

LDAP Directory on Yealink IP Phones

Introduction

LDAP stands for Lightweight Directory Access Protocol, which is a client-server protocol for accessing a directory service. LDAP is a directory service protocol that runs over TCP/IP. The nitty-gritty details of LDAP are defined in RFC 1777 "Lightweight Directory Access Protocol".

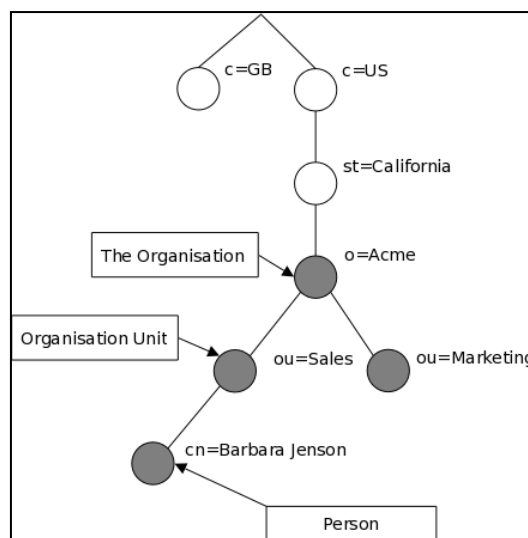
The following gives an overview of LDAP from a user's perspective.

What kind of information can be stored in the directory?

The LDAP information model is based on entries. An entry is a collection of attributes that has a globally-unique Distinguished Name (DN). The DN is used to refer to the entry unambiguously. Each of the entry's attributes has a type and one or more values. The types are typically mnemonic strings, like "cn" for common name, or "mail" for email address. The syntax of values depends on the attribute type. For example, a cn attribute might contain the value "Babs Jensen". A mail attribute might contain the value "babs@example.com".

How is the information arranged?

In LDAP, directory entries are arranged in a hierarchical tree-like structure. Traditionally, this structure reflected the geographic and/or organizational boundaries. Entries representing countries appear at the top of the tree. Below them are entries representing states and national organizations. Below them might be entries representing organizational units, people, printers, documents, or just about anything else you can think of. The following shows an example of LDAP directory tree using traditional naming.



LDAP enables you to locate organizations, individuals, and other resources such as files and devices in a network, whether on the Internet or on a corporate intranet, and whether or not you know the domain name, IP address, or geographic whereabouts. An LDAP directory can be distributed among many servers on a network, then replicated and synchronized regularly. LDAP is particularly useful for storing information that you wish to read from many locations, but update infrequently.

This guide provides configurations on the LDAP server and IP phones, and applies to the following Yealink IP phones:

- CP860 IP phones running firmware version 71 or later
- SIP-T21P IP phones running firmware version 72 or later
- SIP-T28P, SIP-T26P, SIP-T22P, SIP-T48G, SIP-T46G, SIP-T42G and SIP-T41P IP phones running firmware version 73 or later
- SIP VP-T49G, SIP-T40P, SIP-T29G, SIP-T27P, SIP-T23P/G and SIP-T21(P) E2 IP phones running firmware version 80 or later.

Installing and Configuring the LDAP Server

An LDAP server is essentially a bit like an SQL server, which is mainly used for storing/retrieving information about people (such as contacts). The configuration settings on the phone will be altered depending on how the LDAP server is configured.

Before using LDAP feature on IP phones, you must make sure the LDAP server is prepared properly, otherwise you need to install and configure an LDAP server. This chapter shows you how to install and configure an LDAP server. We recommend you to use the OpenLDAP, Microsoft Active Directory, Microsoft Active Directory Application Mode (ADAM) or Sun One Directory Server on Windows system.

OpenLDAP

Installing the OpenLDAP Server

This section shows you how to install an OpenLDAP server on Microsoft Windows 2007 system. The OpenLDAP server software is available for free. You can download it from <http://www.userbooster.de/en/download/openldap-for-windows.aspx?l=en>.

To install the OpenLDAP server:

1. Double click the OpenLDAP application to start the installation. You will be prompted for the installation.

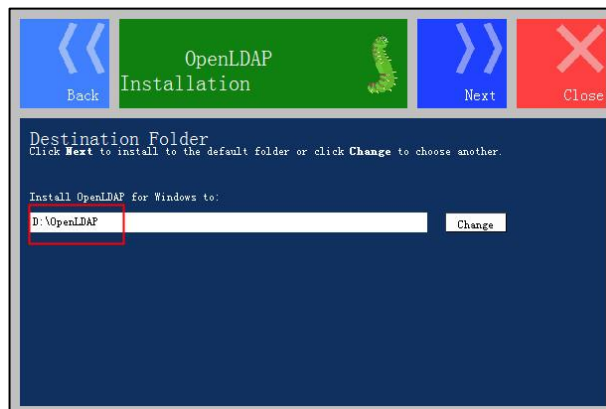


2. Click **Yes** to continue the installation.
3. Follow the default settings and click **Next** until the **Destination Folder** screen appears.

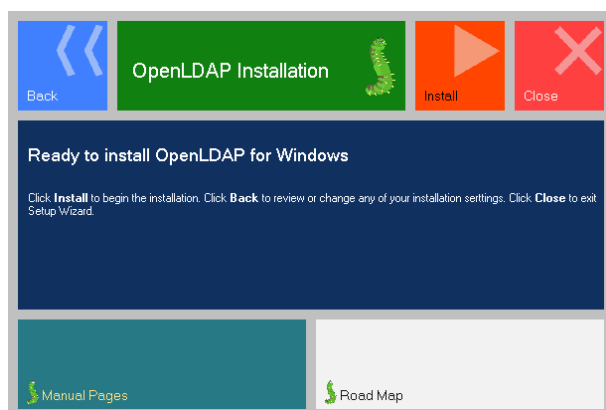
- Click **Change** to locate the installation path from local computer system and then click **Next**.

You need to remember the installation path (e.g., D:\OpenLDAP) located here.

The screenshot for reference is shown as below:



- Follow the default settings and click **Next** until the **Ready to install OpenLDAP for Windows** screen appears.



- Click **Install** to start the installation.
- Click **Close** to exit the Setup Wizard.

For more information on how to install the OpenLDAP server for windows, refer to the website online:

<http://www.userbooster.de/en/support/feature-articles/openldap-for-windows-installation.aspx>.

Configuring the OpenLDAP Server

Editing the slapd.conf File

Access the OpenLDAP installation path. Edit the manager information for LDAP.

1. Open and edit the slapd.conf file using your favorite text editor.

Find the commands

Suffix "dc=maxcsrc, dc=com"

Rootdn "cn=Manager,dc=maxcsrc,dc=com"

Suffix defines the components of the domain name.

Rootdn defines the manager as a management user for accessing the LDAP server.

For example:

Suffix "dc=yealink,dc=com"

Rootdn "cn=Manager,dc=yealink,dc=com "

The suffix line means that the domain name of the LDAP directory is yealink.com.

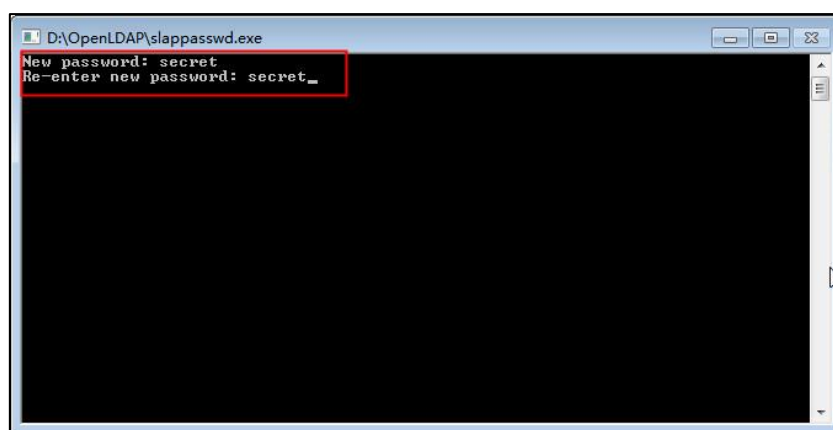
The Rootdn line defines a management user named as Manager.

If the domain name contains additional components, for example, yealink.com.cn, the suffix line will be edited as below:

Suffix "dc=yealink,dc=com,dc=cn"

Rootdn "cn=Manager,dc=yealink,dc=com,dc=cn"

2. Double click slappasswd.exe to modify the user password for the management user.
Type the new password twice.



Starting the Slapd Service

To start the slapd service:

1. Click **Start->Run**.
2. Enter **cmd** in the pop-up dialogue box and click **OK** to enter the command line interface.

3. Access the server installation path. For example, execute the following commands to access the server installation path at **D:\OpenLDAP**.

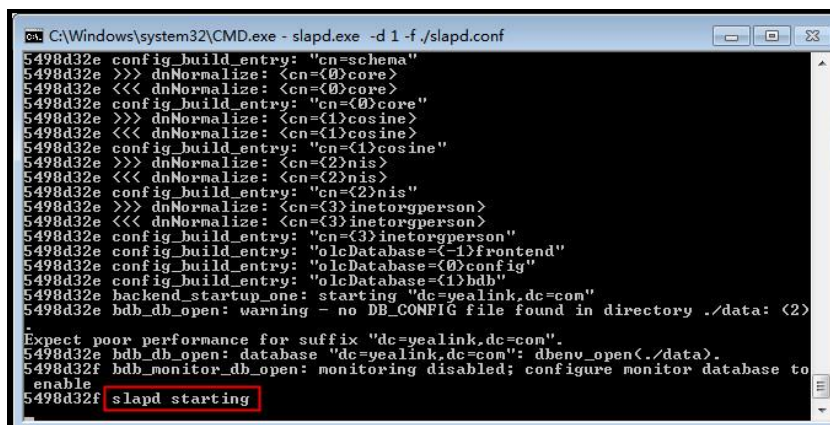
```
C:\Users\y10215>d:
D:\>cd OpenLDAP
D:\OpenLDAP>
```

4. Execute the command **slapd.exe -d 1 -f ./slapd.conf** to start the slapd service.

```
C:\Users\y10215>d:
D:\>cd OpenLDAP
D:\OpenLDAP>slapd.exe -d 1 -f ./slapd.conf
```

If the service runs successfully, you can find the prompt **"slapd starting"**.

The screenshot for reference is shown as below:



```
C:\Windows\system32\CMD.exe - slapd.exe -d 1 -f ./slapd.conf
5498d32e config_build_entry: "cn=schema"
5498d32e >>> dnNormalize: <cn={0}core>
5498d32e <<< dnNormalize: <cn={0}core>
5498d32e config_build_entry: "cn={0}core"
5498d32e >>> dnNormalize: <cn={1}cosine>
5498d32e <<< dnNormalize: <cn={1}cosine>
5498d32e config_build_entry: "cn={1}cosine"
5498d32e >>> dnNormalize: <cn={2}nis>
5498d32e <<< dnNormalize: <cn={2}nis>
5498d32e config_build_entry: "cn={2}nis"
5498d32e >>> dnNormalize: <cn={3}inetorgperson>
5498d32e <<< dnNormalize: <cn={3}inetorgperson>
5498d32e config_build_entry: "cn={3}inetorgperson"
5498d32e config_build_entry: "olcDatabase={-1}frontend"
5498d32e config_build_entry: "olcDatabase={0}config"
5498d32e config_build_entry: "olcDatabase={1}bdb"
5498d32e backend_startup_one: starting "dc=yealink,dc=com"
5498d32e bdb_db_open: warning - no DB_CONFIG file found in directory ./data: {2}
Expect poor performance for suffix "dc=yealink,dc=com".
5498d32e bdb_db_open: database "dc=yealink,dc=com": dbenv_open(./data).
5498d32f bdb_monitor_db_open: monitoring disabled; configure monitor database to
enable
5498d32f slapd starting
```

Please do not close this window to make sure the LDAP server keeps running.

Adding the Initial Entry to the LDAP Directory

You can add the initial entry to the LDAP directory by using the LDIF file. Create a new text document, then modify the filename extension as **ldif** and place the document to the OpenLDAP installation path. For example, create a text document named as **test.txt**, right click the **test.txt** document and then select to rename it, modify the filename extension as **ldif**. Open the LDIF file with your favorite text editor and input the corresponding content. The following shows an example of the content of the LDIF file:

```
dn: dc=yealink,dc=com
objectClass: top
objectClass: dcObject
objectClass: domain
dc: yealink
```

```
dn: ou=roles,dc=yealink,dc=com
objectClass: top
objectClass: organizationalUnit
ou: roles

dn: ou=people,dc=yealink,dc=com
objectClass: top
objectClass: organizationalUnit
ou: people

dn: cn=Test Users,ou=roles,dc=yealink,dc=com
objectClass: groupOfUniqueNames
cn: Test Users
uniqueMember:
uid=sspecial,ou=people,dc=yealink,dc=com
uniqueMember:
uid=jbloggs,ou=people,dc=yealink,dc=com

dn: cn=Special
Users,ou=roles,dc=yealink,dc=com
objectClass: groupOfUniqueNames
cn: Special Users
uniqueMember:
uid=sspecial,ou=people,dc=yealink,dc=com

dn: cn=Admin Users,ou=roles,dc=yealink,dc=com
objectClass: groupOfUniqueNames
cn: Admin Users
uniqueMember:
uid=admin,ou=people,dc=yealink,dc=com

dn: uid=admin,ou=people,dc=yealink,dc=com
objectClass: person
objectClass: inetOrgPerson
cn: State App
displayName: App Admin
givenName: App
```

```
mail: admin@fake.org
sn: Admin
uid: admin
userPassword: adminpassword

dn: uid=jbloggs,ou=people,dc=yealink,dc=com
objectClass: person
objectClass: inetOrgPerson
cn: Joe Bloggs
displayName: Joe Bloggs
givenName: Joe
mail: jbloggs@fake.org
sn: Bloggs
uid: jbloggs
userPassword: password

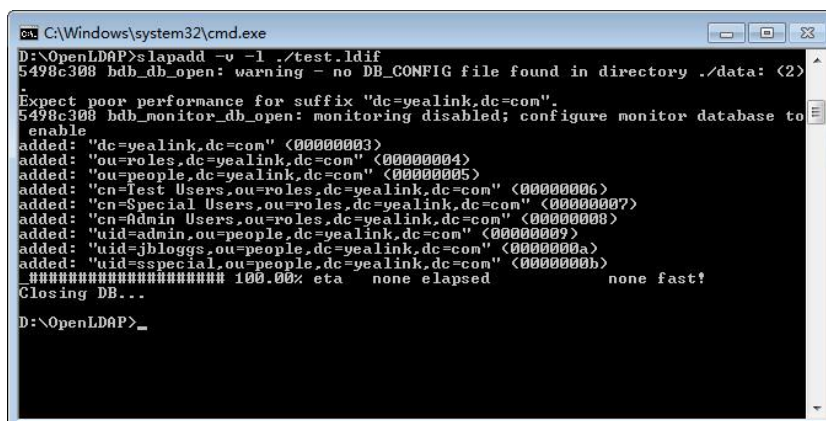
dn: uid=sspecial,ou=people,dc=yealink,dc=com
objectClass: person
objectClass: inetOrgPerson
cn: Super Special
displayName: Super Special
givenName: Super
mail: sspecial@fake.org
sn: Special
uid: sspecial
userPassword: password
```

To add the initial entry using the test.ldif file:

1. Click **Start->Run**.
2. Execute **cmd** in the pop-up dialogue box and click **OK** to enter the command line interface.
3. Access the server installation path. For example, execute the following commands to access the server installation path at **D:\OpenLDAP**.

4. Execute the command `slapadd -v -l ./test.ldif` to add the initial entry.

The screenshot for reference is shown as below:



```

cmd: C:\Windows\system32\cmd.exe
D:\OpenLDAP>slapadd -v -l ./test.ldif
5498c308 bdb_db_open: warning - no DB_CONFIG file found in directory ./data: <2>
Expect poor performance for suffix "dc=yealink,dc=com".
5498c308 bdb_monitor_db_open: monitoring disabled; configure monitor database to
enable
added: "dc=yealink,dc=com" <00000003>
added: "ou=roles,dc=yealink,dc=com" <00000004>
added: "ou=people,dc=yealink,dc=com" <00000005>
added: "cn=Test Users,ou=roles,dc=yealink,dc=com" <00000006>
added: "cn=Special Users,ou=roles,dc=yealink,dc=com" <00000007>
added: "cn=Admin Users,ou=roles,dc=yealink,dc=com" <00000008>
added: "uid=admin,ou=people,dc=yealink,dc=com" <00000009>
added: "uid=jblogs,ou=people,dc=yealink,dc=com" <0000000a>
added: "uid=special,ou=people,dc=yealink,dc=com" <0000000b>
##### 100.00% eta none elapsed none fast!
Closing DB...
D:\OpenLDAP>_

```

Configuring the LDAPExploreTool2

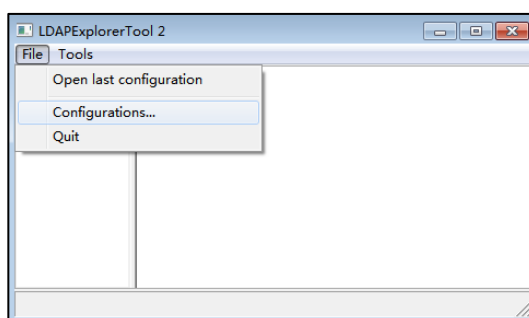
The LDAPExploreTool2 application supports running on Windows system. The application is a graphical LDAP tool that enables you to browse, modify and manage contact entry on LDAP server.

If you have an LDAPExploreTool2 application installed on your computer, open it now, otherwise, download the application from <http://ldaptool.sourceforge.net/>. And then complete the installation following the wizard.

Creating a Configuration

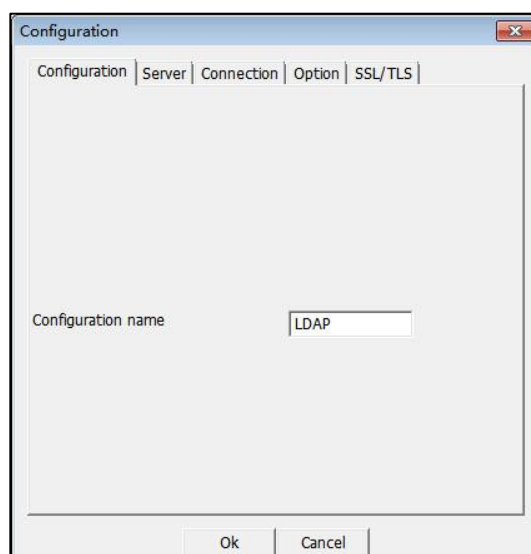
To create a configuration:

1. Double click the LDAPExploreTool2.exe to run the application.
2. Click **File->Configurations**.

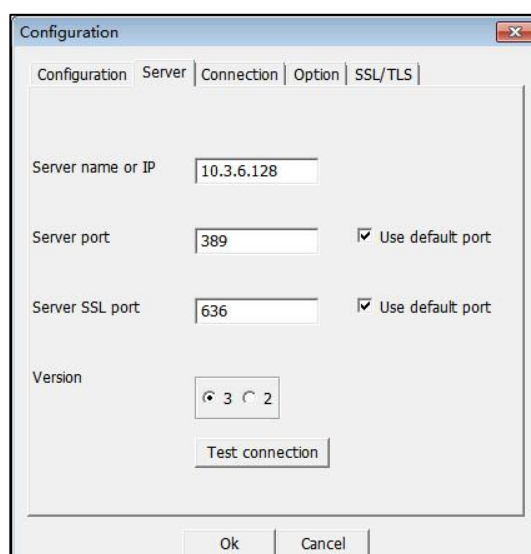


3. Click **New** to create a new configuration.

4. Enter a name in the **Configuration name** field under the **Configuration** tab.



5. Enter the domain name or IP address of the LDAP server in the **Server name or IP** field under the **Server** tab. Check the checkbox of **Use default port** for the **Server port** and **Server SSL port**.



6. Enter the user DN and password in the **User DN** and **Password** field under the **Connection** tab.

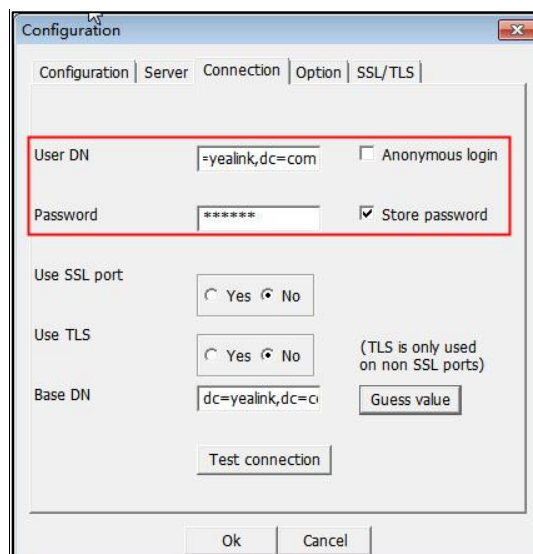
The user DN and password correspond with the Rootdn and Rootpw defined in the slapd.conf file.

For example, according to the manager information defined in the slapd.conf file:

Rootdn "cn=Manager,dc=yealink,dc=com"

Rootpw secret

Enter **cn=Manager,dc=yealink,dc=com** in the **User DN** field and **secret** in the **Password** field under the **Connection** tab.



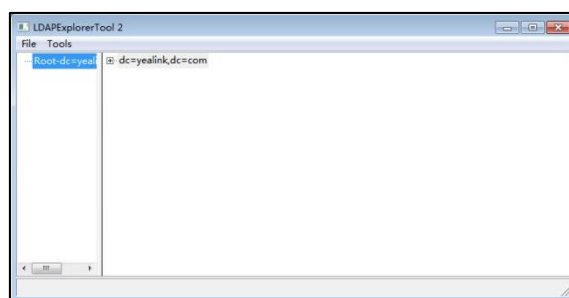
7. Click **Guess value** to fill the **Base DN** automatically.
8. Click **Test connection** to test the connection to the LDAP server. If you encounter an error or warning during the test, you need to resolve the error or warning first according to the prompt, and then retry to test the connection.
9. Click **OK** to accept the change.

Adding Entries

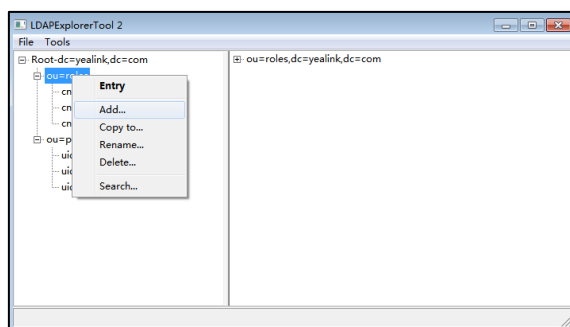
To add entries:

1. Click **File->Configurations**, select the configuration created above, and then click **Open**.

The screenshot for reference is shown as below:



- Right click the root entry, and then select **Add** to add a new entry.



- Enter the desired values in the corresponding fields.

Parent DN: It will be automatically generated according to the server configuration.

Entry RDN: The format is cn=XXX. This is a unique identifier for each entry.

Object Class (from schema): Select the structure class which the entry belongs to.

Each structure class has its own must attributes and may attributes. For example, we select **person** from the pull-down list of **Object class (from schema)**.

- Select the desired attributes for object class.

Must attributes: Double click attributes to add them to the entry node. All attributes listed in the **Must attributes** field must be added and each value of the attribute must be set.

May attributes: Double click the desired attributes to add them to the entry node. The attributes listed in the **May attributes** field are optional.

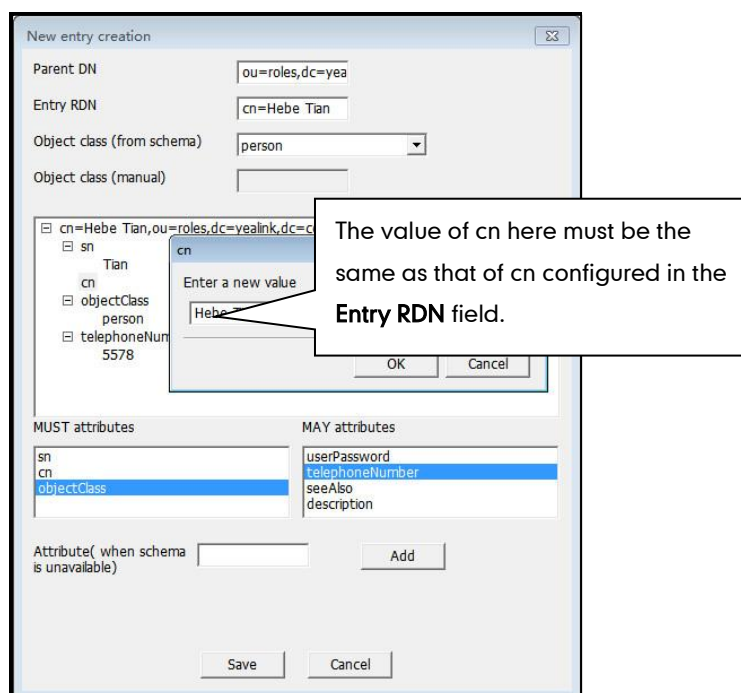
Common attributes are listed in the following table:

Attribute	Name	Description
cn	commonName	Full name of the entry.
gn	givenName	First name also called Christian name.
sn	surname	Surname, last name or family name.
telephoneNumber	telephoneNumber	Office phone number.
homePhone	homeTelephoneNumber	Home phone number.
mobile	mobileTelephoneNumber	Mobile or cellular phone number.
pager	pagerTelephoneNumber	Pager telephone number.
company	company	Company name.
o	organizationName	Organization name.
ou	organizationUnitName	Usual department or any sub

Attribute	Name	Description
		entity of larger entity.

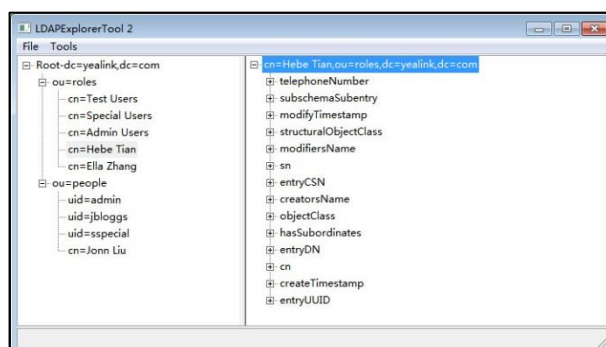
- Right click the selected attribute and then select **Add value**.

