Configuring Embedded Kerberos Authentication

invent

configure

Configuring Embedded Kerberos Authentication

For HP product models:

LaserJet 4345mfp, LaserJet 9040mfp,
LaserJet 9050mfp, LaserJet 9500mfp, and
Digital Sender 9200C

Legal Notice

Configuring embedded authentication using Kerberos Authentication
Rev. 5.21

Contents

Overview

Kerberos is a network authentication protocol. It is designed to provide secure authentication for client/server applications by using secret keys delivered with session tickets. This document provides step-by-step instructions for configuring Kerberos.

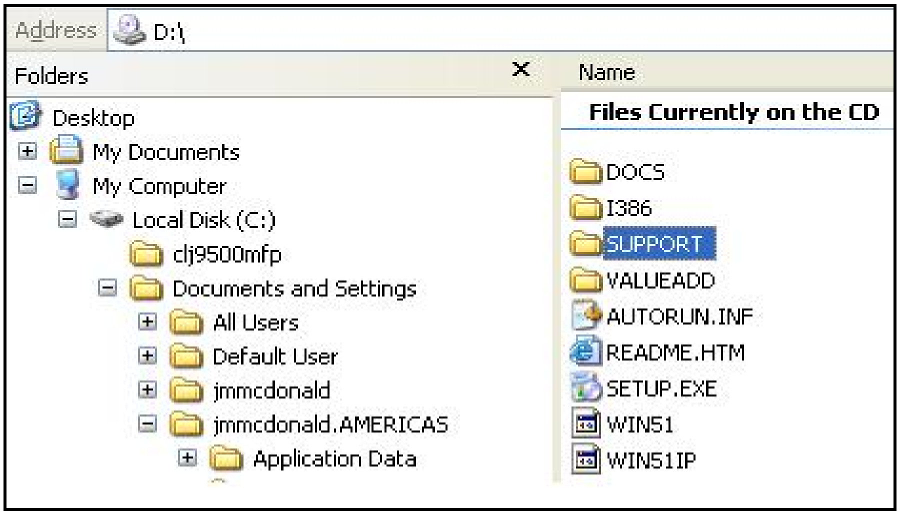
Required tool

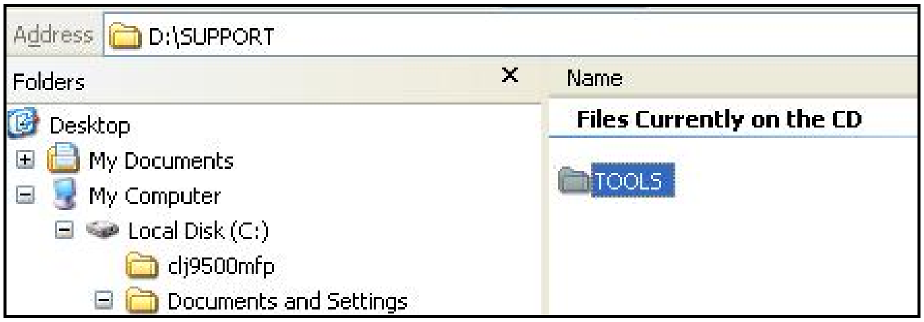
It is necessary to use Microsoft LDP to configure the MFP for embedded LDAP authentication. Microsoft LDP is a support tool that ships with the Windows Support Tools contained on the Windows OS media. It allows you to connect, bind, and query an LDAP database.

Microsoft LDP can be installed and configured by following the instructions below:

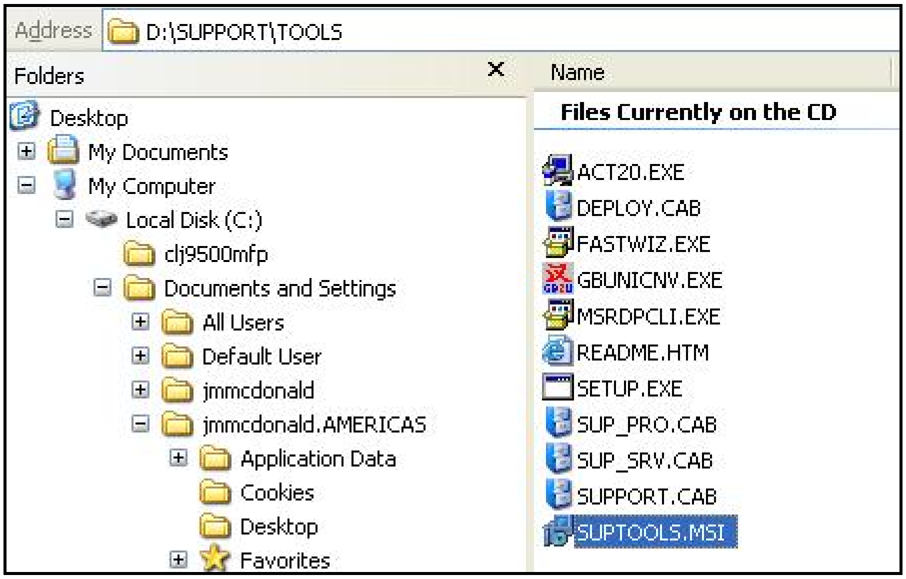
Note
Another way to obtain the Windows Support tools is to download them from Microsoft at the following address:
`http://www.microsoft.com/downloads/details.aspx?FamilyId=49AE8576-9BB9-4126-9761-BA8011FABF38&displaylang=en`

