



HCL Domino 12 Systemadministration 2

Advanced Domino Administration Topics

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A warm welcome!

Are you already familiar with the basics of HCL Domino Administration and would like to delve into more advanced topics? Then this is the right book for you!

- This is not an introduction to Domino Administration - the contents of my book »HCL Domino 12 System Administration 1« or comparable knowledge is assumed.
- This book presents selected topics of Domino Administration and implements them in a learning environment. It is not intended to be a replacement for the HCL Notes/Domino software manual - full documentation is provided by HCL itself (see chapter [9.11. Official HCL product documentation](#) on page [223](#)).
- Because of its structure and detailed instructions, this book is very well suited as a detailed handout for use in seminars or for self-study.

I would strongly encourage you to follow all the steps presented in your own learning environment. »Learning by doing« is still one of the best ways to get familiar with new topics.

I wish you a great learning success and a lot of fun using the HCL Notes/Domino software!

Manfred Dillmann

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Table of contents

1. Introduction	8
1.1. Learning environment setup	9
1.2. Legal notice	10
2. Working with multiple Domains	11
2.1. Learning environment for chapters on this topic	12
2.2. Communication between foreign Domains	13
2.3. Selection of the level for cross certification	14
2.3.1. Cross certificates at the organizational level (O)	14
2.3.2. Cross certificates at the unit level (OU)	15
2.3.3. Cross certificates at the level of an ID file	16
2.4. Setup of the cross certification	17
2.4.1. Connection between Domino Servers without cross certificate	17
2.4.2. Creation of the cross certificate	18
2.4.3. Cross certificate in the Domino Directory	21
2.4.4. Successful connection with cross certificates	22
2.5. Mail routing between foreign domains	23
2.5.1. Connection documents	24
2.5.2. Functional test through mails	25
2.6. Replication between foreign domains	26
2.6.1. Distribution of the desired applications	26
2.6.2. ACL settings	26
2.6.3. Connection documents	28
2.7. Domain documents	30
2.7.1. Adjacent domains	30
2.7.2. Domain document for adjacent domains	31
2.7.3. Non adjacent domains	32
2.7.4. Domain document for non adjacent domains	33
2.8. Activation of foreign Directories	35
2.8.1. Replication	35
2.8.2. Activation via notes.ini	36
2.8.3. Activation via Directory Assistance	36
2.8.4. Documents in the Directory Assistance application	38
2.9. Merging Domains/Organizations	42
2.10. Learning environment for all further chapters in this book	43
3. User management	44
3.1. Resolve nested groups	45
3.2. Service generates out-of-office messages	47
3.2.1. Activation in the configuration document	47
3.2.2. Changed setting options for the user	49
3.3. ID Vault	50
3.3.1. What is the ID Vault?	51
3.3.2. Requirements for the ID Vault	51
3.3.3. How does the ID Vault work?	51

3.3.4. Synchronization of local user IDs.....	52
3.3.5. Synchronization of user IDs when using multiple workstations.....	52
3.3.6. Recovery of deleted user IDs.....	52
3.3.7. Setting up the ID Vault.....	53
3.3.8. Checking the ID Vault setup.....	61
3.3.9. Upload of user IDs to the ID Vault.....	61
3.3.10. Using the ID Vault - user has forgotten his password.....	63
3.3.11. Using the ID vault - user ID file was deleted.....	66
3.3.12. Using the ID Vault - extract user ID file.....	67
3.3.13. Make changes to the ID Vault configuration.....	69
3.3.14. New features of the ID Vault as of Domino version 10.....	72
3.4. License tracking.....	75
3.4.1. Activation of license tracking.....	75
3.4.2. Documents in the userlicenses.nsf application.....	77
3.5. As of Domino 12: Entitlement Tracking.....	78
4. Mailrouting.....	79
4.1. More details about mails in the LOG application.....	80
4.1.1. Default for a new Domino Server.....	80
4.1.2. Settings in the configuration document.....	80
4.2. Mail recall.....	82
4.2.1. Settings in the configuration document.....	82
4.2.2. Configuration through policies.....	83
4.2.3. Recall of mails by the user.....	85
4.3. Mail tracking.....	87
4.3.1. Settings in the configuration document.....	87
4.3.2. Using mail tracking.....	89
4.3.3. Reports.....	92
4.4. Scheduled sending of mails.....	94
4.4.1. Technical details.....	94
4.4.2. Setting in the configuration document.....	95
4.4.3. Configuration through policies.....	96
4.4.4. Using scheduled sending in the Notes Client.....	97
4.5. SMTP Mailrouting.....	98
4.5.1. Incoming SMTP mails.....	98
4.5.1.1. Configuration in the server document.....	98
4.5.1.2. Functional test.....	99
4.5.2. Outgoing SMTP mails when using one Domino Server.....	100
4.5.3. Outgoing SMTP mails when using multiple Domino Servers.....	101
4.5.3.1. Domain document.....	101
4.5.3.2. SMTP connection document.....	103
5. Applications.....	106
5.1. ODS (On Disk Structure).....	107
5.1.1. What is the ODS?.....	107
5.1.2. ODS versions.....	108
5.1.3. Changing the ODS.....	108
5.1.3.1. Entry in the notes.ini file.....	108
5.1.3.2. Activation of ODS for existing applications.....	109
5.1.4. Changing the ODS for all applications.....	110
5.1.5. Changing the ODS for templates and mailboxes.....	110