The screenshot of adding a new entry is shown as below:



- Click **Save** to confirm the configuration.
- Repeat steps 2 to 6 to add more contact entries.

You can find the added entries at the left of the LDAP catalogue.



Microsoft Active Directory

Installing the Microsoft Active Directory Domain Services

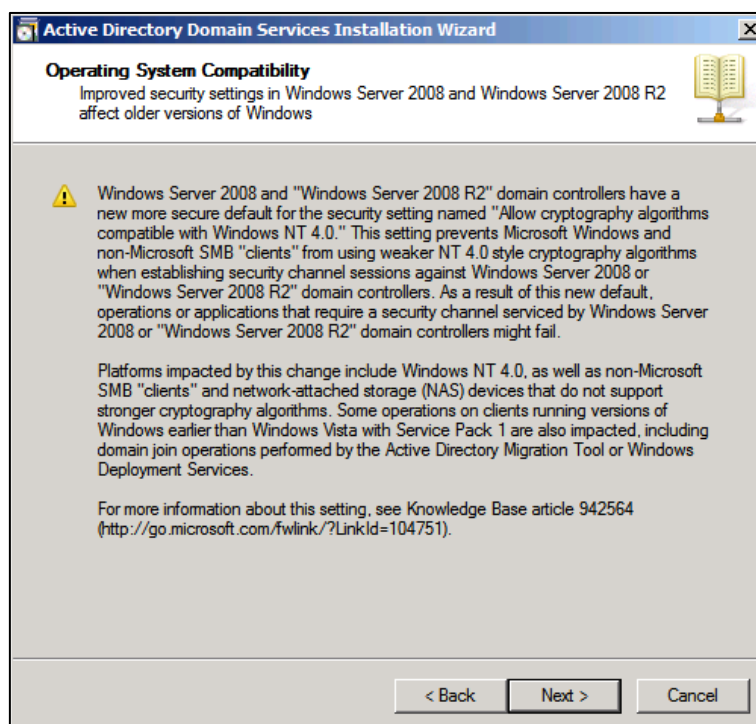
This section shows you how to install an active directory on Microsoft Windows Server 2008 R2 Enterprise 64-bit system.

To install the Microsoft Active Directory Domain Services:

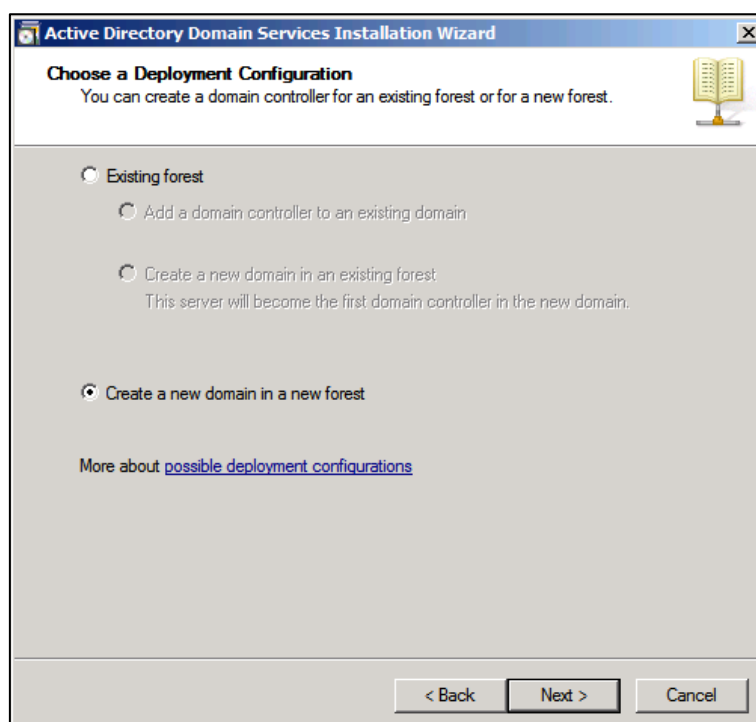
1. Click **Start->Run**.
2. Enter **dcpromo** in the pop-up dialogue box and click **OK**.
3. The Active Directory Domain Services Installation Wizard will appear after a short while, click **Next**.



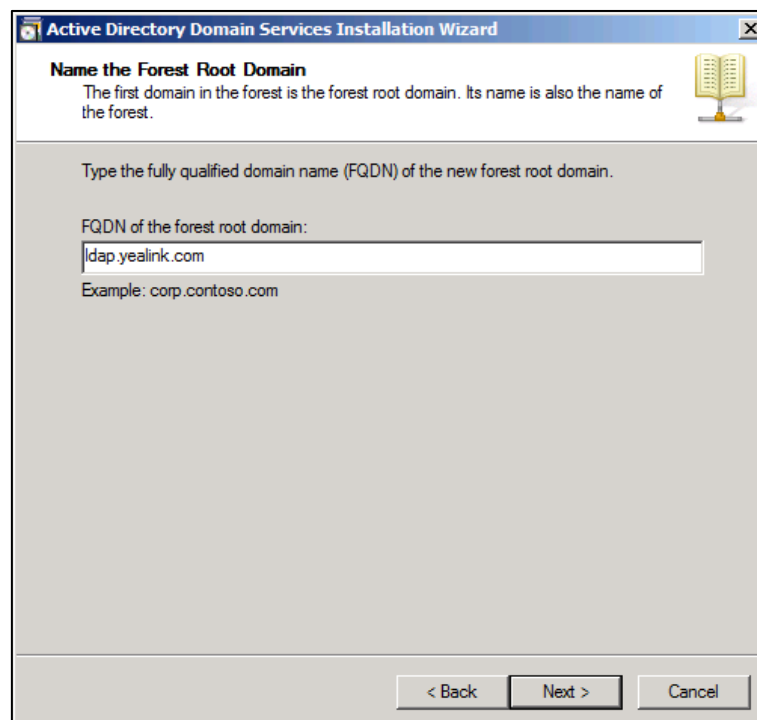
4. Read the provided information and click **Next**.



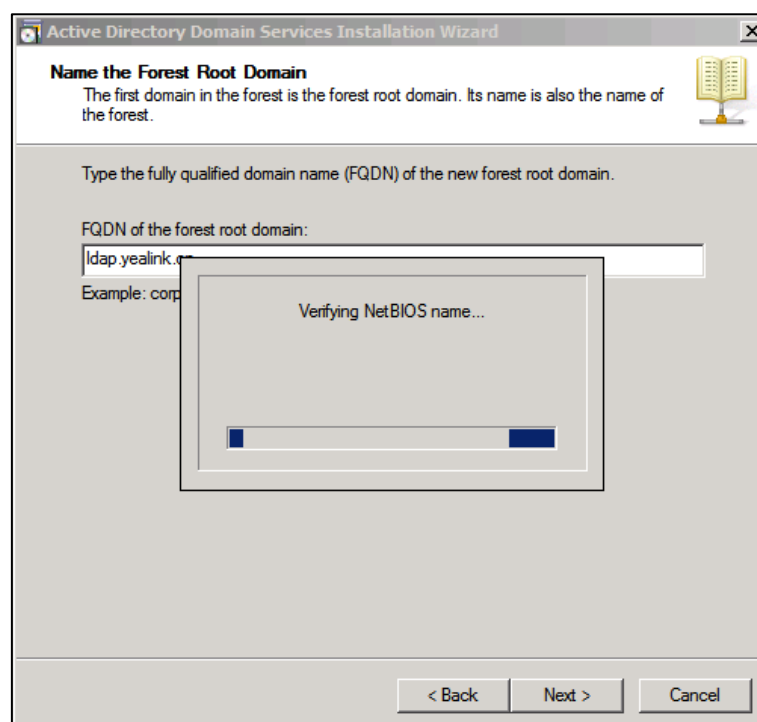
5. Mark the **Create a new domain in a new forest** radio box and click **Next**.



6. Enter an appropriate domain name for the forest root domain and click **Next**.

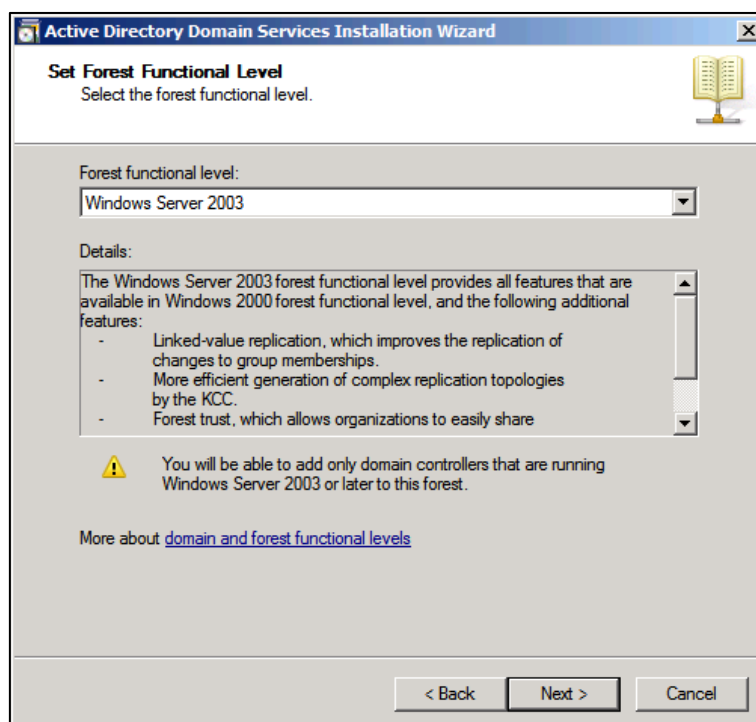


The wizard will check if the domain name is in use on the local network.



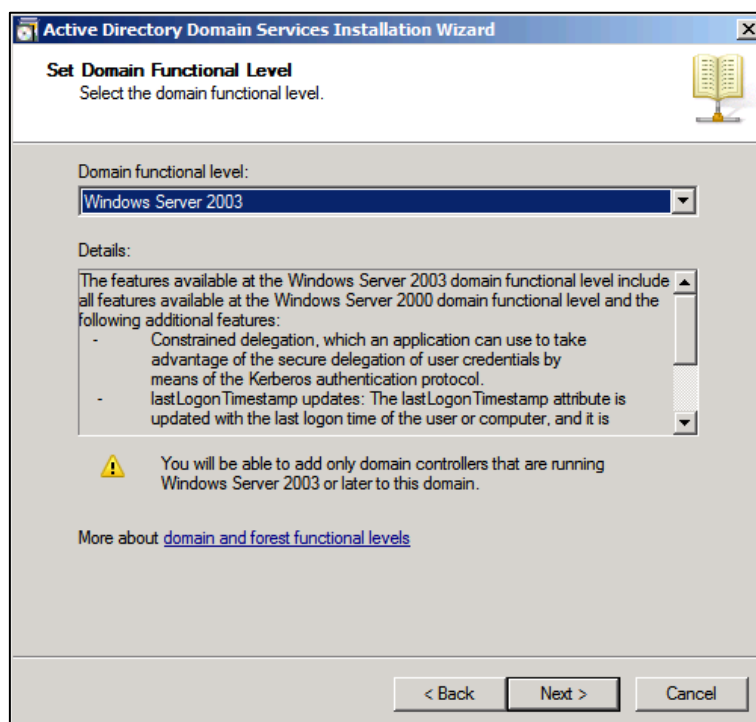
7. Select the desired forest functional level from the pull-down list of **Forest functional level**, and click **Next**.

For more information, click **domain and forest functional levels**.



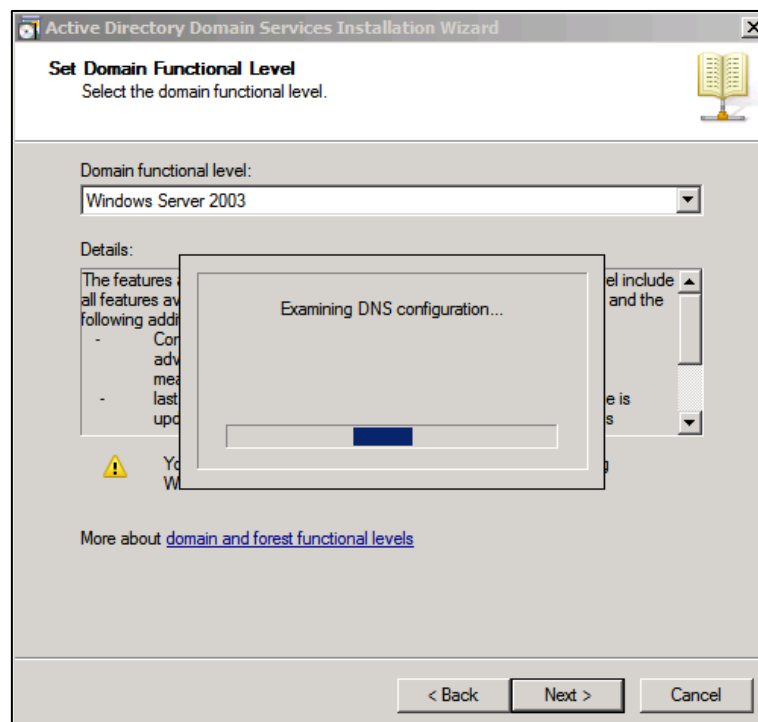
8. Select the desired domain functional level from the pull-down list of **Domain functional level**, and click **Next**.

For more information, click **domain and forest functional levels**.

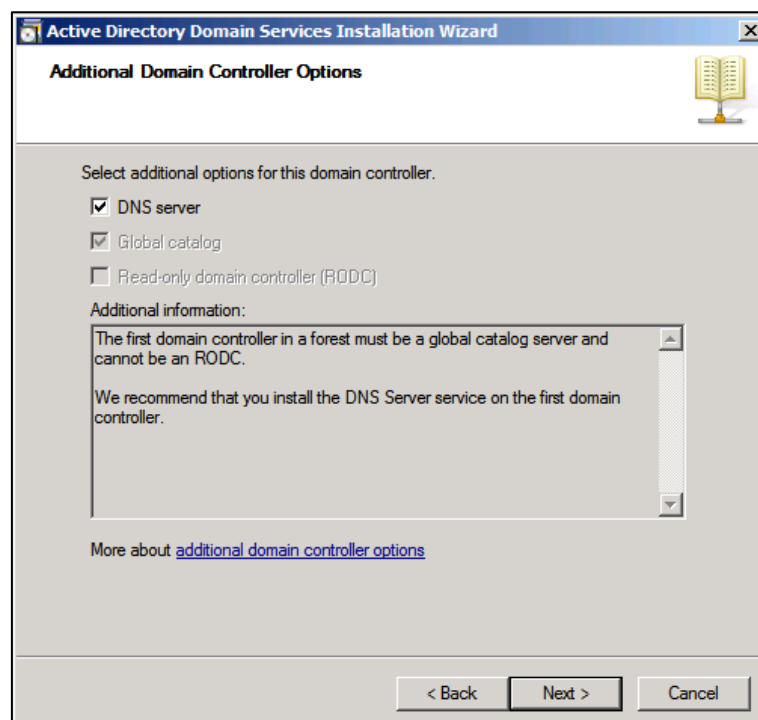


If you select **Windows Server 2008 R2** for the forest functional level, you will not be prompted to select a domain functional level.

The wizard will check if the DNS is properly configured on the local network.

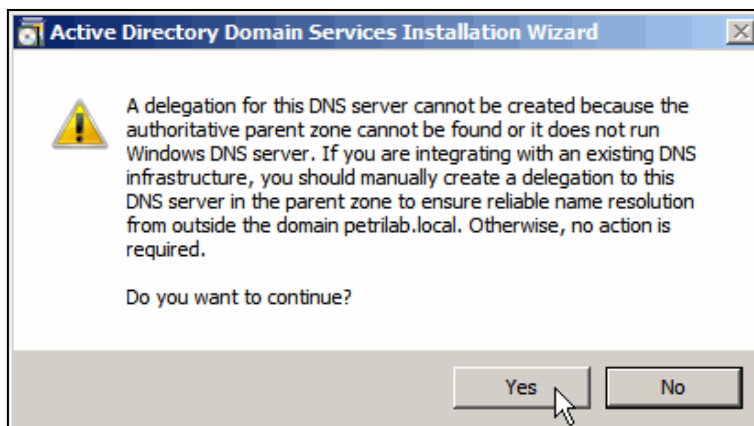


9. Select additional options for this domain controller if required, and click **Next**.



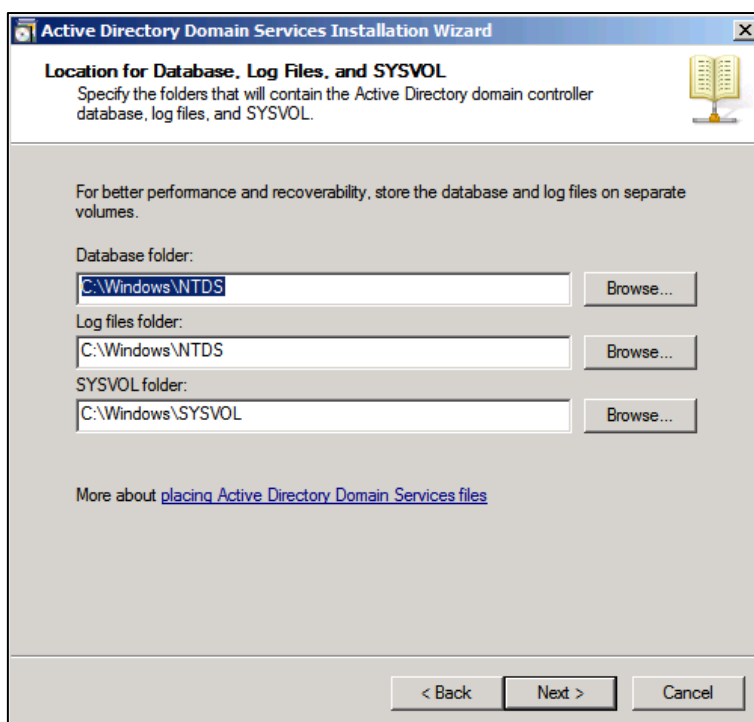
You may get a warning telling you that the server has one or more dynamic IP addresses. We recommend assigning a static IP address to the server.

10. The wizard will prompt a warning about DNS delegation. Since no DNS has been configured yet, you can ignore the message and click **Yes**.



11. Specify the desired paths for the database, log files and SYSVOL folders, and click **Next**.

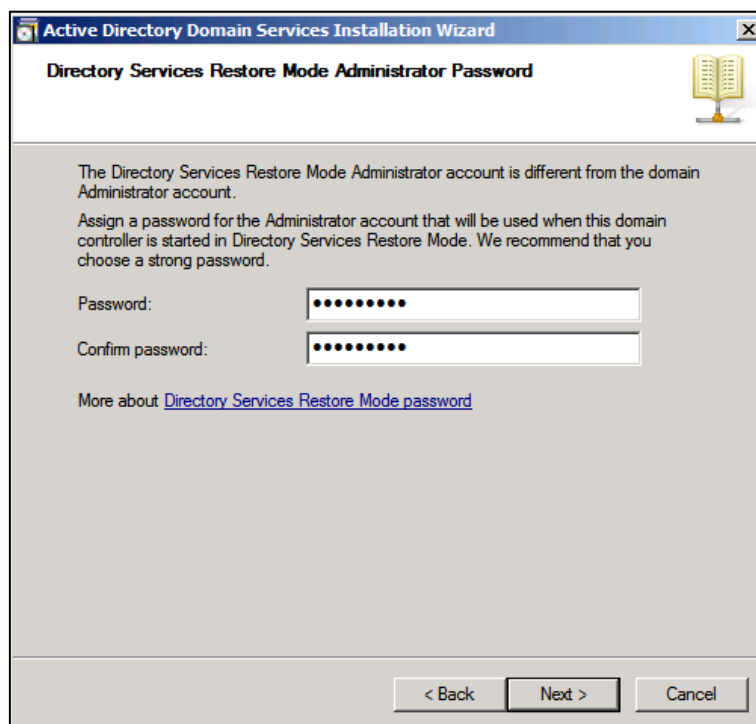
For more information, click **placing Active Directory Domain Services files**.



12. Configure the password for the active directory recovery mode, and click **Next**.

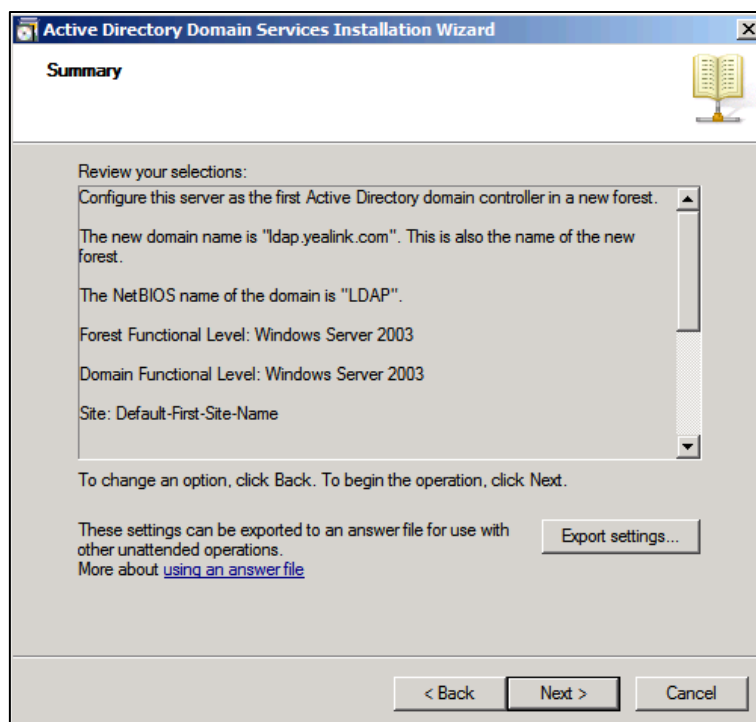
For more information, click **Directory Services Restore Mode password**.

The password should be complex and at least 7 characters long.



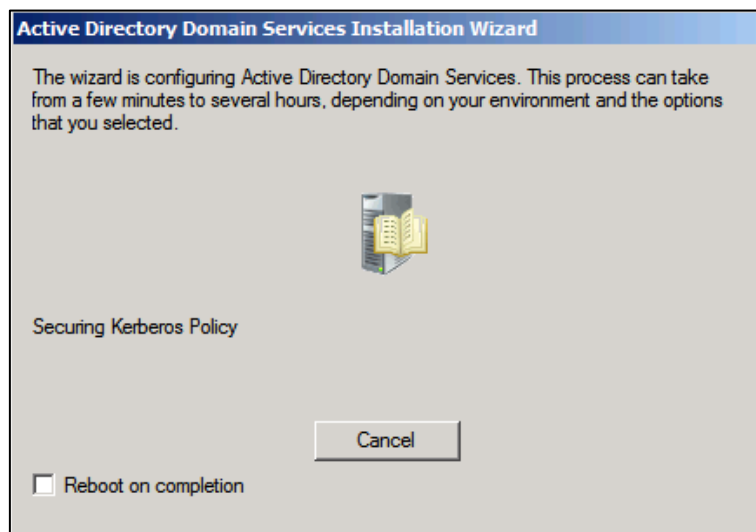
The screenshot shows the 'Active Directory Domain Services Installation Wizard' window. The title bar reads 'Active Directory Domain Services Installation Wizard'. The main heading is 'Directory Services Restore Mode Administrator Password'. Below the heading, there is a small icon of a book. The text reads: 'The Directory Services Restore Mode Administrator account is different from the domain Administrator account. Assign a password for the Administrator account that will be used when this domain controller is started in Directory Services Restore Mode. We recommend that you choose a strong password.' There are two password input fields: 'Password:' and 'Confirm password:'. Both fields contain a series of dots. Below the fields, there is a link: 'More about [Directory Services Restore Mode password](#)'. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

13. Review your selection and click **Next**.



The screenshot shows the 'Active Directory Domain Services Installation Wizard' window. The title bar reads 'Active Directory Domain Services Installation Wizard'. The main heading is 'Summary'. Below the heading, there is a small icon of a book. The text reads: 'Review your selections: Configure this server as the first Active Directory domain controller in a new forest. The new domain name is "ldap.yealink.com". This is also the name of the new forest. The NetBIOS name of the domain is "LDAP". Forest Functional Level: Windows Server 2003 Domain Functional Level: Windows Server 2003 Site: Default-First-Site-Name'. Below the text, there is a button: 'Export settings...'. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

The wizard will prompt that the system begins to create the Active Directory Domain Services.



14. Click **Finish** to complete the installation and exit the wizard.



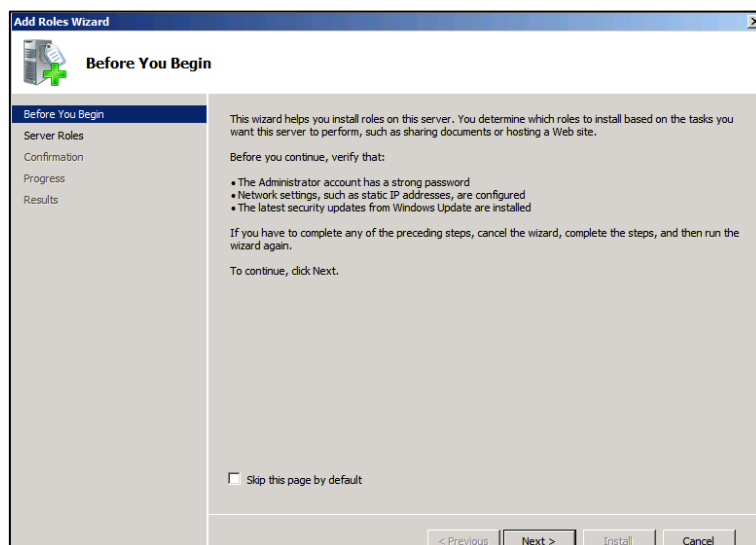
Installing Active Directory Lightweight Directory Services Role

You should also install the Active Directory Lightweight Directory Services role on Windows Server 2008 system.

