

Software Installation Guide

Software Installation Guide

Release 5.5.0

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Abstract

This guide is a step-by-step description of the procedures required to install DFdiscover.

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Preface

1. Getting Help

For software support, please contact the DFdiscover team:

- via email, <help@dfnetresearch.com>;
- visit our website, www.dfnetresearch.com.

2. Conventions

A number of conventions have been used throughout this document.

Any freestanding sections of code are generally shown like this:

```
# this is example code  
code = code + overhead;
```

If a line starts with # or %, this character denotes the system prompt and is not typed by the user.

Text may also have several styles:

- Emphasized words are shown as follows: *emphasized words*.
- Filenames appear in the text like so: `dummy.c`.
- Code, constants, and literals in the text appear like so: `main`.
- Variable names appear in the text like so: `nBytes`.
- Text on user interface labels or menus is shown as: **Printer name**, while buttons in user interfaces are shown as **Cancel**.
- Menus and menu items are shown as: **File > Exit**.

Table 1. Change History

Date	Notes
2021/05/11	DFdiscover 2021 Version 5.5.0 Release
2020/07/20	DFdiscover 2020 Version 5.3.0 Release
2020/08/03	Corrected names of several rpms, pkgs and msi files mis-identified with version 5.2.0

Chapter 1. Introduction

Chapters [DFdiscover Software Installation](#), [DFdiscover Acceptance Test Kit \(ATK\) Installation](#) and [Installation Completion](#) are required for new and upgrade installations. Chapters [DFdiscover Configuration](#), and [Integration Testing](#) are required for new installations only. Implementation of [Client Desktop Packages Installation](#) will be dependent upon the packages that are included with the release. Chapter [Study Installation](#) is required only when a new study setup is available at the time of DFdiscover installation.

Execute chapters and steps in order

All chapters and steps must be executed in document order.

1.1. Software Release

DFdiscover 2022 Version 5.5.0 is a continuation of the DFdiscover 2018 major release, having a major version number of 5, minor version number of 5 (the fourth minor version) and patch version number of 0 (this is not a patch). It contains everything needed for a complete installation.

1.2. Installation Worksheet

The last chapter, [DFdiscover Installation Worksheet](#), is an installation worksheet that should be completed at the same time as the installation is being performed. Use of the worksheet will confirm that no steps are missed and can subsequently be used as a part of documentation for installation qualification. If a step is not relevant or not required, mark that location of the worksheet NA (or stroke through it), rather than leaving it blank.

Procedures in the body of the guide that must be recorded on the worksheet are marked with [CC##], a cross-reference symbol (XREF), where CC is an acronym for the chapter name and ## is a sequence number for the step within the chapter.

Chapter 2. DFdiscover Software Installation

This chapter ensures that the individuals responsible for DFdiscover have been identified, the materials necessary for the install are available, configures the UNIX environment of the server, and then steps through the installation of the major version.

2.1. Staffing

A successful DFdiscover installation and subsequent properly maintained DFdiscover environment requires the commitment of personnel with different skills. It is essential that these personnel be identified in advance and be trained in the relevant aspects of DFdiscover. The following is a minimal set of job functions for which personnel must be identified. On the worksheet, record the names of one or more staff that will fill each job function. It is entirely acceptable for a single individual to perform more than one of the job functions.

- **UNIX administrator [SI50]** . This job function includes maintenance of the hardware and operating system, supervision of and planning for resources such as disk storage and printers, administration of HylaFAX and modems, supervision of cron jobs, installation of application software and any updates, backup and recovery of data, and the creation of UNIX user accounts. The primary contact is the DFdiscover administrator. Typically this job requires 0.1 FTE.
- **DFdiscover administrator [SI51]** . This job function includes registration of new studies to DFdiscover, administration of user privileges within DFdiscover, starting and stopping of study databases, and monitoring of study database consistency. Typically this job requires 0.1 FTE.
- **Study setup [SI52]** . This job function is responsible for the definition of the study database to DFdiscover which minimally includes importing of the CRFs for setup, definition of variable styles and variables, specification of visit scheduling, and entry of participating centers information. This job function may also be involved in the initial creation of CRFs.
- **Programmer [SI53]** . The programmer is responsible for creating any custom logic checks (referred to as edit checks within DFdiscover) and possibly executing them in batch, creating any study-specific reports, and defining lookup or coding tables.
- **SAS specialist [SI54]** . This job function is responsible for creating **DFsas** specification files, executing them in DFdiscover, and subsequently processing the results in SAS®. This job function may also get involved in the definition of variable names, data types, and coding, and hence may liaise with the study setup job function.
- **Data entry [SI55]** . This job function performs initial (and possibly second, or double data entry) review of received CRFs, verifying the data that was read by ICR, entering data that was not read, adding Queries where necessary, and identifying and resolving duplicates when they occur.
- **Higher-level data review [SI56]** . This job function performs additional data reviews after entry. The focus is on data quality, completeness, and consistency.

2.2. Before Installation

Before beginning installation, the following steps must be completed as they gather information necessary for the install.

- Record the full company name on the worksheet [SI00].
- Record the DFdiscover software release on the worksheet [SI01].

Release numbers are of the form X.Y.Z.

Software Release

These installation instructions are for a specific DFdiscover software release only. Confirm that the software release number on the download matches the software release number at the head of this document.

