



LDAP BRIDGE

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1. Product Overview

The main use-case of OpenOTP LDAP Bridge is enabling enterprise applications that use LDAP as an external authentication mechanism to work with OpenOTP. LDAP Bridge allows authentication to be delegated to an OpenOTP server transparently, without changing the LDAP back-end. From the client applications perspective, the main change is that it will use the LDAP Bridge as an LDAP server, instead of the backend-end LDAP server.

LDAP Bridge works by relaying LDAP messages to a back-end LDAP server. It intercepts user bind (LDAP authentication) operations and makes an OpenOTP call to authenticate the request with OpenOTP. It then sets the result of the bind request to the authentication result of the OpenOTP call.

One drawback of LDAP protocol is that LDAP bind does not support challenge-response or interactive user dialogue, which means that all authentication factors must be passed concatenated in one unique login request. Like RCDevs' OpenOTP RADIUS Bridge, LDAP Bridge is not designed to be exposed to the internet, but rather to sit beside WebADM, or in a DMZ.

2. System Requirements

LDAP Bridge runs on Linux 64bit operating systems with GLIBC \geq 2.5. The installation package contains all the required dependencies allowing LDAP Bridge to run on any Linux system without any other requirement.

LDAP Bridge requires a working OpenOTP+WebADM installation (version \geq 1.4) connected to an LDAP backend.

The LDAP Bridge can be run on the same server as OpenOTP and WebADM. A standalone LDAP Bridge should meet the following requirements:

- > Running a Linux distribution with Glibc \geq 2.5 installed (RedHat, CentOS, SUSE, Debian, Ubuntu).
- > At least a 1 GHz x86-64 processor (two cores or vCPUs recommended).
- > 512 MB of RAM.
- > At the very least 20 MB of free disk space.

3. Installation

3.1 Install with Yum Repository

On a RedHat, CentOS or Fedora system, you can use our repository, which simplifies installation and updates.

Add the repository:

```
yum install https://www.rcdevs.com/repos/redhat/rcdevs_release-1.0.0-0.noarch.rpm
```

Clean the yum cache and install LDAP Bridge:

```
yum clean all
yum install ldproxy
```

3.2 Install with Debian Repository

On a Debian system, you can use our repository, which simplifies installation and updates.

Add the repository:

```
wget https://www.rcdevs.com/repos/debian/rcdevs-release_1.0.1-0_all.deb
apt-get install ./rcdevs-release_1.0.1-0_all.deb
```

Clean the cache and install WebADM with all WebApps & Services:

```
apt-get update
apt-get install ldproxy
```

3.3 Install using the Self-Installer

You first need to download and install the LDAP Bridge software package. You can download *OpenOTP LDAP Bridge* on the [RCDevs Website](#) and copy it to your server. You can copy the package file to the server with WinSCP or scp. Then connect via SSH to your server, uncompress and run the self-installer package with:

```
gunzip ldproxy-1.2.*.sh.gz
bash ldproxy-1.2.*.sh
```

The installation process will automatically run the console-based setup script in `bin/setup`.

4. Configuration

Once the package is installed, you can run the setup script:

```
[root@ldproxy ~]# /opt/ldproxy/bin/setup
Checking system architecture...Ok
```

You insert the hostname of the LDAP Bridge server for the certificate generation:

```
Enter the server fully qualified hostname (FQDN): ldproxy.test.local
Enter LDAP server IP or hostname [localhost]: backend_ldap.test.local
Enter LDAP server port [389]:
389
Enter LDAP protocol (ldap/ldaps) [ldap]:
ldap
```

If the login mode defined in *openotp* is *OTP*, then you need to configure a bind account in *ldproxy*, if it's only *LDAPOTP*, you can keep it empty because *ldproxy* is able to forward the LDAP request with the correct password to the LDAP backend:

```
Enter a bindable LDAP account from the back-end with no specific permission:
cn=bind_user,cn=users,dc=test,dc=local
Enter the LDAP account password:
```

You enter the IP of the WebADM server:

```
Enter WebADM server IP or hostname [localhost]: webadm1.test.local
Found two server URLs:
> URL1: https://webadm1.test.local:8443/openotp/
> URL2: https://webadm2.test.local:8443/openotp/
Retrieving WebADM CA certificate... Ok
The setup needs now to request a signed SSL server certificate.
This request should show up as pending in your WebADM interface and an administrator
must accept it!
Waiting 5 minutes for approbation... Ok
```

