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**eldap**

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**February 27, 2024**

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# 1 Eldap User's Guide

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The **Eldap** application provides an api for accessing an LDAP server.

The original code was developed by Torbjörn Törnkvist.

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## 2 Reference Manual

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# eldap

Erlang module

This module provides a client api to the Lightweight Directory Access Protocol (LDAP).

References:

- RFC 4510 - RFC 4519
- RFC 2830

The above publications can be found at **IETF**.

## DATA TYPES

Type definitions that are used more than once in this module:

```
handle()
    Connection handle

attribute() =
    {Type = string(), Values=[string()] }

modify_op()
    See mod_add/2, mod_delete/2, mod_replace/2

scope()
    See baseObject/0, singleLevel/0, wholeSubtree/0

dereference()
    See neverDerefAliases/0, derefInSearching/0, derefFindingBaseObj/0, derefAlways/0

filter()
    See present/1, substrings/2, equalityMatch/2, greaterOrEqual/2, lessOrEqual/2, approxMatch/2,
    extensibleMatch/2, 'and'/1, 'or'/1, 'not'/1

return_value() =
    ok | {ok, {referral, referrals()}} | {error, Error}

referrals() =
    [Address = string()] The contents of Address is server dependent.
```

## Exports

```
open([Host]) -> {ok, Handle} | {error, Reason}
```

Types:

```
Handle = handle()
```

Setup a connection to an LDAP server, the HOST's are tried in order.

```
open([Host], [Option]) -> {ok, Handle} | {error, Reason}
```

Types:

```
Handle = handle()
```

```
Option = {port, integer()} | {log, function()} | {timeout, integer()} |  
{ssl, boolean()} | {sslopts, list()} | {tcptopts, list()}
```

Setup a connection to an LDAP server, the HOST's are tried in order.

The log function takes three arguments, `fun(Level, FormatString, [FormatArg]) end`.

Timeout set the maximum time in milliseconds that each server request may take.

All TCP socket options are accepted except `active`, `binary`, `deliver`, `list`, `mode` and `packet`

```
close(Handle) -> ok
```

Types:

```
Handle = handle()
```

Shutdown the connection after sending an `unbindRequest` to the server. If the connection is `tls` the connection will be closed with `ssl:close/1`, otherwise with `gen_tcp:close/1`.

```
start_tls(Handle, Options) -> return_value()
```

Same as `start_tls(Handle, Options, infinity)`

```
start_tls(Handle, Options, Timeout) -> return_value()
```

Types:

```
Handle = handle()
```

```
Options = ssl:ssl_options()
```

```
Timeout = infinity | positive_integer()
```

Upgrade the connection associated with `Handle` to a `tls` connection if possible.

The upgrade is done in two phases: first the server is asked for permission to upgrade. Second, if the request is acknowledged, the upgrade to `tls` is performed.

Error responses from phase one will not affect the current encryption state of the connection. Those responses are:

`tls_already_started`

The connection is already encrypted. The connection is not affected.

`{response, ResponseFromServer}`

The upgrade was refused by the LDAP server. The `ResponseFromServer` is an atom delivered by the LDAP server explained in section 2.3 of rfc 2830. The connection is not affected, so it is still un-encrypted.

Errors in the second phase will however end the connection:

Error

Any error responded from `ssl:connect/3`

The `Timeout` parameter is for the actual `tls` upgrade (phase 2) while the timeout in `eldap:open/2` is used for the initial negotiation about upgrade (phase 1).

```
simple_bind(Handle, Dn, Password) -> return_value()
```

Types:

```
Handle = handle()
```

```
Dn = string()
```

```
Password = string()
```

Authenticate the connection using simple authentication.