5.1.6. Design and data compression	110
5.1.6.1. Activation for single applications	111
5.1.6.2. Activation for multiple applications	111
5.2. Transactional Logging	113
5.2.1. What is Transactional Logging?	113
5.2.2. Activation of Transactional Logging	114
5.2.2.1. Activation on the Domino Server	114
5.2.2.2. Activation for single applications	117
5.2.2.3. Activation for multiple applications	117
5.2.3. Meaning of the Database Instance ID (DBIID)	118
5.3. DAOS (Domino Attachment and Object Services)	120
5.3.1. Requirements for using DAOS	120
5.3.2. Using DAOS with Domino Servers of different versions	120
5.3.3. Enable DAOS	121
5.3.3.1. Activation on the Domino Server	121
5.3.3.2. Activation for single applications	123
5.3.3.3. Activation for multiple applications	123
5.3.4. Reduction of the required storage space (example)	124
5.3.5. Saving older file attachments in the DAOS Pool	125
5.3.6. DAOS Catalog	126
5.3.7. DAOS console commands	126
5.3.8. DAOS Tips	127
5.3.8.1. Server mailboxes	127
5.3.8.2. Three .nlo files for the same file attachment?	127
5.4. Domain Catalog and Domain Search	129
5.4.1. The Catalog application (catalog.nsf)	129
5.4.2. Activation Domain Search on the Domino Server	130
5.4.3. Activation of Domain Search in applications	132
5.4.4. Creation of the search index by the Domain Indexer Task	133
5.4.5. Problem solution: Inclusion of applications in the Domain Search index	134
5.4.6. Domain Search in Notes Client	135
5.4.6.1. Customize Location	135
5.4.6.2. Doing a Domain Search	136
5.5. Domino Backup & Restore	138
5.5.1. Components	138
5.5.2. Configuration	139
5.5.2.1. Global Configuration	139
5.5.2.2. Backup Configuration Document	141
5.5.3. Backup (example)	142
5.5.4. Restore an application(example)	143
6. Monitoring	146
6.1. Domino consoles	147
6.1.1. Global settings for Domino Server consoles	147
6.1.2. Console in Domino Administrator	149
6.1.3. HCL Domino Console	149
6.1.4. Log application	150
6.1.5. Log filter	151
6.2. Monitoring classic: statistics and event monitoring	153
6.2.1. Statistic values of the Domino Server	153
6.2.2. Statistical values in the Monitoring Results application	154

6.2.2.1. Starting the Collect task	154
6.2.2.2. Definition of the collection interval	155
6.2.2.3. Recorded statistics values	157
6.2.3. Monitoring of self-defined statistics limits	158
6.2.4. Notifications through Event Handler	162
6.2.4.1. Self-defined statistics limits	163
6.2.4.2. Other options of the Event Handler	166
6.2.5. Monitoring other events	169
6.2.6. Additional views of the Monitoring Configuration	170
6.3. DDM (Domino Domain Monitoring)	171
6.3.1. What is Domino Domain Monitoring?	171
6.3.2. DDM Probes	172
6.3.3. DDM Events	174
6.3.4. DDM Filter	176
6.3.5. Hierarchical structures for collecting DDM events	177
7. Domino Cluster	179
7.1. Overview	180
7.1.1. Concept	180
7.1.2. Requirements	180
7.1.3. Components	181
7.2. Creating a cluster / adding servers to the cluster	182
7.3. What changes after a cluster is created?	184
7.3.1. Cluster Tasks	184
7.3.2. Cluster Directory (clbdir.nsf)	184
7.3.3. Local Free Time Info (clusbusy.nsf)	185
7.4. Manually distribute the applications in the cluster	186
7.5. Cluster test	187
7.5.1. Cluster Replicator	187
7.5.2. Cluster Failover	187
7.6. Special settings / commands	188
7.6.1. server_restricted - Force manual failover	188
7.6.2. server_availability_threshold - Load balancing in the cluster	188
7.6.3. rtr_logging - More details about cluster replication	189
7.6.4. crepl - Console command	189
7.7. New as of Domino 10: Symmetric Cluster	190
7.7.1. Requirements	190
7.7.2. How it works	191
7.7.2.1. Missing applications	191
7.7.2.2. Damaged applications	191
7.7.2.3. Tasks of the repair service	191
7.7.3. Setup of the Symmetric Cluster	192
7.7.3.1. notes.ini entry	192
7.7.3.2. Tasks	192
7.7.3.3. Cluster Configuration Documents	193
7.7.3.4. Symmetric Cluster Test	196
7.8. Discontinue Domino Cluster	197
7.8.1. Removing individual or all Domino Servers	197
7.8.2. Manual tasks	198