You connect to the WebADM interface and approve the certificate request:

□

□

□

```
Updating OpenOTP configuration file... Ok
Setting file permissions... Ok.
Starting OpenOTP LDAP Bridge... Ok
Do you want OpenOTP LDAP Bridge to be automatically started at boot (y/n)[y]?
y
Adding systemd service... Ok
Do you want to register OpenOTP LDAP Bridge logrotate script (y/n)[y]?
y
Adding logrotate script... Ok
OpenOTP LDAP Bridge has successfully been setup.
```

You can use `ldapsearch` for testing. If it's not already available, you can install it with `yum install openldap-clients` on CentOS. In this example, the user *john* is reading informations about himself, his password is *password* and his OTP is *637991*:

```
[root@ldproxy ~]# ldapsearch -H ldap://ldproxy.test.local:10389 -D cn=john,o=Root -w
password637991 -b cn=john,o=Root dn
# extended LDIF
#
# LDAPv3
# base <cn=john,o=Root> with scope subtree
# filter: (objectclass=*)
# requesting: dn
#
# john, Root
dn: cn=john,o=Root
# search result
search: 2
result: 0 Success
# numResponses: 2
# numEntries: 1
```

You can also define settings manually in `ldproxy.conf`:

- > *cert_file*: OpenOTP client certificate.
- > *cert_password*: OpenOTP client certificate's password.
- > *client_id*: the client ID that will be set in every request to OpenOTP, who can then match requests to a client policy with the same name (or alias).
- > *denied_dn*: a list of users who are not allowed to be authenticated by OpenOTP, they will receive an authentication failure.
- > *domain*: the WebADM domain that will be set on every request to OpenOTP.

- > *ignored_dn*: a list of users who don't need to use OpenOTP, the authentication is not redirected to the OpenOTP server.
- > *server_policy*: the load-balancing policy of requests between OpenOTP servers, if two servers are defined in *server_url*.
- > *server_url*, *server_url1*, *server_url2*: openotp server url.
- > *soap_timeout*: the time in seconds without before LDproxy's connection to OpenOTP times out. The LDAP clients of LDproxy must have a higher tolerance than *soap_timeout* to timeouts when connecting to LDproxy.
- > *status_cache*: the time in seconds between health polls of the backend OpenOTP servers.
- > *user_settings*: which are the public OpenOTP settings that will be passed in every request. OpenOTP must be configured with "Allow Request Settings" in WebADM. These settings will have priority over any settings defined on the users, groups, client policies and OpenOTP configuration.

Upgrades of LDAP Bridge will overwrite the file `/opt/ldproxy/conf/ldproxy.conf.default`, which will indicate the default values for any new configuration directive added by the upgrade. If new directives or any significant change has been added, it will be mentioned in `/opt/ldproxy/RELEASE_NOTES`.

4.1 LDAP sections

These sections contain per LDAP backend configurations:

- > *bind_dn* and *bind_pw*: Proxy user used for OTP user binds to the LDAP back-end. It must be a bindable LDAP account with no specific permission.
- > *domain*: the WebADM domain that will be set on every request to OpenOTP.
- > *name*: the name shown in logs.
- > *security*: Specify a set of security strength factors
- > *suffix*: base dn corresponding to the backend, it should not be included in a previous defined ldap backend.
- > *tls*: tls configuration `[[try-]start|[try-]propagate|ldaps] [tls_cert=<file>] [tls_key=<file>] [tls_cacert=<file>] [tls_cacertdir=<path>] [tls_reqcert=never|allow|try|demand] [tls_ciphersuite=<ciphers>] [tls_crlcheck=none|peer|all]`.
- > *uri*: ldap backend uri.