`add(Handle, Dn, [Attribute]) -> return_value()`

Types:

```
Handle = handle()
Dn = string()
Attribute = attribute()
```

Add an entry. The entry must not exist.

```
add(Handle,
    "cn=Bill Valentine, ou=people, o=Example Org, dc=example, dc=com",
    [{"objectclass", ["person"]},
     {"cn", ["Bill Valentine"]},
     {"sn", ["Valentine"]},
     {"telephoneNumber", ["545 555 00"]}])
)
```

`delete(Handle, Dn) -> return_value()`

Types:

```
Dn = string()
```

Delete an entry.

```
delete(Handle, "cn=Bill Valentine, ou=people, o=Example Org, dc=example, dc=com")
```

`mod_add(Type, [Value]) -> modify_op()`

Types:

```
Type = string()
Value = string()
```

Create an add modification operation.

`mod_delete(Type, [Value]) -> modify_op()`

Types:

```
Type = string()
Value = string()
```

Create a delete modification operation.

`mod_replace(Type, [Value]) -> modify_op()`

Types:

```
Type = string()
Value = string()
```

Create a replace modification operation.

`modify(Handle, Dn, [ModifyOp]) -> return_value()`

Types:

```
Dn = string()
ModifyOp = modify_op()
```

Modify an entry.

```
modify(Handle, "cn=Bill Valentine, ou=people, o=Example Org, dc=example, dc=com",
  [eldap:mod_replace("telephoneNumber", ["555 555 00"]),
  eldap:mod_add("description", ["LDAP Hacker"]) ])
```

`modify_password(Handle, Dn, NewPasswd) -> return_value() | {ok, GenPasswd}`

Types:

```
Dn = string()
NewPasswd = string()
```

Modify the password of a user. See `modify_password/4`.

`modify_password(Handle, Dn, NewPasswd, OldPasswd) -> return_value() | {ok, GenPasswd}`

Types:

```
Dn = string()
NewPasswd = string()
OldPasswd = string()
GenPasswd = string()
```

Modify the password of a user.

- **Dn**. The user to modify. Should be "" if the modify request is for the user of the LDAP session.
- **NewPasswd**. The new password to set. Should be "" if the server is to generate the password. In this case, the result will be `{ok, GenPasswd}`.
- **OldPasswd**. Sometimes required by server policy for a user to change their password. If not required, use `modify_password/3`.

`modify_dn(Handle, Dn, NewRDN, DeleteOldRDN, NewSupDN) -> return_value()`

Types:

```
Dn = string()
NewRDN = string()
DeleteOldRDN = boolean()
NewSupDN = string()
```

Modify the DN of an entry. `DeleteOldRDN` indicates whether the current RDN should be removed from the attribute list after the operation. `NewSupDN` is the new parent that the RDN shall be moved to. If the old parent should remain as parent, `NewSupDN` shall be "".

```
modify_dn(Handle, "cn=Bill Valentine, ou=people, o=Example Org, dc=example, dc=com ",
  "cn=Bill Jr Valentine", true, "")
```

`search(Handle, SearchOptions) -> {ok, #eldap_search_result{}} | {ok, {referral, referrals()}} | {error, Reason}`

Types:

```
SearchOptions = #eldap_search{} | [SearchOption]
SearchOption = {base, string()} | {filter, filter()} | {scope, scope()}
| {attributes, [string()]} | {deref, dereference()} | {types_only,
boolean()} | {timeout, integer()}
```



Search the directory with the supplied the SearchOptions. The base and filter options must be supplied. Default values: scope is wholeSubtree(), deref is derefAlways(), types\_only is false and timeout is 0 (meaning infinity).

```
Filter = eldap:substrings("cn", [{any,"V"}]),
search(Handle, [{base, "dc=example, dc=com"}, {filter, Filter}, {attributes, ["cn"]}]),
```

The timeout option in the SearchOptions is for the ldap server, while the timeout in eldap:open/2 is used for each individual request in the search operation.

**baseObject()** -> scope()

Search baseobject only.

**singleLevel()** -> scope()

Search the specified level only, i.e. do not recurse.

**wholeSubtree()** -> scope()

Search the entire subtree.

**neverDerefAliases()** -> dereference()

Never dereference aliases, treat aliases as entries.

**derefAlways()** -> dereference()

Always dereference aliases.