1. Browse to the root of the OS media, and open the `Support` folder.
2. Open the `Tools` folder.



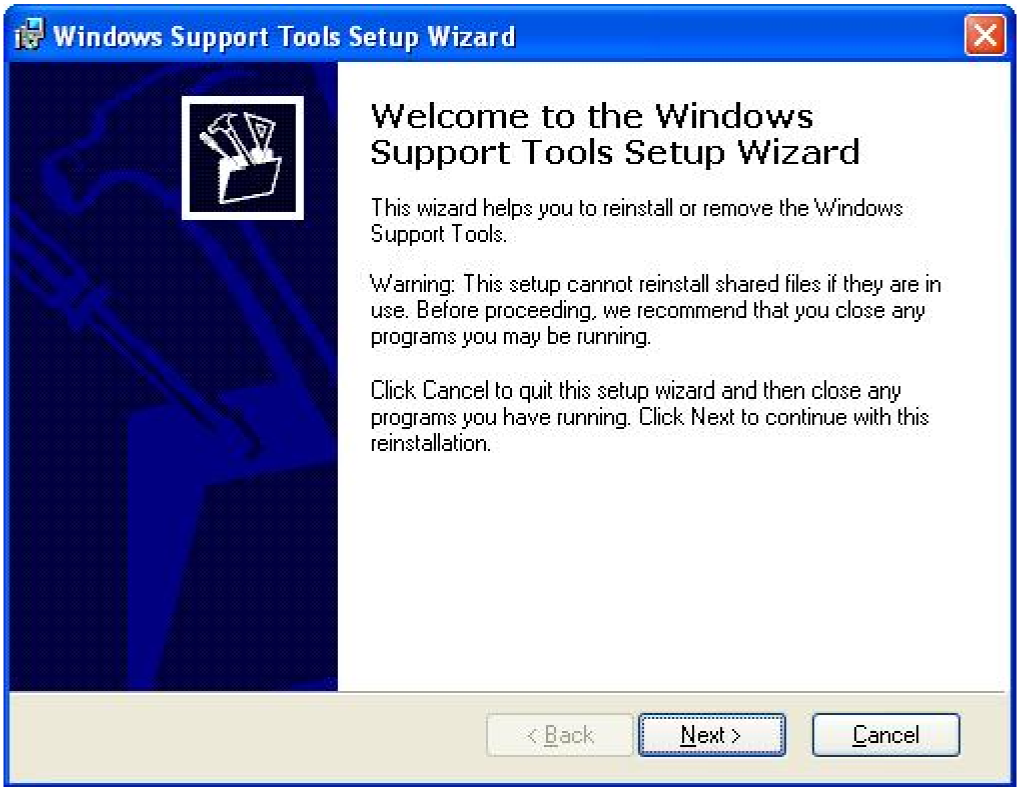


3. Double click the SUPTOOLS.MSI file.



Address D:\SUPPORT\TOOLS

4. Select Next at the Welcome to the Windows Support Tools Setup Wizard.



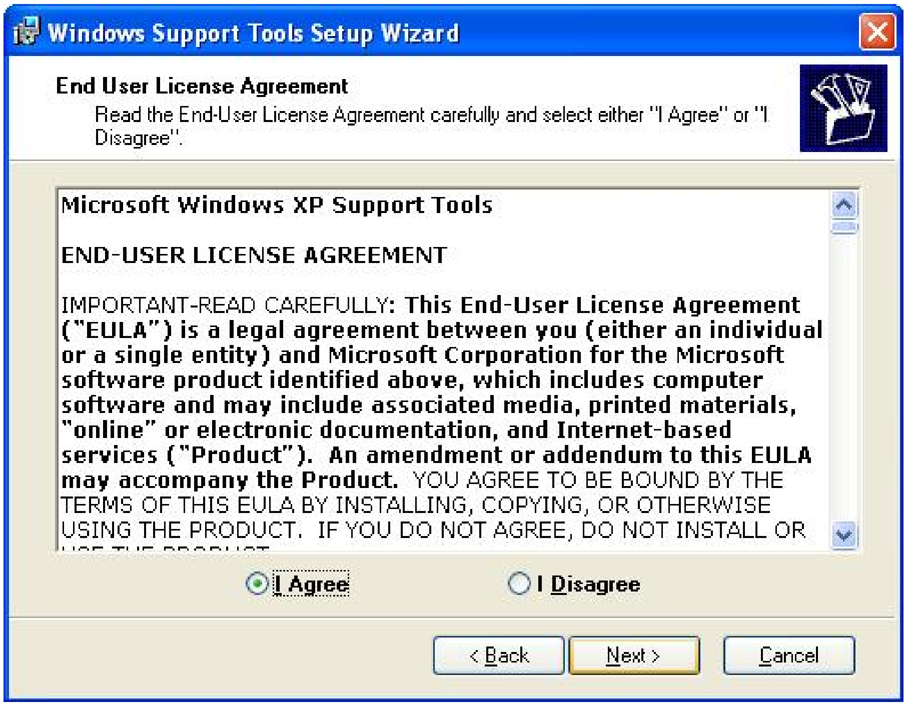
Welcome to the Windows Support Tools Setup Wizard

This wizard helps you to reinstall or remove the Windows Support Tools.

Warning: This setup cannot reinstall shared files if they are in use. Before proceeding, we recommend that you close any programs you may be running.

Click Cancel to quit this setup wizard and then close any programs you have running. Click Next to continue with this reinstallation.

5. After reading the licensing agreement, select the I Agree radial button and click Next.



End User License Agreement

Read the End-User License Agreement carefully and select either "I Agree" or "I Disagree".

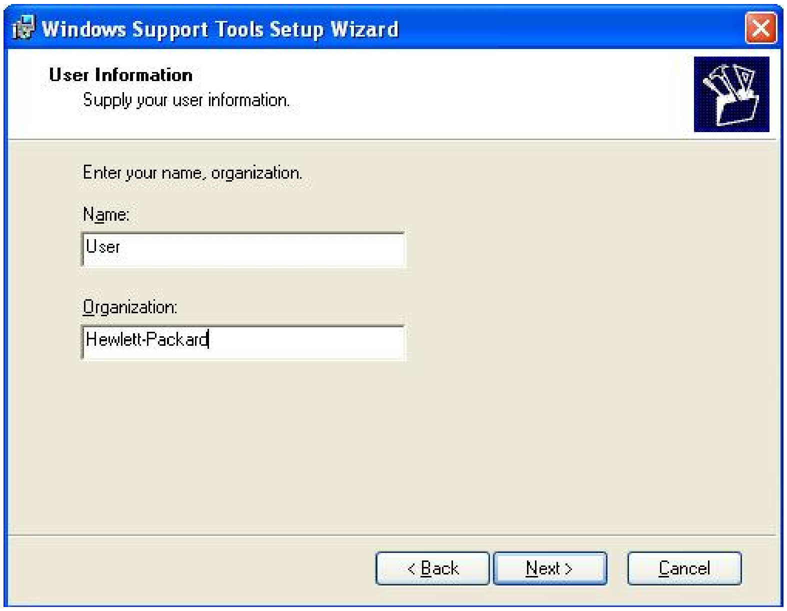
Microsoft Windows XP Support Tools

END-USER LICENSE AGREEMENT

IMPORTANT-READ CAREFULLY: **This End-User License Agreement ("EULA") is a legal agreement between you (either an individual or a single entity) and Microsoft Corporation for the Microsoft software product identified above, which includes computer software and may include associated media, printed materials, "online" or electronic documentation, and Internet-based services ("Product"). An amendment or addendum to this EULA may accompany the Product.** YOU AGREE TO BE BOUND BY THE TERMS OF THIS EULA BY INSTALLING, COPYING, OR OTHERWISE USING THE PRODUCT. IF YOU DO NOT AGREE, DO NOT INSTALL OR

● I Agree ○ I Disagree

6. Enter your name and organization; then click Next.



User Information

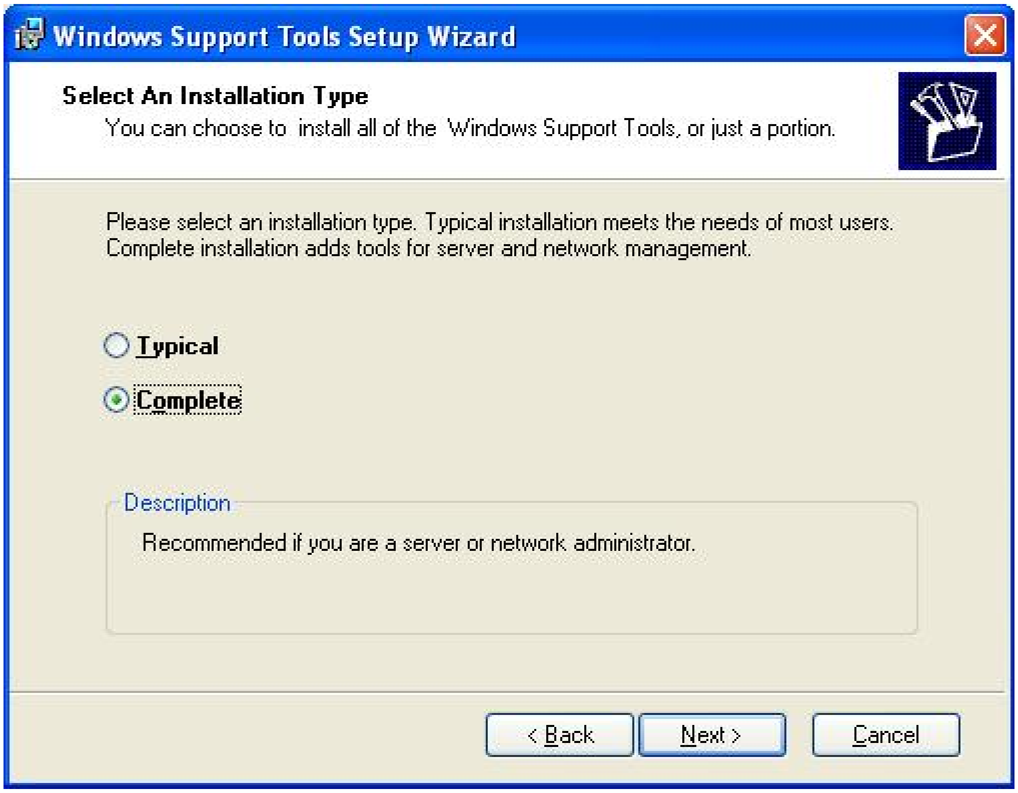
Supply your user information.

Enter your name, organization.

Name: User

Organization: Hewlett-Packard

7. Select Complete for the installation type; then click Next.



Windows Support Tools Setup Wizard

Select An Installation Type

You can choose to install all of the Windows Support Tools, or just a portion.

Please select an installation type. Typical installation meets the needs of most users. Complete installation adds tools for server and network management.

