_attrs(self, username, attrs):
        ldap_client = self._bind()
        tmp = self._get_user(username, ALL_ATTRS)
        dn = tmp[0]
        old_attrs = tmp[1]
        for attr in attrs:
            content = self._str(attrs[attr])
            attr = self._str(attr)
            new = {attr: content}
            if attr in old_attrs:
                old = {attr: old_attrs[attr]}
            else:
                old = {}
            ldif = modlist.modifyModlist(old, new)
            try:
                ldap_client.modify_s(dn, ldif)
```

```
            except Exception as e:
                ldap_client.unbind_s()
                self._exception_handler(e)

        ldap_client.unbind_s()

    def add_to_groups(self, username, groups):
        ldap_client = self._bind()
        tmp = self._get_user(username, ALL_ATTRS)
        dn = tmp[0]
        attrs = tmp[1]
        attrs['dn'] = dn
        for group in groups:
            group = self._str(group)
            for attr in self.group_attrs:
                content = self._str(self.group_attrs[attr] % attrs)
                self._logger(
                    severity=logging.DEBUG,
                    msg="%(backend)s: adding user '%(user)s'"
                        " with dn '%(dn)s' to group '%(group)s' by"
                        " setting '%(attr)s' to '%(content)s'" % {
                            'user': username,
                            'dn': dn,
                            'group': group,
                            'attr': attr,
                            'content': content,
                            'backend': self.backend_name
                            }
                )
                ldif = modlist.modifyModlist({}, {attr: content})
                try:
                    ldap_client.modify_s(group, ldif)
                except ldap.TYPE_OR_VALUE_EXISTS as e:
                    self._logger(
                        severity=logging.INFO,
                        msg="%(backend)s: user '%(user)s'"
                            " already member of group '%(group)s'"
                            "(attribute '%(attr)s')" % {
                                'user': username,
                                'group': group,
                                'attr': attr,
                                'backend': self.backend_name
                                }
                    )
                except ldap.NO_SUCH_OBJECT as e:
                    raise GroupDoesntExist(group, self.backend_name)
                except Exception as e:
                    ldap_client.unbind_s()
                    self._exception_handler(e)
        ldap_client.unbind_s()

    def del_from_groups(self, username, groups):
        ldap_client = self._bind()
        tmp = self._get_user(username, ALL_ATTRS)
        dn = tmp[0]
        attrs = tmp[1]
        attrs['dn'] = dn
        for group in groups:
```

```
            group = self._str(group)
            for attr in self.group_attrs:
                content = self._str(self.group_attrs[attr] % attrs)
                ldif = [(ldap.MOD_DELETE, attr, content)]
                try:
                    ldap_client.modify_s(group, ldif)
                except ldap.NO_SUCH_ATTRIBUTE as e:
                    self._logger(
                        severity=logging.INFO,
                        msg="%(backend)s: user '%(user)s'"
                        " wasn't member of group '%(group)s'"
                        " (attribute '%(attr)s')" % {
                            'user': username,
                            'group': group,
                            'attr': attr,
                            'backend': self.backend_name
                            }
                    )
                except Exception as e:
                    ldap_client.unbind_s()
                    self._exception_handler(e)
        ldap_client.unbind_s()

    def search(self, searchstring):
        ret = {}

        searchstring = ldap.filter.escape_filter_chars(searchstring)
        searchfilter = self.search_filter_tmpl % {
            'searchstring': searchstring
        }
        for u in self._search(searchfilter, DISPLAYED_ATTRS, self.userdn):
            attrs = {}
            attrs_tmp = u[1]
            for attr in attrs_tmp:
                value_tmp = attrs_tmp[attr]
                if len(value_tmp) == 1:
                    attrs[attr] = self._uni(value_tmp[0])
                else:
                    attrs[attr] = map(self._uni, value_tmp)

            if self.key in attrs:
                ret[attrs[self.key]] = attrs
        return ret

    def get_user(self, username):
        ret = {}
        tmp = self._get_user(username, ALL_ATTRS)
        if tmp is None:
            raise UserDoesntExist(username, self.backend_name)
        attrs_tmp = tmp[1]
        for attr in attrs_tmp:
            value_tmp = attrs_tmp[attr]
            if len(value_tmp) == 1:
                ret[attr] = self._uni(value_tmp[0])
            else:
                ret[attr] = map(self._uni, value_tmp)
        return ret
```