- Record today's date on the worksheet [SI02].
- Determine the name of the contact person [SI03], the server hostname [SI04], and the version of operating system on the server [SI05]. The contact person, in accordance with the *DFdiscover License Agreement*, should be the DFdiscover administrator or the DFdiscover software user consultant, and will be the primary liaison between end users and DF/Net Research, Inc..
- Confirm the name of a printer that can be accessed from the DFdiscover environment [SI08].
- Confirm that www.dfnetresearch.com can be accessed for obtaining the software release, patches and other downloads [SI09].
- Confirm that the computer that will be running the DFdiscover software is able to send email externally, for example to DF/Net Research, Inc. (<help@dfnetresearch.com>) [SI57].

2.3. Installation Materials

The following materials are required for installation:

- these installation notes [SI13]
- the super-user password for the server machine [SI14]
- the current DFdiscover software release [SI15]
- a copy of the current DFdiscover Release Notes [SI16]
- a copy of the Installation and Initialization chapter of the DFdiscover Acceptance Test Kit documentation [SI18]
- a DFdiscover License Renewal form (or email) [SI21] with a valid license and expiration date for the server host identifier.

Transcribe the values from the form/email to the worksheet: hostid [SI37], hostname [SI38], # of users [SI39], expiry date [SI40], features [SI42], password [SI41]

- a support username [SI22] and support password [SI23] that will grant access to the support section of www.dfnetresearch.com

If the first study setup is being supplied by DF/Net Research, Inc., the study setup [SI24] is also required.

2.4. Installation

The steps in this section require the DFdiscover software media from download and super-user privileges.

2.4.1. Linux Installation Instructions

DFdiscover 2022 is supported on Novell openSUSE version Leap 42.1 and newer, SUSE Tumbleweed and Redhat Enterprise Linux (CentOS) versions 7.X and 8.X. DFdiscover is a 64-bit server application - it installs on the 64-bit versions

of any of these Linux distributions. It will not run on 32-bit systems. Other Linux distributions may work, but are unsupported. Debian distributions such as Ubuntu will not work at this time.

Procedure 2.1. Before you install DFdiscover

1. If this is a new installation, *DO NOT CREATE* a `datafax` user account or `/opt/dfdiscover` directory. These tasks are completed automatically by the installer. The installer also adds the DFdiscover executables to the system-wide path and installs DFdiscover as a **systemd** service.
2. If this is an upgrade of a DataFax server, there are several important changes that will be performed on your system. It is **HIGHLY** recommended that you have a complete backup or snapshot of your server prior to upgrading. Ensure that the `datafax` account is not in use as the installer moves `/opt/datafax` to `/opt/dfdiscover` and resets the `datafax` account home directory to the new file structure. The systemwide path to the software is automatically adjusted. Existing configuration files are automatically adjusted to match the new file structure.
3. If this is an upgrade of a DFdiscover server, no special changes are required.

Procedure 2.2. Installing DFdiscover

1. Download and save the software rpm, from www.dfnetresearch.com to a local hard drive. Login to your server as `root`.
2. If this is an upgrade, stop DataFax/DFdiscover, and erase the current version.

- Stop DataFax or DFdiscover as follows:

```
# DFshutdown -f
```

or

```
# systemctl stop dfdiscover
```

- On openSUSE, use **zypper** to remove DataFax / DFdiscover as follows:

```
# zypper remove datafax
```

or

```
# zypper remove dfdiscover
```

- RHEL uses **yum** as follows:

```
# yum remove datafax
```

or

```
# yum remove dfdiscover
```

3. A complete installation will require approximately 1.7 Gb of free disk space for the software and documentation. The software will be installed into `/opt/dfdiscover`. Record the installation directory [SI32].

Execute the installation command appropriate for the operating system.

- On openSUSE, use **zypper**, which will automatically download and install any dependencies required:

```
# zypper --no-gpg-checks install dfdiscover-5.5-0.x86_64.rpm
```

- On RHEL, first install the epel-release repo (if you haven't already) as follows:

```
# yum install epel-release
```

Then install DFdiscover using **yum**:

```
# yum --nogpgcheck install dfdiscover-5.5-0.x86_64.rpm
```

4. Record that the Linux installation completed successfully on the worksheet [\[LX00\]](#).

2.4.2. Request and Install Server Certificate

Note

If you already have a valid certificate, you can skip this step. If you acquired a certificate from a commercial CA, you can skip this step.

The steps in this section require super-user privileges.

DFexplore and other DFdiscover client applications communicate with the DFdiscover server using TLS (Transport Layer Security, specifically TLS v1.2 and TLS v1.3, in the same way that Internet banking sites do. TLS provides an encrypted path through the internet that prevents eavesdropping and modification of your data by third parties. Each DFdiscover client checks that it is communicating with the correct DFdiscover server by means of a certificate which encodes the DFdiscover server's name and ownership. This certificate is generated by choosing a very large random number (a key), adding organizational ownership information to it and then requesting that DF/Net Research, Inc. certify this key as authentic. When an **DFexplore** client connects to the DFdiscover server, it asks for this certificate and can then determine whether it is communicating with the correct server.

The process of generating a certificate starts with the execution of **DFserveradmin** which generates the random number and then prompts for required organizational information, including the country, state, organization name and server name. Once this information has been provided, an email is generated to certreq@dfnetresearch.com. containing a request to certify that this is an authentic DFdiscover server. DF/Net Research, Inc. processes this request and emails back a small file containing the certificate, which is then installed into the DFdiscover system. Once this step has been completed, DFdiscover and **DFexplore** can be used.