4.2 Client sections

`ldproxy.conf` can also contain client sections, which can, for requests coming from a specific IP or a subnet, override *client_id*, *domain* and *ignored_dn*.

```

client {
    name            myapp
    client_addr     192.168.3.237
    client_mask     255.255.255.255
    client_id       myappid
    domain          adrcdevs
    ignored_dn      "cn=aduser12,cn=Users,dc=adrcdevs,dc=com"
}

```

4.2.1 Client Logs

- > *name*: It could be any name you want to give this section.
- > *client_addr*: The IP address you want to assign the client configuration. It could be also a full network or subnet.
- > *client_mask*: The subnet mask for the IP/network defined in *client_address*. Put 255.255.255.255 in case you want to use only one IP.
- > *client_id*: The ID assigned to this client. It can be used with a [client_policy](#)
- > *domain*: You can set a specific **domain** here to replace the general configuration.
- > *ignored_dn*: You can also set a specific **ignored_dn** configuration here to replace the general configuration.

Below, you can find **WebADM logs** for an authentication example using this client configuration. You can notice the **client ID** is matched and the **client policy** is then applied.

```

[Mon Dec 07 16:02:01.226587 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] New openotpSimpleLogin
SOAP request
[Mon Dec 07 16:02:01.226635 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] > Username: aduser2
[Mon Dec 07 16:02:01.226644 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] > Domain: adrcdevs
[Mon Dec 07 16:02:01.226655 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] > Password:
xxxxxxxxxxxx
[Mon Dec 07 16:02:01.226662 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] > Client ID: myappid
[Mon Dec 07 16:02:01.226670 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] > Settings:
ChallengeMode=No
[Mon Dec 07 16:02:01.226676 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] > Options: NOVOICE,-
U2F
[Mon Dec 07 16:02:01.226769 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Enforcing client
policy: myappid (matched client ID)
[Mon Dec 07 16:02:01.226779 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Registered
openotpSimpleLogin request
[Mon Dec 07 16:02:01.227016 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Resolved LDAP user:
CN=aduser2,CN=Users,DC=adrcdevs,DC=com (cached)
[Mon Dec 07 16:02:01.227192 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Resolved LDAP groups:
group1
[Mon Dec 07 16:02:01.239039 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Started transaction
lock for user
[Mon Dec 07 16:02:01.251163 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Found user fullname:

```

aduser2

[Mon Dec 07 16:02:01.251211 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Found 1 user mobiles: 123456789

[Mon Dec 07 16:02:01.251231 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Found 1 user emails: aduser2@adrcdevs.com

[Mon Dec 07 16:02:01.251749 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Found 49 user settings:

LoginMode=LDAPOTP,OTPTType=TOKEN,PushLogin=Yes,MaxTries=5,BlockNotify=MAIL,ExpireNotify=M/1:HOTP-SHA1-6:QN06-TIM,DeviceType=FID02,SMSType=Normal,SMSMode=Ondemand,MailMode=Ondemand,PrefetchExpire=10,

[Mon Dec 07 16:02:01.251818 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Found 1 request settings: ChallengeMode=No

[Mon Dec 07 16:02:01.252647 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Found 6 user data: VoiceState,Token2Type,Token2Key,Token2State,Token2ID,Token2Serial

[Mon Dec 07 16:02:01.252725 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Found 1 registered OTP token (TOTP)

[Mon Dec 07 16:02:01.252749 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Challenge mode disabled (assuming concatenated passwords)

[Mon Dec 07 16:02:01.252760 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Requested login factors: LDAP & OTP

[Mon Dec 07 16:02:01.276923 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] LDAP password Ok

[Mon Dec 07 16:02:02.089090 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Sent push notification for token #2

[Mon Dec 07 16:02:02.089257 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Waiting 27 seconds for mobile response

[Mon Dec 07 16:02:05.289941 2020] [192.168.3.172] [OpenOTP:FZV9GSGK] Received mobile authentication response from 172.16.3.45

[Mon Dec 07 16:02:05.289987 2020] [192.168.3.172] [OpenOTP:FZV9GSGK] > Session: gLM036MctYE4IGvC

[Mon Dec 07 16:02:05.289995 2020] [192.168.3.172] [OpenOTP:FZV9GSGK] > Password: 16 Bytes

[Mon Dec 07 16:02:05.290002 2020] [192.168.3.172] [OpenOTP:FZV9GSGK] Found authentication session started 2020-12-07 16:02:01

[Mon Dec 07 16:02:05.290102 2020] [192.168.3.172] [OpenOTP:FZV9GSGK] PUSH password Ok (token #2)

[Mon Dec 07 16:02:05.295494 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Updated user data