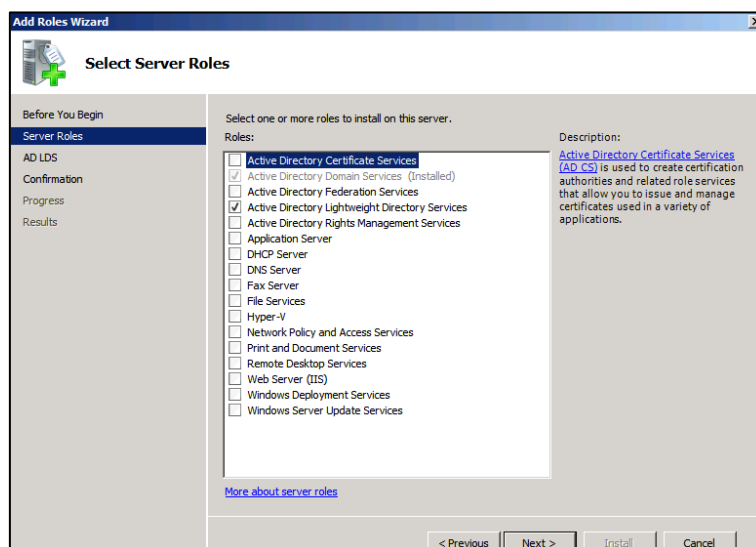
To install the Active Directory Lightweight Directory Services role:

1. Click **Start->Administrative Tools->Server Manager**.

2. Right click **Roles**, and then select **Add Roles**.
3. The Add Roles Wizard will pop up, click **Next**.

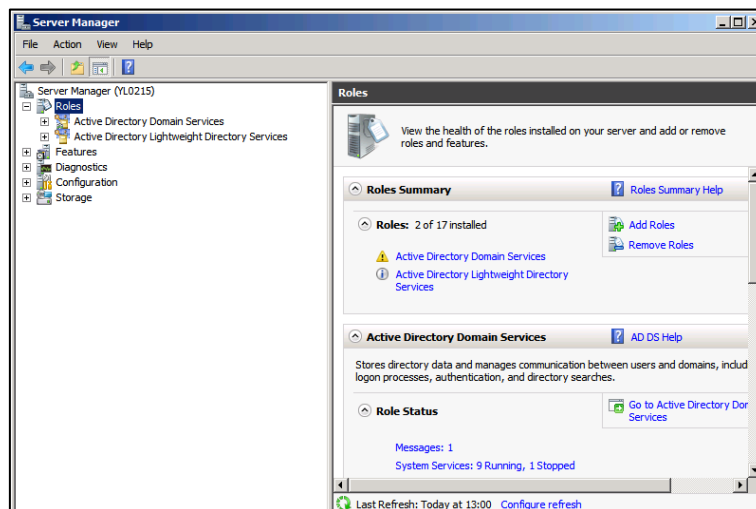


4. Check the **Active Directory Lightweight Directory Services** checkbox and click **Next**.



5. Follow the default settings and click **Next**.
6. When the installation is completed, click **Close**.

After the installation succeeds, you will find the **Active Directory Lightweight Directory Services** role listed in roles of the server manager.



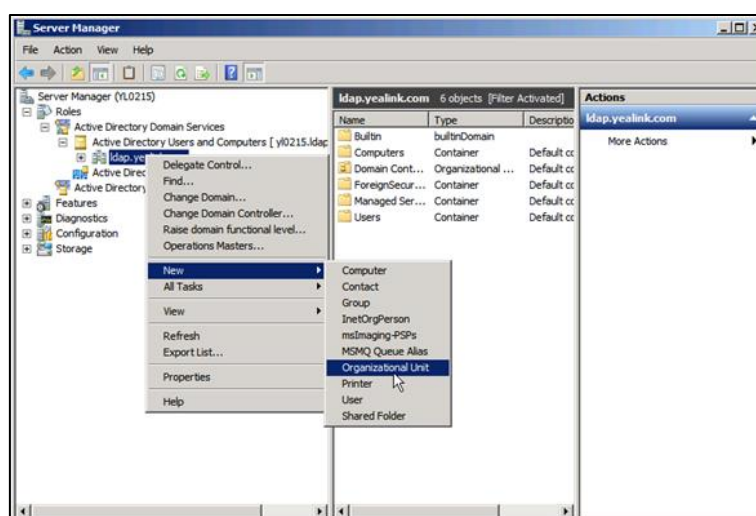
Configuring the Microsoft Active Directory Server

Adding an Entry to the Active Directory

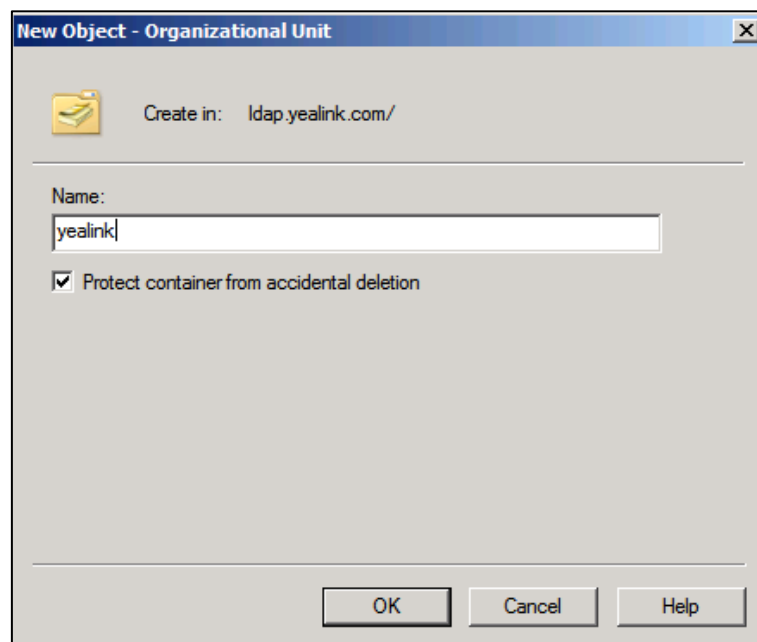
You can add entries to the active directory one by one in this way.

To add an entry to the Active Directory:

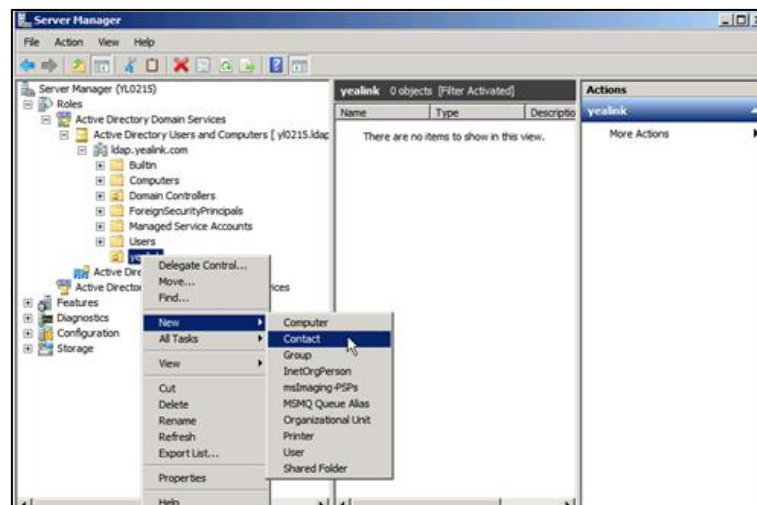
1. Click **Start->Administrative Tools->Server Manager**.
2. Double click **Roles->Active Directory Domain Services->Active Directory Users and Computers**.
3. Right click the domain name created above (e.g., ldap.yealink.com), and then select **New->Organizational Unit**.



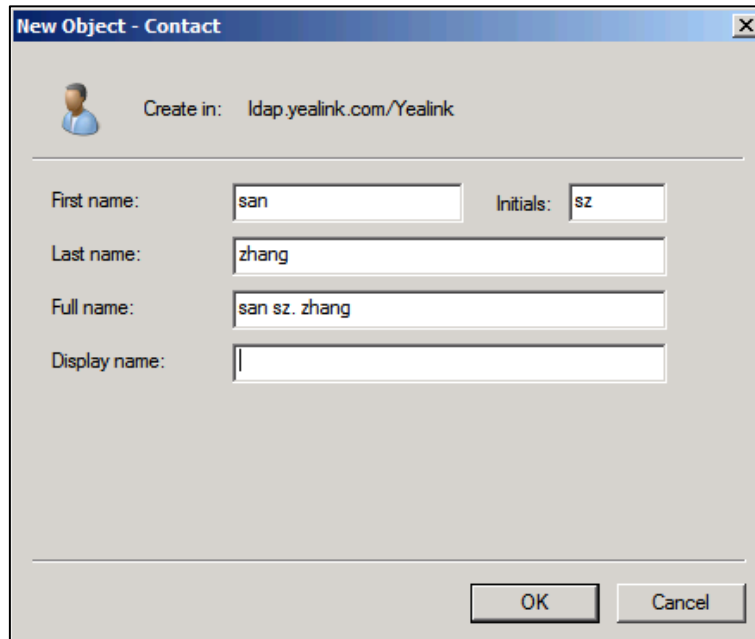
4. Enter the desired name of the organizational unit.



5. Click **OK** to accept the change.
6. Right click the organizational unit created above, and then select **New->Contact**.

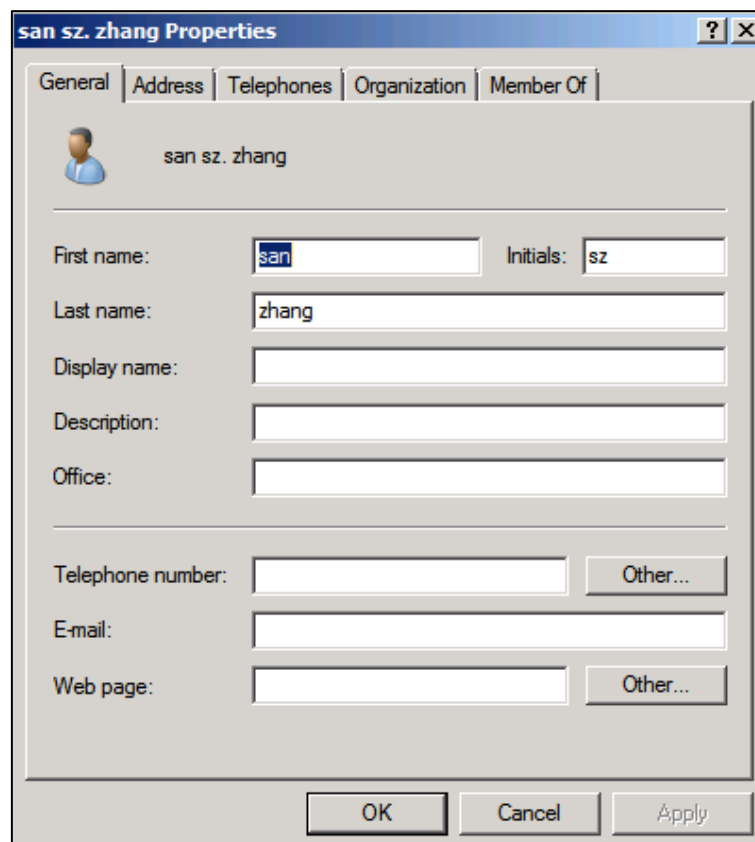


7. Enter the desired values in the corresponding fields.



The 'New Object - Contact' dialog box is shown. It has a title bar with a close button. Below the title bar is a user icon and the text 'Create in: ldap.yealink.com/Yealink'. The main area contains several text input fields: 'First name:' with 'san', 'Initials:' with 'sz', 'Last name:' with 'zhang', 'Full name:' with 'san sz. zhang', and 'Display name:' which is empty. At the bottom right are 'OK' and 'Cancel' buttons.

8. Click **OK** to accept the change.
9. Double click the contact created above.
10. Configure more properties of the contact.



The 'san sz. zhang Properties' dialog box is shown. It has a title bar with a help button and a close button. Below the title bar are tabs: 'General', 'Address', 'Telephones', 'Organization', and 'Member Of'. The 'General' tab is selected. Below the tabs is a user icon and the text 'san sz. zhang'. The main area contains several text input fields: 'First name:' with 'san', 'Initials:' with 'sz', 'Last name:' with 'zhang', 'Display name:', 'Description:', 'Office:', 'Telephone number:', 'E-mail:', and 'Web page:'. There are also 'Other...' buttons next to the 'Telephone number:' and 'Web page:' fields. At the bottom are 'OK', 'Cancel', and 'Apply' buttons.

11. Click **OK** to accept the change.

Adding Entries to the Active Directory Using the Ldifde Tool

You can use a LDIF file to perform a batch import of all entries to the active directory.

To create the LDIF file:

Create a new text document and then modify the filename extension as ldif. For example, create a text document named as test.txt, right click the test.txt document and then select to rename it, modify the filename extension as ldif. Open the LDIF file with your favorite text editor and input the corresponding content. The following shows an example of the content of the LDIF file:

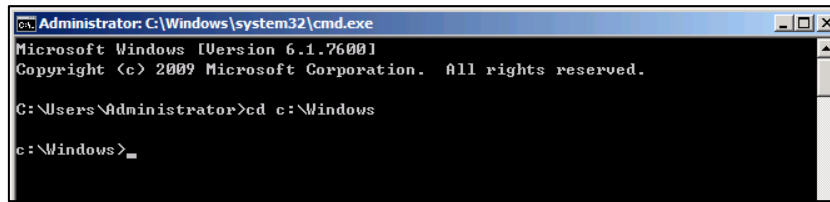
```
##Create a new organizational unit##
dn: OU=yealink,DC=ldap,DC=yealink,DC=com
changetype: add
objectClass: top
objectClass: organizationalUnit
ou: yealink
name: yealink

##create a new contact##
dn: CN=san zhang,OU=yealink,DC=ldap,DC=yealink,DC=com
changetype: add
objectClass: top
objectClass: person
objectClass: organizationalPerson
objectClass: contact
cn: san zhang
sn: zhang
givenName: san
initials: zs
name: san zhang
ipPhone: 2336
mobile: 15557107369
```

To import the test.ldif file:

1. Click **Start->Run**.
2. Enter **cmd** in the pop-up dialogue box and click **OK** to enter the command line interface.

3. Execute the command `cd` to access the path of the test.ldif file. For example, execute `cd c:\Windows` to access the path of the test.ldif file at `c:\Windows`.



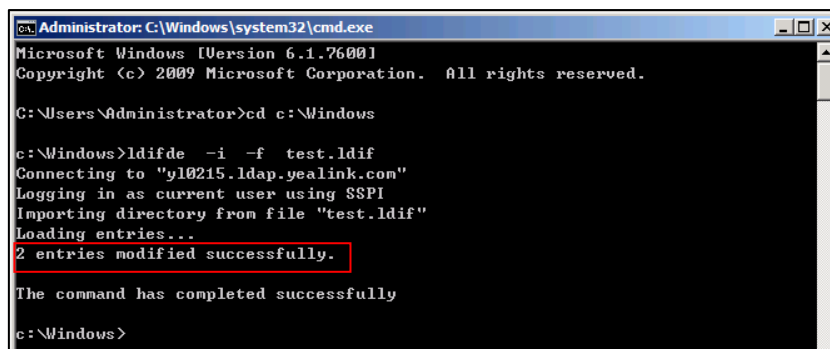
```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>cd c:\Windows

c:\Windows>
```

4. Execute the command `ldifde -i -f test.ldif` to import the file.
If the entries are added successfully, you can find the prompt **"n entries modified successfully"** ("n" indicates the number of the added entries).

The screenshot for reference is shown as below:



```
Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>cd c:\Windows

c:\Windows>ldifde -i -f test.ldif
Connecting to "y10215.ldap.yealink.com"
Logging in as current user using SSPI
Importing directory from file "test.ldif"
Loading entries...
2 entries modified successfully.
The command has completed successfully

c:\Windows>
```

You can also export the existing entries on the active directory into a *.ldif file first, modify the file, and then import the modified file into the active directory. For more information, refer to the network resource.

Adding Entries to the Active Directory Using the Csvde Tool

You can also use a CSV file to perform a batch import of all entries to the active directory. Create a new document using a spreadsheet application (e.g., Microsoft Excel) and then save the document to your local computer using "Save as" in the format "*.csv". For example, create a document named as test.xls, click "Save as" to save the document as test.csv. Open the CSV file with the spreadsheet application and input the corresponding content. The following shows an example of the CSV file content:

	A	B	C	D	E	F	G	H	I	J
1	DN	objectClass	ou	name	cn	sn	givenName	initials	ipPhone	mobile
2	OU=yealink, DC=ldap, DC=yealink, DC=com	organizationalUnit	yealink	yealink						
3	CN=san zhang, OU=yealink, DC=ldap, DC=yealink, DC=com	contact		san zhang	san zhang	san	zhang	sz	1111	123456789001
4	CN=si li, OU=yealink, DC=ldap, DC=yealink, DC=com	contact		si li	si li	li	si	sl	2222	123456789002
5	CN=wu wang, OU=yealink, DC=ldap, DC=yealink, DC=com	contact		wu wang	wu wang	wang	wu	ww	3333	123456789003

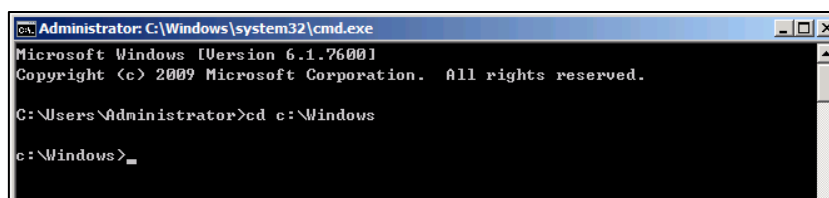
The first line lists the attributes of the entries.

The second line lists the values of an organizational unit in the corresponding attribute columns.

The other lines list the values of contacts in the corresponding attribute columns.

To import the test.csv file:

1. Click **Start->Run**.
2. Enter **cmd** in the pop-up dialogue box and click **OK** to enter the command line interface.
3. Execute the command **cd** to access the path of the test.csv file. For example, execute **cd c:\Windows** to access the path of the test.csv file at **c:\Windows**.



4. Execute the command **csvde -i -f test.csv** to import the file.

If the entries are added successfully, you can find the prompt "**n entries modified successfully**" ("n" indicates the number of the added entries).

The screenshot for reference is shown as below:

```

Administrator: C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>cd c:\Windows
c:\Windows>csude -i -f test.csv
Connecting to "<null>"
Logging in as current user using SSPI
Importing directory from file "test.csv"
Loading entries....
4 entries modified successfully.

The command has completed successfully
c:\Windows>_

```

The csvde tool cannot edit or delete the existing entries on the active directory.

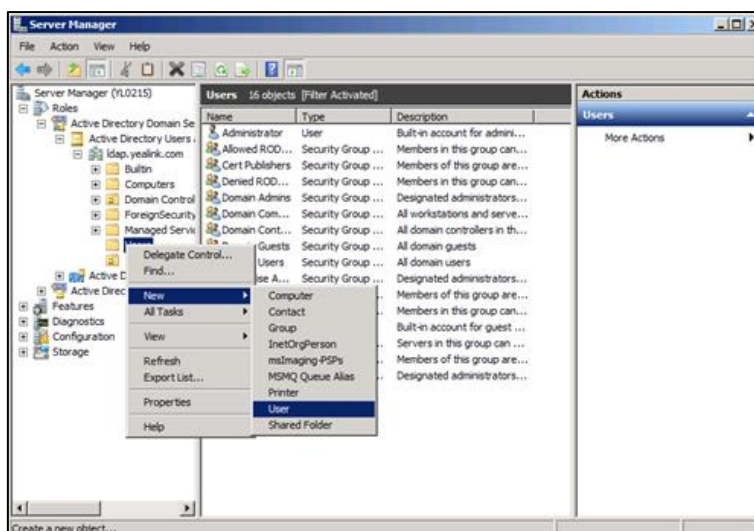
You can also export the existing entries on the active directory into a *.csv file first, modify the file, and then import the modified file into the active directory. For more information, refer to the network resource.

Creating User Accounts

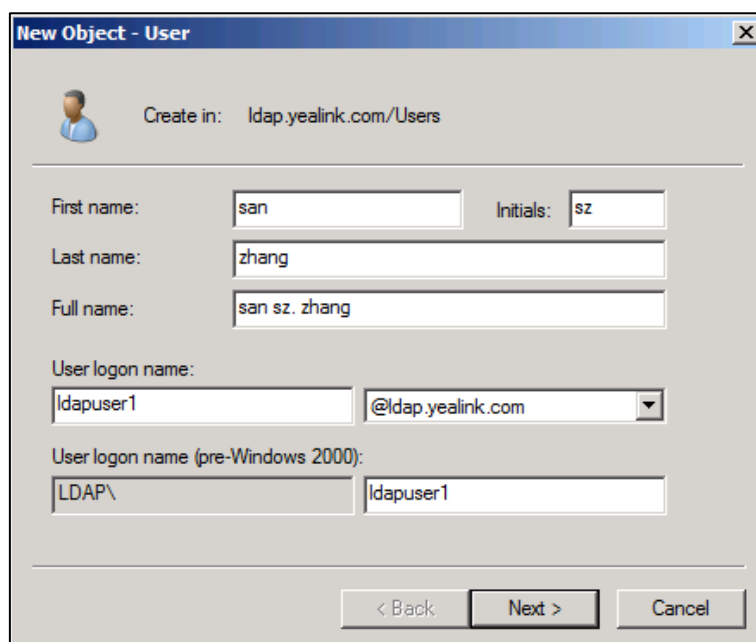
You can create user accounts to allow access to resources on the active directory. User accounts are very important and useful.

To create a user account:

1. Click **Start->Administrative Tools->Server Manager**.
2. Double click **Server Manager->Roles->Active Directory Domain Services->Active Directory Users and Computers**.
3. Select the domain name created above (e.g., ldap.yealink.com).
4. Right click **Users**, and then select **New->User**.

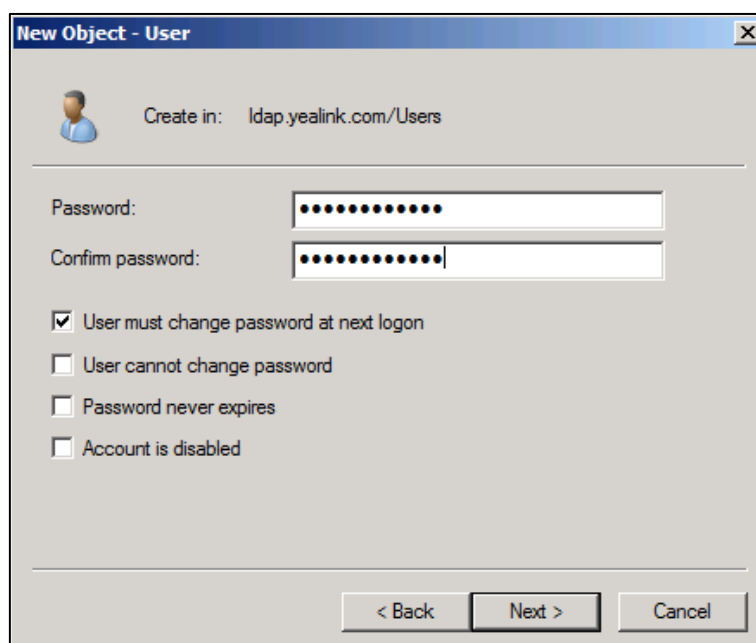


5. Enter desired values in the corresponding fields and click **Next**.



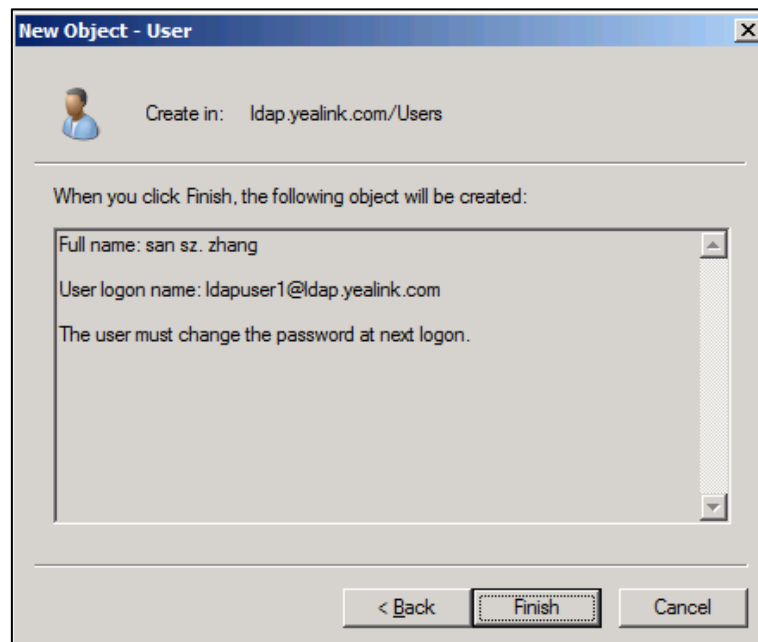
The screenshot shows the 'New Object - User' dialog box. At the top, it says 'Create in: ldap.yealink.com/Users'. Below this, there are several input fields: 'First name' with 'san', 'Initials' with 'sz', 'Last name' with 'zhang', and 'Full name' with 'san sz. zhang'. There are also fields for 'User logon name' (ldapuser1) and a dropdown menu showing '@ldap.yealink.com'. Below these, there are fields for 'User logon name (pre-Windows 2000)' with 'LDAP\' and 'ldapuser1'. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

6. Enter the password for the user, select the appropriate options and click **Next**.
The password should be a combination of upper case letters, lower case letters, numbers and special characters.



The screenshot shows the 'New Object - User' dialog box. It has the same header as the previous one. Below the header, there are two password input fields: 'Password:' and 'Confirm password:', both filled with dots. Below these, there are four checkboxes: 'User must change password at next logon' (checked), 'User cannot change password' (unchecked), 'Password never expires' (unchecked), and 'Account is disabled' (unchecked). At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'.