8. Extras	199
8.1. Domino Server as LDAP Server - Changing the LDAP Schema	200
8.2. Automatic restart after crashes	203
8.3. Consolidate Domino Server - Decommissioning Analysis	204
8.4. DCT - Domino Configuration Tuner	206
9. Good to know	209
9.1. Abbreviation of commands at the Domino console	210
9.2. Show file name in application icons	211
9.3. Usage of tools vs. actions	212
9.4. Help function for individual fields	214
9.5. Make Notes Clients faster	215
9.6. Sorted list of all notes.ini entries	217
9.7. Does it matter on which server I administrate?	218
9.8. Why are documents missing in Domino Administrator?	219
9.9. Why are changes not applied immediately?	220
9.10. Line breaks in the Domino Console	222
9.11. Official HCL product documentation	223

1. Introduction

1.1. Learning environment setup

Normally, according to HCL specifications, a Domino Server is to be installed on a Windows Server (or one of the other possible server operating systems - e.g. Linux).

Since we are only implementing a learning environment, Windows 10/11 Pro is also very suitable. Equipped with a reasonably up-to-date CPU and with 3-4 GByte RAM, all shown functions will run smoothly.

If you also want to install a learning environment at your end, you will need the following:

- **Windows 10/11 Pro**
(these do not have to be physical PCs - a virtual machine is also suitable)

One Domino Server + Domino Administrator can be installed on one Windows instance at the same time - if there are to be multiple Domino Servers, the rule is:

- 1 x Windows 10/11 Pro for each Domino Server

- **Notes Client (inkl. Administrator) and Domino Server Version 9.0.1.x bis 12.0.1**

Before someone asks: Notes and Domino are commercial products of the company HCL and cannot be downloaded »just like that« somewhere.

However, since you are probably dealing with Domino Administration as an employee of a company (Notes/Domino is hardly used by private persons), the software should be available in your company.

Hint

To be able to try out functions such as those described in the chapters [2. Working with multiple Domains](#) on page 11 or [7. Domino Cluster](#) on page 179, at least two Domino Servers are required.

Language of the operating system and Notes/Domino software

Also in the German edition of this book, both the Windows operating system and the Notes/Domino software are used in **English**. This is primarily for the following reasons:

- Many administrators now prefer the English language for software. A search for possible solutions to problems in English is much more successful.
- When creating the book, I don't have to take all the screenshots multiple times.

1.2. Legal notice

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Hints

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Great care has been taken in the preparation of texts and illustrations - nevertheless, errors cannot be completely ruled out.

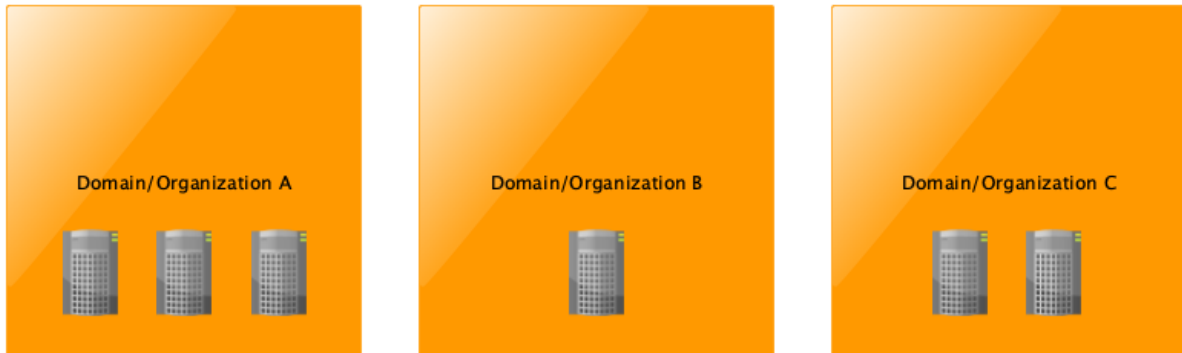
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2. Working with multiple Domains

2.1. Learning environment for chapters on this topic

In order to be able to try out a special feature with the domain documents later (chapter 2.7. [Domain documents](#) on page 30), an environment with 3 domains is desirable.



The number of Domino Servers within a domain does not matter - a single Domino Server would be sufficient.

Hint

To be able to demonstrate the mentioned feature, I will set up the learning environment with 3 Domino Servers.

We use the following names:

Domino Server	Domain	Organization	Administrator
S01	Dom1	Org1	Admin1
S02	Dom2	Org2	Admin2
S03	Dom3	Org3	Admin3

What to do now?