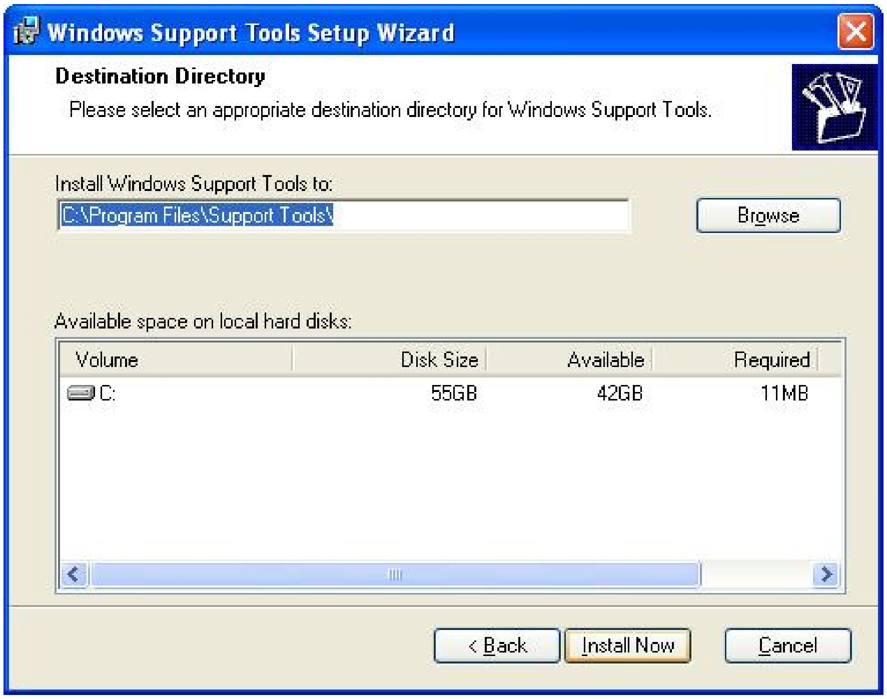
○ Typical

● Complete

Description

Recommended if you are a server or network administrator.

8. Select Install Now to begin the installation.



Windows Support Tools Setup Wizard

Destination Directory

Please select an appropriate destination directory for Windows Support Tools.

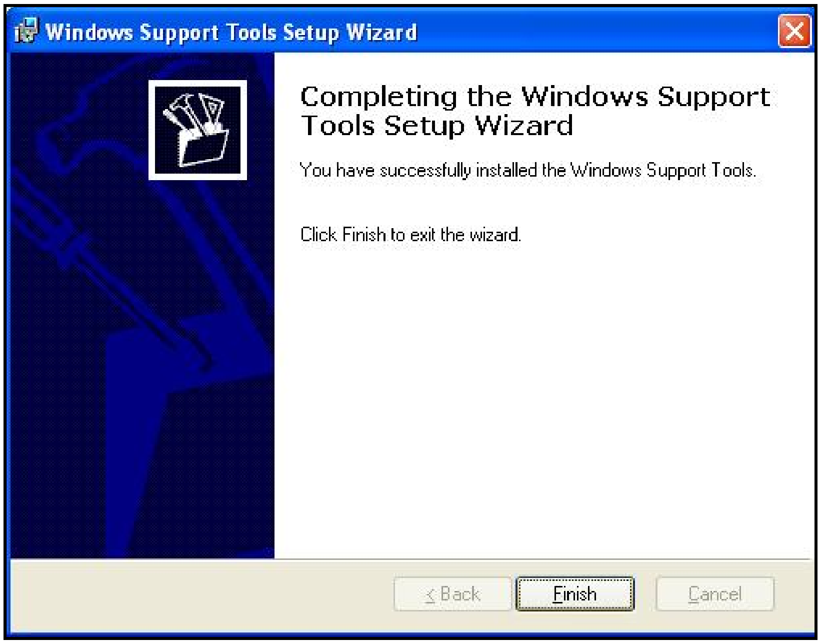
Install Windows Support Tools to:

C:\Program Files\Support Tools\

Available space on local hard disks:

Volume	Disk Size	Available	Required
C:	55GB	42GB	11MB

9. Click Finish to complete the installation.



Completing the Windows Support Tools Setup Wizard

You have successfully installed the Windows Support Tools.

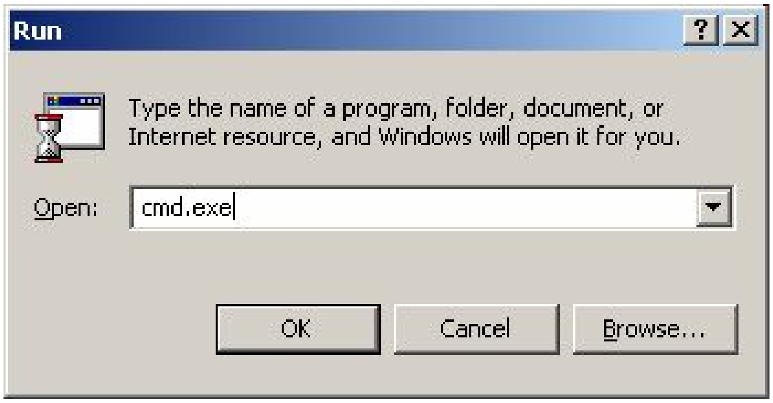
Click Finish to exit the wizard.

Step 1: Discovering the LDAP server

There are two key methods to discover an available LDAP server on the network.

Method 1

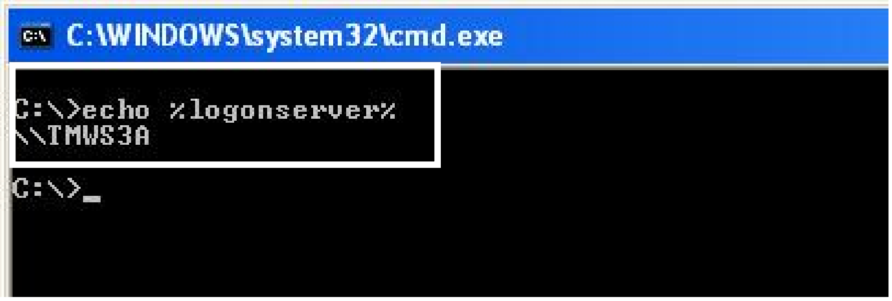
1. Open a command window by clicking on Start ® Run and typing cmd.exe in the dialog box. Then press Enter or click OK.



Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.

Open: cmd.exe

2. To determine which Windows Active Directory logon server you are logged onto, type the following: echo %logonserver%. Then press Enter. The server that appears (for example: \\TMWS3A) can be used as the LDAP server.



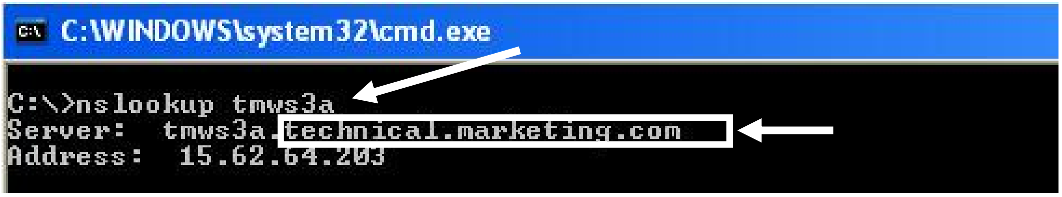
```
C:\>echo %logonserver%
\\TMWS3A

C:\>_
```

Method 2

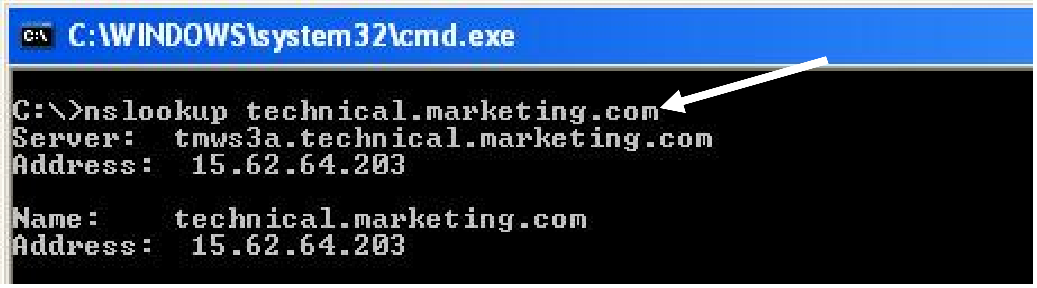
You must first discover the name of your domain.

1. To determine the name of your domain, input nslookup "server result from echo %logonserver%" discovered in Method 1.
   - The domain is placed behind the "tmws3a" server discovered in Method 1. In this example, technical.marketing.com.



```
C:\>nslookup tmws3a
Server:   tmws3a.technical.marketing.com
Address:   15.62.64.203
```

2. The following command can then be used to provide a list of DNS servers.
   - nslookup "name of your domain" (i.e. nslookup TECHNICAL.MARKETING.COM). In a Windows Active Directory environment, a DNS server is typically running Active Directory which contains the LDAP database.