Procedure 2.3. Request Server Certificate

1. Login as super-user.
2. Use **DFserveradmin** to create the certificate request [\[CI01\]](#)

The certificate request is created with the **DFserveradmin** program. Click [Request an SSL certificate signing for DFedcservice](#) and enter the appropriate values for each of the fields.

Figure 2.1. Typical certificate request dialog

DFserveradmin - DFdiscover Server Administration

dfserveradmin

Master SSL Certificate License Study Spaces Study Diagnostics

Request an SSL certificate signing for DFedcservice

Country (2 letter code)

State or Province (Full name)

Locality Name (City)

Organization Name (Company)

Organizational Unit (Section)

DFdiscover Server Domain Name

Email

Once you have entered the required data, click **Send Request** to submit the certificate signing request to DF/Net Research, Inc..

Outgoing email

The certificate signing request is emailed to DF/Net Research, Inc. from the machine where the **DFserveradmin** program was executed. This machine must be able to send email to the internet (in other words, outside of any corporate intranet). If that is not possible, the files `/tmp/cert.csr.txt` and `/tmp/cert.csr` can be transferred (use binary mode if doing this via ftp) to another machine and sent as attachments in an email to `<certreq@dfnetresearch.com>`.

3. Wait for the certificate

This is the end of the procedure for generating a certificate request. You can expect an email with a signed certificate within 24 hours on business days.

In the interim, it is still possible to proceed as **DFserveradmin** also generates a self-signed certificate that is valid for 10 days.

Procedure 2.4. Install Server Certificate

1. Determine install location

The server certificate must be installed in the location referenced by the `certificate` keyword in the `/opt/dfdiscover/lib/DFedcservice.cf` file. For example, this `DFedcservice.cf` file:

```
master localhost
key /opt/discover/lib/edckey.pem
certificate /opt/discover/lib/edccert.pem
documentroot /opt/discover/edcdocs
```

identifies `/opt/discover/lib/edccert.pem` as the location of the server certificate.

2. Save the signed certificate [CI02]

The signed certificate will be emailed back to the email address that was specified as the `Email Address` in the certificate request procedure. Typically it will appear as a small (~1KB) attachment named `edccert.pem`.

Save the attachment to the filename identified in the first step. If **DFcertReq** also generated a self-signed certificate, that certificate will be overwritten by this permanent, signed certificate.

This is the end of the steps necessary to request and install a server certificate.

2.4.3. Request and Install DFdiscover License

The process of requesting and installing a DFdiscover license is described in this section.

DFdiscover is licensed on an annual basis for a specified maximum number of concurrent users working on a uniquely identified DFdiscover server. Each license is unique to the combination of server identifier, features, expiry date, and number of licensed users. If any of these values changes, the existing license becomes invalid and a new license is required. Please note that if you are upgrading an existing DataFax server you will need to request a replacement license as the old license will no longer work once DFdiscover is installed.¹

Procedure 2.5. Request DFdiscover License

1. Determine server identifier

The unique server identifier [LI01] can be determined with the **DFhostid** command, as in:

```
# /opt/dfdiscover/bin/DFhostid
SG8D-QM2L-V8TK-PFB5-DDEG
```

The output is a 20 character/digit identifier displayed in 5 blocks of 4. Note that the identifier will never contain any of 0 (zero), 1 (one), I (capital i), or O (capital o).

2. Forward server identifier to DF/Net Research, Inc.

Contact DF/Net Research, Inc. via telephone or email and provide them with this unique server identifier. Using the server identifier, and other license information including the expiry date, the number of licenses purchased, and any additional licensed features (such as web services or large study numbers), DF/Net Research, Inc. will generate a unique license. The license information will be emailed to the DFdiscover administrator.

3. Install DFdiscover License

The license will arrive in the body of an email message and have the following appearance:

```
hostid          SG8D-QM2L-V8TK-PFB5-DDEG
hostname        <replace_with_your_hostname>
nclients        12
expiration      20191231
password        2SQG-PGVG-BVXY-87BU-YYBL
features        DFWS,LS
```

Save the license [LI03] to the file `/opt/dfdiscover/work/license` (note the license will always be stored in this location, it is not customizable).

¹ DFdiscover employs a concurrent user license mechanism based on a unique host identifier, which requires one machine on the network to act as the central DFdiscover server. Choose a machine that is reliable (infrequently down) and is accessible by all potential DFdiscover client machines. If another server replaces the selected server in the future, a new license must be requested from DF/Net Research, Inc..

4. Update hostname in DFdiscover License [\[LI04\]](#)

In the installed license, the value for the `hostname` keyword must be updated. Edit the saved license and replace `<replace_with_your_hostname>` with the actual hostname of the server (this can be the fully qualified name or the nickname). Be careful to use the correct name and spell it correctly - if the hostname is inaccurate, DFdiscover will not start. Save the changes to the license file.

2.4.4. Migrate pre-2014 studies

This step is applicable **only** if you have studies that were created in pre-2014 versions of DataFAX. It must be performed by super-user.

DFdiscover requires that studies from pre-2014.0.0 DataFAX installations be migrated using the **DFmigrate** program to take advantage of new features. **DFmigrate** will determine which steps need to be taken based on the version of DFdiscover that the study is from. These changes may include moving edit checks to an `ecsrc` directory and moving the lookup tables into a `lut` directory.