- Installation of the Domino Servers on one Windows machine at a time
- Installation of the Notes Client (incl. Domino Administrator) on one Windows machine at a time
- Domino Server configuration
- Start up of the Domino Server
- Startup of the Notes Client

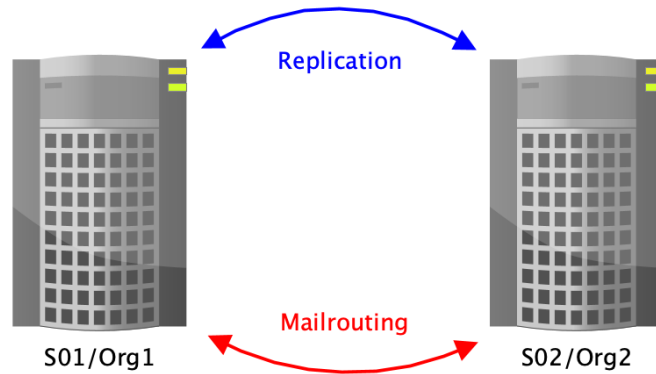
Important

We will reset the current installation towards the end of the chapter »Working with multiple domains« and work with only one domain/organization in the further chapters.

Therefore, make a copy of the respective installation directory **before** configuring the Domino Servers and starting up the Notes Clients. This will save you the time and effort of a new installation that would otherwise be necessary.

2.2. Communication between foreign Domains

This chapter shows how to connect Domino Servers from different domains/organizations. Since we are talking about Domino Servers, we are discussing replication and mail routing (NRPC mail routing, not SMTP).



Communication between Domino Servers from different domains/organizations is basically not different from the communication that takes place between Domino Servers from the same domain/organization.

Only the authentication, i.e. the »handshake« when the Domino Servers connect, will not work »just like that«, because the server IDs involved come from different organizations (i.e. are »descendants« of different cert.id's).

We remember:

When setting up the first Domino Server, a certificate (you could call it the root certificate of the Notes/Domino environment) is created, which is stored in the cert.id file and is included in the ID files of servers or users when they are registered.

If a connection attempt is now made between two Domino Servers, each of the Domino Servers involved checks whether the other side also has this certificate. If this is the case, the subsequent communication will take place without any problems. Otherwise, error messages will appear on the Domino console (or in the »log.nsf«) and access will be denied.

Domino Server and Notes Clients only communicate with each other if the server or user IDs used carry the same root certificates, i.e. originate from the same cert.id file (or a unit ID created with it).

To enable communication between »foreign« Domino Servers and/or Notes Clients, so-called Cross Certificates have to be created on both systems involved.

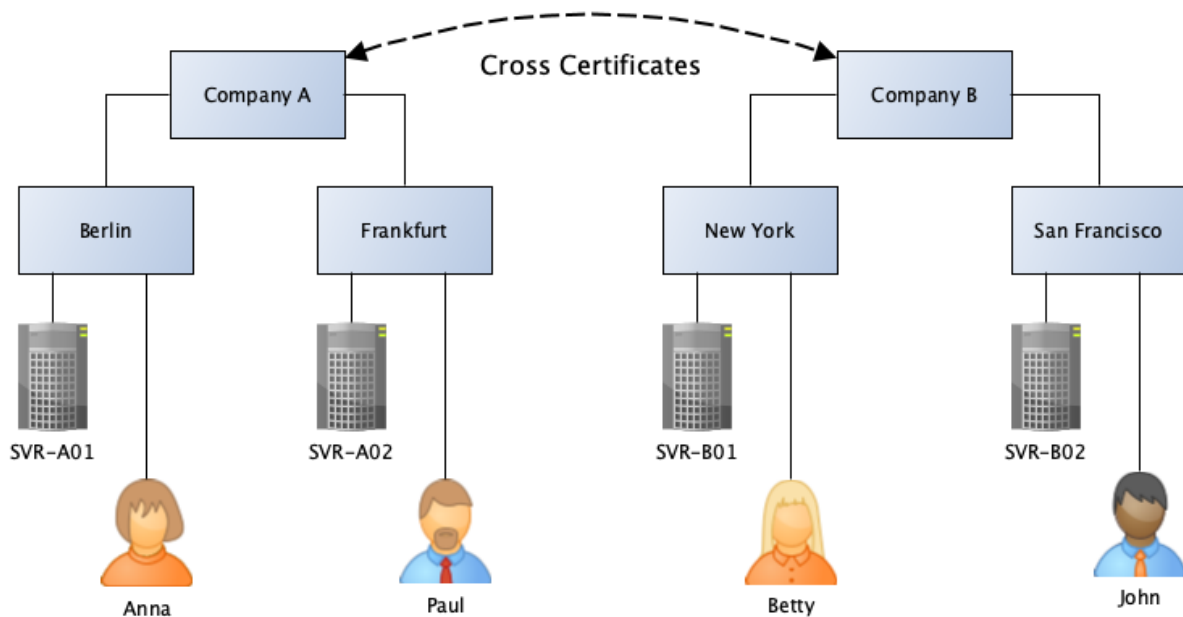
This can be done at different levels (organization, unit, server or person ID). The details of this will be presented in the next chapter.

2.3. Selection of the level for cross certification

In this chapter you will learn at which level (organization, unit, server or person ID) a cross certification is possible. The concrete steps for creating the Cross Certificates will then be shown in the next chapter.

In the following, 3 examples are presented, each of which shows a cross certification on one of the levels. Any other variants (e.g. server ID is cross certified with the »cert.id«) are possible.