```
    def get_groups(self, username):

        username = ldap.filter.escape_filter_chars(username)
        userdn = self._get_user(username, NO_ATTR)

        searchfilter = self.group_filter_tmpl % {
            'userdn': userdn,
            'username': username
        }

        groups = self._search(searchfilter, NO_ATTR, self.groupdn)
        ret = []
        for entry in groups:
            ret.append(self._uni(entry[0]))
        return ret
```

CHAPTER 5

Implementing password policy modules

5.1 API

The password policy modules must respect following API:

class ldapcherry.ppolicy.**PPolicy**(*config*, *logger*)

__init__(*config*, *logger*)
Password policy constructor

Parameters

- **config** (*dict {'config key': 'value'}*) – the configuration of the ppolicy
- **logger** (*python logger*) – the cherrypy error logger object

check(*password*)
Check if a password match the ppolicy

Parameters **password** (*string*) – the password to check

Return type dict with keys 'match' a boolean (True if ppolicy matches, False otherwise) and 'reason', an explaination string

info()
Give information about the ppolicy

Return type a string describing the ppolicy

5.2 Configuration

Parameters are declared in the main configuration file, inside the **ppolicy** section.

After having set **self.config** to **config** in the constructor, parameters can be recovered by **self.get_param**:

class ldapcherry.ppolicy.**PPolicy**(*config*, *logger*)

get_param(*param*, *default=None*)
Get a parameter in config (handle default value)

Parameters

- **param** (*string*) – name of the parameter to recover

- **default** (*string or None*) – the default value, raises an exception if param is not in configuration and default is None (which is the default value).

Return type the value of the parameter or the default value if not set in configuration

5.3 Example

Here is the simple default ppolicy module that comes with LdapCherry:

```
# -*- coding: utf-8 -*-
# vim:set expandtab tabstop=4 shiftwidth=4:
#
# The MIT License (MIT)
# LdapCherry
# Copyright (c) 2014 Carpentier Pierre-Francois

import ldapcherry.ppolicy
import re


class PPolicy(ldapcherry.ppolicy.PPolicy):

    def __init__(self, config, logger):
        self.config = config
        self.min_length = self.get_param('min_length')
        self.min_upper = self.get_param('min_upper')
        self.min_digit = self.get_param('min_digit')

    def check(self, password):
        if len(password) < self.min_length:
            return {'match': False, 'reason': 'password too short'}
        if len(re.findall(r'[A-Z]', password)) < self.min_upper:
            return {
                'match': False,
                'reason': 'not enough upper case characters'
                }
        if len(re.findall(r'[0-9]', password)) < self.min_digit:
            return {'match': False, 'reason': 'not enough digits'}
        return {'match': True, 'reason': 'password ok'}

    def info(self):
        return \
            "* Minimum length: %(len)n\n" \
            "* Minimum number of uppercase characters: %(upper)n\n" \
            "* Minimum number of digits: %(digit)n" % {
                'upper': self.min_upper,
                'len': self.min_length,
                'digit': self.min_digit
                }
```

CHAPTER 6

Changelog

6.1 Version 0.0.1

- first release

CHAPTER 7

Some Goodies

Here are some goodies that might help deploying LdapCherry

They are located in the **goodies/** directory.

7.1 Init Script

Sample init script for Debian:

```
#! /bin/sh

### BEGIN INIT INFO
# Provides:        ldapcherryd
# Required-Start:    $remote_fs $network $syslog
# Required-Stop:    $remote_fs $network $syslog
# Default-Start:    2 3 4 5
# Default-Stop:
# Short-Description:    ldapcherry
### END INIT INFO

PIDFILE=/var/run/ldapcherryd/ldapcherryd.pid
CONF=/etc/ldapcherry/ldapcherry.ini
USER=www-data
GROUP=www-data
BIN=/usr/local/bin/ldapcherryd
OPTS="-d -c $CONF -p $PIDFILE"

