# Integrating an existing account system by using LDAP

## **LDAP Introduction**

• LDAP (Lightweight Directory Access Protocol) is the lightweight directory access protocol, Implementing information Services called directory Services. The directory service is a special database system, which is specifically optimized for reading, browsing and searching operations.

• The information in the LDAP directory is organized in tree structure, and the specific information is stored in the data structure of the item (entry). Entry equals to records in the relational database; entry has DN (Distinguished Name) attribute; DN is used to refer to entry, and it equals to primary key in the relational database table. Attribute contains Type and one or more Values, and it is equivalent to Field which contains field name and data type. Just in order to facilitate the retrieval, LDAP type can have multiple values which is different with the relational database. The entries in LDAP are organized according to the location and organization relationship in a very intuitive way. LDAP stores the data in the file, and can use the index based file database instead of relational database for improving the efficiency. An example of the type is mail, whose value will be an email address.

## **LDAP** Abbreviation

- o- organization
- ou organization unit
- c country Name
- dc domain Component
- sn suer name
- cn common name

## **Directory Design**

• To design the directory structure is one of the most important aspects of LDAP. Here we will illustrate how to design a reasonable directory structure by using a simple example. The example will be accessed through the Netscape address book. Suppose there is a company located in the United States US (c=US), across multiple states and named Acme (o=Acme). Acme wants to implement a small address book server for all employees.

- Start from the simple structure DN:
- dn: o=Acme, c=US

• In Acme all the organization's classification and attributes will be stored under the DN, the directory the DN is stored in the server is unique. In Acme the employee's information is divided into two categories: Managers (ou= managers) and ordinary employees (ou=Employees). RDN (relative distinguished names) is expressed relative to a vertex DN as:

- dn: ou=Managers, o=Acme, c=US
- dn: ou=Employees, o=Acme, c=US

• In the following we'll see the composition of the hierarchy: the top node is Acme in US, under it there are manager organization unit and the employee organization unit. Thus, the DN comprising Managers and Employees is:

- dn: cn=Jason H. Smith, ou=Managers, o=Acme, c=US
- dn: cn=Ray D. Jones, ou=Employees, o=Acme, c=US
- dn: cn=Eric S. Woods, ou=Employees, o=Acme, c=US

• To cite the common name entry for Jason H. Smith, LDAP will use RDN where cn=Jason H. Smith. And then combine the previous parent entry to form the following tree structure:

| cn=Jason H. Smith                                   |
|---|
| + ou=Managers                                       |
| + o=Acme  |
| + c=US  |
| -> dn: cn=Jason H. Smith, ou=Managers, o=Acme, c=US |

• Now you have defined the directory structure, the next step is to import directory information. Directory information data will be stored in the LDIF file, which is the default file for importing directory information data. Users can easily write Perl scripts to create LDIF files from the system file such as /etc/passwd, NIS, etc..

• LDIF is a universal file format used to describe directory information or to modify directory. LDIF is completely independent of the storage format used in all specific directories, and it is typically used to export directory information from the LDAP server or import data into the LDAP server.

• LDIF is generally easy to be generated. Thus, you can use some tools (such as awk or Perl) to move data from specific formats to LDAP directory. You can also write scripts to generate test data for LDIF format.

## **Configure OpenLDAP**

#### **Create LDIF file**

• Before setting OpenLDAP, it's needed to create a LDIF file, take creating the openIdapfortest.ldif file as an example:

- dn: ou=People, dc=maxcrc, dc=com
- objectClass: top
- objectClass: organizationalUnit

```
ou: People
description: Container for user entries
structuralObjectClass: organizationalUnit
entryUUID: fea960bd-a082-457c-bbdc-f92d83f3c3d8
creatorsName: cn=manager, dc=maxcrc, dc=com
createTimestamp: 20140801020034Z
entryCSN: 20140801020034.844507Z#000000#000#000000
modifiersName: cn=manager, dc=maxcrc, dc=com
modifyTimestamp: 20140801020034Z
dn: ou=groups, dc=maxcrc, dc=com
objectClass: top
objectClass: organizationalUnit
ou: groups
structuralObjectClass: organizationalUnit
entryUUID: 10fbce96-7085-4f00-be47-a99c9d85e72f
creatorsName: cn=Manager, dc=maxcrc, dc=com
createTimestamp: 20140804023216Z
entryCSN: 20140804023216.519824Z#000000#000#000000
modifiersName: cn=Manager, dc=maxcrc, dc=com
modifyTimestamp: 20140804023216Z
dn: uid=bob, ou=People, dc=maxcrc, dc=com
objectClass: posixAccount
objectClass: top
objectClass: inetOrgPerson
gidNumber: 0
sn: test
uid: bob
uidNumber: 49223
homeDirectory: test
structuralObjectClass: inetOrgPerson
entryUUID: fd3a66e0-635a-414a-b2e8-70874c1c81dd
creatorsName: cn=Manager, dc=maxcrc, dc=com
createTimestamp: 20140804033305Z
cn: bob2
givenName: bob2
userPassword:: e1NIQX01ZW42RzZNZXpScm9UM1hLcWtkUE9tWS9CZIE9
entryCSN: 20140923021306.643518Z#000000#000#000000
modifiersName: cn=Manager, dc=maxcrc, dc=com
modifyTimestamp: 20140923021306Z
```

- h: uid=alice, ou=People, dc=maxcrc, dc=com
- objectClass: posixAccount
- objectClass: top
- objectClass: inetOrgPerson
- gidNumber: 0
- givenName: alice
- sn: test
- displayName: alice
- uid: alice
- homeDirectory: test
- 🕨 cn: alice
- uidNumber: 4193
- structuralObjectClass: inetOrgPerson
- entryUUID: c8122bdc-2db6-49c7-811a-04e2fa343fd3
- creatorsName: cn=Manager, dc=maxcrc, dc=com
- createTimestamp: 20140804033308Z
- userPassword:: MTIzNDU2
- entryCSN: 20140918064051.754045Z#000000#000#000000
- modifiersName: cn=Manager, dc=maxcrc, dc=com
- modifyTimestamp: 20140918064051Z
- dn: uid=bill, ou=People, dc=maxcrc, dc=com
- objectClass: posixAccount
- objectClass: top
- objectClass: inetOrgPerson
- gidNumber: 0
- givenName: bill
- sn: test
- uid: bill
- homeDirectory: test
- cn: bill
- uidNumber: 4542
- structuralObjectClass: inetOrgPerson
- entryUUID: 29c3c904-0ccb-493b-b841-fe1452fac891
- creatorsName: cn=Manager, dc=maxcrc, dc=com
- createTimestamp: 20140804033312Z
- userPassword:: MTIzNDU2
- entryCSN: 20140804055604.649500Z#000000#000#000000
- modifiersName: cn=Manager, dc=maxcrc, dc=com
- modifyTimestamp: 20140804055604Z

- dn: cn=ldapadmin, ou=groups, dc=maxcrc, dc=com
- objectClass: posixGroup
- objectClass: top
- cn: Idapadmin
- memberUid: bill
- gidNumber: 19399
- structuralObjectClass: posixGroup
- entryUUID: d3a990b1-5227-44b5-9c9d-7328a821b56a
- creatorsName: cn=Manager, dc=maxcrc, dc=com
- createTimestamp: 20140918062008Z
- entryCSN: 20141016061223.535652Z#0000000#000#000000
- modifiersName: cn=Manager, dc=maxcrc, dc=com
- modifyTimestamp: 20141016061223Z
- dn: cn=ldapuser, ou=groups, dc=maxcrc, dc=com
- objectClass: posixGroup
- objectClass: top
- cn: ldapuser
- memberUid: alice
- gidNumber: 31590
- structuralObjectClass: posixGroup
- entryUUID: d63843a6-6e87-4fdf-830d-d7fc93286a83
- creatorsName: cn=Manager, dc=maxcrc, dc=com
- createTimestamp: 20140918062028Z
- entryCSN: 20141016061238.615730Z#000000#000#000000
- modifiersName: cn=Manager, dc=maxcrc, dc=com
- modifyTimestamp: 20141016061238Z
- dn: cn=ldappublisher, ou=groups, dc=maxcrc, dc=com
- objectClass: posixGroup
- objectClass: top
- cn: ldappublisher
- memberUid: bob
- gidNumber: 51276
- structuralObjectClass: posixGroup
- entryUUID: a4305015-9098-4957-a703-a1aeebbcd77e
- creatorsName: cn=Manager, dc=maxcrc, dc=com
- createTimestamp: 20140918062410Z
- entryCSN: 20141016061140.167443Z#000000#000#000000
- modifiersName: cn=Manager, dc=maxcrc, dc=com
- modifyTimestamp: 20141016061140Z