2.3.1. Cross certificates at the organizational level (O)



Here, the cross certification is performed at the level of the **organization**.

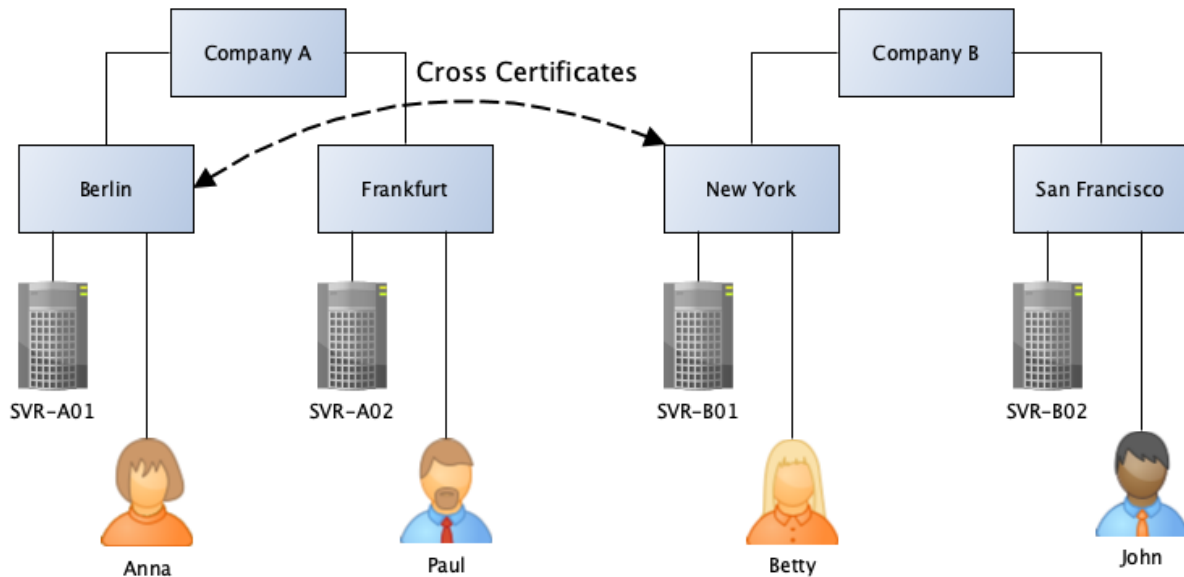
This means that the organizations trust each other completely. Any Domino Server from Company A (SVR-A01, SVR-A02) can communicate with any Domino Server from Company B (SVR-B01, SVR-B02). Even any employee can access any Domino Server of the other side.

One must ask oneself in the case of a cross certification on the level of the organization whether one wants to remove the previously existing separation between the organizations in practice to that extent. If two companies merge and thus constitute a single entity, cross certification at this level is conceivable, otherwise caution is advised.

Conclusion

If you want to exchange information with a cooperation partner via replication or mail routing, cross certification at the organizational level seems too high. In this case, cross certification is recommended at most at the OU level or - better, because more secure - at the level of individual server IDs.

2.3.2. Cross certificates at the unit level (OU)



Here, cross certification takes place at the **organizational unit** level.

By creating the Cross Certificates at the unit level, significantly fewer Domino Server or Notes users are already able to access Domino Servers on the remote side.

At the Berlin location, only Anna and the server SVR-A01 are granted access to the Domino Server SVR-B01 at the New York location. Betty and the Domino Server SVR-B01 at the New York location are granted access to the Domino Server SVR-A01 in Berlin.

The number of communication partners is thus considerably reduced compared to cross certification at the organizational level. Nevertheless, the responsible administrator must at least reckon with accesses from strangers - their number cannot be readily estimated and thus not the resources used on the company's own Domino Servers.

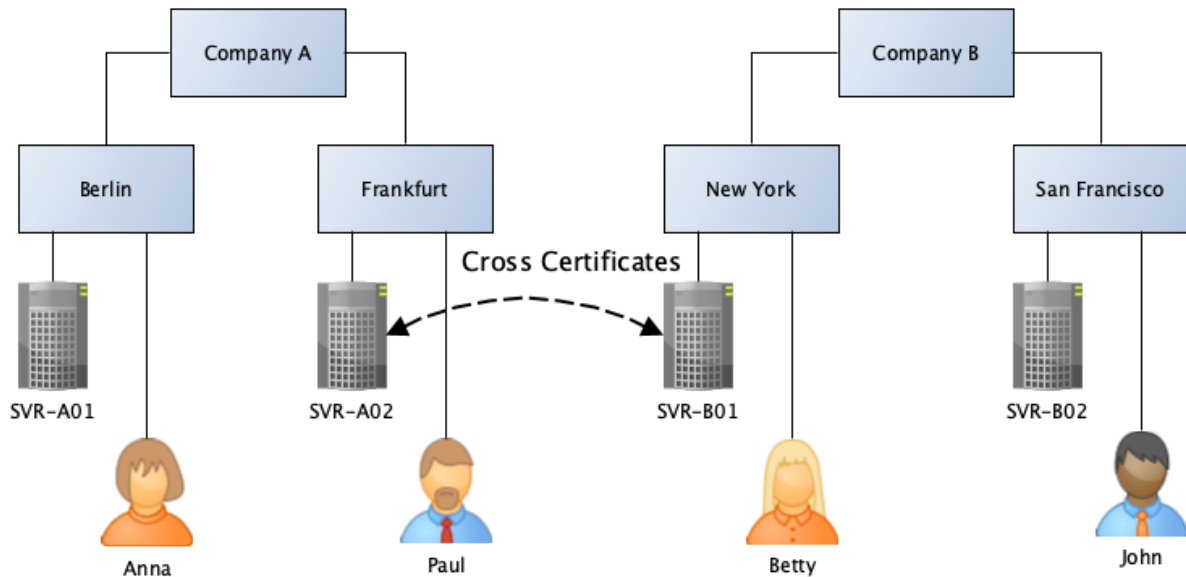
Likewise, the ACLs of all applications must be carefully maintained so that the employees of the foreign company cannot access information not intended for them in an uncontrolled manner.