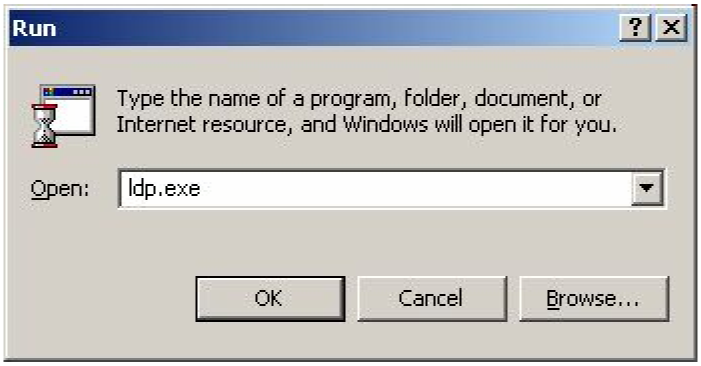


```
C:\>nslookup technical.marketing.com
Server:   tmws3a.technical.marketing.com
Address:   15.62.64.203

Name:     technical.marketing.com
Address:   15.62.64.203
```

Step 2: Setting up LDP

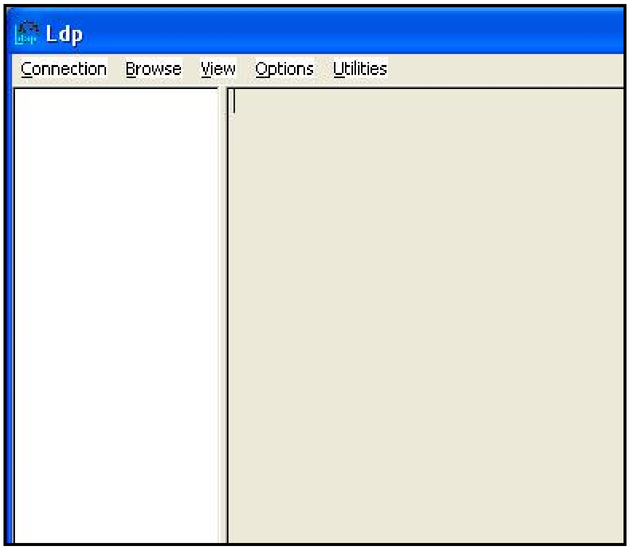
1. Open LDP by clicking on Start ® Run, and typing ldp.exe; then press Enter or click OK.



Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.

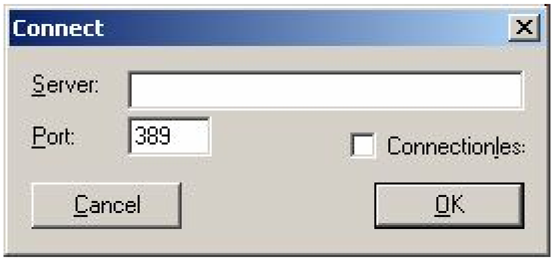
Open: ldp.exe

2. From the Ldp menu, select Connection ® Connect.



3. In the Connect window, input the IP address or hostname of the LDAP server in the Server box; then input 389 or 3268 as the Port number. Click OK.

   - Port 389 is the standard LDAP port. However, it may be necessary to use port 3268 when communicating with a Windows Global Catalog Active Directory Server.



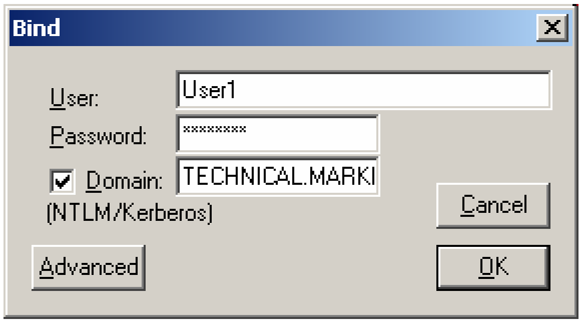
Server:

Port: 389

□ Connectionles:

4. From the LDP menu, select Connection ® Bind.

5. In the Bind window, input username, password, and domain name; then click OK.



User: User1

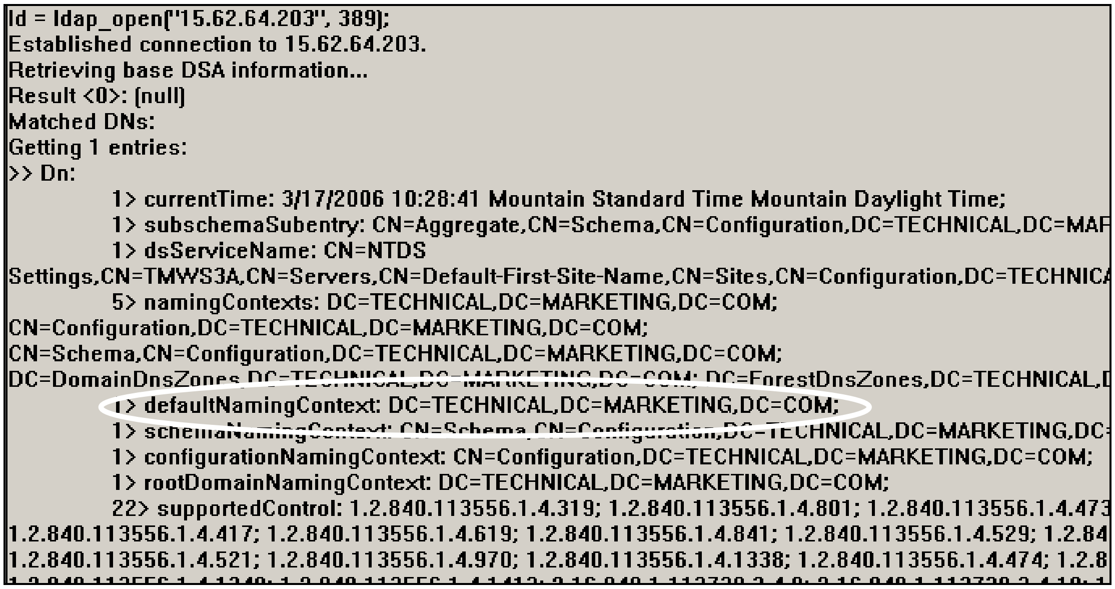
Password: ********

☑ Domain: TECHNICAL.MARKI

(NTLM/Kerberos)

6. On the LDP screen, find and copy the Base DN.

   - The Base DN is normally listed within “defaultNamingContext.”



```
ld = ldap_open("15.62.64.203", 389);
Established connection to 15.62.64.203.
Retrieving base DSA information...
Result <0>: (null)
Matched DNs:
Getting 1 entries:
>> Dn:
            1> currentTime: 3/17/2006 10:28:41 Mountain Standard Time Mountain Daylight Time;
            1> subschemaSubentry: CN=Aggregate,CN=Schema,CN=Configuration,DC=TECHNICAL,DC=MAR
            1> dsServiceName: CN=NTDS
Settings,CN=TMWS3A,CN=Servers,CN=Default-First-Site-Name,CN=Sites,CN=Configuration,DC=TECHNICA
            5> namingContexts: DC=TECHNICAL,DC=MARKETING,DC=COM;
CN=Configuration,DC=TECHNICAL,DC=MARKETING,DC=COM;
CN=Schema,CN=Configuration,DC=TECHNICAL,DC=MARKETING,DC=COM;
DC=DomainDnsZones,DC=TECHNICAL,DC=MARKETING,DC=COM; DC=ForestDnsZones,DC=TECHNICAL,D
            1> defaultNamingContext: DC=TECHNICAL,DC=MARKETING,DC=COM;
            1> schemaNamingContext: CN=Schema,CN=Configuration,DC=TECHNICAL,DC=MARKETING,DC=
            1> configurationNamingContext: CN=Configuration,DC=TECHNICAL,DC=MARKETING,DC=COM;
            1> rootDomainNamingContext: DC=TECHNICAL,DC=MARKETING,DC=COM;
            22> supportedControl: 1.2.840.113556.1.4.319; 1.2.840.113556.1.4.801; 1.2.840.113556.1.4.473
1.2.840.113556.1.4.417; 1.2.840.113556.1.4.619; 1.2.840.113556.1.4.841; 1.2.840.113556.1.4.529; 1.2.84
1.2.840.113556.1.4.521; 1.2.840.113556.1.4.970; 1.2.840.113556.1.4.1338; 1.2.840.113556.1.4.474; 1.2.8
1.2.840.113556.1.4.1340; 1.2.840.113556.1.4.1413; 2.16.840.1.113730.3.4.9; 2.16.840.1.113730.3.4.10; 1
```

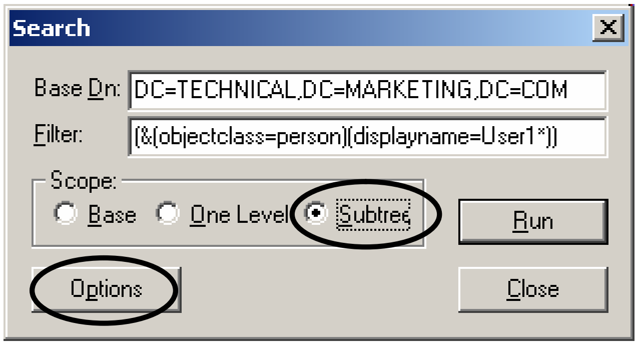
7. From the LDP menu, select Browse ® Search.