7. Click **Finish** to complete the creation of the user account.



Microsoft Active Directory Application Mode

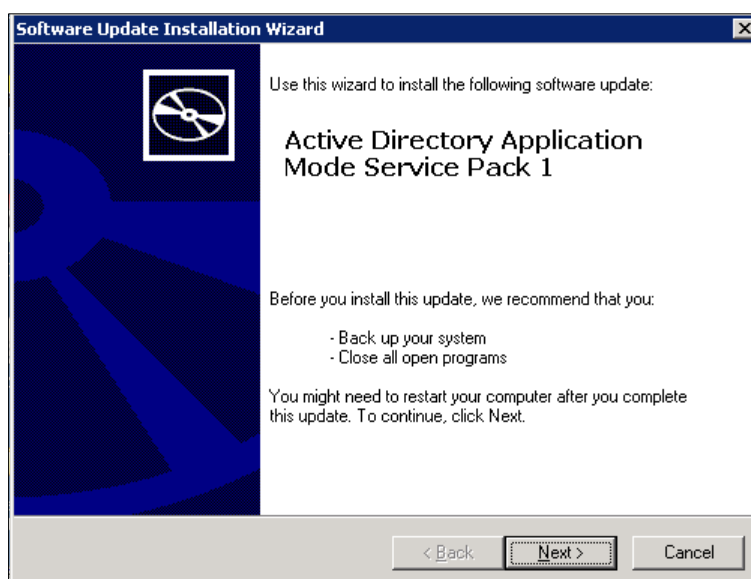
Microsoft Active Directory Application Mode (ADAM) is a new mode of Active Directory that is designed specifically for directory-enabled applications. ADAM is a Lightweight Directory Access Protocol (LDAP) directory service that runs as a user service, rather than as a system service. You can run ADAM on servers and domain controllers running operating systems in the Windows Server 2003 family. This section shows you how to install Active Directory Application Mode (ADAM) on Microsoft Windows Server 2003 SP2 Enterprise 32-bit system. You can download Active Directory Application Mode (ADAM) online:

<http://www.microsoft.com/en-us/download/confirmation.aspx?id=4201>.

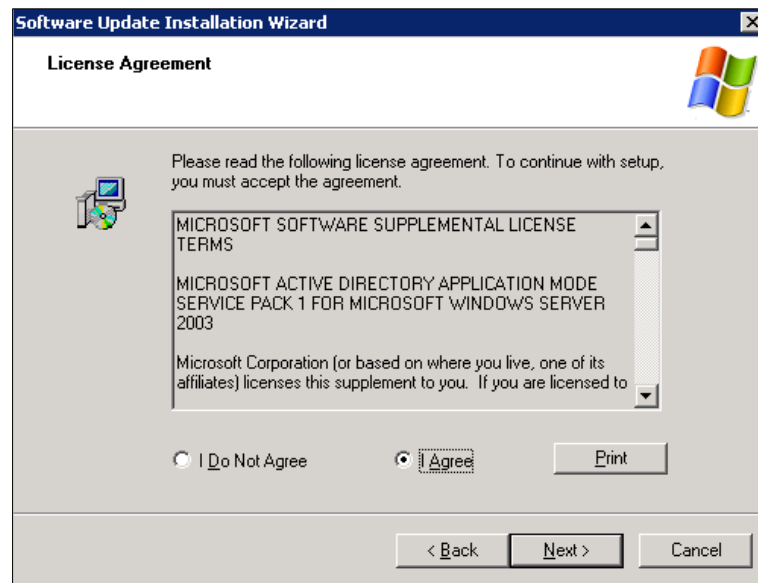
Installing the Active Directory Application Mode

To install the Active Directory Application Mode:

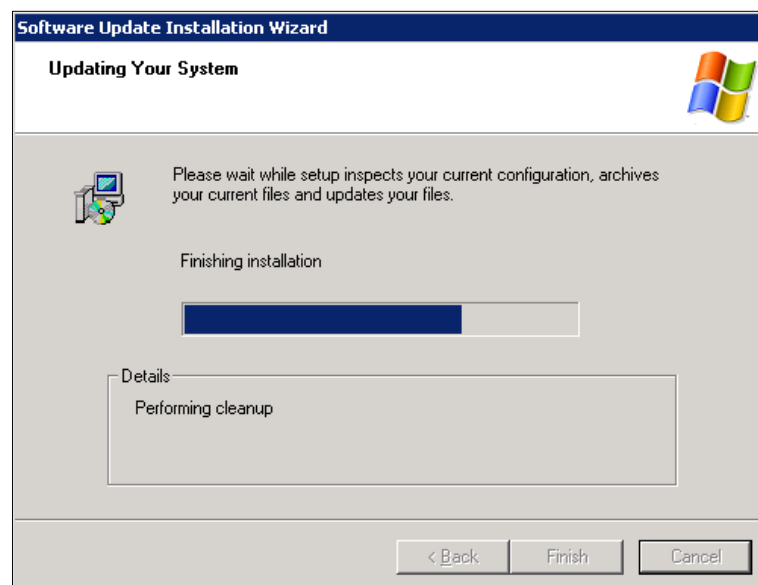
1. Double click ADAMSP1_x86_English.exe to run the application.
2. The Active Directory Application Mode Service Pack 1 Installation Wizard will appear after a short while, click **Next**.



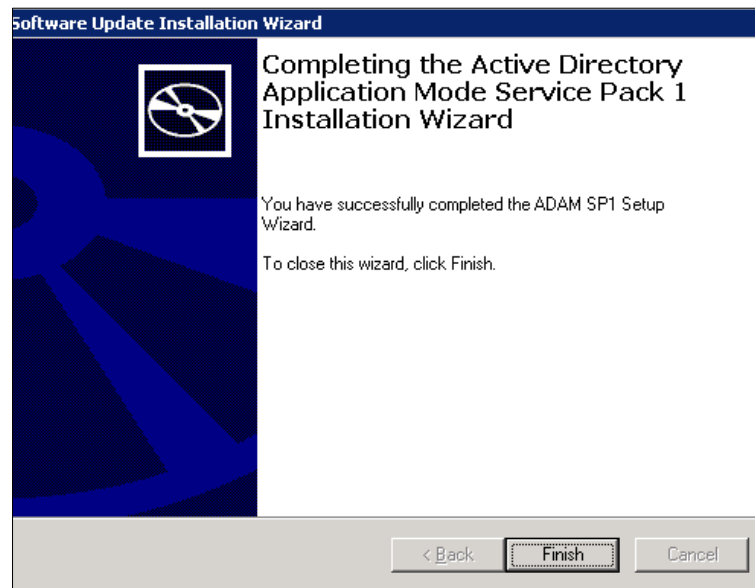
3. Read the software license agreement and mark **I Agree** radio box. And then click **Next**.



The installation progress screen will be shown as below:



- Click **Finish** to complete the installation and exit the wizard.



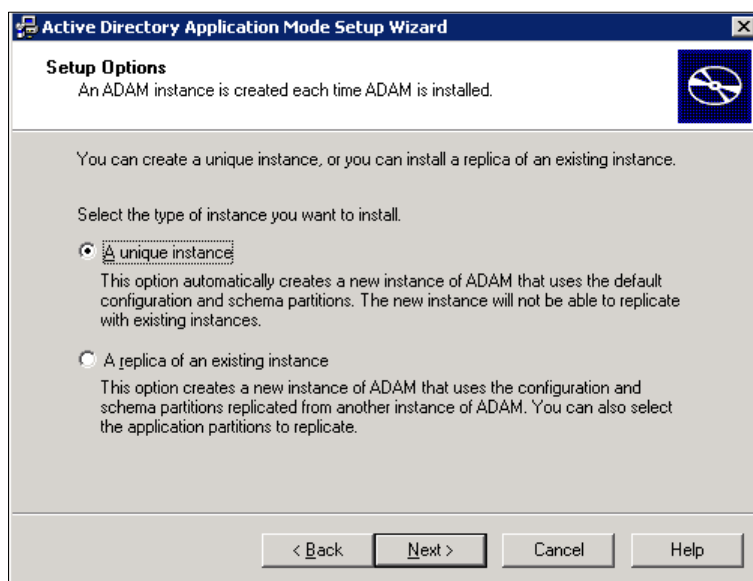
To create an ADAM instance:

- Click **Start->Programs->ADAM->Create an ADAM instance**.

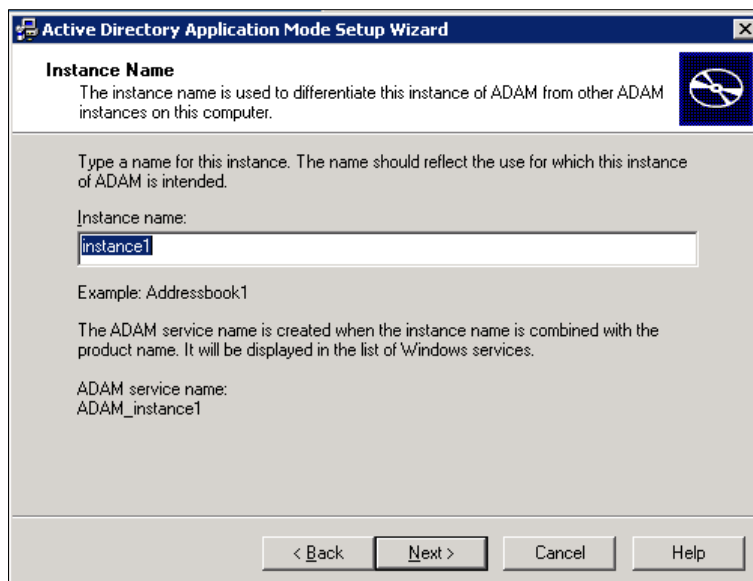
It will prompt the following interface and click **Next**.



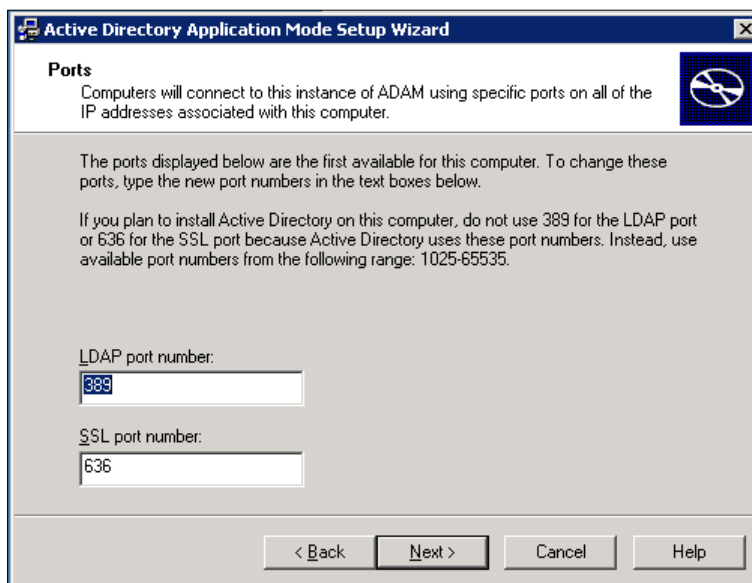
2. Mark the **A unique instance** radio box and click **Next**.



3. Enter the desired name in the **Instance name** field and click **Next**.

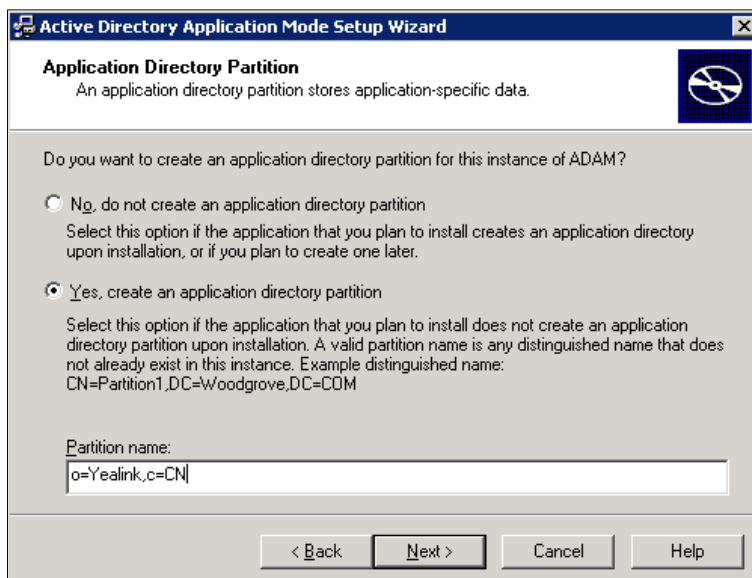


4. Keep the default ports and click **Next**.



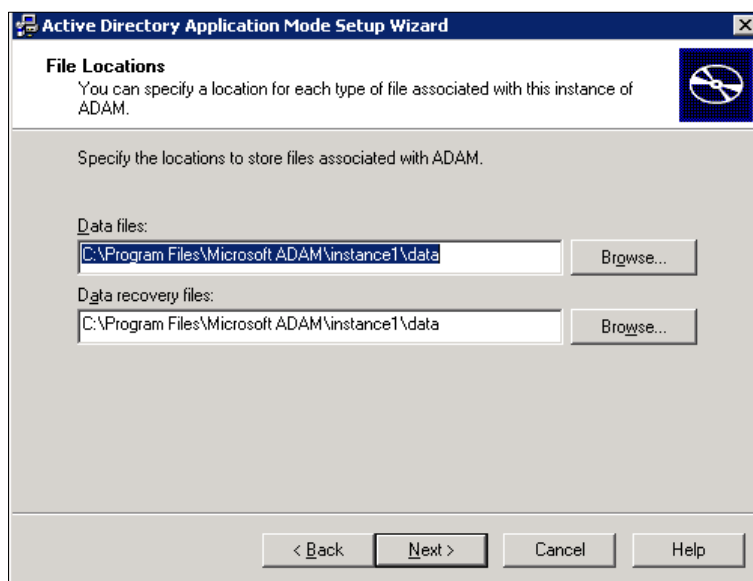
The screenshot shows the 'Ports' screen of the 'Active Directory Application Mode Setup Wizard'. The title bar reads 'Active Directory Application Mode Setup Wizard'. The main heading is 'Ports'. Below it, a text box states: 'Computers will connect to this instance of ADAM using specific ports on all of the IP addresses associated with this computer.' To the right is a blue square icon with a white 'X'. The main area contains two paragraphs: 'The ports displayed below are the first available for this computer. To change these ports, type the new port numbers in the text boxes below.' and 'If you plan to install Active Directory on this computer, do not use 389 for the LDAP port or 636 for the SSL port because Active Directory uses these port numbers. Instead, use available port numbers from the following range: 1025-65535.' Below this are two text boxes: 'LDAP port number:' with '389' entered, and 'SSL port number:' with '636' entered. At the bottom are four buttons: '< Back', 'Next >', 'Cancel', and 'Help'.

5. Mark the **Yes, create an application directory partition** radio box and enter the desired name (e.g., o=Yealink,c=CN) in the **Partition name** field, and then click **Next**.

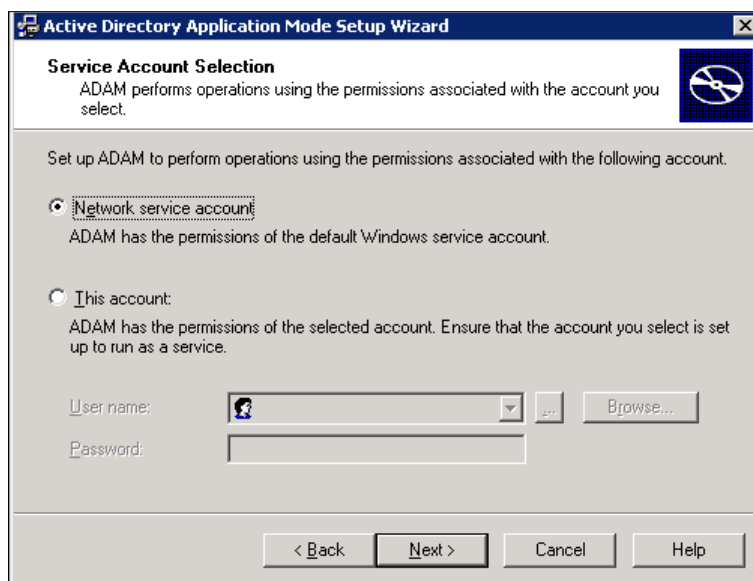


The screenshot shows the 'Application Directory Partition' screen of the 'Active Directory Application Mode Setup Wizard'. The title bar reads 'Active Directory Application Mode Setup Wizard'. The main heading is 'Application Directory Partition'. Below it, a text box states: 'An application directory partition stores application-specific data.' To the right is a blue square icon with a white 'X'. The main area contains the question 'Do you want to create an application directory partition for this instance of ADAM?'. There are two radio button options: 'No, do not create an application directory partition' (unselected) and 'Yes, create an application directory partition' (selected). Below the 'Yes' option is a text box with the following text: 'Select this option if the application that you plan to install does not create an application directory partition upon installation. A valid partition name is any distinguished name that does not already exist in this instance. Example distinguished name: CN=Partition1,DC=Woodgrove,DC=COM'. Below this is a text box labeled 'Partition name:' containing the text 'o=Yealink,c=CN'. At the bottom are four buttons: '< Back', 'Next >', 'Cancel', and 'Help'.

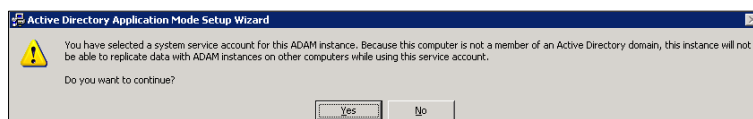
6. Specify the desired paths for the data and data recovery files, and click **Next**.



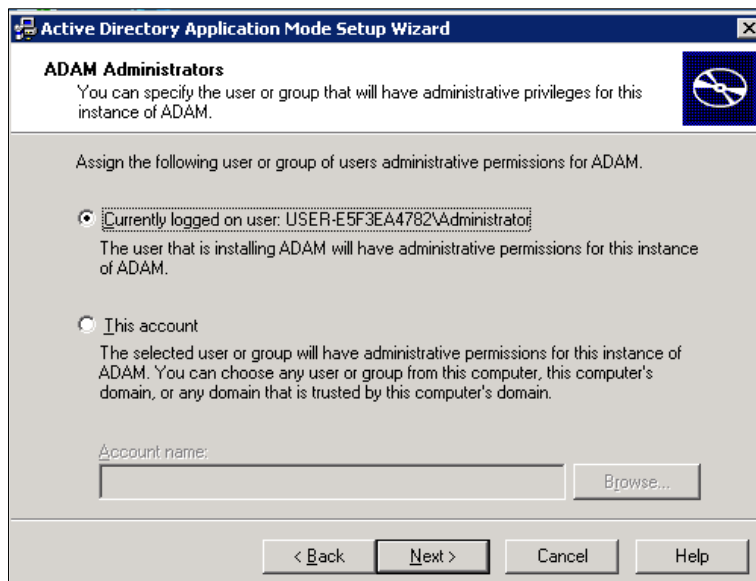
7. Mark the **Network service account** radio box and click **Next**.



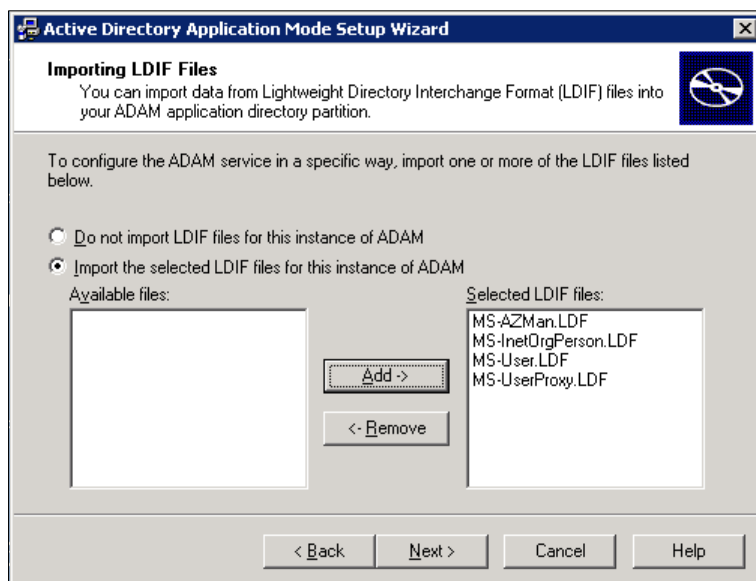
It will pop up the following prompt box. Read the provided information and click **Yes**.



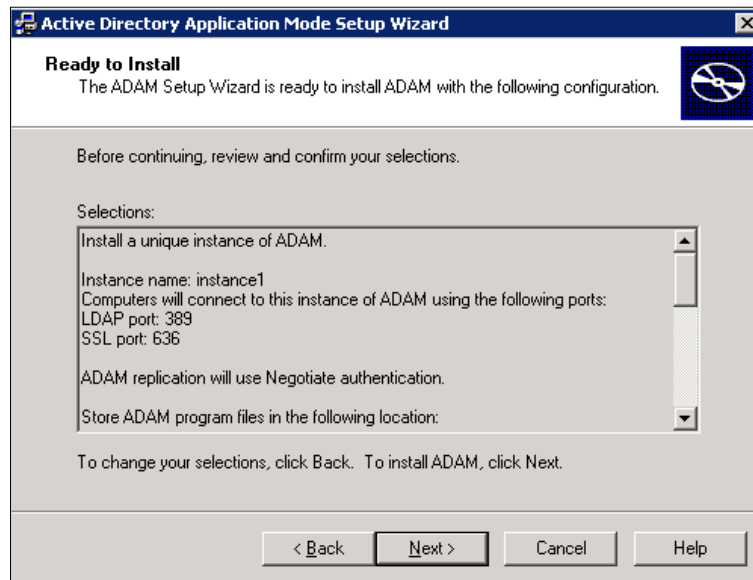
8. Mark the first radio box to assign the administrative permissions for ADAM to the currently logged on user (e.g., USER-E5F3EA4782) and click **Next**.



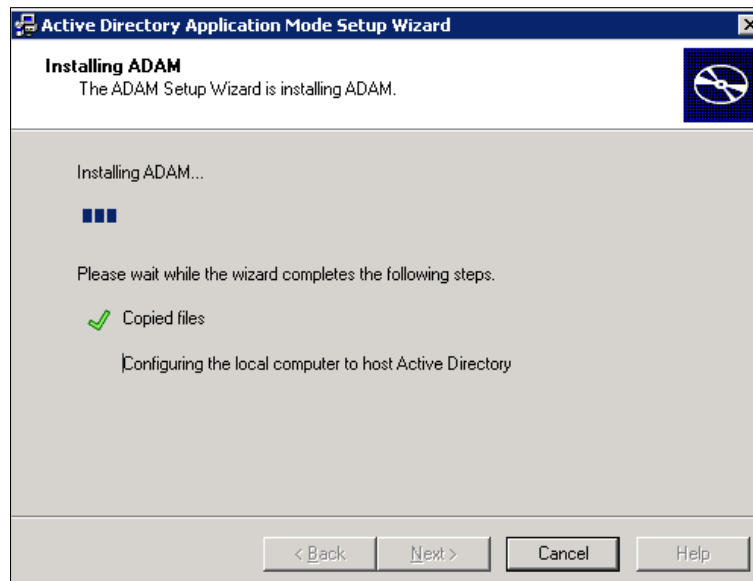
9. Mark the **Import the selected LDIF files for this instance of ADAM** radio box.
10. In the **Available files** box, select the desired LDF files and then click **Add->**, and then click **Next**.



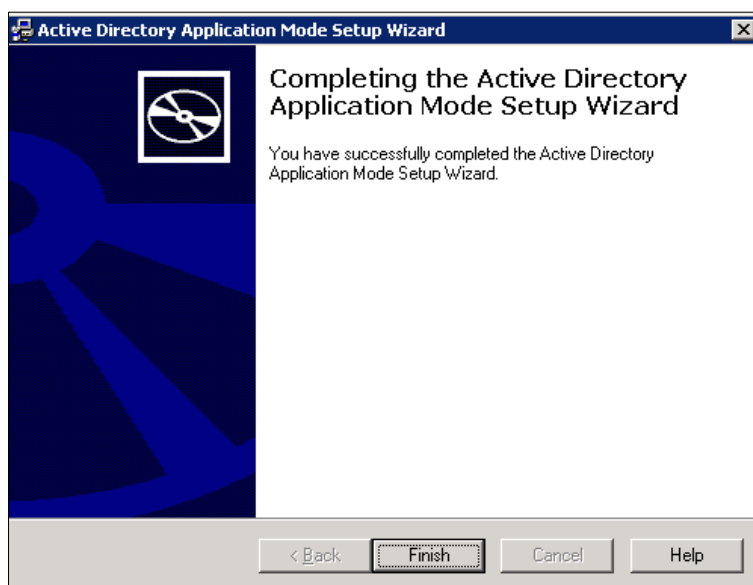
11. Review your selection and click **Next**.



The installing progress is shown as below:



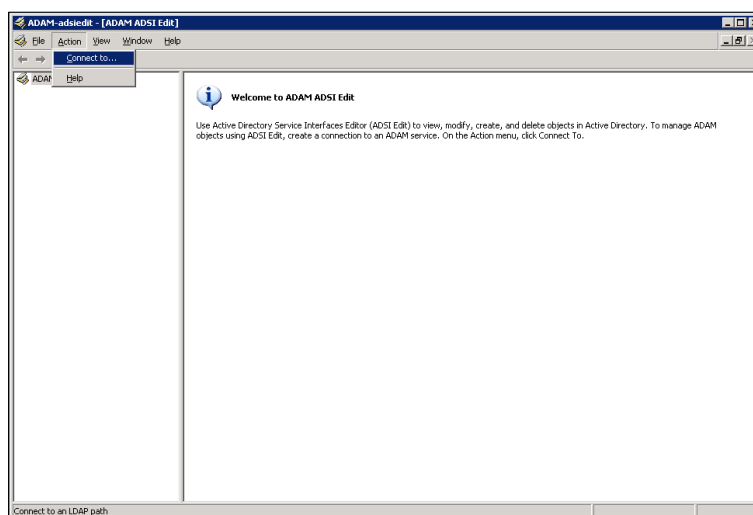
12. Click **Finish** to complete the installation and exit the wizard.