Conclusion

Although cross certification at the unit level, as opposed to the organization level, reduces the number of possible communication partners, the fundamental question is whether employees with their Notes Client have access to the other side at all?

The Domino Servers exchange all the necessary information via replication and mail routing, so individual access for individual employees is usually not required at all.

2.3.3. Cross certificates at the level of an ID file



Here, the cross certification is done at the level of **Server ID files**.

In the example, only the Domino Server SVR-A02 at the Frankfurt location can communicate with the Domino Server SVR-B01 in New York. At first glance, this looks like a massive restriction of the communication possibilities. However, since the entire information flow (replication, mail routing) in a Notes/Domino environment always takes place via Domino Servers, this is not a restriction.

If only the servers from Frankfurt and New York communicate with each other, the information exchanged between the companies can also be passed on within the respective company via replication.

Conclusion

If cross certification is performed at the level of server ID files, it is known exactly who is communicating with whom. According to this concept, it will not happen that uncontrolled foreign users access one's own Domino Servers.

On the other hand, there is no restriction on the distribution of information and it is known at any time through which channels it is exchanged.

For these reasons, Cross Certificates at the ID file level seem to be the first choice for security-conscious administrators.

2.4. Setup of the cross certification

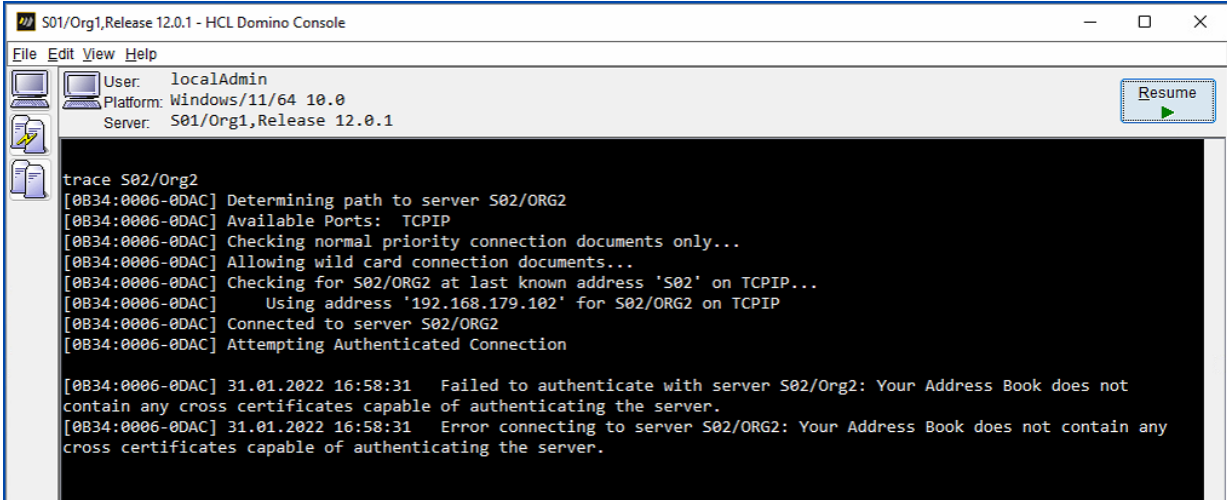
This chapter shows how to create a Cross Certificate quickly and conveniently.

Hint

In addition to the variant shown here for creating the Cross Certificates, this can also be done by exchanging ID files (possibly via mail routing). These variants are more complicated and time-consuming. For this reason, they are not presented in the book.

Subsequently, a Cross Certificate is created at the level of Server IDs.