8. In the Search window, paste the Base DN into the Base Dn box. Input the LDP Filter into the Filter box.

   - Use (&(objectclass=person)(displayname=”customer last name, first name letter”*)) as the LDP Filter. For example, (&(objectclass=person)(displayname=User1*))

   - Select Subtree for the Scope.

   - Click Options.



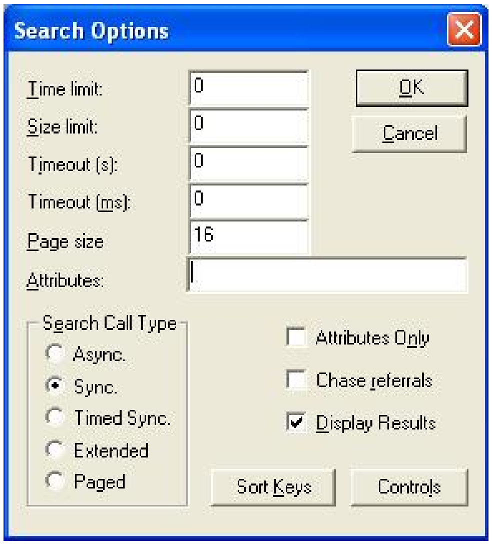
Search

Base Dn: DC=TECHNICAL,DC=MARKETING,DC=COM

Filter: (&(objectclass=person)(displayname=User1*))

Scope: ○ Base ○ One Level ● Subtree

- In the Search Options window, remove all entries in Attributes; then click OK.



Search Options

Time limit: 0

Size limit: 0

Timeout (s): 0

Timeout (ms): 0

Page size: 16

Attributes:

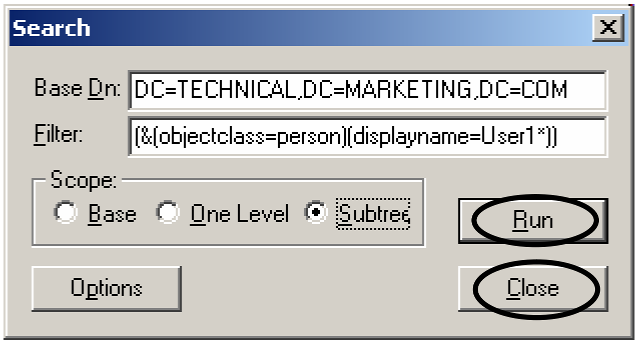
Search Call Type: ○ Async. ● Sync. ○ Timed Sync. ○ Extended ○ Paged

□ Attributes Only

□ Chase referrals

☑ Display Results

- Back in the Search window, click Run; then click Close.



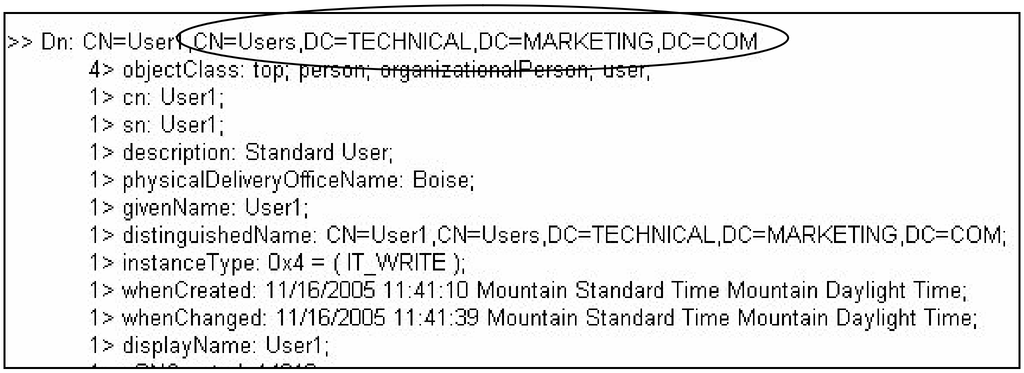
Search

Base Dn: DC=TECHNICAL,DC=MARKETING,DC=COM

Filter: (&(objectclass=person)(displayname=User1*))

Scope: ○ Base ○ One Level ● Subtree

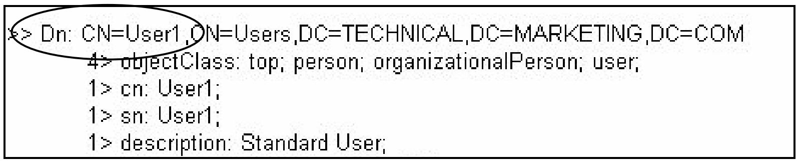
9. On the LDP screen, locate the user DN from the returned results. Copy it for use in the Embedded Web Server (EWS).
    - The Search Prefix begins after the individual user CN.



```
>> Dn: CN=User1,CN=Users,DC=TECHNICAL,DC=MARKETING,DC=COM
        4> objectClass: top; person; organizationalPerson; user;
        1> cn: User1;
        1> sn: User1;
        1> description: Standard User;
        1> physicalDeliveryOfficeName: Boise;
        1> givenName: User1;
        1> distinguishedName: CN=User1,CN=Users,DC=TECHNICAL,DC=MARKETING,DC=COM;
        1> instanceType: 0x4 = ( IT_WRITE );
        1> whenCreated: 11/16/2005 11:41:10 Mountain Standard Time Mountain Daylight Time;
        1> whenChanged: 11/16/2005 11:41:39 Mountain Standard Time Mountain Daylight Time;
        1> displayName: User1;
```

Hint

Notice how the username is set up on the LDP screen. The username format is defined within the device user DN. This can be viewed in the LDP trace. The format is often in email address format, but can be defined in many different combinations. The example below is User1.



```
>> Dn: CN=User1,CN=Users,DC=TECHNICAL,DC=MARKETING,DC=COM
        4> objectClass: top; person; organizationalPerson; user;
        1> cn: User1;
        1> sn: User1;
        1> description: Standard User;
```

Step 3: Kerberos Authentication

Note

Embedded Kerberos Authentication uses session tickets in the authentication process. The session tickets are time stamped by both the Kerberos Domain Controller (KDC) and the MFP. It is essential that the stamped times are within five minutes of each other. This can be accomplished by setting identical time on both the KDC and MFP.

1. Open the EWS in a web browser.
2. Select the Settings tab, and then Kerberos Authentication.
3. Under the Accessing the Kerberos Authentication Server section,

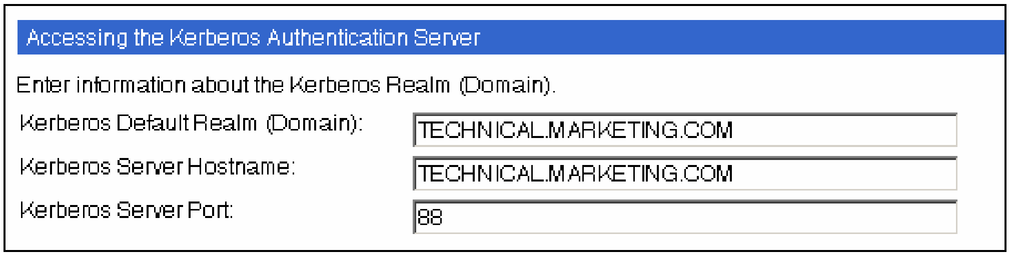
    a. Enter the Kerberos Default Realm (Domain).

        W The Kerberos Default Realm (Domain) is case-sensitive and needs to be input using capital letters. Example: TECHNICAL.MARKETING.COM

b. Enter the Kerberos Realm for the Kerberos Server Hostname. DNS finds the first available Kerberos Domain Controller.

w As an alternative, this can be a hostname or an IP address.

c. The Kerberos Server Port should be auto filled as 88.