Procedure 2.6. Upgrading all Studies

- To upgrade all studies on your system, as super-user run:

```
# /opt/dfdiscover/utils/DFmigrate -a
```

The following shows example output from this command:

```
*****
DFmigrate: Study 254 - /opt/studies/val254 - Thu Apr 18 15:04:33 2019
*****
Step 1: Updating DFserver.cf
-----
File Converted: /opt/studies/val254/lib/DFserver.cf
Step 2: Converting DFsetup
-----
File Converted: /opt/studies/val254/lib/DFsetup
File Converted: /opt/studies/val254/lib/DFschema
File Converted: /opt/studies/val254/lib/DFschema.stl
File Converted: /opt/studies/val254/lib/DFtips

Step 3: Moving Lookup Tables to lut directory
-----
Following lookup table files moved from study's lib to lut dir:
aecodes.lut
drugs.lut
investigators.lut

Step 4: Moving Edit Checks code to ecsrc directory
-----
DFedits already exist in ecsrc directory.

Step 5: Converting postscript to png and old tiffs to png
-----
WARNING: PNG files already exist for plates: 1-11, 20.

Study migration was successful.
```

```
~~~~~  
DONE:  
Migration has been performed on the following study: 254  
Please review dfmigrate_errors for any migration errors  
or warnings and/or manual steps that may be required.  
~~~~~  
#
```

In some cases (as in the example above), the background images used by **DFprintdb** will not be automatically converted. If you use **DFprintdb** and get a conversion error, you will need to re-import the backgrounds from the original PostScript® or PDF file using **DFsetup**.

Record that the pre-2014 studies migration completed successfully on the worksheet [\[MG00\]](#).

2.4.5. Load journal files for pre-5.5.0 studies

This step is applicable for **all** studies created prior to version 5.5.0 of DFdiscover. It must be performed by super-user.

DFdiscover requires that studies from all installations prior to 5.5.0 have their journal files loaded into the new DFaudit.db sqlite database.

Procedure 2.7. Upgrading all Studies

- To upgrade all studies on your system, as super-user run:

```
# /opt/dfdiscover/utils/DFauditdb -s all
```

The following shows example output from this command:

```
> Processing study 154:  
Reading journal files ... 1 seconds  
Truncating DFaudit.db ... 0 seconds  
Loading to DFaudit.db ... 0 seconds  
Adding index to table ... 0 seconds  
Study 154: 12752 records in audit database.
```

Record that the study journal files loaded on the worksheet [\[LJ00\]](#).

2.5. Installation Completed

Congratulations! You have installed DFdiscover on your system. There are additional steps to be followed to ensure that your DFdiscover system is up-to-date and also to configure the various components. These are outlined in the following chapters.

Chapter 3. DFdiscover Configuration

Upgrade installation

These steps are required for a new installation only. If this is an upgrade install, execute

```
# systemctl start dfdiscover.service
```

to restart DFdiscover. Then complete [Define DFdiscover capable printer](#) and skip to [Study Installation](#).

This chapter completes the configuration of DFdiscover. After completing these steps, DFdiscover will be operational.

3.1. Define DFdiscover capable printer

DFdiscover is able to print to printers that are either local to the server or networked. The printers must already be configured and named on the DFdiscover server, which is typically a UNIX administration issue. Given the set of printer names which are known to the system, that complete set, or a subset thereof, needs to be configured in DFdiscover. This is done by creating the file `/opt/dfdiscover/lib/DFprinters`.

Procedure 3.1. Define DFdiscover printers

1. **Edit, or create, `/opt/dfdiscover/lib/DFprinters`**

Use your favorite editor to edit this file.

2. **Add default printer name first**

Of all of the printers that have been identified as being DFdiscover capable, identify the one that will be the default, and add that printer name as the first line of the file. The order that the names appear in the file dictates the order in which they are displayed in any DFdiscover print dialog.

3. **Add additional printers, if any**

Each additional printer name should be added, one per line, following the default printer name.

4. **Save file**

Save the changes made to `/opt/dfdiscover/lib/DFprinters` and exit the editor [\[DF10\]](#).

3.2. Start DFdiscover

It's time to start the DFdiscover services [\[DF12\]](#). Before doing so confirm that a valid DFdiscover license is installed in `/opt/dfdiscover/work/license`.

To start the DFdiscover services, type:

```
% /opt/dfdiscover/bin/DFbootstrap
```

The output will be similar to the following:

```
DFmaster.rpcd: your software license expires in 365 days
1. Checking state of incoming daemons...

2. Checking /opt/dfdiscover/work/.dfincoming_work...
   0 stale incoming entries obsoleted
```

```
3. Checking /opt/dfdiscover/incoming...
  0 faxes awaiting processing.
DFmaster.rpcd: started.
Done.
```

The DFdiscover services have now been started - continue with the next section. If an error prevents the DFdiscover services from starting, it is essential to fix the problem before continuing - the steps in the remaining sections will fail.

The remaining steps in this chapter must be executed by user `datafax`. Exit the super-user shell and become user `datafax`.