#### **Install OpenLDAP for Windows**

• Step 1: Double click OpenLDAPforWindows.exe to show the following interface:



• Step 2: Click Yes to show this:

| OpenLDAP<br>Installation   | \$          | Next                                | Close         |
|--|-------------|-------------------------------------|---------------|
| Wellcome to the OpenLDAP for<br>The Setup Wizard will install OpenLDAP for Windo<br>Cancel to exit Setup Wizard. | Windows Set | up Wizard<br>r. Click <b>Hext</b> t | o continue or |
|  |             |                                     |               |
| Manual Pages   | Read        | Man                                 |               |

• Step 3: Click Next to show this:



• Step 4: Check I accept..., click Next to show this:



• Step 5: Click Install to show this:

| OpenLDAPBack  | Next        | Close |
|---|-------------|-------|
| Destination Folder<br>Click Wext to install to the default folder or click Change to choo | se another. |       |
| C:\OpenLDAP   | Change      |       |
|   |             |       |
|   |             |       |

• Step 6: Choose the installation directory, click Next to show this:

| OpenLDAP<br>Back Installation   | <u></u> | Next | Close |
|---|---------|------|-------|
| Customize Setup<br>Choose the way you want features to be installed.  |         |      |       |
| <ul> <li>✓ OpenLDAP Client Tools</li> <li>✓ OpenLDAP Server</li> <li>✓ OpenLDAP Service</li> <li>✓ OpenLDAP Backend Tools</li> <li>✓ DejaVu Sans Mono Font for Windows Console</li> </ul> |         |      |       |
|   |         |      |       |

• Step 7: Click Next to show this:



• Step 8: Click Next, select to get the back end data from "LDIF", also can choose other file types, as shown below:

| Back Inst   | OpenLDAP<br>allation   |   | Next  | Close   |
|---|--|---|---|---|
| Database back<br>Server Properties (opt:<br>OpenLDAP supports many<br>and other backend engin<br>configure it.<br>Please select one of the<br>LDAP Backend, LDIF Back<br>BDB<br>MDB<br>LDAP<br>LDIF<br>SQL Server | end<br>sonal)<br>backends. This package o<br>hes out of the box. Pleas<br>he backend engines below,<br>kend or SQL-Server Databa | ffers the most pop<br>e select the desir<br>Berkely Database B<br>se Backend: | ular Berkeley Dat<br>ed backend and cl<br>ackend, Memory Me | tabase (BDB)<br>Lick Next to<br>apped Database, |

• Step 9: Click Next, the default initial password is secret as below



• Step 10: Click Next to show this:



• Step 11: Click Install to show this:

| OpenLDAP<br>Installation  |                           |
|---|---------------------------|
| Installing OpenLDAP for Wind<br>Please wait while the Setup Wizard installs Ope | OWS<br>nLDAP for Windows. |
| Feature: Feature.DejaVuConsoleFont  |                           |
| 💃 Manual Pages  | 💃 Road Map                |

• Step 12: After the installation is completed, click Close to show this:

| OpenLDAP<br>Installation                     | <u>s</u>            | Close |
|--|---------------------|-------|
| Completed the OpenLDAP for W                 | indows Setup Wizard |       |
| Click <b>Close</b> to exit the Setup Wizard. |                     |       |
|  |                     |       |
|  |                     |       |
|  |                     |       |
|  |                     |       |
| 💃 Manual Pages                               | 💃 Road Map          |       |

#### **Configure the Directory Data of LDAP**

• This sample provides a way of using the LdapAdmin.exe editor to connect to the LDAP server and visually configure LDAP directory data.