Accessing the Kerberos Authentication Server

Enter information about the Kerberos Realm (Domain).

Kerberos Default Realm (Domain): TECHNICAL.MARKETING.COM

Kerberos Server Hostname: TECHNICAL.MARKETING.COM

Kerberos Server Port: 88

4. Under the Accessing the LDAP Server section,

a. Select Kerberos from the LDAP Server Bind Method drop-down box.

b. Choose the radial button of the Credential method desired.

w If choosing Use Public Credentials, enter a username and password.

Hint

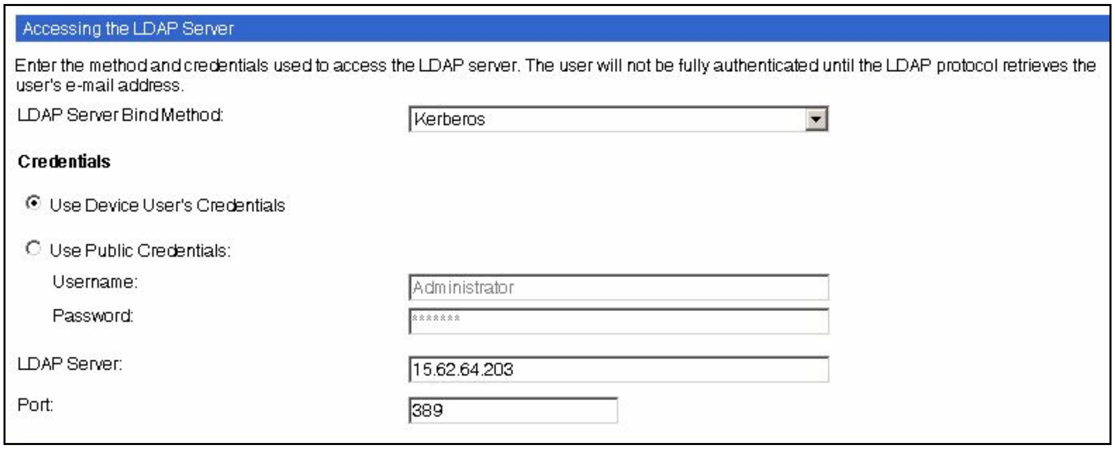
Remember how the username was set up on the LDP screen. The username is defined within the device user DN value in the LDP trace and is not in standard Windows domain account format. The format is often your entire email address, including the @xx.xx.

c. Input the LDAP server in the LDAP Server field.

Hint

Using the command "nslookup technical.marketing.com" earlier, 15.62.64.203 was the server IP address discovered.

d. Input 389 in the Port field.



Accessing the LDAP Server

Enter the method and credentials used to access the LDAP server. The user will not be fully authenticated until the LDAP protocol retrieves the user's e-mail address.

LDAP Server Bind Method: Kerberos

Credentials

● Use Device User's Credentials

○ Use Public Credentials:

Username: Administrator

Password: *******

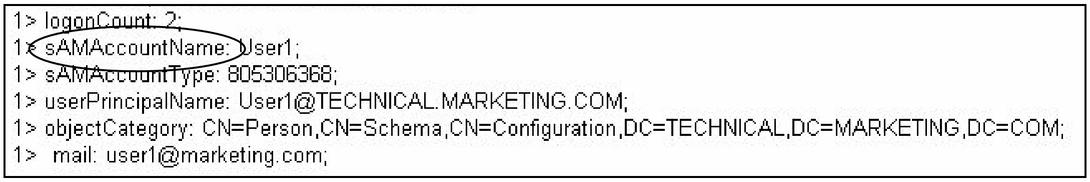
LDAP Server: 15.62.64.203

Port: 389

5. Under the Searching the LDAP Database section,

   a. Paste the Search Prefix into the Search Root field.

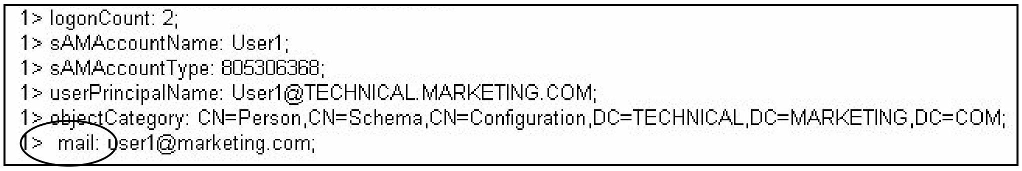
   b. Input sAMAccountName into the "Match the name entered with the LDAP attribute of" field.



```
1> logonCount: 2;
1> sAMAccountName: User1;
1> sAMAccountType: 805306368;
1> userPrincipalName: User1@TECHNICAL.MARKETING.COM;
1> objectCategory: CN=Person,CN=Schema,CN=Configuration,DC=TECHNICAL,DC=MARKETING,DC=COM;
1>  mail: user1@marketing.com;
```

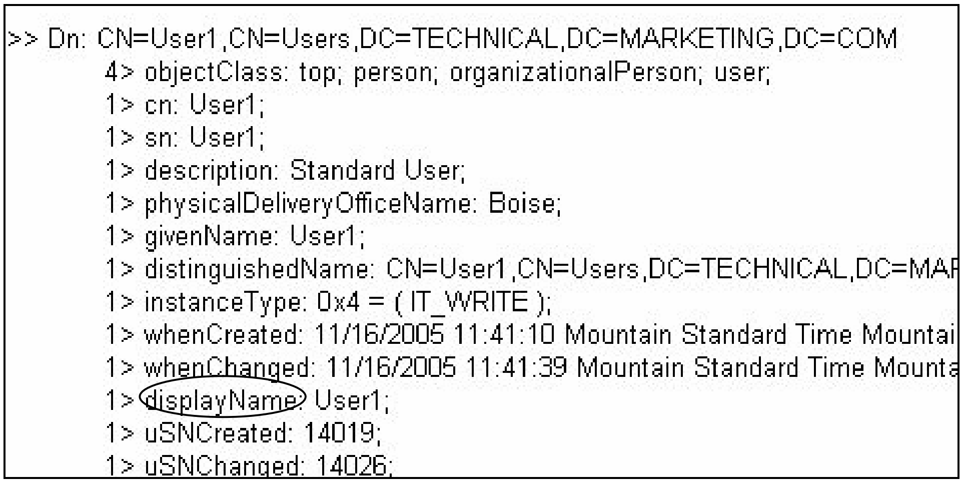
   c. Find the device user email address in the LDP trace. Copy the attribute defining the email address.

      w Paste the attribute into the "Retrieve the device user's email address using attribute of" field.



```
1> logonCount: 2;
1> sAMAccountName: User1;
1> sAMAccountType: 805306368;
1> userPrincipalName: User1@TECHNICAL.MARKETING.COM;
1> objectCategory: CN=Person,CN=Schema,CN=Configuration,DC=TECHNICAL,DC=MARKETING,DC=COM;
1>  mail: user1@marketing.com;
```

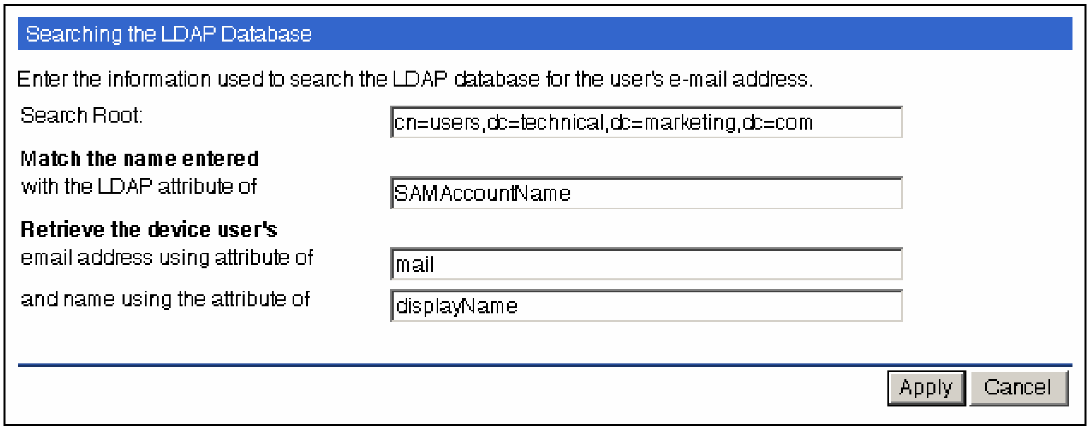
   d. Find the device user "name using the attribute of" in the LDP trace. Copy the attribute defining the name.



```
>> Dn: CN=User1,CN=Users,DC=TECHNICAL,DC=MARKETING,DC=COM
        4> objectClass: top; person; organizationalPerson; user;
        1> cn: User1;
        1> sn: User1;
        1> description: Standard User;
        1> physicalDeliveryOfficeName: Boise;
        1> givenName: User1;
        1> distinguishedName: CN=User1,CN=Users,DC=TECHNICAL,DC=MAR
        1> instanceType: 0x4 = ( IT_WRITE );
        1> whenCreated: 11/16/2005 11:41:10 Mountain Standard Time Mountai
        1> whenChanged: 11/16/2005 11:41:39 Mountain Standard Time Mounta
        1> displayName: User1;
        1> uSNCreated: 14019;
        1> uSNChanged: 14026;
```

   e. Paste the attribute into the "and name using the attribute of" field.

   f. Click Apply.