3.3. (Re-)configure DFdiscover Master

Start the DFdiscover system administration application with the command:

```
% DFadmin
```

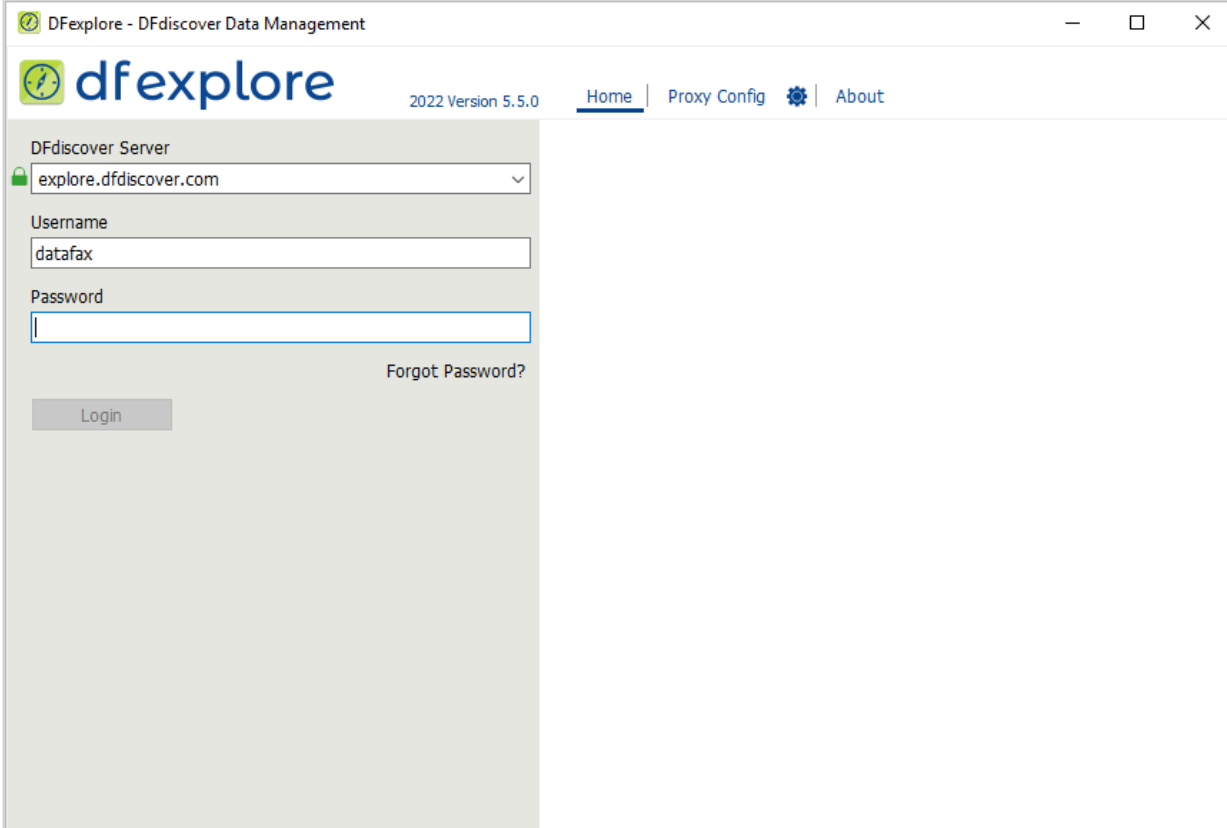
The system administration application is used to configure the DFdiscover master process.

Procedure 3.2. Configure DFdiscover Master [DF06]

1. Login to the DFdiscover administration application

If this is the first time that the administration application is used, enter the nickname or fully qualified name for the licensed DFdiscover server in the **Server** field. The **Login Name** is `datafax` and the **Password** is `passwd` (this is a one-time password that must immediately be changed after authentication). Click **Login**.

Figure 3.1. Typical login dialog appearance



DFExplore - DFdiscover Data Management

dfexplore 2022 Version 5.5.0 Home Proxy Config About

DFdiscover Server
explore.dfdiscover.com

Username
datafax

Password

Forgot Password?

Login

2. Click **Master** to display the **Master** dialog

A complete description of the dialog and the meaning of the individual fields can be found in [System Administrator Guide, DFadmin - Master DFadmin - Master](#). Complete the fields as follows.

a. **Bootstrap Slave Host**

The default value for this field is the hostname of the DFdiscover server. If the default is not filled in, enter the hostname. Multiple hostnames (comma-delimited) are only required when multiple DFdiscover servers are available.

b. **Default Printer**

The value of this field is the name of a local printer. Typically, this should be the same default printer defined in [\[DF10\]](#).

Study-specific printers are defined at study creation time.

3. Select **File** > **Save** to save the changes

The values specified in the dialog are saved.

3.4. Configure Incoming and Outgoing Processes

Incoming and outgoing fax processing is handled by third-party software: DFdiscover can work with either HylaFAX or the Protus fax service. Additionally, outbound service can be handled via email. DFdiscover communicates with the fax software or service by means of inbound and outbound processes that are configured using **DFadmin**.

At this point configure an incoming daemon [\[DF08\]](#) and configure an outgoing daemon [\[DF09\]](#). A complete description of the configuration process can be found in [System Administrator Guide, DFadmin - TrafficDFadmin - Traffic](#).

3.5. Configuration Complete

DFdiscover configuration is now complete. Take this opportunity to update the worksheet. The next chapter describes several optional integration tests that should be completed to demonstrate that the installation is operating in the expected manner.

Chapter 4. Integration Testing

The integration tests described in this chapter are recommended but not required. Their purpose is to demonstrate that incoming and outgoing faxing is operational, and that printing is correctly defined.

4.1. Receiving Faxes

Note

This test is relevant only if incoming faxing is part of your document workflow. If incoming faxing is not configured, this test will fail.

The purpose of this test is to demonstrate that an incoming fax can be received by DFdiscover, that it is properly archived, and that it can be viewed in **DFexplore**.

Procedure 4.1. To demonstrate incoming fax operation

1. Fax a non-DFdiscover page from a plain paper machine

The purpose of this test is not to demonstrate that a CRF can be recognized as a study CRF, and so a simple cover page of any type is preferred. Fax the page from a traditional fax machine to the number that DFdiscover will receive faxes on [\[IN01\]](#).