Configuring the ADAM ADSI Edit

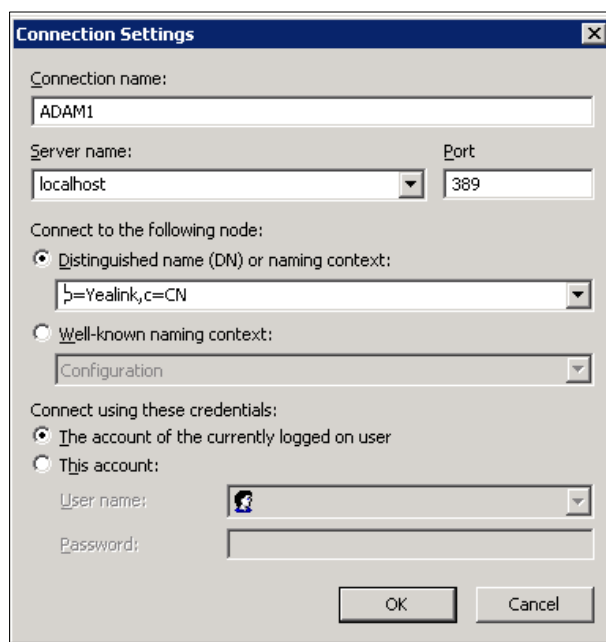
To configure the ADAM ADSI Edit:

1. Click **Start->Programs->ADAM->ADAM ADSI Edit**.
2. Click **Action->Connect to**.



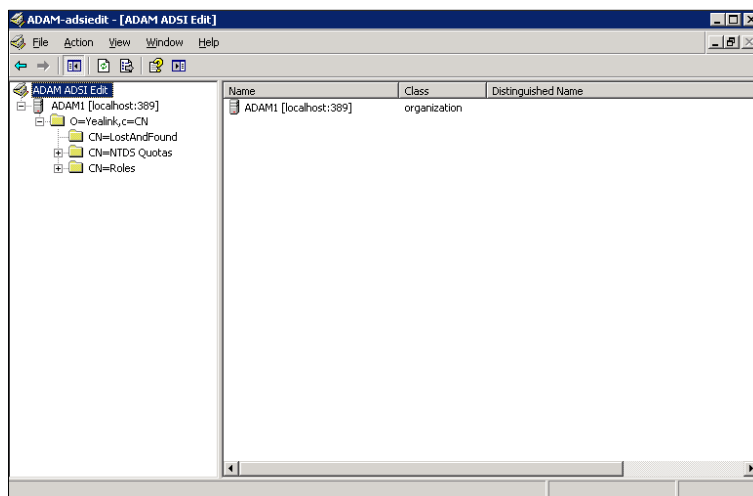
3. Enter the desired name (e.g., ADAM1) in the **Connection name** field.
4. Mark the **Distinguished name (DN) or naming context** radio box and enter the desired value (e.g., o=Yealink,c=CN) in the following field.

5. Click **OK**.



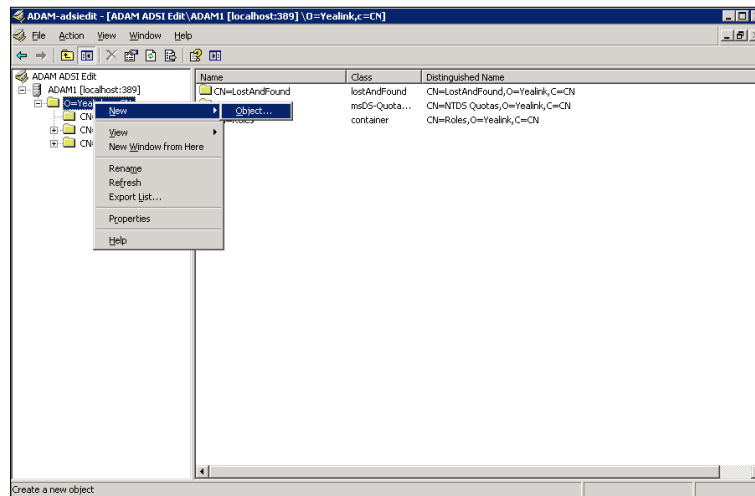
The 'Connection Settings' dialog box is shown. It has a title bar with a close button. The 'Connection name' field contains 'ADAM1'. The 'Server name' dropdown is set to 'localhost' and the 'Port' field is '389'. Under 'Connect to the following node:', the 'Distinguished name (DN) or naming context:' radio button is selected, and the dropdown shows 'o=Yealink,c=CN'. The 'Well-known naming context:' radio button is unselected, and its dropdown shows 'Configuration'. Under 'Connect using these credentials:', the 'The account of the currently logged on user' radio button is selected. The 'This account:' radio button is unselected, and its fields for 'User name' and 'Password' are empty. At the bottom are 'OK' and 'Cancel' buttons.

When the ADAM ADSI Edit connects an application directory partition (e.g., `o=Yealink,c=CN`) successfully, it will show as below:

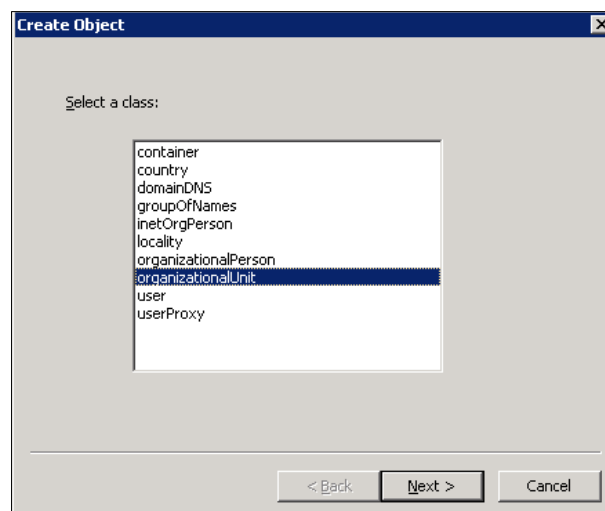


To create the object for ADAM:

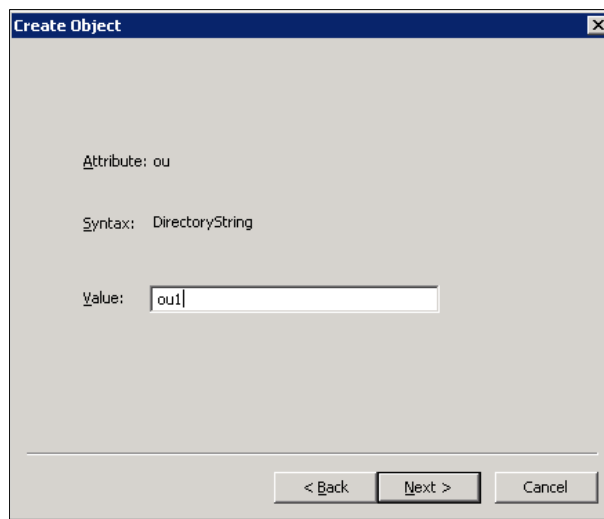
1. Select and right click **O=Yealink,c=CN**, and then select **New->Object**.



2. Select **organizationalUnit** and click **Next**.



3. Enter the desired value (e.g., ou1) in the **Value** field and click **Next**.



The 'Create Object' dialog box shows the following fields and controls:

- Attribute:** ou
- Syntax:** DirectoryString
- Value:** ou1
- Buttons at the bottom: < Back, Next >, Cancel

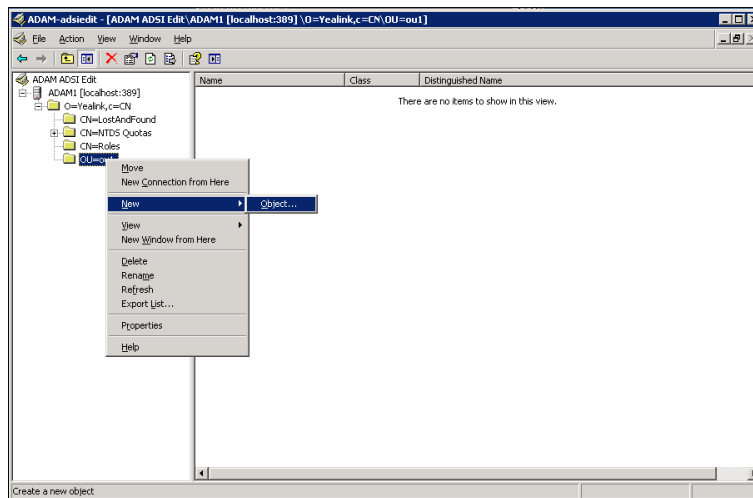
4. Click **Finish** to complete the creation of this object.
You can also click **More Attributes** to set more attributes for this object.



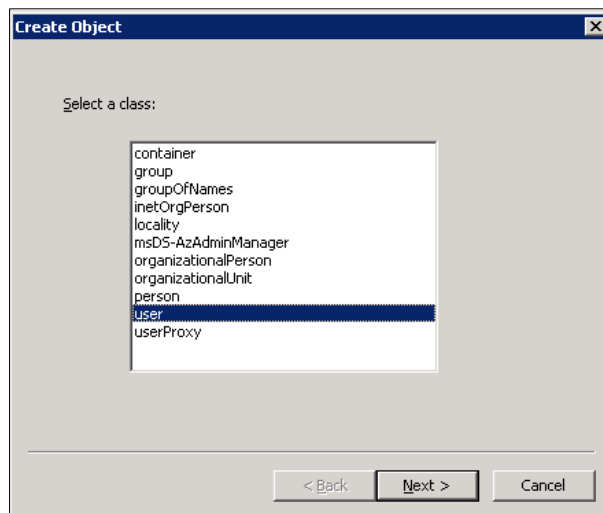
The 'Create Object' dialog box shows the following fields and controls:

- Text: To complete the creation of this object, click Finish.
- Text: To set more attributes, click More Attributes.
- Button: More Attributes
- Buttons at the bottom: < Back, Finish, Cancel

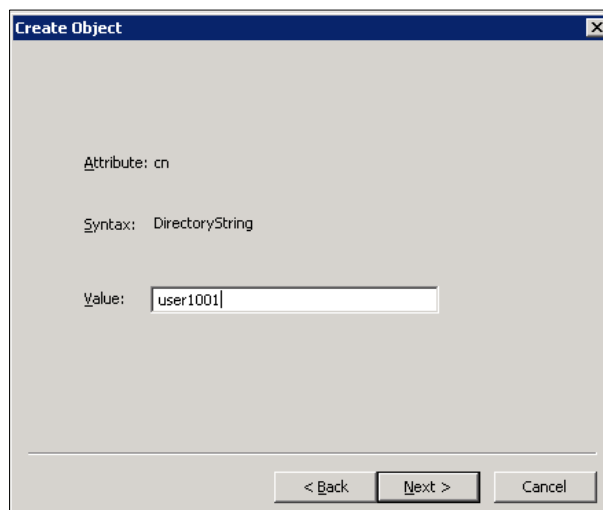
5. Select and right click **OU=ou1**, and then select **New->Object**.



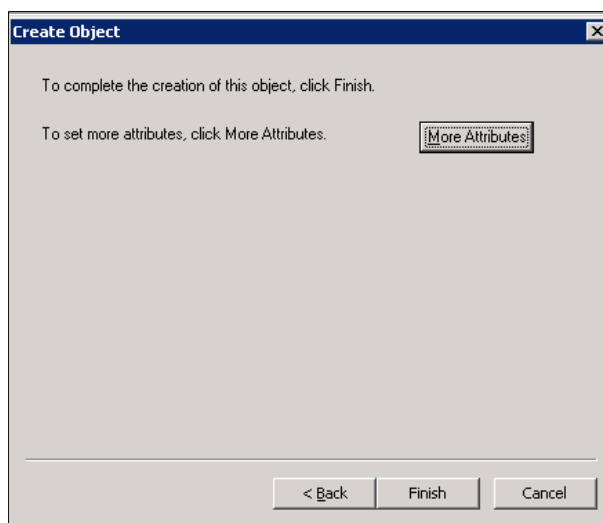
6. Select **user** and click **Next**.



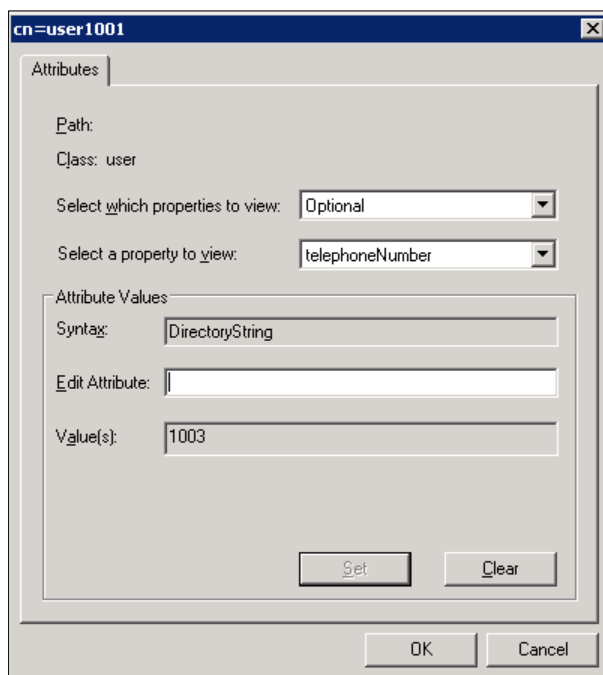
7. Enter the desired value (e.g., user1001) in the **Value** field and click **Next**.



8. Click **More Attributes** to set more attributes for this user.

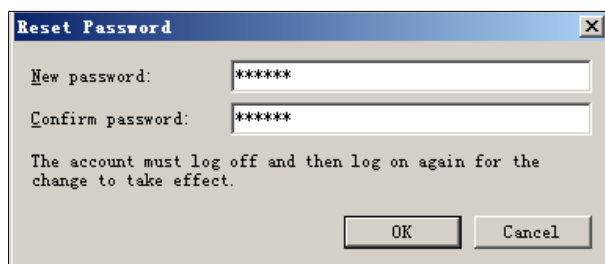


9. In the popup dialog of Attributes, select the telephoneNumber from the pull-down list of **Select a property to view**. Enter the desired telephone number (e.g., 1003) in the **Edit Attribute** field and click **Set**. The entered telephone number will be shown in the **Value(s)** field.



10. Click **OK** to close the Attributes dialog, and click **Finish** to complete the creation of this user.
11. Select and right click the user created above, and then select **Reset Password**.

- Enter the password for the user created above in the **New password** field and **Confirm password** field respectively.

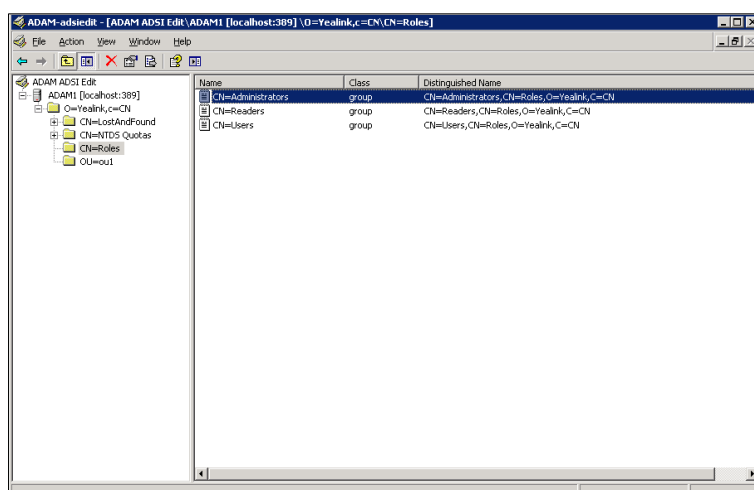


- Click **OK** to accept the change.

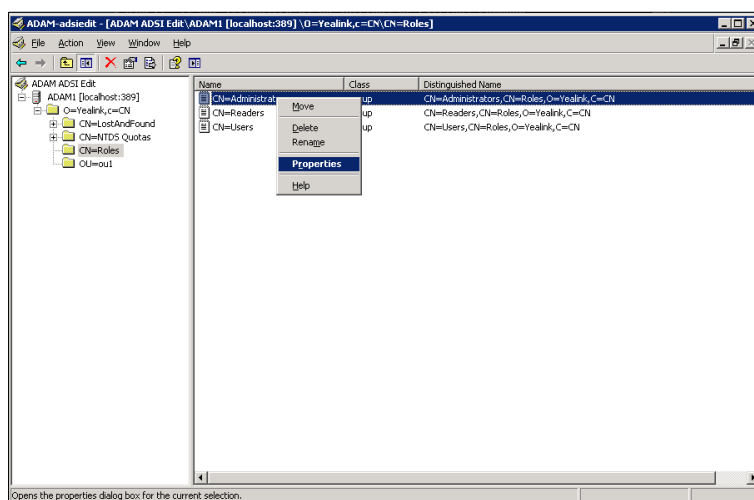
If you want to use the user created above to manage and search information of LDAP, you need to add the user to the administrator group in advance.

To add the user to the administrator group:

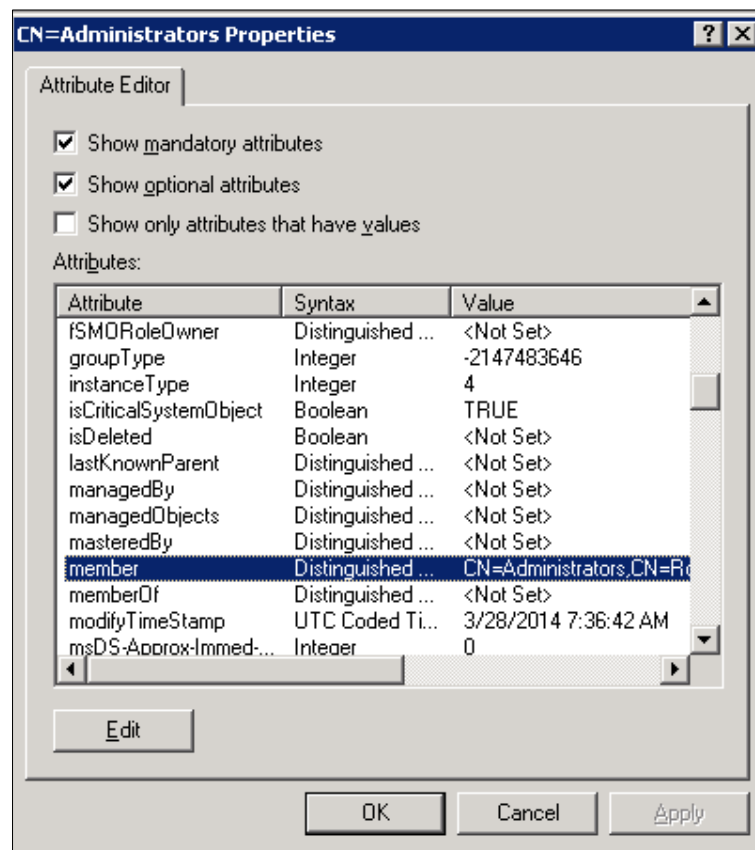
- Click **ADAM1->O=Yealink, c=CN->CN=Roles**.



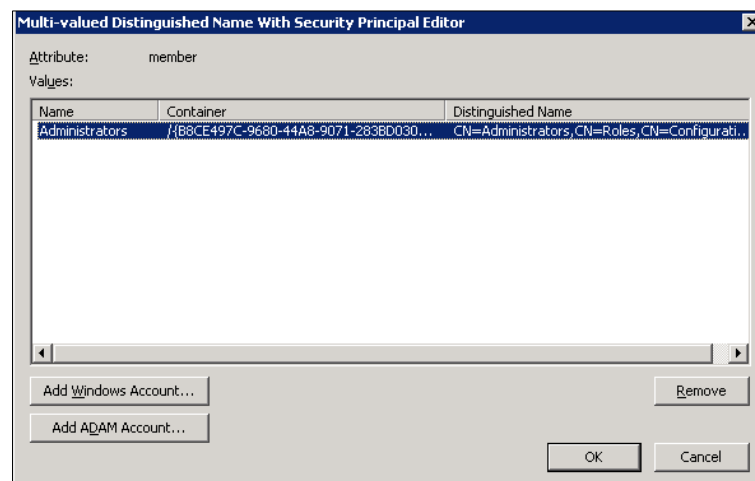
- Select and right click **CN=Administrators**, and then select **Properties**.



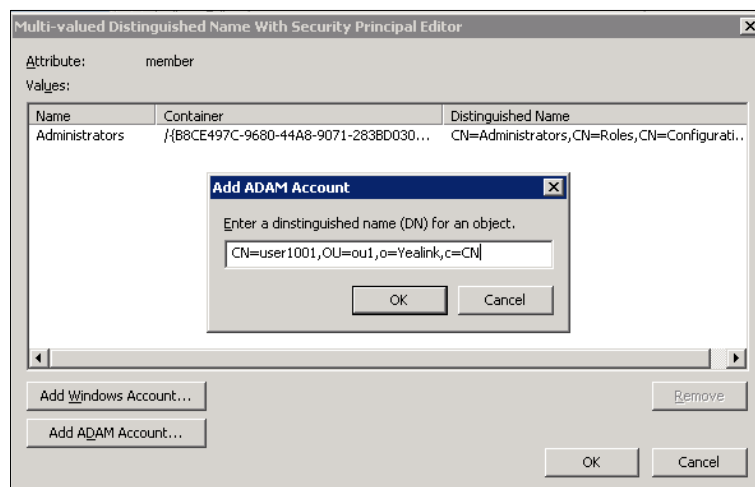
3. Select the **member** attribute in the **Attributes** box and click **Edit**.



4. In the popup dialog of the member attribute, click **Add ADAM Account**.



5. In the popup dialog of adding ADAM account, enter the desired distinguished name (e.g., CN=user1001,OU=ou1,o=Yealink,c=CN) in the field.



6. Click **OK** to accept the change and close the dialog of adding ADAM account.
7. Click **OK** to accept the change and close the dialog of the member attribute.
8. Click **OK** to accept the change and close the Administrators Properties interface.

You can also view permissions of ADAM using the command.

To view permissions using the command:

1. Click **Start->Programs->ADAM->ADAM Tools Command Prompt**.
2. Execute the command `dscls \\localhost:389\o=Yealink,c=CN` view permissions of `o=Yealink,c=CN`.

```

c:\ADAM Tools Command Prompt
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\ADAM>dscls \\localhost:389\o=Yealink,c=CN
Owner: CN=Administrators,CN=Roles,O=Yealink,C=CN
Group: CN=Administrators,CN=Roles,O=Yealink,C=CN

Access list:
Allow CN=Instances,CN=Roles,CN=Configuration,CN={B8CE497C-9680-44A8-9071-283BD030BCF0}
    SPECIAL ACCESS
    READ PERMISSIONS
    LIST CONTENTS
    READ PROPERTY
    LIST OBJECT
Allow CN=Readers,CN=Roles,O=Yealink,C=CN
    SPECIAL ACCESS
    READ PERMISSIONS
    LIST CONTENTS
    READ PROPERTY
    LIST OBJECT
Allow CN=Administrators,CN=Roles,O=Yealink,C=CN
    FULL CONTROL
Allow CN=Instances,CN=Roles,CN=Configuration,CN={B8CE497C-9680-44A8-9071-283BD030BCF0}
    Replicating Directory Changes
Allow CN=Instances,CN=Roles,CN=Configuration,CN={B8CE497C-9680-44A8-9071-283BD030BCF0}
    Replication Synchronization
Allow CN=Instances,CN=Roles,CN=Configuration,CN={B8CE497C-9680-44A8-9071-283BD030BCF0}
    Manage Replication Topology
Allow CN=Instances,CN=Roles,CN=Configuration,CN={B8CE497C-9680-44A8-9071-283BD030BCF0}
    Replicating Directory Changes All

Permissions inherited to subobjects are:
Inherited to all subobjects
Allow CN=Readers,CN=Roles,O=Yealink,C=CN

```

Sun One Directory Server

Sun One Directory Server, also known as Sun Java System Directory Server, is a component of the Java Enterprise System. Sun One Directory Server can be installed on multiple platforms, such as Windows, Linux, Solaris and so on. This section shows you how to install Sun One Directory Server version 5.2 on Microsoft Windows Server 2003 SP2 Enterprise 32-bit system. You can download it online:

<http://download.csdn.net/download/wbsoso/6439291>.

Before the installation, you should prepare as follows:

- Modify the hosts file of your computer.
- Install the Java Development Kit (JDK) 5 or later.

To modify the hosts file of your computer:

1. Locate the hosts file in the path "C:\WINDOWS\system32\drivers\etc\hosts".
2. Open and edit the hosts.dz file using your favorite text editor.
3. Add FQCN (Fully Qualified Computer Name) of your computer to the file. For example, the FQCN of your computer is ldapsun.yealinktest.com. Add the following mapping:

```
127.0.0.1    ldapsun.yealinktest.com
```

```
# Copyright (c) 1993-1999 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
#       102.54.94.97    rhino.acme.com    # source server
#       38.25.63.10    x.acme.com       # x client host

127.0.0.1    localhost
127.0.0.1    ldapsun.yealinktest.com
```

4. Save the hosts file.

The following shows you how to install Java Development Kit (JDK) 6 on your computer. You can download it online:

<http://www.oracle.com/technetwork/java/javase/downloads/index.html>.

To install the Java Development Kit (JDK) 6:

1. Double click jdk-6u22-windows-i586.exe to run the application.

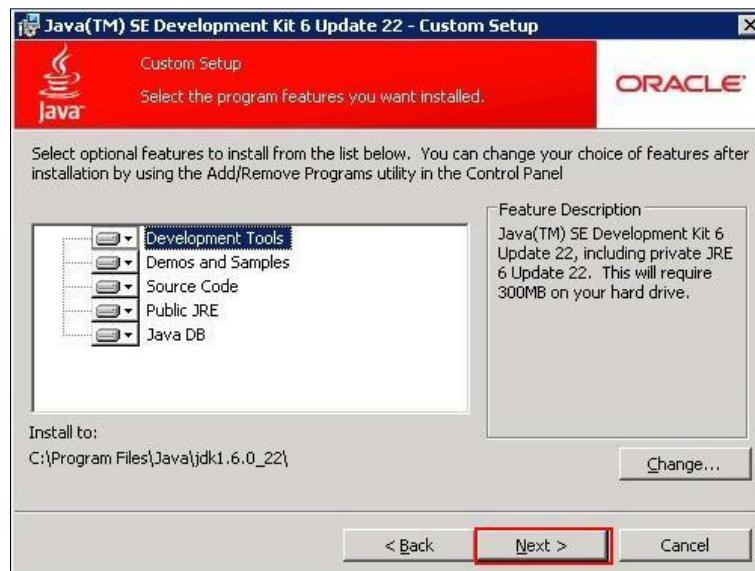
- The Java (TM) SE Development Kit 6 Update 22 Installation Wizard will appear after a short while, click **Next**.