Searching the LDAP Database

Enter the information used to search the LDAP database for the user's e-mail address.

Search Root: cn=users,dc=technical,dc=marketing,dc=com

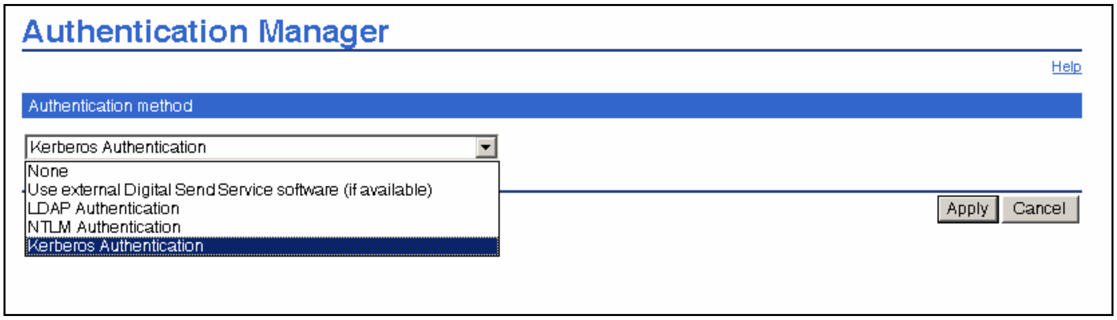
Match the name entered with the LDAP attribute of SAMAccountName

Retrieve the device user's email address using attribute of mail

and name using the attribute of displayName

Step 4: Configure the Authentication Manager

1. Click Authentication Manager on the left-side menu.
2. On the Authentication Manager screen, select Kerberos Authentication from the Authentication method drop-down list.
3. Click Apply.



Authentication Manager

Authentication method: Kerberos Authentication

Step 5: Configure Addressing Settings

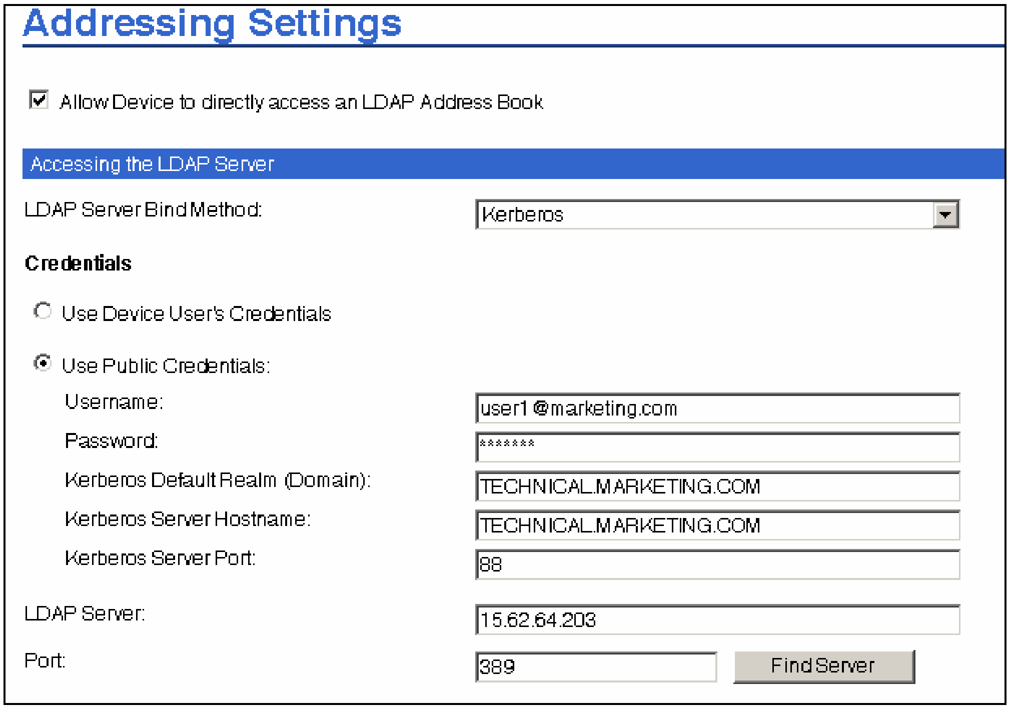
1. Click the Digital Sending tab.
2. Select Addressing from the right-side menu.
3. Select the “Allow device to directly access an LDAP Address Book” check box (screenshot on next page).
4. Under the Accessing to LDAP Server section,
   a. Select Kerberos from the LDAP Server Bind Method drop-down list.
      - The LDAP Server Bind Methods on the Addressing Settings and Kerberos Authentication screens must match for Kerberos authentication to work properly.

   b. Under Credentials, select the Use Public Credentials radial dial.
      - Input the Username and Password.

- Input the Kerberos Default Realm (Domain). Example: TECHNICAL.MARKETING.COM
- Input the Kerberos Server Hostname. Example: 15.62.64.203
- Input the Kerberos Server Port. Example: 88.

c. Input the LDAP Server. Example:15.98.10.51

d. Input the Port number. Example: 389



Addressing Settings

☑ Allow Device to directly access an LDAP Address Book

Accessing the LDAP Server

LDAP Server Bind Method: Kerberos

Credentials

○ Use Device User's Credentials

● Use Public Credentials:

Username: user1@marketing.com

Password: *******

Kerberos Default Realm (Domain): TECHNICAL.MARKETING.COM

Kerberos Server Hostname: TECHNICAL.MARKETING.COM

Kerberos Server Port: 88

LDAP Server: 15.62.64.203

Port: 389

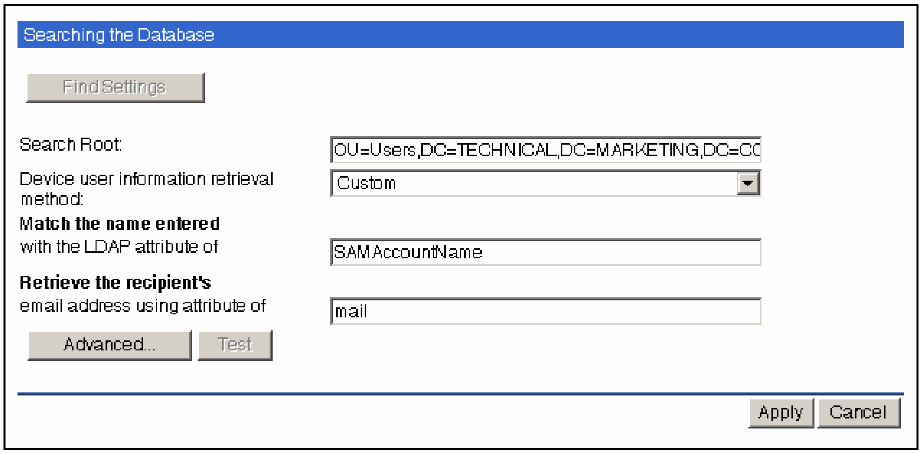
5. Under the Searching the Database section,

   a. Input the Search Prefix into the Search Root field.

   b. Select an option from the “Device user information retrieval method” drop-down list. The list contains three options. The appropriate choice depends on the customer network environment.

      - Select Exchange 5.5 Defaults when exchange 5.5 servers are used in LDAP addressing.
      - Select Active Directory Defaults for Windows 2000 or later network environments.
      - Select Custom for specialized network environments.