2. Monitor the fax modem status lights (HylaFAX only)

During fax reception, various lights on the modem will flash or be illuminated. On Multitech modems the **OH** (off-hook) light will be on during the fax reception and the **RD** (receive data) light will be flashing indicating that information is being received from the sending fax machine. When transmission is complete some of these lights will go out.

3. Confirm fax archival

Within 30 seconds (5 minutes for Protus fax service users) of the end of transmission, DFdiscover will create a new directory under the directory previously defined as the **Archive Directory** by [Configure Incoming and Outgoing Processes](#). The directory name is 4-digits where the first two digits are the year within the century and the last two digits are the week within the year. The contents of the directory will be a single file with a 4-digit name, generally 0001. Confirm that the directory and file are present [\[IN02\]](#).

Example 4.1. Confirmation of fax archival

In this case, the first fax was received on November 14, 2015 (the 46th week of 15). The archive directory was defined as `/opt/dfdiscover/archive`.

```
% cd /opt/dfdiscover/archive
% ls
1546
% cd 1546
% ls
0001
```

4. View the fax in DFexplore

Fax pages that are not barcoded as DFdiscover CRFs will be routed to a holding directory for subsequent manual identification.

Start **DFexplore** with the command:

```
% /opt/dfdiscover/bin/DFexplore
```

Authentication is required. Then click **Image Router** and confirm that the faxed page or pages are present [\[IN03\]](#).

5. Print the page from DFexplore

Choose **Print** from the **Page** menu. In the Print dialog, select the Printer to which you want to print the page and choose **Print** to print the current page.

Confirm that the fax page prints successfully [\[IN04\]](#).

Completion of this section demonstrates that DFdiscover is able to receive faxes and process them.

4.2. Printing from DFdiscover

The purpose of this test is to demonstrate that the previous editing done in [Define DFdiscover capable printer](#) was successful.

Procedure 4.2. Print a plain text file

1. Identify a plain text file

Any text file will work for this test. The file should not be too large - the purpose of the test is to print a text file, not print hundreds of pages of text. A good default file is `/etc/passwd`.

2. Print the file

From a shell prompt, issue the command:

```
% /opt/dfdiscover/lib/DFprint_filter /etc/passwd
```

possibly substituting `/etc/passwd` with the name of the file that you chose to print.

3. Confirm that the text file printed properly [\[IN05\]](#).

4.3. Faxing from DFdiscover

The purpose of this test is to demonstrate proper operation of the previously defined outgoing daemon.

This test will require the fax number of a local paper fax machine to be used as the fax destination.

Procedure 4.3. Fax a plain text file

1. Identify a plain text file

Any text file will work for this test. The file should not be too large - the purpose of the test is to fax a text file, not fax hundreds of pages of text. A good default file is `/etc/passwd`.

2. Fax the file

If the installation is configured to send documents via email, issue the command:

```
% DFsendfax /etc/passwd mailto:recipient
```

where *recipient* is the email address to send to. If the installation is configured to fax documents, issue the command:

```
% DFsendfax /etc/passwd faxnumber
```

where *faxnumber* is the fax number of the local paper fax machine.

Depending upon the **Polling Interval** previously specified in the outgoing daemon configuration, it may take up to 60 seconds for DFdiscover to pass the queued fax to email, HylaFAX or the Protus fax service.

3. Confirm that the fax was sent successfully

Wait for a few minutes and confirm that the sent fax has arrived at the destination fax machine or email recipient [\[IN06\]](#).

Chapter 5. Study Installation

This chapter is optional, and generally will not be executed at the time of DFdiscover installation.

The study installation steps described in this chapter will only apply to DFdiscover installations where a new study is ready to be installed at the same time.

5.1. A DFdiscover study

To DFdiscover, a study definition comprises a parent directory and several sub-directories that hold study specific configuration information. As a result of this structure, a study definition can be easily transported by moving the parent directory to a new location. Everything that is needed by the study is contained within that parent directory.

5.2. Installing the study

Become super-user

The steps in this section must be executed by super-user.

Studies that are created by DF/Net Research, Inc. are typically distributed via download link, as a UNIX **tar** file. The procedure described here assumes this structure. Studies that are transported from other vendors or from affiliates within a company may be structured differently. This procedure may need to be modified to fit those specific conventions.

Procedure 5.1. Study Installation

1. Pre-requisite: Create a parent directory for all studies

Generally, (but this is not a requirement) all DFdiscover studies exist under a common parent directory on the DFdiscover server. This directory is typically `/opt/studies`. Create the parent directory, if necessary [\[SS01\]](#):

```
# mkdir -p /opt/studies
```

and update the ownership of the directory so that it is owned by `datafax` and group `studies`:

```
# chown -R datafax /opt/studies
# chgrp -R studies /opt/studies
```

2. Obtain the study tar image

The remaining steps assume that the study tar image is available as `/tmp/study.tar` [\[SS02\]](#).

3. Create a study folder and extract the contents of the tar image

A study setup from DF/Net Research, Inc. will be rooted at the study directory and is easily extracted with **tar**. Create the study folder and extract the tar image contents with commands similar to this [\[SS03\]](#):

```
# cd /opt/studies
# mkdir newstudy
# cd newstudy
# tar xpf /tmp/study.tar
```

Example 5.1. Extracting study proto123

```
# cd /opt/studies
# mkdir proto123
# cd proto123
# pwd
/opt/studies/proto123
# tar xpf /tmp/study.tar
bkgd/...
bkgd/...
...
#
```

4. Update the file permissions and ownership of the extracted study

The owner and group permissions of the extracted study must be updated to reflect the ids for user `datafax` and group `studies` present on the installed system. Update the permissions with the **chown** and **chgrp** commands [SS04].