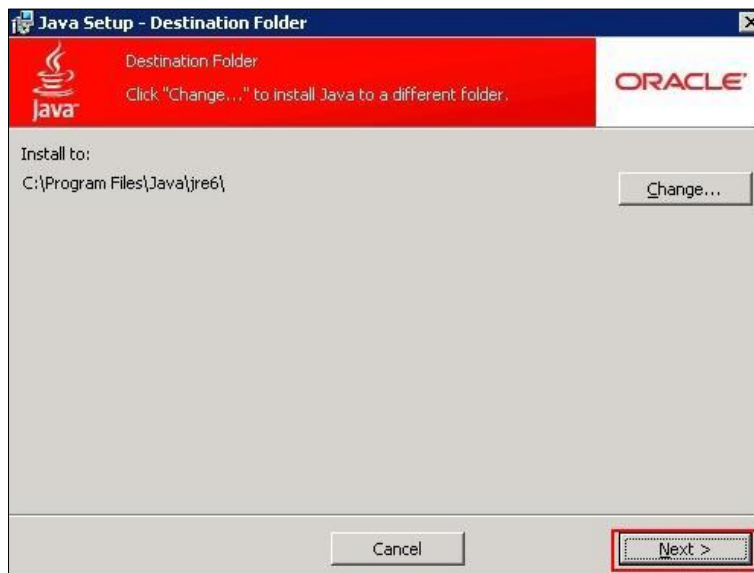


- Click **Change** to locate the installation path from local computer system and then click **Next**.

You need to remember the installation path (e.g., C:\Program Files\Java\jdk1.6.0_22) located here.

The screenshot for reference is shown as below:





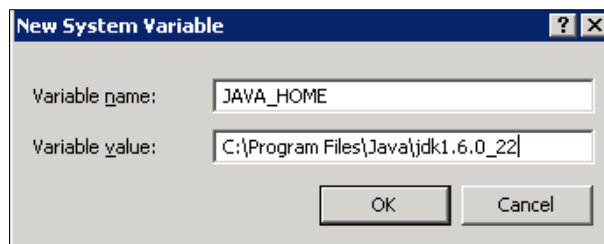


4. Click **Finish** to finish the installation.

After the installation, you need to configure environment variables.

To configure environment variables:

1. Right-click the **My Computer** icon and select **Properties**.
2. Click the **Advanced** tab.
3. Click the **Environment Variables** button.
4. Add the following variables, click **New** under **System Variables**.
5. Enter the variable name as **JAVA_HOME**.
6. Enter the variable value as the installation path (e.g., C:\Program Files\Java\jdk1.6.0_22) for the Java Development Kit.



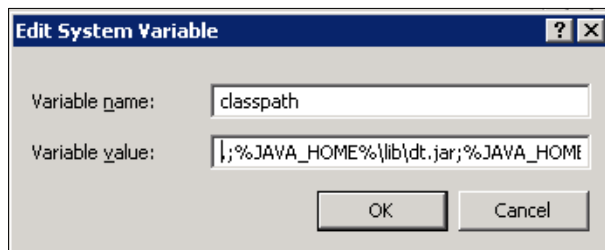
7. Click **OK**.
8. Repeat the steps 4-7 to create a new system variable.

Variable name: classpath

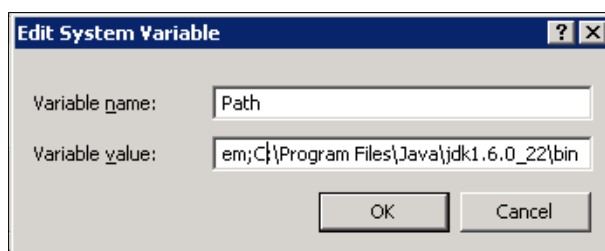
Variable value: .;%JAVA_HOME%\lib\dt.jar;%JAVA_HOME%\lib\tools.jar

The dot "." stands for the current path and it can't be deleted.

%JAVA_HOME% references the value of the specified JAVA_HOME variable created before.



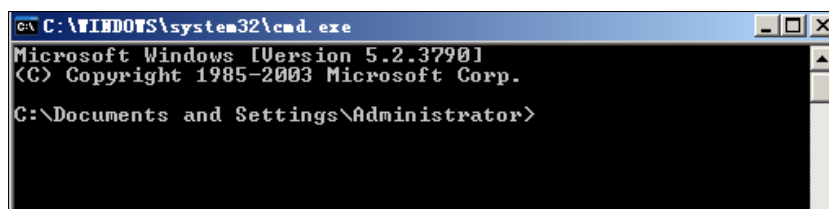
9. Under **System Variables**, select the **Path** variable and click **Edit**.
10. In the **Variable value** field, append the Java bin directory (e.g., C:\Program Files\Java\jdk1.6.0_22\bin) to the end of the existing path (e.g., %SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;). If the end of the existing path has no semicolon, you should add a semicolon to the end of the existing path and then append the Java bin directory.



11. Click **OK**.
12. Click **Apply Changes**.

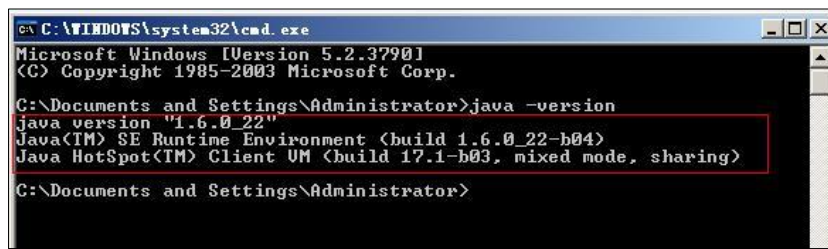
To verify the configuration of environment variables:

1. Click **Start->Run**.
2. Enter **cmd** in the pop-up dialogue box and click **OK** to enter the command line interface.



3. Execute the command **java -version** to check the java version.

It prompts the following information.



```

C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

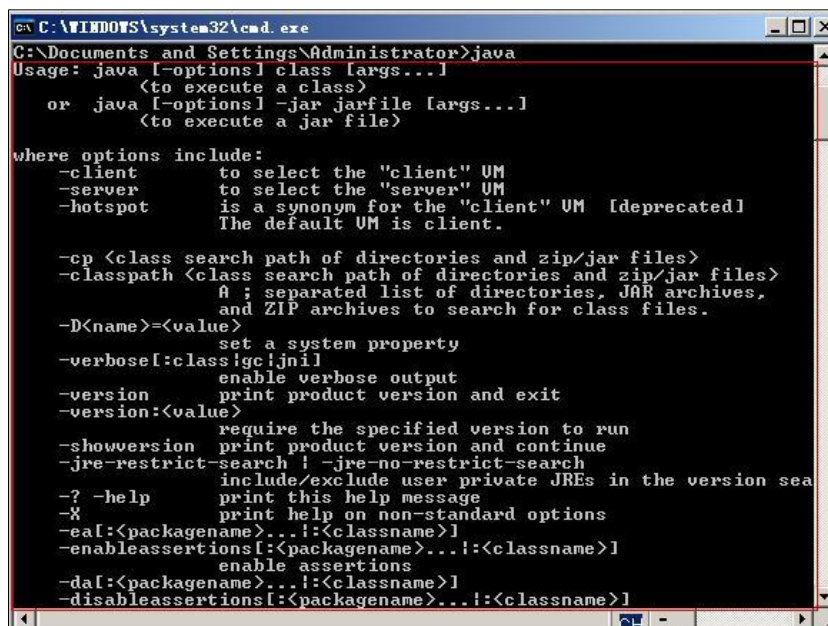
C:\Documents and Settings\Administrator>java -version
java version "1.6.0_22"
Java(TM) SE Runtime Environment (build 1.6.0_22-b04)
Java HotSpot(TM) Client VM (build 17.1-b03, mixed mode, sharing)

C:\Documents and Settings\Administrator>

```

4. Execute the command **java** to run the application.

It prompts the following information.



```

C:\WINDOWS\system32\cmd.exe
C:\Documents and Settings\Administrator>java
Usage: java [-options] class [args...]
           (to execute a class)
   or  java [-options] -jar jarfile [args...]
           (to execute a jar file)

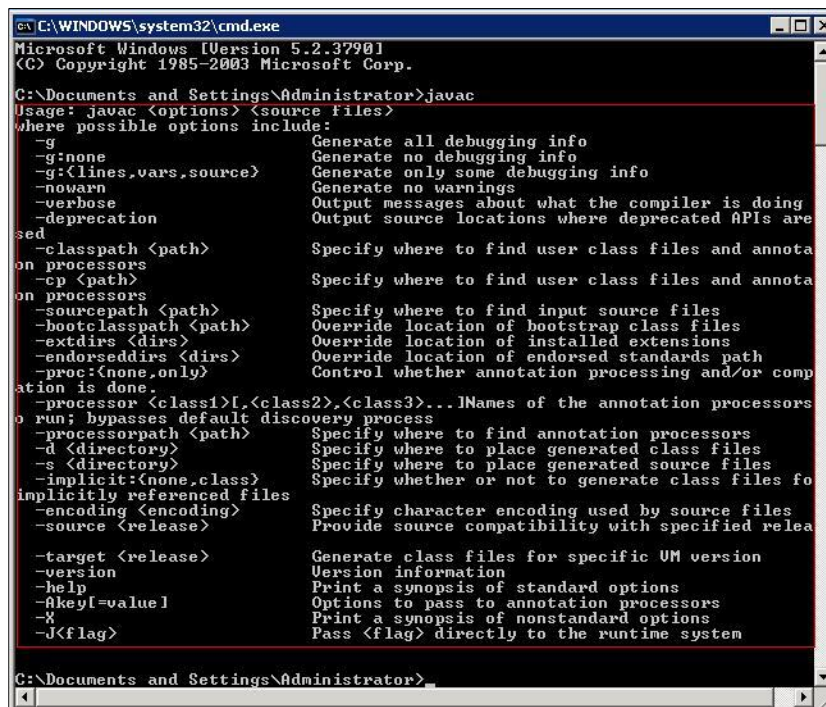
where options include:
    -client          to select the "client" VM
    -server          to select the "server" VM
    -hotspot         is a synonym for the "client" VM [deprecated]
                    The default VM is client.

    -cp <class search path of directories and zip/jar files>
    -classpath <class search path of directories and zip/jar files>
                  A ; separated list of directories, JAR archives,
                  and ZIP archives to search for class files.
    -D<name>=<value> set a system property
    -verbose[:class[:gc[:jni]]
                  enable verbose output
    -version          print product version and exit
    -version:<value> require the specified version to run
    -showversion      print product version and continue
    -jre-restrict-search ! -jre-no-restrict-search
                  include/exclude user private JREs in the version sea
    -? -help          print this help message
    -X               print help on non-standard options
    -ea[:<packagename>...[:<classname>]]
                  enable assertions
    -da[:<packagename>...[:<classname>]]
                  disable assertions
    -disableassertions[:<packagename>...[:<classname>]]

```

5. Execute the command **javac** to compile java files into class files.

It prompts the following information.



```

C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\Documents and Settings\Administrator>javac
Usage: javac <options> <source files>
where possible options include:
  -g               Generate all debugging info
  -g:none          Generate no debugging info
  -g:{lines,vars,source}  Generate only some debugging info
  -nowarn          Generate no warnings
  -verbose         Output messages about what the compiler is doing
  -deprecation     Output source locations where deprecated APIs are found
  -classpath <path> Specify where to find user class files and annotation processors
  -cp <path>       Specify where to find user class files and annotation processors
  -sourcepath <path> Specify where to find input source files
  -bootclasspath <path> Override location of bootstrap class files
  -extdirs <dirs>    Override location of installed extensions
  -endorseddirs <dirs> Override location of endorsed standards path
  -proc:{none,only} Control whether annotation processing and/or compilation is done.
  -processor <class1>[,<class2>,<class3>...] Names of the annotation processors to run; bypasses default discovery process
  -processorpath <path> Specify where to find annotation processors
  -d <directory>     Specify where to place generated class files
  -s <directory>     Specify where to place generated source files
  -implicit:{none,class} Specify whether or not to generate class files for implicitly referenced files
  -encoding <encoding> Specify character encoding used by source files
  -source <release>  Provide source compatibility with specified release
  -target <release>  Generate class files for specific VM version
  -version          Version information
  -help            Print a synopsis of standard options
  -Xkey[=value]    Options to pass to annotation processors
  -X              Print a synopsis of nonstandard options
  -J<flag>         Pass <flag> directly to the runtime system

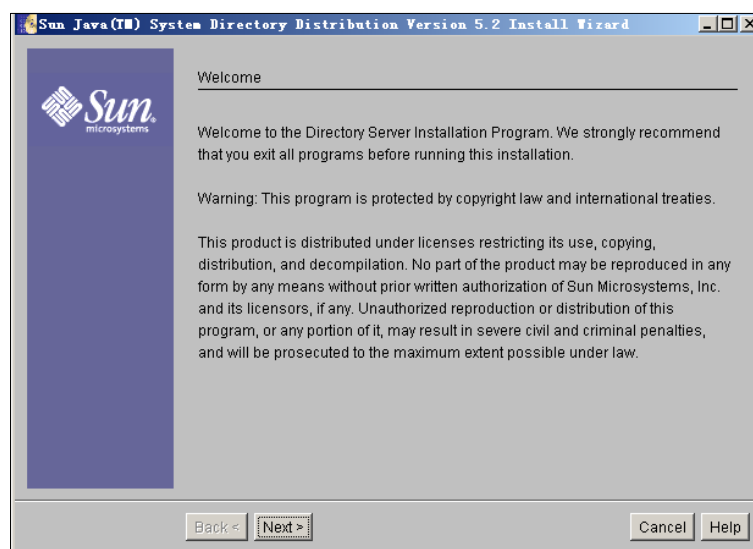
C:\Documents and Settings\Administrator>

```

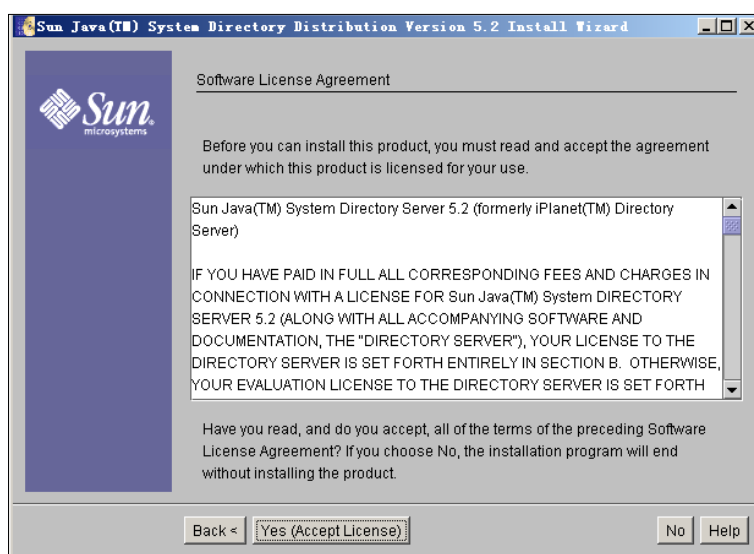
Installing the Sun One Directory

To install the Sun One Directory:

1. Unpack the compressed files named Sun Java System Directory Server 5.2.P4.Windows.full.rar.
2. Double click setup.exe to run the application.
3. The Sun Java(TM) System Directory Distribution Version 5.2 Install Wizard will appear after a short while, click **Next**.

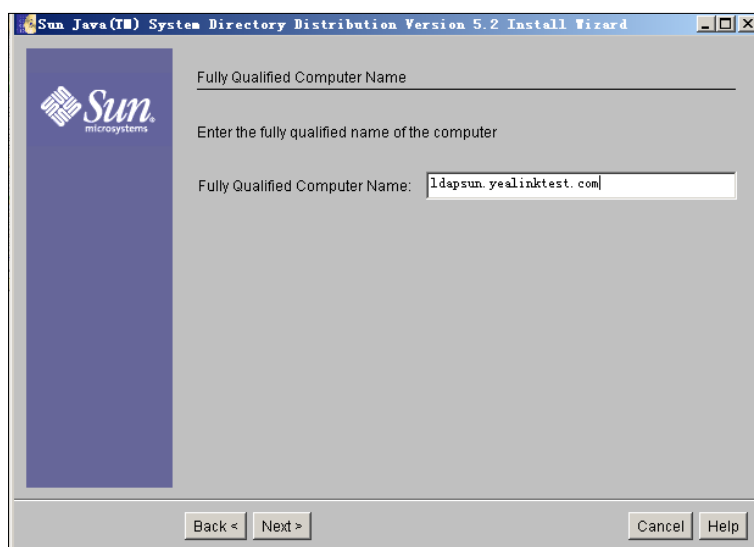


4. Read the software license agreement and click **Yes (Accept License)**.

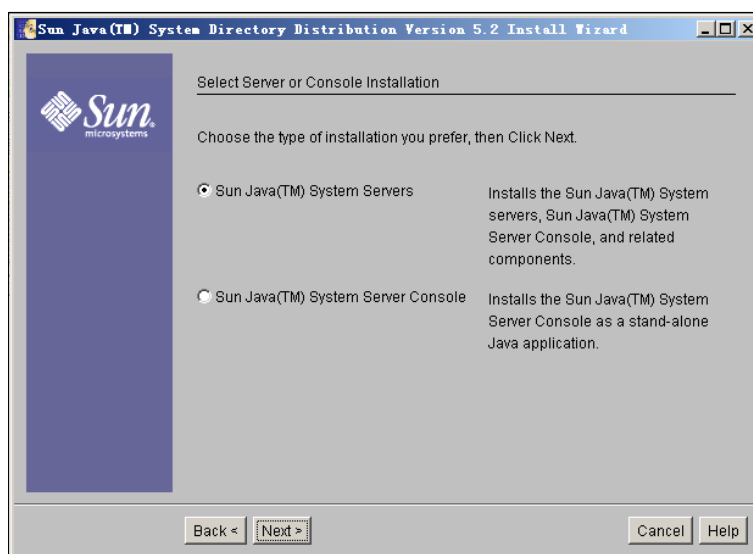


5. Enter the fully qualified name of the computer (e.g., ldapsun.yealinktest.com) in the **Fully Qualified Computer Name** field and click **Next**.

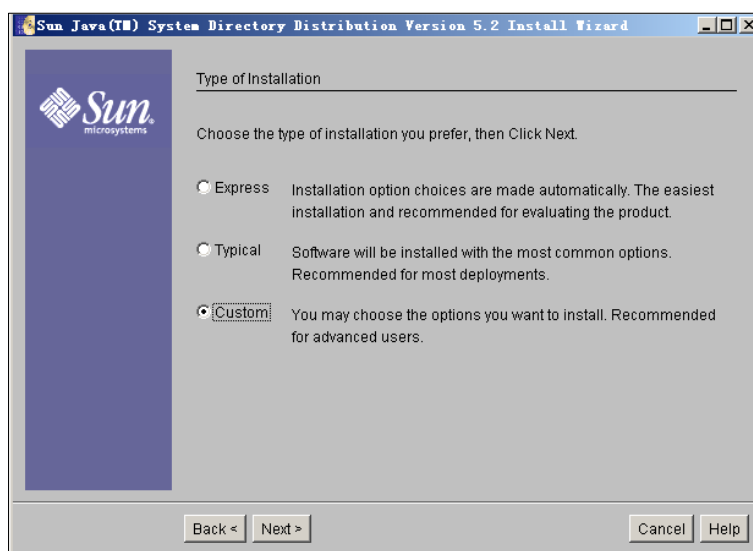
The fully qualified name of the computer was planned before. For more information, refer to [modify the hosts file of your computer](#).



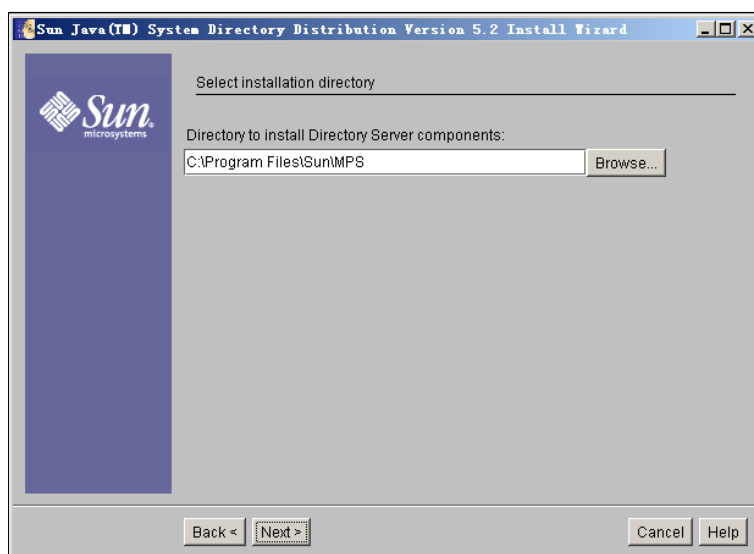
6. Mark the **Sun Java (TM) System Servers** radio box and click **Next**.



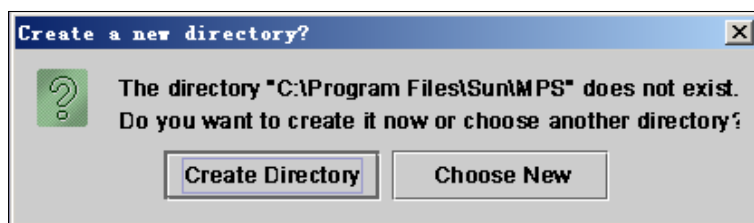
7. Mark the **Custom** radio box and click **Next**.



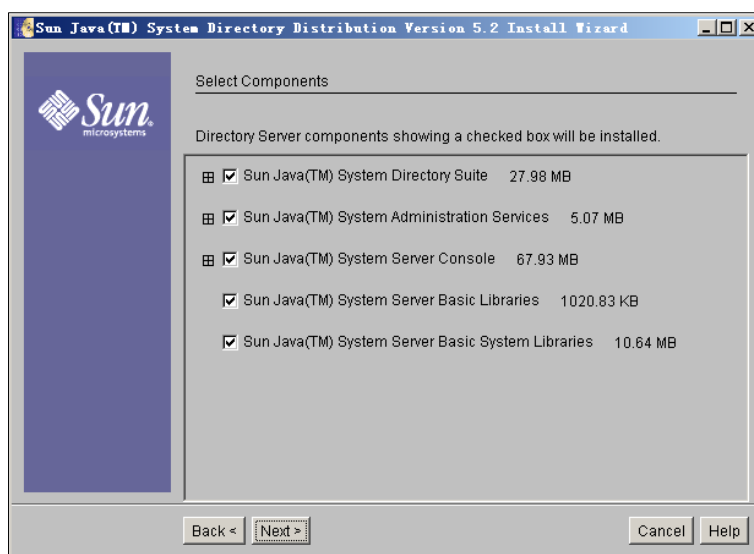
8. Specify the desired installation directory and click **Next**.



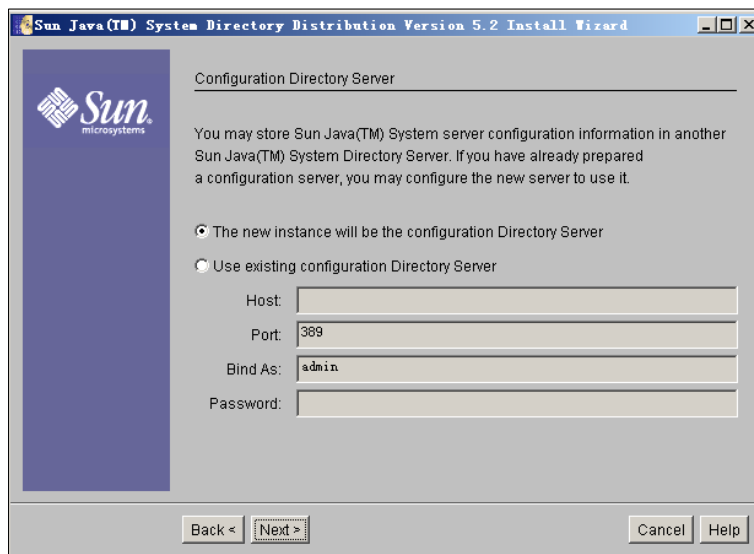
It prompts the following window. And you can click **Create Directory** to create the directory or click **Choose New** to select another path.



9. Select the desired installation components and click **Next**.

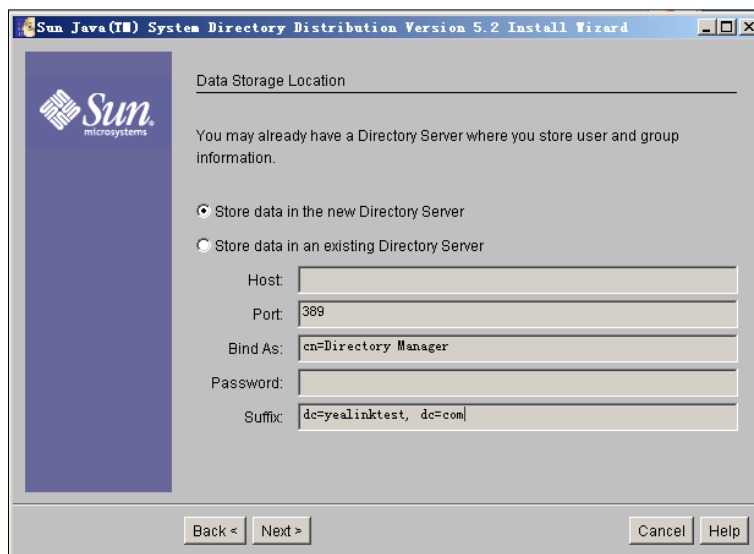


10. Mark **The new instance will be the configuration Directory Server** radio box and click **Next**.



The screenshot shows the 'Configuration Directory Server' step of the Sun Java(TM) System Directory Distribution Version 5.2 Install Wizard. The window title is 'Sun Java(TM) System Directory Distribution Version 5.2 Install Wizard'. On the left is the Sun Microsystems logo. The main text reads: 'You may store Sun Java(TM) System server configuration information in another Sun Java(TM) System Directory Server. If you have already prepared a configuration server, you may configure the new server to use it.' There are two radio buttons: 'The new instance will be the configuration Directory Server' (which is selected) and 'Use existing configuration Directory Server'. Below the radio buttons are four text input fields: 'Host' (empty), 'Port' (389), 'Bind As' (admin), and 'Password' (empty). At the bottom are buttons for 'Back <', 'Next >', 'Cancel', and 'Help'.