#### • Open the editor:

| 🔏 LDAP Admin            |                 |           |
|-------------------------|-----------------|-----------|
| Start Edit View Tools ? |                 |           |
| 3 3 2 B X P 7 0 (       |                 |           |
|                         | Attribute Value | Type Size |
|                         |                 |           |
|                         |                 |           |
|                         |                 |           |
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|                         |                 |           |

• Click Start menu, select Connections to pop up a dialog, and then double click New connection to configure:

| Connection properties                   | ×                     |  |  |  |
|---|-----------------------|--|--|--|
| Connection name: GSX-PC/dc=maxcrc,dc=co | m                     |  |  |  |
| General Options Attributes              |                       |  |  |  |
| Connection:                             |                       |  |  |  |
| Host: GSX-PC Pc                         | ort: 636 Version: 3 💌 |  |  |  |
| Base: dc=maxcrc,dc=com                  | Fetch DNs             |  |  |  |
| Simple authentication                   | SSL 🔲 TLS             |  |  |  |
| GSS-API                                 | SASL                  |  |  |  |
| Account                                 |                       |  |  |  |
| Username: CN=Manager,DC=maxcro          | ;DC=com               |  |  |  |
| Password: *****                         |                       |  |  |  |
| Anonymous connection                    |                       |  |  |  |
|   |                       |  |  |  |
| Test connection                         | OK Cancel             |  |  |  |

Add: 6/F, Building 107, No. A10, Jiuxianqiao North Road, Chaoyang District, Beijing, 100015, CHINA, 100015 E-mail: request@supermap.com Website: www.supermap.com

- Where:
  - **"Connection name":** The location of the computer name and root entry for the LDAP server
  - **"Host"**: computer name where the LDAP server is, **"port"**: port, the default uses TLS protocol to connect to the LADP server, and the port number is 389; If you choose SSL connection protocol, the port number will automatically be set to 636
  - "Base": Root entry position
  - "Account": Account connectING LDAP server, the default is "Anonymous connection", you can uncheck it and enter the account name and password to connect, "Username": "creatorsName" in the newly created openIdapfortest.Ldif file, the value is: cn=Manager, dc=maxcrc, DC = com, the initial password is: secret.
- After the setting, click Test connection to test whether LDAP server is connected as follows:

| 100.000                 | -  | -   |   | ×  |
|-------------------------|--|---|---|--|
| The server you are tryi | ng to connect  | to is using a   | a certificate which c   | ould not be verified!  |
| - The certificat        | e is self-signe  | d root certif   | icate   |  |
| Do you want to procee   | ed?  |   |   |  |
|                         | es   | No  | View:   |  |
|                         |  | .,  |   |  |
|                         | The server you are tryi<br>- The certificat<br>Do you want to procee | The server you are trying to connect<br>- The certificate is self-signe<br>Do you want to proceed?<br>Yes | The server you are trying to connect to is using a<br>- The certificate is self-signed root certif<br>Do you want to proceed?<br>Yes No | The server you are trying to connect to is using a certificate which content of the certificate is self-signed root certificate Do you want to proceed? Yes No View: |

• Click Yes to start the test, the following result means the connection is successful:

| tart Edit View Tools ? |   |            |
|------------------------|---|------------|
| Connections            | Connection properties  Connection name: GSX-PC/dc=maxcrc,dc=com  General Options Attributes  Connection: Host GSX-PC Port 636 Version: 3  Base: dc=maxcrc,dc=com GGS-API  Connection is successed | essful.    |
|                        | Usemame: CN=Manager,DC=maxcrc,DC= Password: xeexax Anonymous connection  Test connection  (   | <b>确</b> 定 |