6. Click Apply.



Searching the Database

Search Root: OU=Users,DC=TECHNICAL,DC=MARKETING,DC=CC

Device user information retrieval method: Custom

Match the name entered with the LDAP attribute of: SAMAccountName

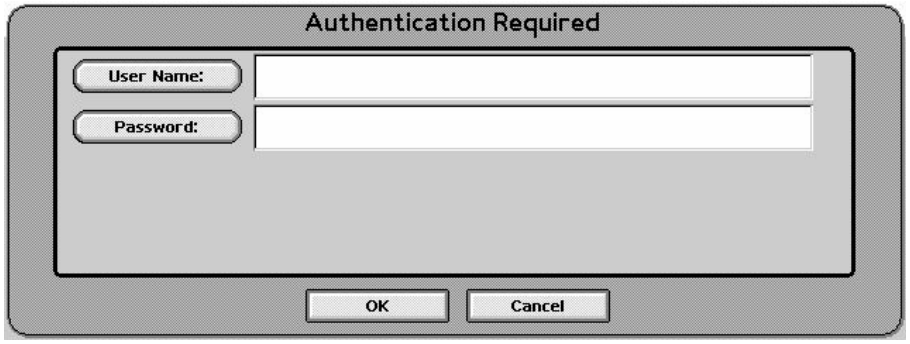
Retrieve the recipient's email address using attribute of: mail

Step 6: Use the MFP control panel

1. At the MFP, touch any option on the main screen. The screen displays a request for authentication.

Hint

Remember the username is defined within the device user DN value in the LDP trace and is often your entire email address, including the @xx.xx.



2. Use the touch screen keypad to input the authentication.
   - Once input, touch OK, and the chosen option appears; for example, the Email screen appears.

Troubleshooting

The following section covers three troubleshooting issues: Reverse DNS, Time Synchronization, and Kerberos Realm Syntax.

Reverse DNS must be configured

Kerberos authentication uses reverse DNS in the authentication process. Reverse DNS helps prevent "Man In The Middle" attacks, and adds an added level of security to the Kerberos process. Kerberos authentication fails and will not operate in a network environment that does not have reverse DNS enabled.

You can verify that reverse DNS is operational using the Nslookup command. Nslookup (Name Server Look Up) is a standard tool available in most Windows, Unix, and Linux environments. You can perform this operation in Windows with the following steps:

Start > Run > cmd > Nslookup "IP Address of the Kerberos Domain Controller"

An example of a proper forward and reverse DNS lookup:

```
C:\>nslookup server1.technical.marketing.com

Server: server1.technical.marketing.com

Address: 10.0.0.1

Name: server1.technical.marketing.com

Address: 10.0.0.1
```

An example of an in-correct forward and reverse DNS lookup:

```
C:\>nslookup server1.technical.marketing.com

Server: server1.technical.marketing.com

Address: 10.0.0.1

Name: server1.technical.futuremarketing.com

Address: 10.0.0.1
```

Time Synchronization

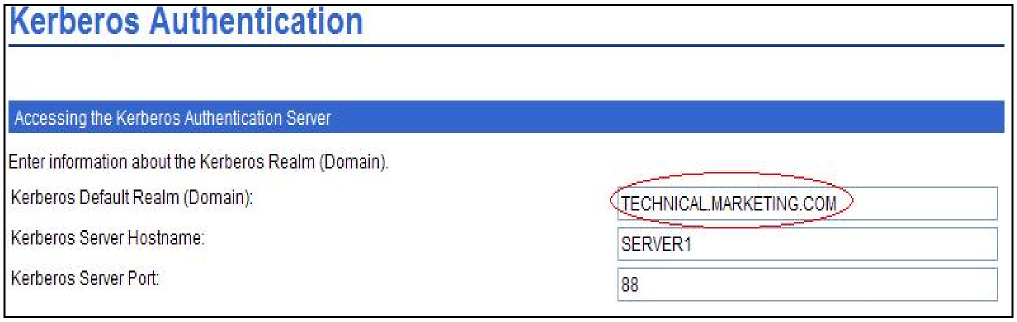
Embedded Kerberos Authentication uses session tickets in the authentication process. The session tickets are time stamped by both the Kerberos Domain Controller (KDC) and the MFP.

It is essential that this time synchronization remain within five minutes of each other. This can be accomplished by setting identical time on both the KDC and the MFP.

Kerberos Realm Syntax

When specifying the Kerberos Realm, it is essential that the entry is capitalized.

This entry must be entered into three separate sections of the EWS: Kerberos Authentication, Addressing Settings, and Network Settings.

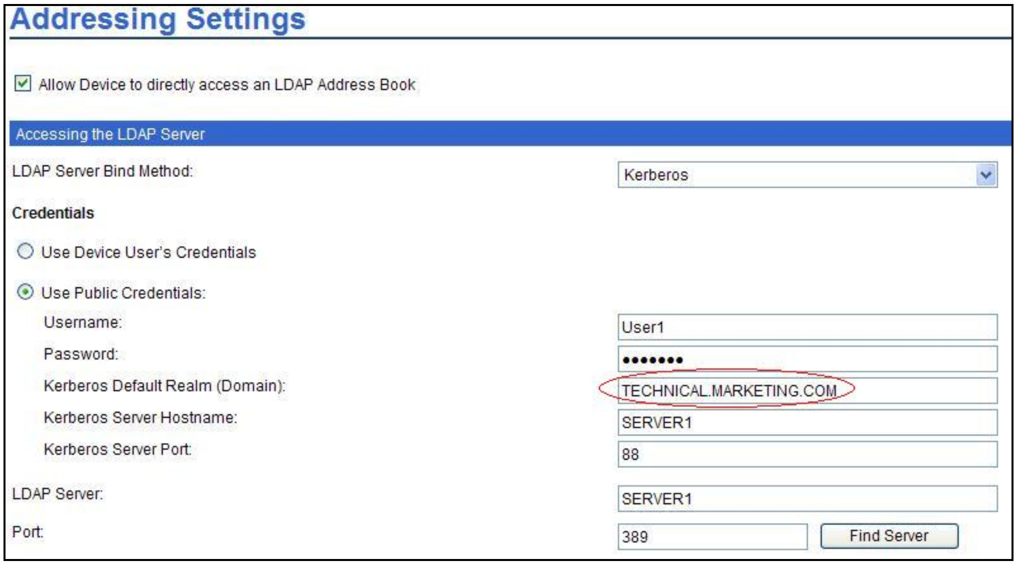


Kerberos Authentication

Accessing the Kerberos Authentication Server

Enter information about the Kerberos Realm (Domain).

Kerberos Default Realm (Domain):	TECHNICAL.MARKETING.COM
Kerberos Server Hostname:	SERVER1
Kerberos Server Port:	88



Addressing Settings

☑ Allow Device to directly access an LDAP Address Book

Accessing the LDAP Server

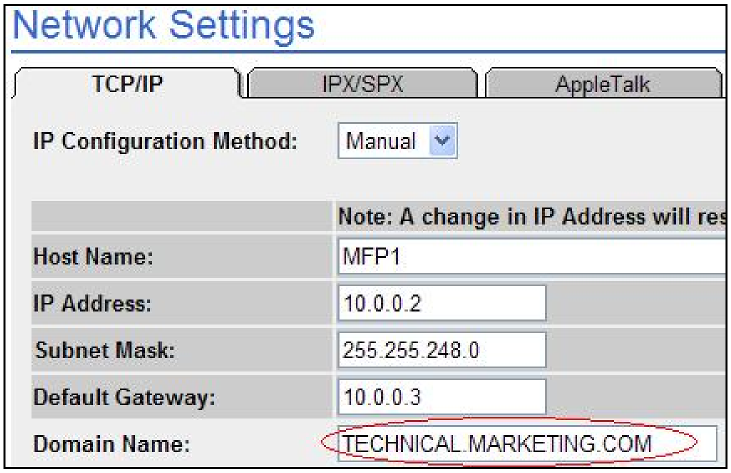
LDAP Server Bind Method: Kerberos

Credentials

○ Use Device User's Credentials

● Use Public Credentials:

Username:	User1
Password:	•••••••
Kerberos Default Realm (Domain):	TECHNICAL.MARKETING.COM
Kerberos Server Hostname:	SERVER1
Kerberos Server Port:	88
LDAP Server:	SERVER1
Port:	389



Network Settings

IP Configuration Method: Manual

Note: A change in IP Address will res

Host Name:	MFP1
IP Address:	10.0.0.2
Subnet Mask:	255.255.248.0
Default Gateway:	10.0.0.3
Domain Name:	TECHNICAL.MARKETING.COM