2.4.1. Connection between Domino Servers without cross certificate



```
S01/Org1,Release 12.0.1 - HCL Domino Console
File Edit View Help
User: localAdmin
Platform: Windows/11/64 10.0
Server: S01/Org1,Release 12.0.1
Resume

trace S02/Org2
[0B34:0006-0DAC] Determining path to server S02/ORG2
[0B34:0006-0DAC] Available Ports: TCPIP
[0B34:0006-0DAC] Checking normal priority connection documents only...
[0B34:0006-0DAC] Allowing wild card connection documents...
[0B34:0006-0DAC] Checking for S02/ORG2 at last known address 'S02' on TCPIP...
[0B34:0006-0DAC] Using address '192.168.179.102' for S02/ORG2 on TCPIP
[0B34:0006-0DAC] Connected to server S02/ORG2
[0B34:0006-0DAC] Attempting Authenticated Connection

[0B34:0006-0DAC] 31.01.2022 16:58:31 Failed to authenticate with server S02/Org2: Your Address Book does not
contain any cross certificates capable of authenticating the server.
[0B34:0006-0DAC] 31.01.2022 16:58:31 Error connecting to server S02/ORG2: Your Address Book does not contain any
cross certificates capable of authenticating the server.
```

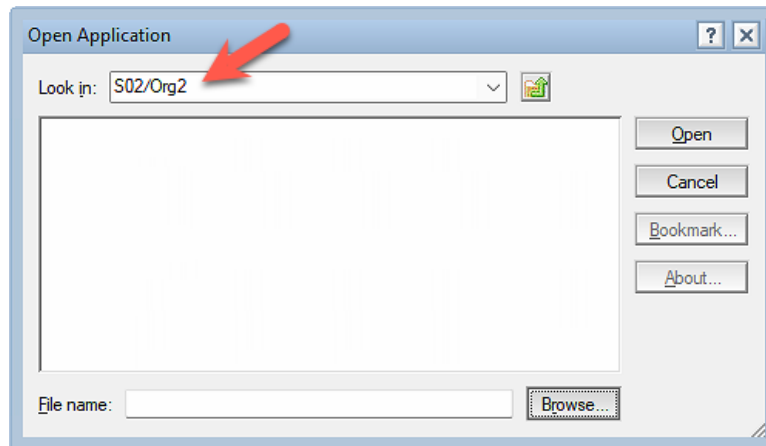
Communication between Domino Servers from different organizations is basically not possible. If you try to establish a connection with the console command »trace« (assuming accessibility via the network), the error messages shown in the screenshot appear.

Message at the Domino Console	Explanation
Attempting Authenticated Connection	An attempt is made to establish a connection, during which the two partners check each other (authentication).
Failed to authenticate with server S02/Org2: Your Address Book does not contain any cross certificates capable of authenticating the server.	Authentication fails because there is no Cross Certificate in the Directory (»names.nsf«) to confirm the foreign Domino Server.
Error connecting to server S02/Org2: Your Address Book does not contain any cross certificates capable of authenticating the server.	No connection can be established because there is no Cross Certificate in the directory (»names.nsf«) to confirm the foreign Domino Server.

2.4.2. Creation of the cross certificate

As mentioned earlier, we will not create the Cross Certificates by exchanging files. It is easier and faster by the following procedure.

In Domino Administrator (which is used for »Org1«) select the menu item »File« → »Application« → »Open« (hotkey: Ctrl + O).

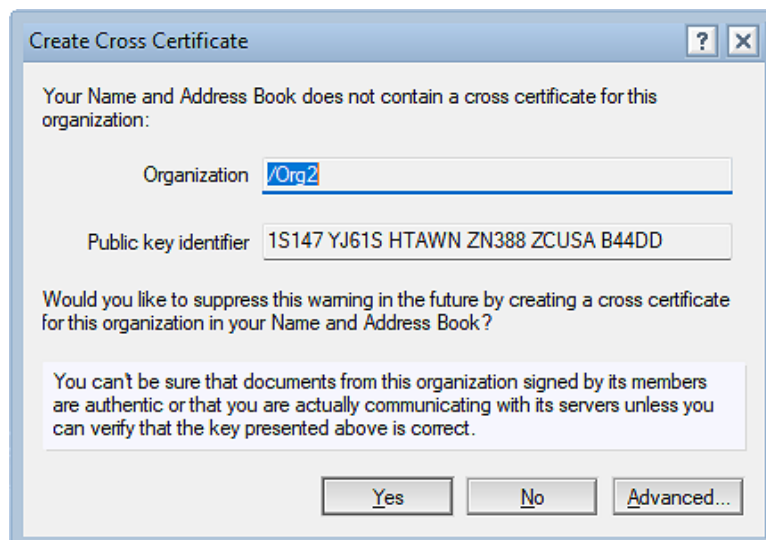


In the upper input field »Look in« enter the name of the Domino Server you want to access.

Hint

This requires accessibility via the network. The name resolution must work and TCP port 1352 must be open in the firewall on the other side.