. /lib/lsb/init-functions

if [ -f /etc/default/ldapcherryd ]; then
    . /etc/default/ldapcherryd
fi

start_ldapcherryd(){
    log_daemon_msg "Starting ldapcherryd" "ldapcherryd" || true
    pidofproc -p $PIDFILE $BIN >/dev/null
    status="$?"
    if [ $status -eq 0 ]
    then
        log_end_msg 1
        log_failure_msg \
        "ldapcherryd already started"
```

```
        return 1
    fi
    mkdir -p `dirname $PIDFILE` -m 750
    chown $USER:$GROUP `dirname $PIDFILE`
    if start-stop-daemon -c $USER:$GROUP --start \
        --quiet --pidfile $PIDFILE \
        --oknodo --exec $BIN -- $OPTS
    then
        log_end_msg 0 || true
        return 0
    else
        log_end_msg 1 || true
        return 1
    fi

}

stop_ldapcherryd(){
    log_daemon_msg "Stopping ldapcherryd" "ldapcherryd" || true
    if start-stop-daemon --stop --quiet \
        --pidfile $PIDFILE
    then
        log_end_msg 0 || true
        return 0
    else
        log_end_msg 1 || true
        return 1
    fi
}

case "$1" in
  start)
    start_ldapcherryd
    exit $?
    ;;
  stop)
    stop_ldapcherryd
    exit $?
    ;;
  restart)
    stop_ldapcherryd
    while pidofproc -p $PIDFILE $BIN >/dev/null
    do
        sleep 0.5
    done
    start_ldapcherryd
    exit $?
    ;;
  status)
    status_of_proc -p $PIDFILE $BIN "ldapcherryd" \
        && exit 0 || exit $?
    ;;
  *)
    log_action_msg \
    "Usage: /etc/init.d/ldapcherryd {start|stop|restart|status}" \
    || true
    exit 1
esac
```

```
exit 0
```

This init script is available in **goodies/init-debian**.

7.2 Apache Vhost

```
<VirtualHost *:80>

    <Location />
        ProxyPass http://127.0.0.1:8080/
        ProxyPassReverse http://127.0.0.1:8080/
    </Location>

</VirtualHost>
```

7.3 Nginx Vhost

```
server {
    listen 80 default_server;

    server_name $hostname;
    #access_log /var/log/nginx/dnscherry_access_log;

    location / {
        proxy_pass http://127.0.0.1:8080;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-for $proxy_add_x_forwarded_for;
        proxy_set_header Host $host:$server_port;
        proxy_set_header X-Forwarded-Proto $remote_addr;
    }
}
```

7.4 Lighttpd Vhost

```
server.modules += ("mod_proxy")

$HTTP["host"] == "ldapcherry.kakwa.fr" {
    proxy.server  = ( "" =>
        (( "host" => "127.0.0.1", "port" => 8080 ))
    )
}
```

CHAPTER 8

LdapCherry

Nice and simple application to manage users and groups in multiple directory services.

Doc ldapcherry documentation on ReadTheDoc

Dev ldapcherry code on GitHub

PyPI ldapcherry package on Pypi

License MIT

Author Pierre-Francois Carpentier - copyright © 2015

CHAPTER 9

Presentation

LdapCherry is CherryPY application to manage users and groups in multiple directory services.

It's main features are:

- manage multiple directories/databases backends in an unified way
- roles management (as in "groups of groups")
- autofill forms
- password policy
- self modification of some selected fields by normal (non administrator) users
- nice bootstrap interface
- modular through pluggable authentication, password policy and backend modules

LdapCherry is not limited to ldap, it can handle virtually any user backend (ex: SQL database, htpasswd file, etc) through the proper plugin (provided that it is implemented ^^).

LdapCherry also aims to be as simple as possible to deploy: no crazy dependencies, few configuration files, extensive debug logs and full documentation.

CHAPTER 10

Screenshot

Screenshots

CHAPTER 11

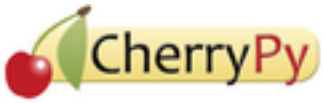
License

LdapCherry is published under the MIT Public License.

CHAPTER 12

Discussion / Help / Updates

- IRC: Freenode `#ldapcherry` channel
- Bugtracker: Github



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Symbols

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