• Double click run.cmd file in the installation directory(c:/OpenLDAP/run) to start LDAP service, it means successful as follows:

| C:\Windows\system32\cmd.exe   |      |
|---|------|
| <pre>x C:Windows\system32\cmdexe 3.0 NAME 'objectIdentifierMatch' APPLIES ( supportedControl \$ supportedExtension \$ supportedFeatures \$ supportedHpplicationContext ) ) 5518a0b7 slapd startup_one: starting "cn=config" 5518a0b7 config_build_entry: "cn=config" 5518a0b7 config_build_entry: "cn=schema" 5518a0b7 config_build_entry: "cn=schema" 5518a0b7 config_build_entry: "cn=schema" 5518a0b7 config_build_entry: "cn=l0]core&gt; 5518a0b7 config_build_entry: "cn={0}core" 5518a0b7 config_build_entry: "cn={0}core" 5518a0b7 config_build_entry: "cn={0}core" 5518a0b7 config_build_entry: "cn={1}cosine&gt; 5518a0b7 config_build_entry: "cn={2}nis&gt; 5518a0b7 config_build_entry: "cn={2}nis" 5518a0b7 config_build_entry: "cn={2}nis" 5518a0b7 config_build_entry: "cn={3}inetorgperson&gt; 5518a0b7 config_build_entry: "cn={3}inetorgperson&gt; 5518a0b7 config_build_entry: "cn={3}inetorgperson" 5518a0b7 config_build_entry: "cn={1}frontend" 5518a0b7 config_build_entry: "cn={1}inetorgperson&gt; 5518a0b7 config_build_entry: "cn={2}nis" 5518a0b7 config_build_entry: "cn={3}inetorgperson&gt; 5518a0b7 config_build_entry: "cn={3}inetorgperson" 5518a0b7 config_bui</pre> |      |
| 5518a0b7 backend_startup_one: starting "dc=maxcrc,dc=com"<br>5518a0b7 slapd starting  | 4 11 |

• Copy the newly created openIdapfortest.Ldif file to the installation directory

(C:\OpenLDAP), then open a command window and enter slapadd -v -l

C:\OpenLDAP\openldapfortest.ldif to import the directory data to LDAP server. If there is something wrong, indicating that the organization unit People already exist, you can delete the ou=people folder and ou=people.ldif file in installation directory such as

C:OpenLDAPdifdatadc=maxcrc, dc=com, and then input the above command to import the data again:

| C:\OpenLDAP>slapadd -v<br>slapadd: could not add  | -1 C:\OpenLD<br>entry dn="ou   | AP\openldapfortest<br>=People,dc=maxcrc,   | .ldif<br>dc=com" (l  | ine=1): | Alrea | ady e |
|---|--|--|--|---------|-------|-------|
| xists<br>##<br>Closing DB   | 11.30% eta   | none elapsed   | non  | e spd   | 0.0   | /s    |
| C:\OpenLDAP>slapadd -v<br>added: "ou=People,dc=ma<br>added: "ou=groups,dc=ma<br>added: "uid=bob,ou=Peop<br>added: "uid=alice,ou=Peop<br>added: "uid=bill,ou=Peop<br>added: "cn=ldapadmin,ou<br>added: "cn=ldapuser,ou<br>added: "cn=ldapuser,ou<br>added: "cn=ldapublisho<br>#################################### | -1 C:\OpenLD<br>axcrc,dc=com"<br>ple,dc=maxcrc<br>eople,dc=maxcrc<br>ople,dc=maxcr<br>u=groups,dc=ma<br>groups,dc=ma<br>er,ou=groups,<br>100.00% eta | AP\openldapfortest<br>(00000001)<br>(00000001)<br>c,dc=com" (00000001)<br>c,dc=com" (0000000<br>c,dc=com" (0000000<br>axcrc,dc=com" (0000<br>kcrc,dc=com" (0000<br>dc=maxcrc,dc=com"<br>none elapsed | .ldif<br>01)<br>1)<br>00001)<br>00001)<br>(000000001)<br>non | e fast! |       |       |
| C:\OpenLDAP>slanadd -v  | -1 C:\OnenLD   | AP\openldanfortest   | ldif_  |         |       |       |