**derefInSearching()** -> dereference()

Dereference aliases only when searching.

**derefFindingBaseObj()** -> dereference()

Dereference aliases only in finding the base.

**present(Type)** -> filter()

Types:

```
Type = string()
```

Create a filter which filters on attribute type presence.

**substrings(Type, [SubString])** -> filter()

Types:

```
Type = string()
```

```
SubString = {StringPart, string() }
```

```
StringPart = initial | any | final
```

Create a filter which filters on substrings.

**equalityMatch(Type, Value)** -> filter()

Types:

```
Type = string()
```

```
Value = string()
```

Create a equality filter.

```
greaterOrEqual(Type, Value) -> filter()
```

Types:

```
Type = string()  
Value = string()
```

Create a greater or equal filter.

```
lessOrEqual(Type, Value) -> filter()
```

Types:

```
Type = string()  
Value = string()
```

Create a less or equal filter.

```
approxMatch(Type, Value) -> filter()
```

Types:

```
Type = string()  
Value = string()
```

Create a approximation match filter.

```
extensibleMatch(MatchValue, OptionalAttrs) -> filter()
```

Types:

```
MatchValue = string()  
OptionalAttrs = [Attr]  
Attr = {matchingRule,string()} | {type,string()} |  
{dnAttributes,boolean()}
```

Creates an extensible match filter. For example,

```
eldap:extensibleMatch("Bar", [{type,"sn"}, {matchingRule,"caseExactMatch"}]))
```

creates a filter which performs a `caseExactMatch` on the attribute `sn` and matches with the value `"Bar"`. The default value of `dnAttributes` is `false`.

```
'and'([Filter]) -> filter()
```

Types:

```
Filter = filter()
```

Creates a filter where all `Filter` must be true.

```
'or'([Filter]) -> filter()
```

Types:

```
Filter = filter()
```

Create a filter where at least one of the `Filter` must be true.

```
'not'(Filter) -> filter()
```

Types:

```
Filter = filter()
```

Negate a filter.

```
paged_result_control(PageSize) -> {control, "1.2.840.113556.1.4.319", true,
binary()}
```

Types:

```
PageSize = positive_integer()
```

Paged results is an extension to the LDAP protocol specified by RFC2696

This function creates a control with the specified page size for use in `search/3`, for example:

```
Control = eldap:paged_result_control(50),
{ok, SearchResults} = search(Handle, [{base, "dc=example, dc=com"}], [Control]),
```

```
paged_result_control(PageSize, Cookie) -> {control, "1.2.840.113556.1.4.319",
true, binary()}
```

Types:

```
PageSize = positive_integer()
```

```
Cookie = binary()
```

Paged results is an extension to the LDAP protocol specified by RFC2696

This function creates a control with the specified page size and cookie for use in `search/3` to retrieve the next results page.

For example:

```
PageSize = 50,
Control1 = eldap:paged_result_control(PageSize),
{ok, SearchResults1} = search(Handle, [{base, "dc=example, dc=com"}], [Control1]),
%% retrieve the returned cookie from the search results
{ok, Cookie1} = eldap:paged_result_cookie(SearchResults1),
Control2 = eldap:paged_result_control(PageSize, Cookie1),
{ok, SearchResults2} = eldap:search(Handle, [{base, "dc=example,dc=com"}], [Control2]),
%% etc
```

```
paged_result_cookie(SearchResult) -> binary()
```

Types:

```
SearchResult = #eldap_search_result{}
```

Paged results is an extension to the LDAP protocol specified by RFC2696.

This function extracts the cookie returned from the server as a result of a paged search result.

If the returned cookie is the empty string "", then these search results represent the last in the series.

```
info(Handle) -> connection_info()
```

Types:

```
connection_info() = #{socket := Socket, socket_type := tcp | ssl}  
Socket = ssl:sslsocket() | gen_tcp:socket()
```

Currently available information reveals the socket and the transport protocol, TCP or TLS (SSL), used by the LDAP connection.