11. Mark the **Store data in the new Directory Server** radio box and click **Next**.



The screenshot shows the 'Data Storage Location' step of the Sun Java(TM) System Directory Distribution Version 5.2 Install Wizard. The window title is 'Sun Java(TM) System Directory Distribution Version 5.2 Install Wizard'. On the left is the Sun Microsystems logo. The main text reads: 'You may already have a Directory Server where you store user and group information.' There are two radio buttons: 'Store data in the new Directory Server' (which is selected) and 'Store data in an existing Directory Server'. Below the radio buttons are five text input fields: 'Host' (empty), 'Port' (389), 'Bind As' (cn=Directory Manager), 'Password' (empty), and 'Suffix' (dc=yealinktest, dc=com). At the bottom are buttons for 'Back <', 'Next >', 'Cancel', and 'Help'.

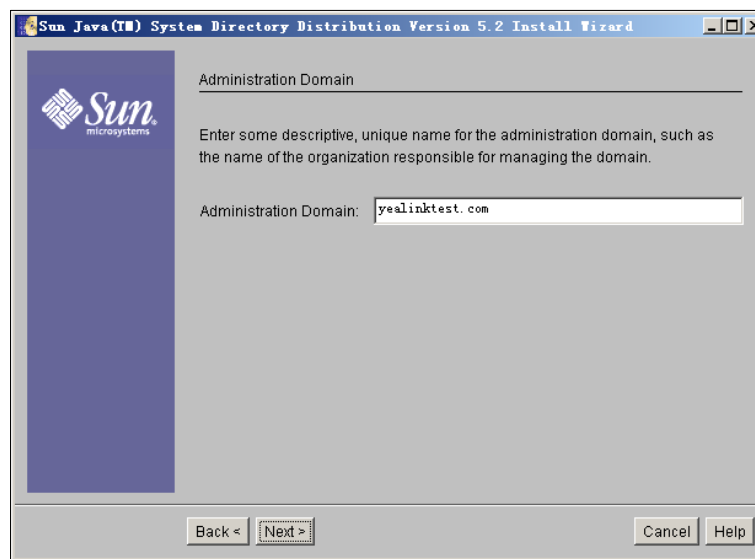
12. Enter the value "ldapsun" in the **Server Identifier** field and keep the default values in other two fields. And then click **Next**.

The screenshot shows the 'Directory Server Settings' window of the Sun Java(TM) System Directory Distribution Version 5.2 Install Wizard. The window has a title bar with the Sun logo and text. On the left is a blue vertical bar with the Sun logo. The main area is titled 'Directory Server Settings' and contains the text 'Settings the new server will use for basic operation'. Below this are three input fields: 'Server Identifier' with the value 'ldapsun', 'Server Port' with the value '28511', and 'Suffix' with the value 'dc=yealinktest, dc=com'. At the bottom are four buttons: 'Back <', 'Next >', 'Cancel', and 'Help'.

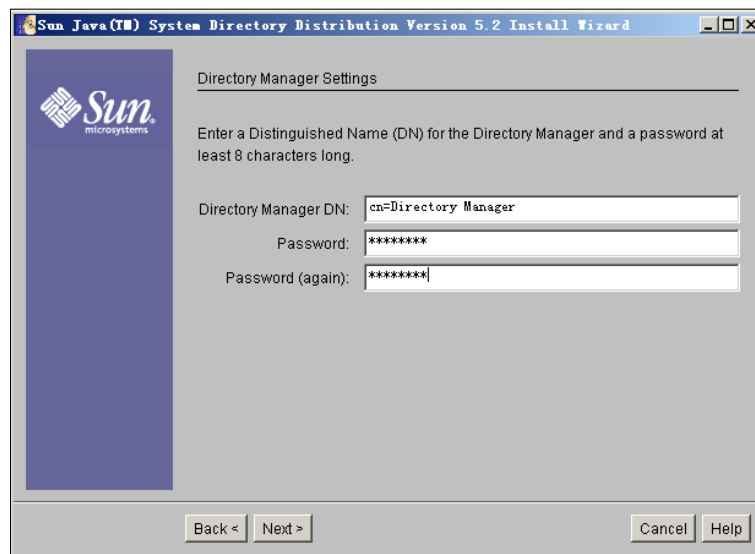
13. Configure the password for the Directory Server Administrator and click **Next**.

The screenshot shows the 'Configuration Directory Server Administrator' window of the Sun Java(TM) System Directory Distribution Version 5.2 Install Wizard. The window has a title bar with the Sun logo and text. On the left is a blue vertical bar with the Sun logo. The main area is titled 'Configuration Directory Server Administrator' and contains the text 'The Directory Administrator ID is used to register the server with the Configuration Directory Server.' Below this are three input fields: 'Administrator ID' with the value 'admin', 'Password' with the value '*****', and 'Password (again)' with the value '*****'. At the bottom are four buttons: 'Back <', 'Next >', 'Cancel', and 'Help'.

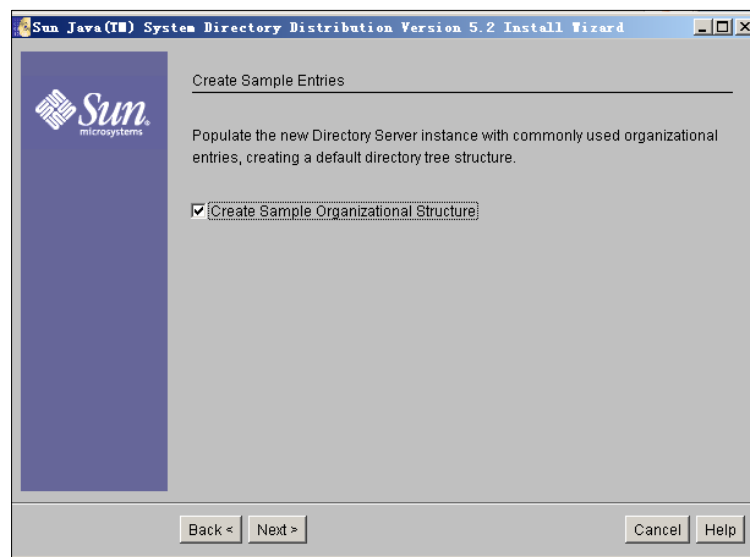
14. Follow the default setting and click **Next**.



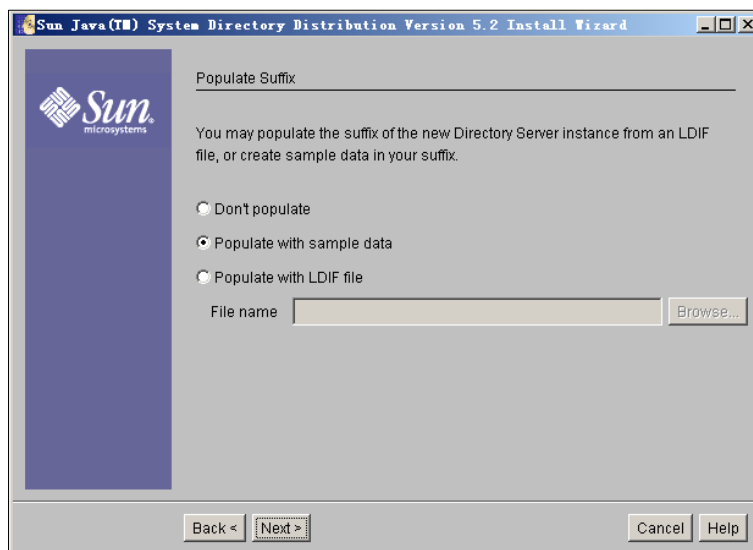
15. Configure the password for the Directory Manager and click **Next**.
The password must be at least 8 characters long.



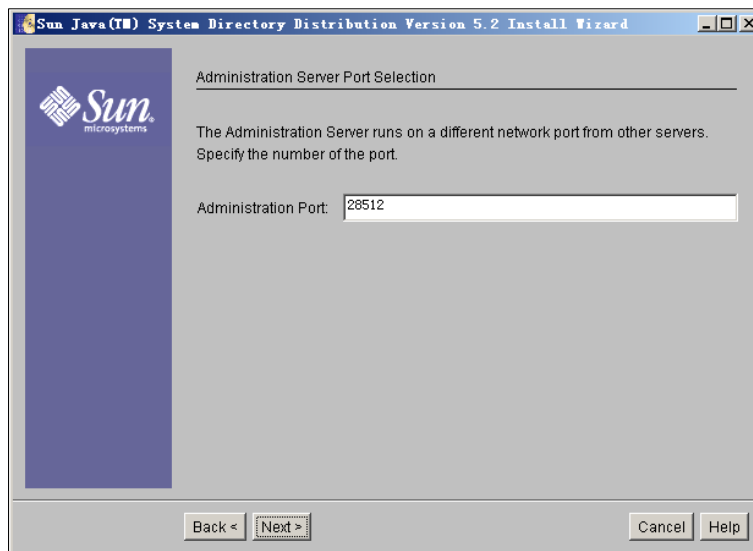
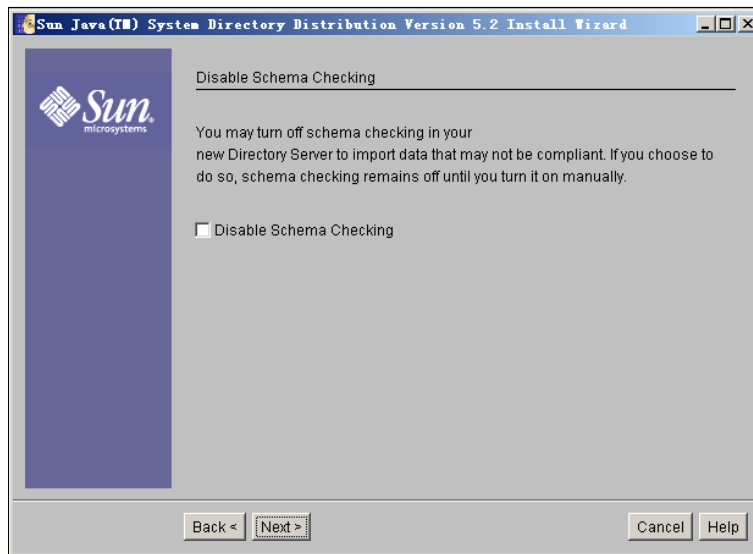
16. Check the **Create Sample Organizational Structure** check box and click **Next**.



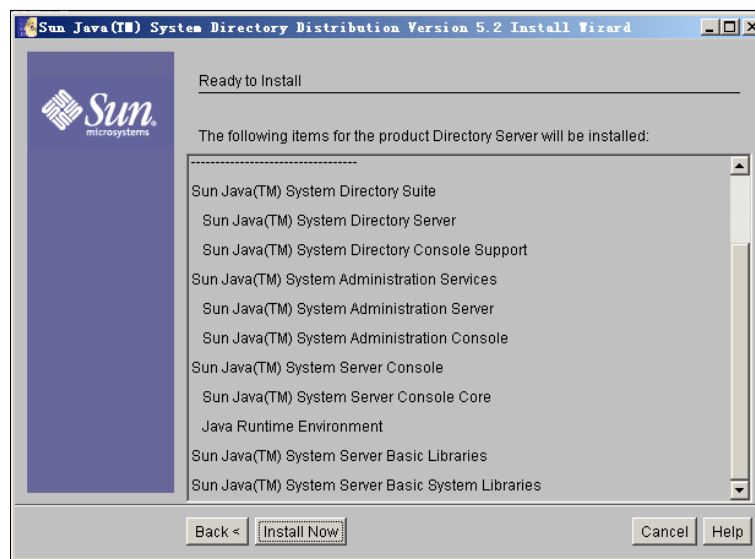
17. Mark the **Populate with sample data** radio box and click Next.



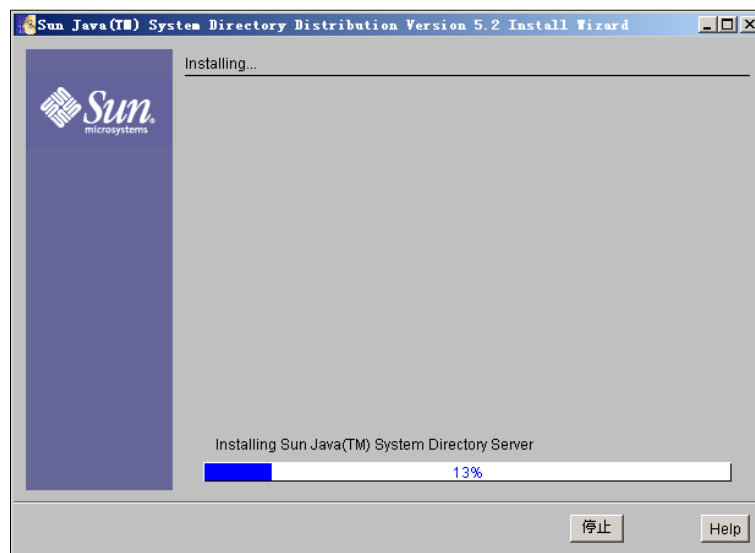
18. Follow the default settings and click **Next** for the following two steps.



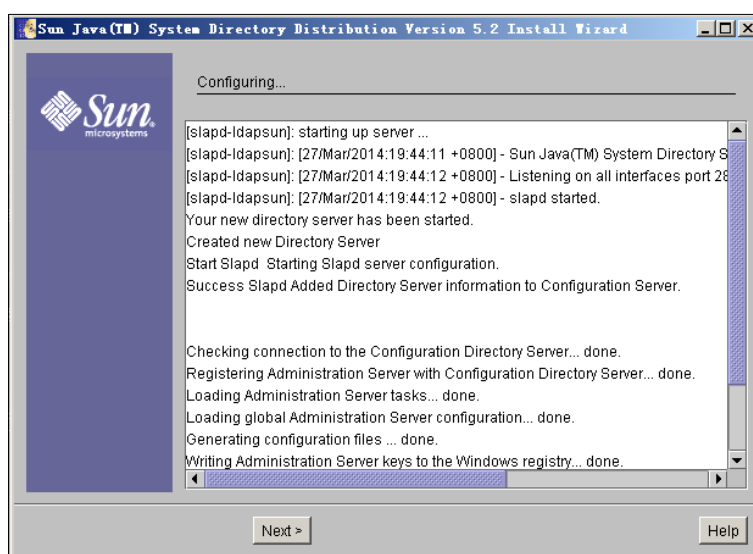
19. View the items to be installed and click **Install Now**.



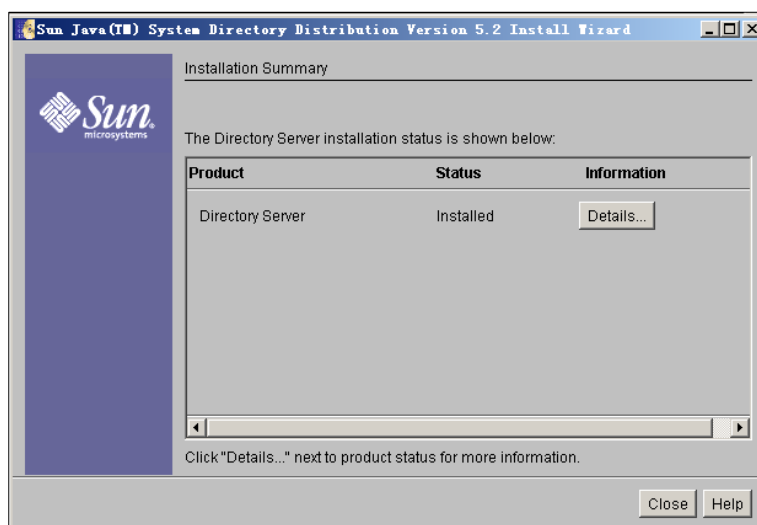
The installing progress is shown as below:



After the installation, it will enter the configuring screen.



20. After the configuration, click **Next** to enter the installation summary screen. You can view the directory sever installation status and click **Details** for more information. You can also click **Close** to close the Sun Java(TM) System Directory Distribution Version 5.2 Install Wizard.



Configuring the Sun Java(TM) System Server Console

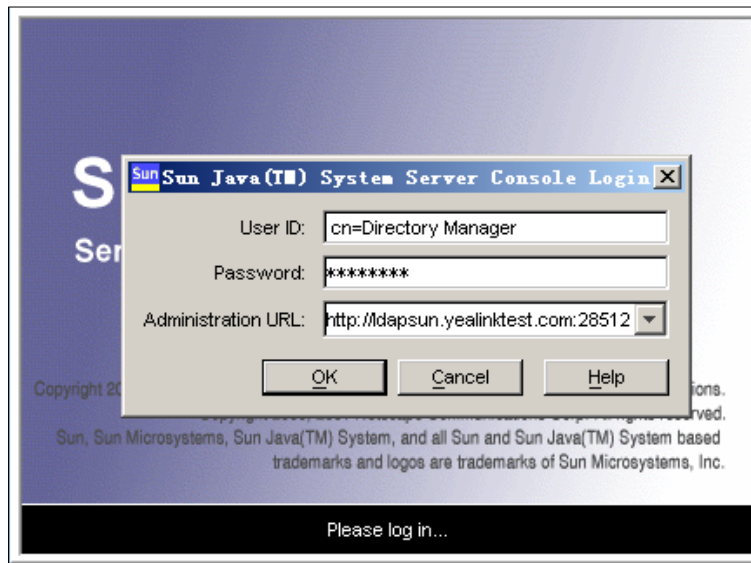
Adding an Entry to the Directory Server

You can add entries to the Directory Server one by one in this way.

To add an entry to the Directory Server:

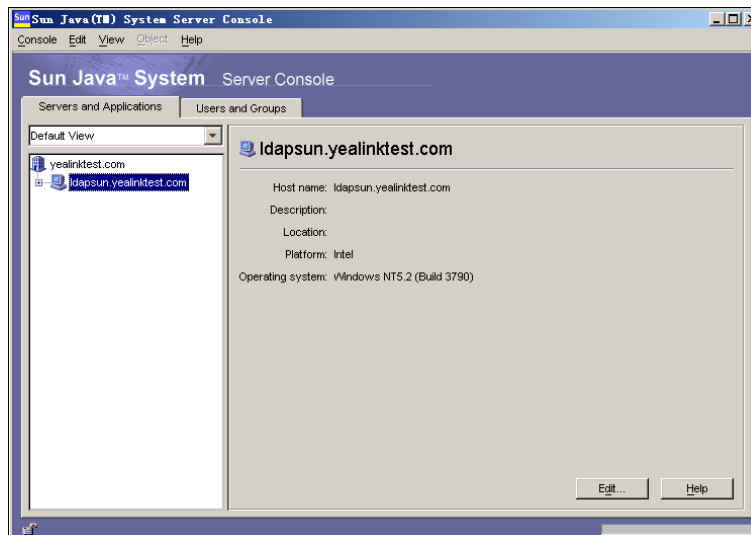
1. Click **Start->Program->Sun Java(TM) System Server Products->Sun Java(TM) System Server Console 5.2.**

It will enter the login screen. You should enter the administrator user name and its password in the **User ID** field and **Password** field respectively.

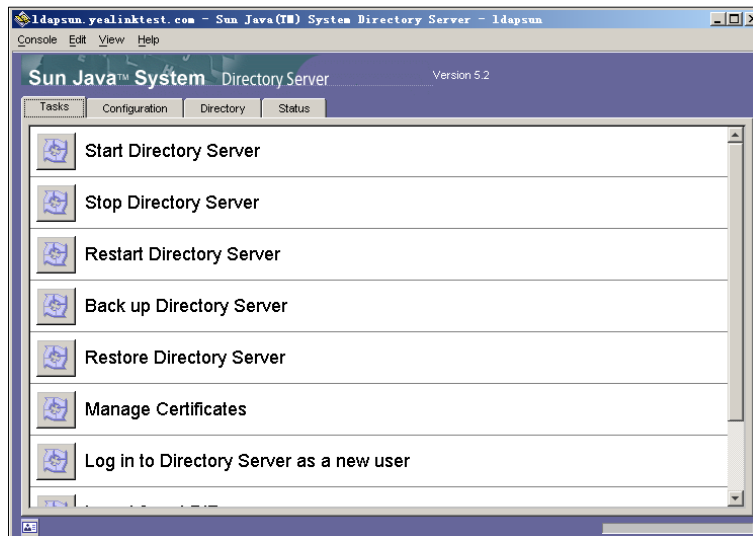


The system default administrator is cn=Directory Manager and its password which must be at least 8 characters long has already been set during the installation process.

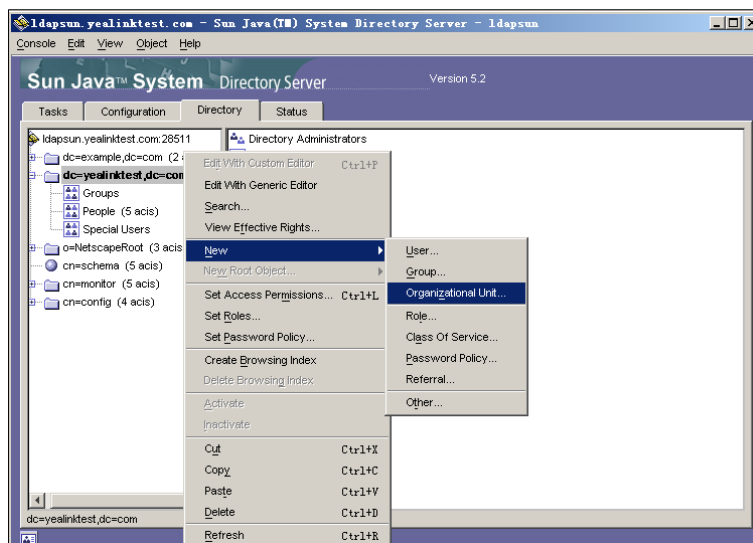
Then click **OK** to enter the home page.



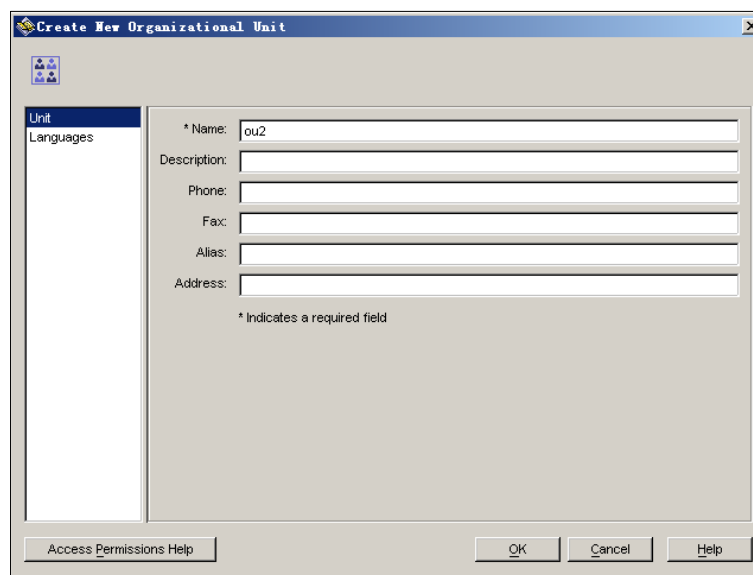
2. Double click **ldapsun.yealinktest.com->Server Group->Directory Server(ldapsun)**. It will enter the Directory Tasks interface.



3. Click the **Directory** tab.
4. Select and right click the **dc=yealinktest,dc=com (6 acis)**, and then select **New->Organizational Unit**.

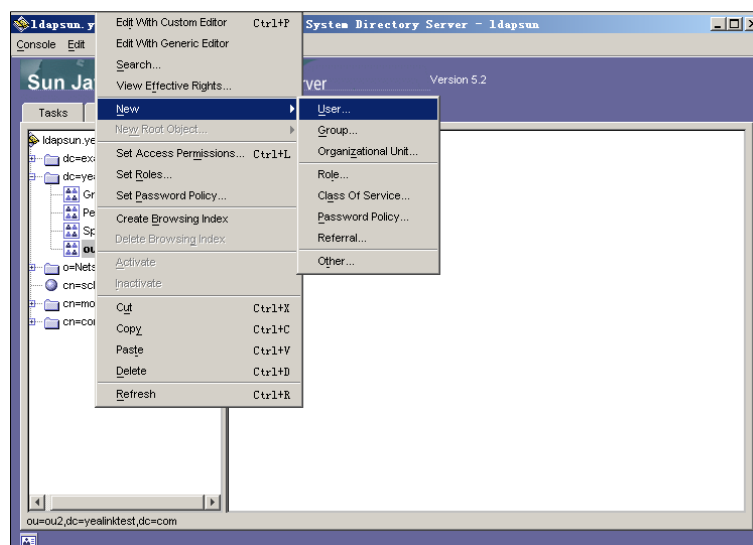


5. Enter the desired name of the organizational unit.

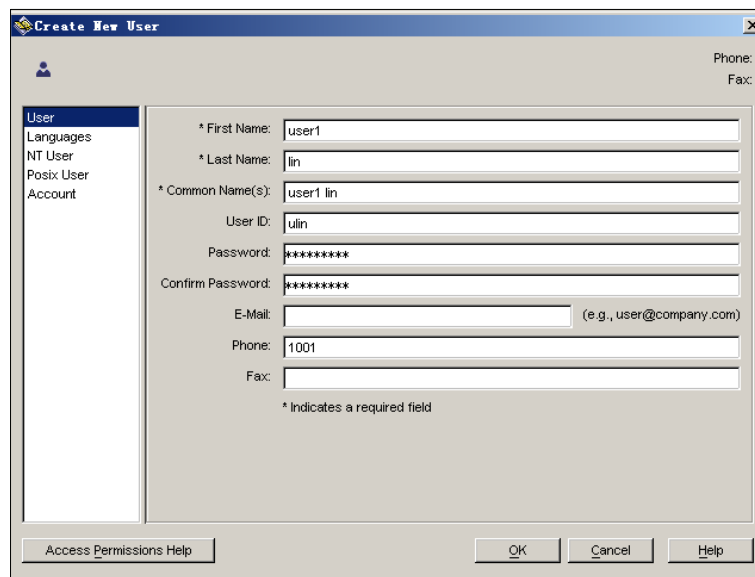


The 'Create New Organizational Unit' dialog box is shown. It has a title bar with a close button. On the left is a tree view with 'Unit' selected. The main area contains several text input fields: '* Name:' (containing 'ou2'), 'Description:', 'Phone:', 'Fax:', 'Alias:', and 'Address:'. A note at the bottom states '* Indicates a required field'. At the bottom of the dialog are buttons for 'Access Permissions Help', 'OK', 'Cancel', and 'Help'.

6. Click **OK** to accept the change.
7. Select and right click the organizational unit created above, and then select **New->User**.