• Next, you can view the directory data in the editor as follows:

| tart Edit View Tools ?                              |             |            |      |      |
|---|-------------|------------|------|------|
| 💐 🍇 🛛 🗟 🗙 🔎 🖉 🕻 🕻                                   | 000000      |            |      |      |
| do-maxere.de=cam[acar-PC]     do=goups     ou=goups | Attabute    | Volue      | Туре | Size |
|   | objectClass | posiaGroup | Text | 10   |
| - Co-kdappublisher                                  | objectClass | top        | Text | 3    |
| Carrielanuser                                       | cn          | Idapuser   | Text | 8    |
| 🕀 🥶 ou-People                                       | memberUid   | alice      | Tent | 5    |
| - 🕹 uidvalice                                       | gidNumber   | 31590      | lext | 5    |
|   |             |            |      |      |
|   |             |            |      |      |
|   |             |            |      |      |

| Mibule       Value       Type       Size         Ordepublisher       condepublisher       objectClass       posisAccount       Test       12         Ordepublisher       condepublisher       condepublisher       Test       13       0         Out-People       out-People       inetOrgPerson       Test       13         Out-People       oilecticlass       inetOrgPerson       Test       13         Ordelapublisher       oilecticlass       inetOrgPerson       Test       1         Ordelapublisher       oile       Test       1       1       1         Ordelapublisher       oile       Test       1 </th <th>🛝 💐 🖉 🗟 🗙 🔎 🖗 🛛</th> <th></th> <th></th> <th></th> <th></th>  | 🛝 💐 🖉 🗟 🗙 🔎 🖗 🛛                |               |               |      |      |
|---|--------------------------------|---------------|---------------|------|------|
| objectClass       posisAccount       Test       12         objectClass       top       Test       3         objectClass       inetOrgPortson       Test       13         objectClass       inetOrgPortson       Test       14         objectClass       alice       Test       15         objectClass       alice       Test       5         objectClass       alice       Test       5         objectClass       alice       Test       5         objectClass       alice       Test       4         objectClass       alice       Test <t< th=""><th>E-S do-maxero.do-com [acer-PC]</th><th>Attabute</th><th>Value</th><th>Туре</th><th>Size</th></t<>   | E-S do-maxero.do-com [acer-PC] | Attabute      | Value         | Туре | Size |
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| ObjectClass       inetOrgPerson       Text       13         gidNumber       0       gidNumber       1         gidNumber       0       Text       1         gidNumber       alice       Text       4         uid       alice       Text       5         uidNumber       4193       Text       4         user/Password       123456       Text       6   | crisicapadrian                 | objectClass   | top           | Text | 3    |
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• Shown in the diagram is: assign the user "alice" in people unit in groups organization to the ldapuser role in groups organization. Click the user name "alice", it will be able to view the detailed information of the user. You can edit the imported directory data.

### **Configure LDAP Login Settings of iPortal**

• First, log in SuperMap iPortal as an administrator, and then click "Management"->"Security"->"LDAP login configuration tab. Detailed configuration information can be referred to: <u>configure the use of LDAP directory</u>.

• The role map configuration can be configured through two ways:

• First, you can add role map to the LDAP login configuration page when you first configure LDAP login;

• Second: if you did not add role map when configuring LDAP login at the first time, then the LDAP users who login to iPortal just have the role of ordinary users "PORTAL\_USER". If you want to change the user role for the users who have logged in, please refer to: <u>role management</u> to edit role.