Example 5.2. Updating ownership and permissions

```
# cd /opt/studies
# chown -R datafax proto123
# chgrp -R studies proto123
```

5. Register the study to DFdiscover

The local DFdiscover installation must now be made aware of the new study. This is accomplished by registering a new study with DFdiscover as described in *System Administrator Guide, StudyAddingAdding a New Study* [SS05].

Chapter 6. DFdiscover Acceptance Test Kit (ATK) Installation

Performance of the procedure in this chapter is not required for the installation, but is highly recommended.

The DFdiscover Acceptance Test Kit is an important part of installation qualification. It allows the end-user to demonstrate that DFdiscover works in a manner that is in accordance with a known set of results.

The installation materials include a printed copy of the Installation and Initialization chapter of the DFdiscover Acceptance Test Kit documentation. These instructions represent the first of eighteen modules in the ATK, and are required for initialization [\[AT01\]](#). A complete description of the remaining modules in the ATK is available after successful completion of the first module. In general, completion of all eighteen modules of the ATK requires one 8-hour day [\[AT02\]](#).

Chapter 7. Client Desktop Packages Installation

DFdiscover includes a number of tools which are available for Windows 10 and macOS 10.14 (Mojave) or later. These can be obtained from www.dfnetresearch.com.

The current Windows 10 packages are:

- `DFdiscover_5_5_0.msi`, containing **DFexplore**, **DFsetup**, **DFadmin**, **DFbarcode**, **DFATK** and several command-line tools.
- `DFexplore_5_5_0.msi`, containing only **DFexplore**.
- `DFsend_5_5_0.msi`, containing only **DFsend**.

The current macOS 10.14 (Mojave) or later packages are:

- `DFdiscover5.5.0.pkg`, containing **DFexplore**, **DFsetup**, **DFadmin**, **DFbarcode**, **DFATK** and several command-line tools.
- `DFexplore5.5.0.pkg`, containing only **DFexplore**.
- `DFsend5.5.0.pkg`, containing only **DFsend**.

7.1. Windows client packages installation [PK01]

7.1.1. Requirements

Installation and proper operation of the Windows client tools requires Windows 10.

7.1.2. Installation

The Windows client tools are distributed as Windows `msi` installer files.

1. Locate the desired client package `msi`

The file can be found on www.dfnetresearch.com in [software releases support website](#).

2. Install from the desired client package

Double-click the desired client package file. Installation begins automatically and behaves similar to other Windows setup programs. The installer will add icons to the Desktop as well as entries in the **Start Programs** menu.

Note

Installation must be performed on the local drive of each Windows machine that is to run the client tools.

7.2. DFdiscover barcoding plug-in for FrameMaker® installation [PK02]

7.2.1. Requirements

Installation and proper operation of the DFdiscover Barcode plug-in requires:

1. FrameMaker 10 through FrameMaker 2020
2. Windows 10

7.2.2. Installation

Note

Installation must be performed on the local drive of each machine that is running FrameMaker®, or on the shared drive if FrameMaker® was installed on a shared drive.

The plug-in is distributed as `barcodet.dll`, a Windows DLL. The file can be found on www.dfnetresearch.com in [software releases support website](#).

The DLL must be copied to the `fminit` directory below the FrameMaker® product installation directory. Use the same name for the copied file. For example:

```
C:\copy "barcodet.dll" "C:\Program Files\Adobe\Framemaker\fminit\barcodet.dll"
```

7.2.3. FrameMaker® Configuration

The FrameMaker® installation directory, typically `C:\Program Files\Adobe\Framemaker` or `C:\Users\username\AppData\Roaming\Adobe\Framemaker\XX\` (where `XX` is the version number), contains a `product.ini` file, typically `maker.ini` or `imaker.ini` or `fmsgml.ini`, depending upon the FrameMaker® version. The `[APIClients]` section of this file lists the clients to load when FrameMaker® starts. Each client description is on a separate line and cannot contain line breaks. A default FrameMaker® installation will already have an `[APIClients]` section that ends with:

```
Mailer=Standard, Send Mail API Client, fminit\mailer.dll  
WordCount=DocReport,Count the number of words in the document, fminit\wordcnt.dll  
BookUtils=Standard, Book Utilities, fminit\bookutils.dll
```

Edit the `maker.ini` file with a text editor, locate the `[APIClients]` section of the file, and add the following text on a new line at the end of the section:

```
DFdiscover=Standard, DFdiscover Barcode Tool, fminit\barcodet.dll, all
```

Save and exit the `maker.ini` file. Configuration is complete.

This procedure needs to be repeated on each computer that will use FrameMaker® to create CRFs for DFdiscover studies.

Chapter 8. Installation Completion

The installation and configuration of DFdiscover is now complete.

Procedure 8.1. To complete the documentation:

1. **Collect together all installation materials and store them in a safe place [CL01]**

If necessary, consult [Installation Materials](#) for the complete list.

2. **Were all required items completed without error [CL02]?**

If there are outstanding items that need input from DF/Net Research, Inc., see [Getting Help](#).

3. **Sign the completed worksheet [CL04]**

The worksheet is an important piece of documentation. Sign it and store it a safe location for future reference.

Thank you for choosing DFdiscover and DF/Net Research, Inc.!