8. Enter the desired values in the corresponding fields.



The 'Create New User' dialog box is shown. It has a left sidebar with a tree view containing 'User' (selected), 'Languages', 'NT User', 'Posix User', and 'Account'. The main area contains the following fields:

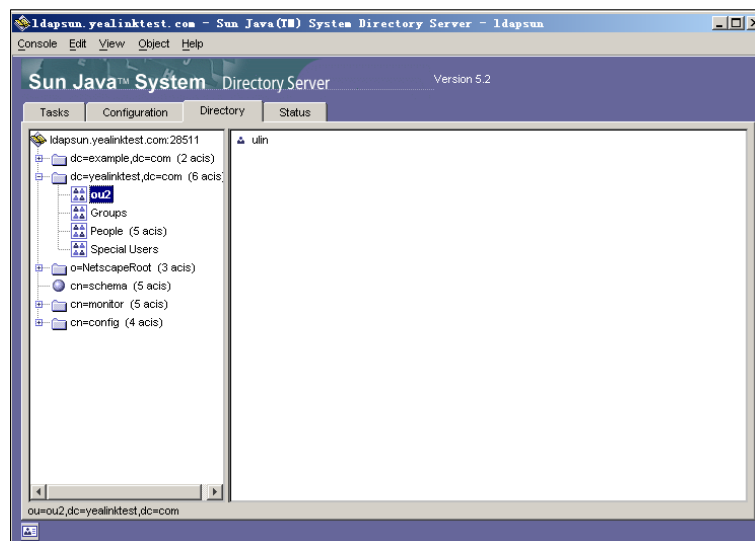
- * First Name: user1
- * Last Name: lin
- * Common Name(s): user1 lin
- User ID: ulin
- Password: *****
- Confirm Password: *****
- E-Mail: (e.g., user@company.com)
- Phone: 1001
- Fax:

* Indicates a required field

Buttons at the bottom: Access Permissions Help, OK, Cancel, Help.

9. Click **OK** to accept the change.

You can view the user (User ID is ulin) created above under the organizational unit named ou2.



Adding Entries to the Directory Server Using the Idifde Tool

You can use a LDIF file to perform a batch import of all entries to the Directory Server. For more information, refer to [create the LDIF file](#). The following shows an example of the content of the LDIF file for the Directory Server:

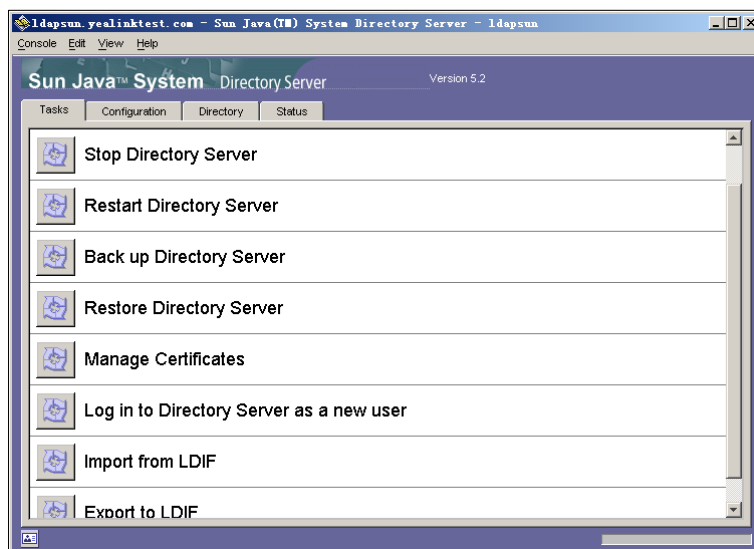
```
##Create a new organizational unit##
dn: ou=ou3,dc=yealinktest,dc=com
ou: ou3
objectClass: top
objectClass: organizationalunit
creatorsname: cn=directory manager
modifiersname: cn=directory manager
parentid: 1
entryid: 15
entrydn: ou=ou3,dc=yealinktest,dc=com

##create a new user##
dn: uid=utest,ou=ou3,dc=yealinktest,dc=com
uid: utest
facsimileTelephoneNumber: 11002
givenName: user4
objectClass: top
objectClass: person
objectClass: organizationalPerson
objectClass: inetorgperson
sn: test
cn: user4 test
```

To import the test.ldif file:

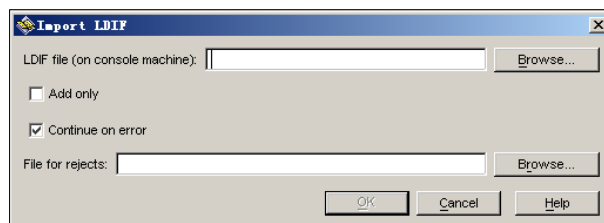
1. In the home page of Sun Java(TM) System Server Console, double click **ldapsun.yealinktest.com->Server Group->Directory Server(ldapsun)**.

It will enter the Directory Tasks interface.

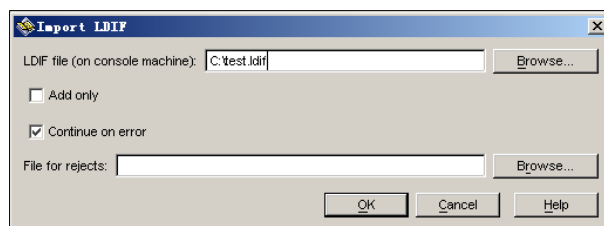


2. Click **Import from LDIF**.

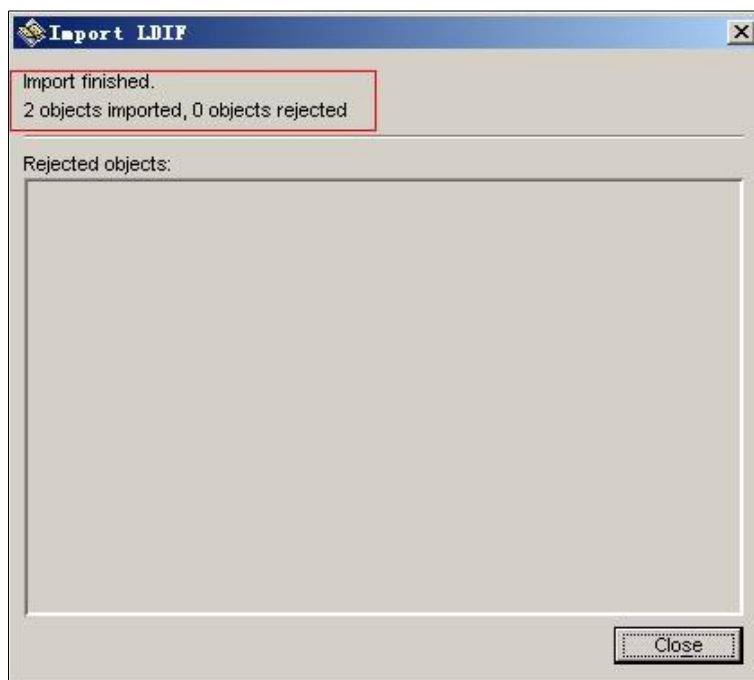
It prompts the following dialog box.



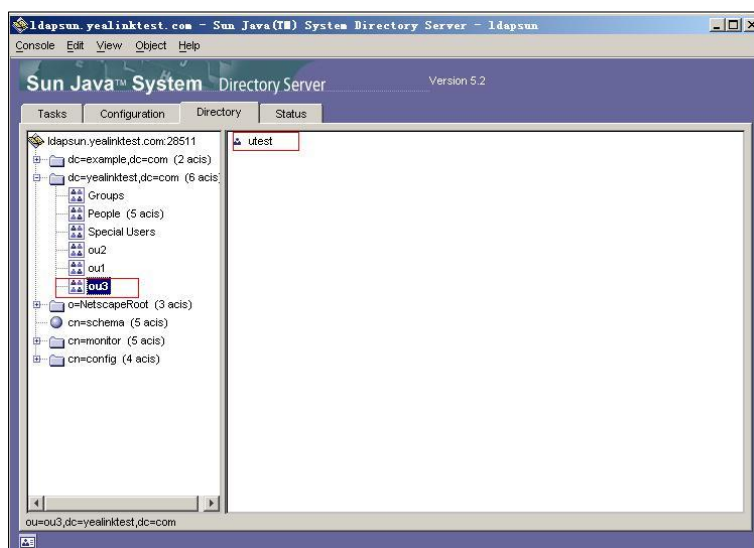
3. Click **Browse** to locate the test.ldif file from your local system, and then click **OK**.



After importing the test.ldif file, it will show the status of importing. If the entries are added successfully, you can view the information “n objects imported, 0 objects rejected”. You can click **Close** to close it.



You can view the imported the organizational unit (e.g., ou3) and user (e.g., uid=utest) under the path: **Directory-> dc=yealinktest,dc=com (6 acis)**.



Configuring Yealink IP Phones

LDAP is disabled on IP phones by default. You can configure LDAP via web user interface or using configuration files. The followings take configurations of a SIP-T29G IP phone running firmware version 80 as examples.

LDAP Attributes on the Phone

Enable LDAP	
Parameter	ldap.enable
Description	This parameter enables or disables LDAP feature on the IP phone. 0-Disabled (Default) 1-Enabled
LDAP Name Filter	
Parameter	ldap.name_filter
Description	This parameter specifies the search criteria for names look up. The format of the search criteria is compliant to the standard string representations of LDAP search filters (RFC 2254). The "*" symbol in the filter stands for any character. The "%" symbol in the filter stands for the name prefix entered by the user.
Example	<ul style="list-style-type: none"> ((cn=*)(sn=*)(telephoneNumber=*)) When the cn or sn or telephoneNumber of the LDAP contact starts with the entered prefix, the record will be displayed on the phone LCD screen. (&(cn=*)(sn=*)) When the cn of the LDAP contact is set and the sn of the LDAP contact start with the entered prefix, the records will be displayed on the phone LCD screen. (!(cn=*)) When the cn of the LDAP contact does not start with the entered prefix, the records will be displayed on the phone LCD screen.
LDAP Number Filter	
Parameter	ldap.number_filter
Description	This parameter specifies the search criteria for numbers look up. The format of the search criteria is compliant to the standard string representations of LDAP search filters (RFC 2254). The "*" symbol in the filter stands for any number. The "%" symbol in the filter stands for the number prefix entered by the user.

Examples	<ul style="list-style-type: none"> ((telephoneNumber=%)(mobile=%)(ipPhone=%)) When the telephoneNumber or mobile or ipPhone of the LDAP contact starts with the entered prefix, the record will be displayed on the phone LCD screen. (&(telephoneNumber=*)(mobile=%)) When the telephoneNumber of the LDAP contact is set and the mobile of the LDAP contact starts with the entered prefix, the record will be displayed on the phone LCD screen.
LDAP TLS Mode	
Parameter	ldap.tls_mode
Description	<p>This parameter specifies the connection mode between the LDAP server and the IP phone.</p> <p>0-LDAP (Default)—Unencrypted connection between LDAP server and the IP phone. (port 389 is used by default).</p> <p>1-LDAP TLS Start—TLS/SSL connection between LDAP server and the IP phone (port 389 is used by default).</p> <p>2-LDAPs—TLS/SSL connection between LDAP server and the IP phone (port 636 is used by default).</p> <p>Note: It is only applicable to IP phones running firmware version 73 or later.</p>
Server Address	
Parameter	ldap.host
Description	This parameter specifies the domain name or IP address of the LDAP server.
Default Value	Blank
Example	<ul style="list-style-type: none"> 10.3.6.128 ldap.company.com
Port	
Parameter	ldap.port
Description	This parameter specifies the LDAP server port.
Default Value	389
Base	
Parameter	ldap.base
Description	This parameter specifies the LDAP search base which corresponds to the location in the LDAP directory. The search base narrows the search scope and decreases directory search time.

Example	<ul style="list-style-type: none"> dc=yealink,dc=com
Username	
Parameter	ldap.user
Description	<p>This parameter specifies the user name to login the LDAP server. If the LDAP server allows anonymous to login, this parameter can be left blank. Otherwise you need to provide the user name to access the LDAP server.</p> <p>Note: If you use Microsoft Active Directory Application Mode (ADAM) as the LDAP server, the user to login the LDAP server must be added to the administrator group in advance.</p>
Password	
Parameter	ldap.password
Description	<p>This parameter specifies the password to login the LDAP server. If the LDAP server allows anonymous to login, this parameter can be left blank. Otherwise you need to provide the password to access the LDAP server.</p>
Max Hits (1~32000)	
Parameter	ldap.max_hits
Description	<p>This parameter specifies the maximum number of the search results to be returned by the LDAP server. If the value of the "Max.Hits" is blank, the LDAP server will return all searched results. Please note that a very large value of the "Max. Hits" will slow down the LDAP search speed, therefore the parameter should be configured according to the available bandwidth.</p>
Default Value	50
LDAP Name Attributes	
Parameter	ldap.name_attr
Description	<p>This parameter specifies the name attributes of each record to be returned by the LDAP server. This parameter compresses the search results. The user can configure multiple name attributes separated by space.</p>
Example	<ul style="list-style-type: none"> cn sn displayName This requires the "cn", "sn" and "displayName" attributes set for each contact record on the LDAP server. givenName This requires the "givenName" attribute set for each contact record on the LDAP server.

LDAP Number Attributes	
Parameter	ldap.numb_attr
Description	This parameter specifies the number attributes of each record to be returned by the LDAP server. This parameter compresses the search results. The user can configure multiple number attributes separated by space.
Example	<ul style="list-style-type: none"> mobile telephoneNumber ipPhone <p>This requires the “mobile”, “telephoneNumber” and “ipPhone” attributes set for each contact record on the LDAP server.</p>
LDAP Display Name	
Parameter	ldap.display_name
Description	This parameter specifies the display name of the contact record displayed on the LCD screen. This parameter value must start with “%” symbol.
Example	<ul style="list-style-type: none"> %cn <p>The desired display name of the contact record is the cn attribute.</p>
Protocol	
Parameter	ldap.version
Description	<p>This parameter specifies the LDAP protocol version supported on the phone. Make sure the protocol value corresponds with the version assigned on the LDAP server.</p> <p>2-Version 2</p> <p>3-Version 3 (Default)</p>
LDAP Lookup For Incoming Call	
Parameter	ldap.call_in_lookup
Description	<p>This parameter enables or disables the phone to perform an LDAP search when receiving an incoming call.</p> <p>0-Disabled (Default)</p> <p>1-Enabled</p> <p>Note: If the caller number contains the special characters (e.g., “+”, “.” or the space), the phone will match the search criteria in the parameter “LDAP Name Filter (ldap.name_filter)”. If not, the phone will match the search criteria in the parameter “LDAP Number Filter (ldap.number_filter)”.</p>
LDAP Lookup For Callout	

Parameter	ldap.call_out_lookup
Description	<p>This parameter enables or disables the phone to perform an LDAP search when placing a call.</p> <p>0-Disabled (Default)</p> <p>1-Enabled</p> <p>Note: If the called number contains the special characters (e.g., "+", "." or the space), the phone will match the search criteria in the parameter "LDAP Name Filter (ldap.name_filter)". If not, the phone will match the search criteria in the parameter "LDAP Number Filter (ldap.number_filter)".</p>
LDAP Sorting Results	
Parameter	ldap.ldap_sort
Description	<p>This parameter enables or disables the phone to sort the search results in alphabetical order or numerical order.</p> <p>0-Disabled (Default)</p> <p>1-Enabled</p>

Configuring LDAP via Web User Interface

To configure LDAP feature via web user interface:

1. Press the **OK** key on the phone when it is idle to obtain the IP address.
2. Enter the IP address (e.g., http://192.168.0.10 or 192.168.0.10) in the address bar of web browser on your PC and then press **Enter**.
3. Enter the user name and password in the login page.
The default login user name is admin (case-sensitive) and the password is admin (case-sensitive).
4. Click on **Directory->LDAP**.
5. Select **Enabled** from the pull-down list of **Enable LDAP**.
6. Enter the desired values in the corresponding fields.

The screenshot for reference is shown as below:

Setting	Value
Enable LDAP	Enabled
LDAP Name Filter	((cn=%)(sn=%))
LDAP Number Filter)(mobile=%)(pPhone=%)
LDAP TLS Mode	LDAP
Server Address	10.3.6.128
Port	389
Base	dc=yealink,dc=cn
Username	manager,dc=yealink,dc=cn
Password	*****
Max Hits (1~32000)	50
LDAP Name Attributes	cn sn
LDAP Number Attributes	oneNumber mobile ipPhone
LDAP Display Name	%cn
Protocol	Version 3
LDAP Lookup For Incoming Call	Enabled
LDAP Lookup For Callout	Enabled
LDAP Sorting Results	Enabled

NOTE
LDAP (Lightweight Directory Access Protocol) is an application protocol for accessing and maintaining information services for the distributed directory over an IP network.
Yealink IP phone can interface with a corporate directory server that supports LDAP version 2 or 3, such as OpenLDAP, Microsoft Active Directory, Microsoft Active Directory Application Mode (ADAM) or Sun One Directory Server.
[You can click here to get more guides.](#)

7. Click **Confirm** to accept the change.

Example for Web User Interface Configuration

You can use the following settings as a starting point and adjust the filter and display attributes according to your requirements. The following shows example of OpenLDAP phone configurations.

```

Enable LDAP: Enabled
LDAP Name Filter: ((cn=%)(sn=%))
LDAP Number Filter: ((telephoneNumber=%)(mobile=%)(ipPhone=*))
LDAP TLS Mode: LDAP
Server Address: 10.3.6.128
Port: 389
Base: dc=yealink,dc=com
Username: cn=Manager,dc=yealink,dc=com
Password: secret
Max Hits (1~32000): 50
LDAP Name Attributes: cn sn
LDAP Number Attributes: mobile telephoneNumber ipPhone
LDAP Display Name: %cn
Protocol: Version 3
LDAP Lookup For Incoming Call: Enabled
LDAP Lookup For Callout: Enabled
LDAP Sorting Results: Enabled
  
```

To use LDAP feature, you need to configure a DSS key as an LDAP key.

To configure an LDAP key via web user interface:

1. Log into the web user interface of the phone.
2. Click on **DSSKey->Line Key** (or **Memory Key** or **Programmable Key**).
Only SIP-T28P/T26P IP phones support memory keys.
3. In the desired DSS key field, select **LDAP** from the pull-down list of **Type**.

The screenshot shows the Yealink T29G web interface. The 'DSSKey' tab is selected. Under 'Line Key 1-9', there is a table for configuring line keys. The table has columns: Key, Type, Value, Label, Line, and Extension. Line Key 4 is set to 'LDAP' type. A 'NOTE' box on the right explains that line keys provide quick access to features like recall and voice mail, and offers a link to more guides. 'Confirm' and 'Cancel' buttons are at the bottom.

4. Click **Confirm** to accept the change.

Configuring LDAP Using Configuration Files

To configure LDAP feature using configuration files:

1. Add/Edit LDAP parameters in configuration files.

The following table shows the information of parameters:

Parameter	Descriptions	Web Setting Path
ldap.enable	These parameters specify the LDAP attributes. Refer to the introduction above for more information.	Contacts->LDAP->Enable LDAP
ldap.name_filter		Directory->LDAP->LDAP Name Filter
ldap.number_filter		Directory->LDAP->LDAP Number Filter
ldap.tls_mode		Directory->LDAP->LDAP TLS Mode
ldap.host		Directory->LDAP->Server Address

Parameter	Descriptions	Web Setting Path
ldap.port		Directory->LDAP->Port
ldap.base		Directory->LDAP->Base
ldap.user		Directory->LDAP->Username
ldap.password		Directory->LDAP->Password
ldap.max_hits		Directory->LDAP->Max Hits (1~32000)
ldap.name_attr		Directory->LDAP->LDAP Name Attributes
ldap.numb_attr		Directory->LDAP->LDAP Number Attributes
ldap.display_name		Directory->LDAP->LDAP Display Name
ldap.version		Directory->LDAP->Protocol
ldap.call_in_lookup		Directory->LDAP->LDAP Lookup For Incoming Call
ldap.call_out_lookup		Directory->LDAP->LDAP Lookup For Callout
ldap.ldap_sort		Directory->LDAP->LDAP Sorting Results

2. Upload configuration files to the root directory of the provisioning server and trigger IP phones to perform an auto provisioning for configuration update.

For more information on auto provisioning, refer to [Yealink_SIP-T2_Series_T19\(P\)
E2_T4_Series_CP860_IP_Phones_Auto_Provisioning_Guide](#).

Example for Configuration Parameters

You can use the following settings as a starting point and adjust the filter and display attributes according to your requirements. The following shows example of OpenLDAP phone configurations.

```
ldap.enable=1
ldap.name_filter= (|(cn=%)(sn=%))
ldap.number_filter= (|(telephoneNumber=%)(mobile=%)(ipPhone=%))
ldap.tls_mode=0
ldap.host= 10.3.6.128
ldap.port= 389
ldap.base= dc=yealink,dc=com
ldap.user= cn=Manager,dc=yealink,dc=com
ldap.password= secret
ldap.max_hits= 50
ldap.name_attr= cn sn
ldap.numb_attr= mobile telephoneNumber ipPhone
ldap.display_name= %cn
ldap.version= 3
ldap.call_in_lookup= 1
ldap.call_out_lookup= 1
ldap.ldap_sort= 1
```

To use LDAP feature, you need to configure a DSS key as an LDAP key.

To configure an LDAP key using configuration files:

1. Add/Edit the LDAP key parameters in configuration files.

You can configure a memory key, a line key or a programable key as an LDAP key.

The following table shows the information of parameters:

Parameter	Description	Value
memorykey.X.type (only applicable to SIP-T28P/T26P IP phones) (SIP-T28P/T26P: X ranges from 1 to 10)	Configures a memory key as an LDAP key on the IP phone.	38
linekey.X.type (SIP VP-T49G/SIP-T48G: X ranges from 1 to 29 SIP-T46G/T29G: X ranges	Configures a line key as an LDAP key on the IP phone.	38

Parameter	Description	Value
from 1 to 27 SIP-T42G/T41P: X ranges from 1 to 15 SIP-T27P: X ranges from 1 to 21 SIP-T40P/T26P/T23P/T23G/T22P: X ranges from 1 to 3 SIP-T28P: X ranges from 1 to 6 SIP-T21P/T21(P) E2: X ranges from 1 to 2)		
programablekey.X.type (SIP VP-T49G: X=1-4, 12-14 SIP-T48G/T46G: X=1-10, 12-14 SIP-T42G/T41P/T40P: X=1-10, 13 SIP-T29G/T27P/T28P/T26P: X=1-14 SIP-T23P/T23G/T22P/T21(P) E2: X=1-10, 14 CP860: X=1-6, 9, 13)	Configures a programable key as an LDAP key on the IP phone.	38

2. Upload configuration files to the root directory of the provisioning server and trigger IP phones to perform an auto provisioning for configuration update.

For more information on auto provisioning, refer to [Yealink_SIP-T2_Series_T19\(P\) E2_T4_Series_CP860_IP_Phones_Auto_Provisioning_Guide](#).

Using LDAP Directory on Yealink IP Phones

You can press the LDAP key to access the LDAP directory. Enter the desired numbers to match the search criteria for searching a contact from LDAP directory, add local contacts from LDAP directory, and dial a contact from LDAP directory. You can also enable the phone to perform an LDAP search when receiving an incoming call or dialing an outgoing call.

To search a contact from the LDAP directory:



1. Press the **LDAP** key to access the LDAP search screen.
The LCD screen prompts "None".



2. Enter a few continuous characters of the contact name or continuous digits of the contact phone number using the keypad.

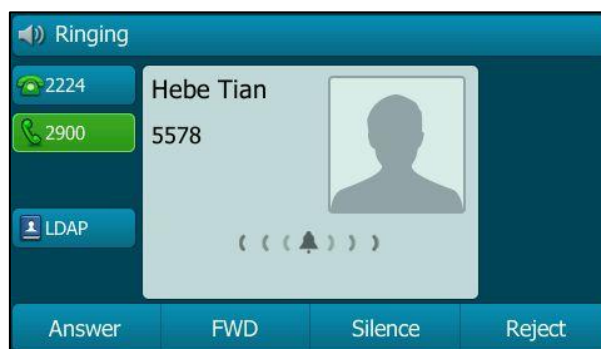


The contacts which match the search criteria will appear on the LCD screen.

3. Press  or  to select the desired contact.
4. Do one of the following:
 - Press the **Option** soft key and then select **Detail** to view the detail information of the contact.
 - Press the **Option** soft key and then select **Add to Contacts** to add the contact to local.
 - Press the **Send** soft key to dial out.

If the **LDAP Lookup For Incoming Call** parameter is enabled on the phone, the phone will perform an LDAP search when receiving an incoming call. If there is a contact record which matches the caller ID, the contact name will be displayed on the phone LCD screen as the calling line identification.

The screenshot of the LCD screen for reference is shown as below:



The **Search Source List In Dialing** feature enables the phone to perform an LDAP search when you enter the digits using the keypad in the dialing interface. For more information on the configuration of the Search Source List In Dialing feature, refer to Yealink phone-specific user guide.

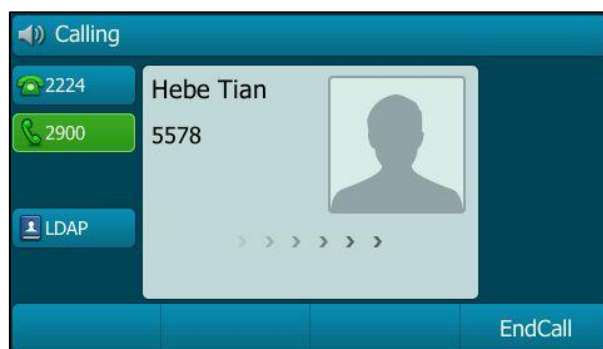
If there are contact records matching the search criteria, the contact records will be listed on the phone LCD screen. You can select the desired contact record to dial out. The contact name will be displayed on the phone LCD screen during the call.

The screenshot of the LCD screen for reference is shown as below:



If the **LDAP Lookup For Callout** parameter is enabled on the phone, the phone will perform an LDAP search when dialing an outgoing call. If there is a contact record which matches the called ID, the contact name will be displayed on the phone LCD screen as the called line identification.

The screenshot of the LCD screen for reference is shown as below:



Customer Feedback

We are striving to improve our documentation quality and we appreciate your feedback. Email your opinions and comments to DocsFeedback@yealink.com.