[Mon Dec 07 16:02:05.296826 2020] [127.0.0.1] [OpenOTP:FZV9GSGK] Sent login success response

[Mon Dec 07 16:02:05.368013 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] New openotpSimpleLogin SOAP request

[Mon Dec 07 16:02:05.368075 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] > Username: cn=aduser1,cn=users,dc=adrcdevs,dc=com

[Mon Dec 07 16:02:05.368084 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] > Domain: adrcdevs

[Mon Dec 07 16:02:05.368097 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] > Password: xxxxxxxxxxxx

[Mon Dec 07 16:02:05.368104 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] > Client ID: myappid

[Mon Dec 07 16:02:05.368113 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] > Settings: ChallengeMode=No

[Mon Dec 07 16:02:05.368120 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] > Options: NOVOICE,-U2F,LDAPDN

[Mon Dec 07 16:02:05.368280 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Enforcing client

policy: myappid (matched client ID)
[Mon Dec 07 16:02:05.368293 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Registered
opentpSimpleLogin request
[Mon Dec 07 16:02:05.390019 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Verified LDAP user:
CN=aduser1,CN=Users,DC=adrcdevs,DC=com
[Mon Dec 07 16:02:05.390100 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Resolved LDAP groups:
qagroup,group1,administrators
[Mon Dec 07 16:02:05.401739 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Started transaction
lock for user
[Mon Dec 07 16:02:05.401903 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Found user fullname:
aduser1
[Mon Dec 07 16:02:05.401921 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Found 1 user mobiles:
+352691131144
[Mon Dec 07 16:02:05.401929 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Found 1 user emails:
mailmarcus@rcdevs.com
[Mon Dec 07 16:02:05.402939 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Found 49 user
settings:
LoginMode=LDAPOTP,OTPTType=TOKEN,PushLogin=Yes,MaxTries=5,BlockNotify=MAIL,ExpireNotify=M/
1:HOTP-SHA1-6:QN06-
TIM,DeviceType=FID02,SMSType=Normal,SMSMode=Ondemand,MailMode=Ondemand,PrefetchExpire=10,

[Mon Dec 07 16:02:05.403027 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Found 1 request
settings: ChallengeMode=No
[Mon Dec 07 16:02:05.403928 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Found 6 user data:
TmpKeyInit,TokenType,TokenKey,TokenState,TokenID,TokenSerial
[Mon Dec 07 16:02:05.404010 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Found 1 registered OTP
token (TOTP)
[Mon Dec 07 16:02:05.404035 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Challenge mode
disabled (assuming concatenated passwords)
[Mon Dec 07 16:02:05.404046 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Requested login
factors: LDAP & OTP
[Mon Dec 07 16:02:05.426642 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] LDAP password Ok
[Mon Dec 07 16:02:05.500768 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Sent push notification
for token #1
[Mon Dec 07 16:02:05.500809 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Waiting 28 seconds for
mobile response
[Mon Dec 07 16:02:08.539857 2020] [192.168.3.172] [OpenOTP:YVT6QTBE] Received mobile
authentication response from 172.16.3.45
[Mon Dec 07 16:02:08.539914 2020] [192.168.3.172] [OpenOTP:YVT6QTBE] > Session:
1idrU6kfJzVWHalr
[Mon Dec 07 16:02:08.539921 2020] [192.168.3.172] [OpenOTP:YVT6QTBE] > Password: 16
Bytes
[Mon Dec 07 16:02:08.539928 2020] [192.168.3.172] [OpenOTP:YVT6QTBE] Found
authentication session started 2020-12-07 16:02:05
[Mon Dec 07 16:02:08.540031 2020] [192.168.3.172] [OpenOTP:YVT6QTBE] PUSH password Ok
(token #1)
[Mon Dec 07 16:02:08.543665 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Updated user data
[Mon Dec 07 16:02:08.545231 2020] [127.0.0.1] [OpenOTP:YVT6QTBE] Sent login success
response

4.3 LDAP Ports

LDAP Bridge provides the LDAP service over the following ports:

- > TCP 10389 for un-encrypted LDAP and TLS.
- > TCP 10636 for LDAP over SSL.