Chapter 9. DFdiscover Installation Worksheet

Use this worksheet as a permanent record of the installation's progress. When completed, sign and date this worksheet and store it together with any other installation qualification (IQ) materials.

Most of the entries in the worksheet require only a checkmark indicating that the step was completed. Some entries require the value of a parameter to be recorded. It is important to record these parameter values as they are assigned because in some cases they are referenced by subsequent steps.

9.1. DFdiscover Software Installation

9.1.1. Staffing

XREF	Parameter	Value
[SI50]	UNIX administrator	
[SI51]	DFdiscover administrator	
[SI52]	Study setup	
[SI53]	Programmer	
[SI54]	SAS specialist	
[SI55]	Data entry	
[SI56]	Higher-level data review	

9.1.2. Before Installation

XREF	Parameter	Value
[SI00]	Company Name	
[SI01]	DFdiscover software release	5.5.0
[SI02]	Date	
[SI03]	Contact Person	
[SI04]	Server Hostname	
[SI05]	Server Operating System	

XREF	Description	Completed?
[SI08]	the name of a printer that can be accessed from the DFdiscover environment	
[SI09]	www.dfnetresearch.com can be accessed	
[SI57]	send email externally, for example to DF/Net Research, Inc. (<help@dfnetresearch.com>)	

9.1.3. Installation Materials

XREF	Parameter	Value
[SI13]	installation notes	

XREF	Parameter	Value
[SI14]	super-user password	
[SI15]	current DFdiscover software release	
[SI16]	current DFdiscover Release Notes	
[SI18]	Installation and Initialization chapter of the DFdiscover Acceptance Test Kit documentation	
[SI21]	DFdiscover License Renewal form	

XREF	Parameter	Value
[SI37]	hostid	
[SI38]	hostname	
[SI39]	# of users	
[SI40]	expiry date	
[SI42]	features	
[SI41]	password	
[SI22]	support username	
[SI23]	support password	

XREF	Description	Completed?
[SI24]	study setup	

9.1.4. Installation for Linux Systems

XREF	Parameter	Value
[SI32]	installation directory	
[LX00]	Linux installation completed successfully	

9.1.5. Request and Install Server Certificate

XREF	Description	Completed?
[CI01]	Use DFserveradmin to create the certificate request	
[CI02]	Save the signed certificate	

9.1.6. Request and Install DFdiscover License

XREF	Parameter	Value
[LI01]	server identifier	
[LI03]	Save the license	
[LI04]	Update hostname in DFdiscover License	

9.1.7. Migration of pre-2014 studies

If you do not have any pre-2014 studies to migrate, cross out this section.

XREF	Parameter	Value
[MG00]	pre-2014 studies migration completed successfully	

9.1.8. Load Journal files for pre-5.5 studies

If you do not have any pre-5.5 studies to migrate (e.g. you are a new customer with no studies), cross out this section.

XREF	Parameter	Value
[LJ00]	study journal files loaded	

9.2. DFdiscover Configuration

XREF	Description	Completed?
[DF10]	Define DFdiscover printers	

9.3. Start DFdiscover

XREF	Description	Completed?
[DF12]	start the DFdiscover services	

9.4. (Re-)configure DFdiscover Master

XREF	Description	Completed?
[DF06]	Configure DFdiscover Master	

9.5. Configure Incoming and Outgoing Daemons

XREF	Description	Completed?
[DF08]	configure an incoming daemon	
[DF09]	configure an outgoing daemon	

9.6. Integration Testing

9.6.1. Receiving Faxes

XREF	Description	Completed?
[IN01]	Fax a non-DFdiscover page	
[IN02]	Confirm fax archival	
[IN03]	View the fax in DFexplore	
[IN04]	Print the page from DFexplore	

9.6.2. Printing from DFdiscover

XREF	Description	Completed?
[IN05]	Print a plain text file	

9.6.3. Faxing from DFdiscover

XREF	Description	Completed?
[IN06]	Fax a plain text file	

9.7. Study Installation

9.7.1. Installing the study

XREF	Description	Completed?
[SS01]	Create a parent directory for all studies	
[SS02]	Obtain the study tar image	
[SS03]	Create a study folder and extract the contents of the tar image	
[SS04]	Update the file permissions and ownership	
[SS05]	Register the study to DFdiscover	

9.8. DFdiscover Acceptance Test Kit (ATK) Installation

XREF	Description	Completed?
[AT01]	the first of eighteen modules	
[AT02]	completion of all eighteen modules	

9.9. Client Desktop Package Installation

XREF	Description	Completed?
[PK01]	Windows client packages	
[PK02]	DFdiscover barcoding plug-in for FrameMaker®	

9.10. Installation Completion

XREF	Description	Completed?
[CL01]	Collect together all installation materials	
[CL02]	all required items completed without error	
[CL04]	Sign the completed worksheet	

9.11. Completion Sign-off

Vendor representative.

Name:	
Title:	
Signature:	
Date:	

Client representative.

Name:	
Title:	
Signature:	
Date:	

Appendix A. Copyrights - Acknowledgments

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The copyright information for each is provided below. If you would like to receive source codes of these third-party components, please send us your request at <help@dfnetresearch.com>.

A.1.1. DCMTK software package

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OFFIS e.V.

R&D Division Health
Eschereg 2
26121 Oldenburg, Germany

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A.1.5. mpack/munpack

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A.1.7. PostgreSQL

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A.1.13. QtAV

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A.1.15. c3.js

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A.1.16. d3.js

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