The LDAP Bridge's default listening network interface and ports can be changed by creating an environment file

`/opt/ldproxy/conf/ldproxy.env` with the following configurations:

```
##This is ldproxy.env example
```

```
INTERFACE=0.0.0.0
```

```
PORT_STD=10389
```

```
PORT_SSL=10636
```

5. Maintenance and Troubleshooting

This section should cover your common administrative tasks concerning LDAP Bridge. For additional support, you can contact RCDevs' commercial support if you are a client or our [Google Group](#) if you are using the freeware edition of OpenOTP.

5.1 Starting and Stopping

If during the setup, you've let the installer set the LDProxy init scripts and systems service files on your machine, the LDAP Bridge should start at machine boot. You should also be able to start and stop the LDAP Bridge through your distribution's usual commands, such as `systemctl start ldproxy` for distributions using systemd like RedHat Enterprise Linux 7.

Alternatively, you can use

```
/opt/ldproxy/bin/ldproxy start | restart | stop | debug
```

5.2 Backup and Restore

You can backup and restore easily the configuration with these commands:

```
/opt/ldproxy/bin/backup ldproxy.bkp.gz
```

```
/opt/ldproxy/bin/restore ldproxy.bkp.gz
```

5.3 Upgrading and Un-Installing

If LDAP Bridge was installed using RCDevs repository, it will be updated with the system when you will execute `yum update` or `apt-get upgrade`.

If it was installed with the tar file, you can download and install it as you did for your first installation. The installer will offer you the option of upgrading your installation.

Be aware that, to do so, the installer will stop LDProxy. As a matter of principle, you should back up the `/opt/ldproxy/` directory before the upgrade. You can then restore the directory if anything breaks and restart the LDProxy service.

The installer also gives you the option of removing an existing LDProxy installation.

You can reset your installation by executing `/opt/ldproxy/setup reset`, which removes any init, systemd and logrotate files the installer put on the machine. This will also remove the log files, SSL certificate and secret key.

5.3.1 Upgrading from 1.1.x to 1.2.x

The version 1.2.0 includes the support of multiple LDAP backends. You need to change some settings manually.

Before the update, keep a backup of `/opt/ldproxy/conf` folder, then run the update.

Once it is done, rename `default_domain` parameter as `domain`. Create also an LDAP section at the end of `ldproxy.conf` and move the config for the LDAP backend in it:

```
ldap {
  uri      "ldaps://ldap.backend1:636,ldaps://ldap.backend2:636"
  suffix   ""
  bind_dn  "cn=test,dc=webadm"
  bind_pw  "Password123"
  domain   "Acme"
}
```

You can use `ldproxy.conf.default` as an example of the new configuration.

5.3.2 Upgrading from 1.0.x to 1.1.x

The version 1.1.0 includes several changes. You probably need to change some settings manually.

Before the update, keep a backup of `/opt/ldproxy/conf` folder, then run the update.

Once it is done, if you don't have changed the default port, you probably need to change it. The previous version used 389 and 636 and the new version 10389 and 10636. If you want to continue to use 389 and 636, you need to create `/opt/ldproxy/conf/ldproxy.env` with the following content:

```
PORT_STD=389
PORT_SSL=636
```

You need also to copy `uri` and `ignored_dn` from `slapd.conf` to `ldproxy.conf`. `uri` is now called `ldap_uri1`.

To finish, you need to replace `denied_usernames` with `denied_dn`, replace `nolock_usernames` with `nolock_dn`, replace all usernames with their distinguished name and remove `uid_attribute` in `ldproxy.conf`.

You can use `ldproxy.conf.default` as an example of the new configuration.

5.4 Troubles and Known Issues

You can start LDAP Bridge in debug mode to get a verbose output of what the proxy does on your terminal.

```
/opt/ldproxy/bin/ldproxy debug <loglevel>
```

If you omit `<loglevel>`, it will be set to `stats` by default, but you can also choose another log level:

log level	Description
any	enable all debugging
trace	trace function calls
packets	debug packet handling
args	heavy trace debugging
conns	connection management
BER	print out packets sent and received
filter	search filter processing
config	configuration processing
ACL	access control list processing
stats	stats log connections/operations/results
stats2	stats log entries sent
shell	print communication with shell backends
parse	print entry parsing debugging
sync	syncrepl consumer processing
none	only messages that get logged whatever log level is set

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