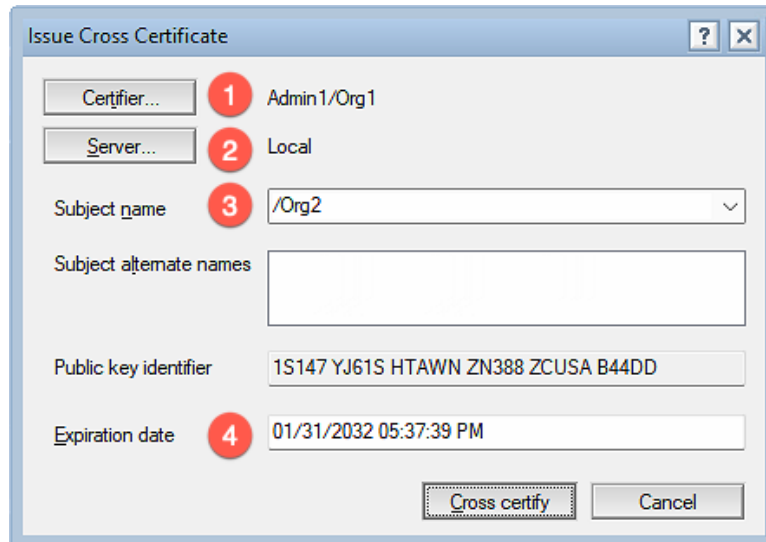
Confirm the dialog with »Open«.



Do **not** click the »Yes« button here. The result would be a Cross Certificate stored in the local Contacts application (»names.nsf«) of the Notes Client.

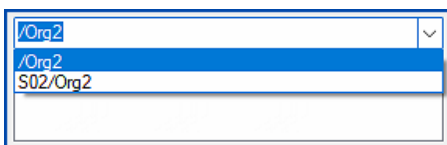
This Cross Certificate would confirm that the currently used user ID trusts the »Org2« organization (the Notes Client accepts connections to the »Org2« organization).

Such a Cross Certificate stored locally on the Notes Client is useless for Domino Server communication. Therefore, click on the »Advanced« button.



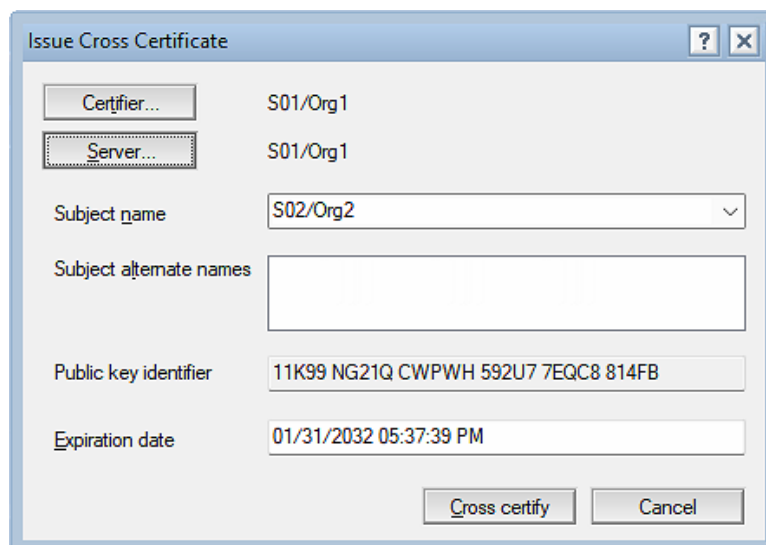
These are the defaults in this dialog. Do **not** click the »Cross certify« button here immediately! These defaults are **not** suitable for creating the Cross Certificate for the Domino Servers.

1. Use the »Certifier...« button to select who from your Domino environment trusts the remote site. This should be the server ID of your own Domino Server.
2. Where should the Cross Certificate be stored? Locally in the »names.nsf« of the Notes Client (not useful) or in the »names.nsf« on your own server? Select one of your Domino Servers by the button »Server...«.
3. At which level do you trust the other side? Pre-selected is the organization level, but you can explicitly specify the Domino Server of the other side by clicking the selection arrow on the right.



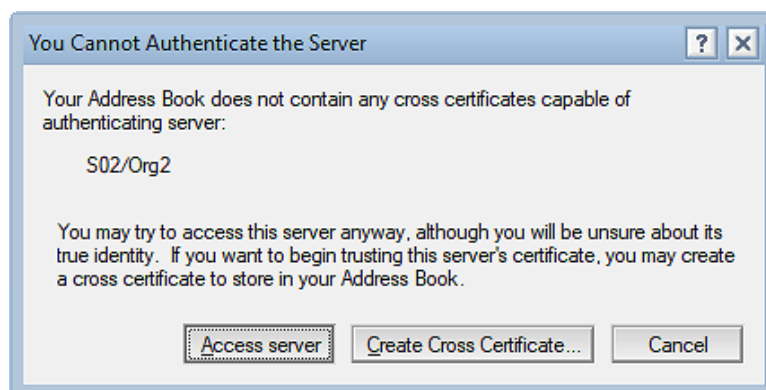
4. How long should the Cross Certificate be valid? A validity period of 10 years is preset. Since you can later terminate the connection to the other side at any time by deleting the Cross Certificate, longer durations can be specified here without any problems.

After changing the parameters, the dialog looks like this:

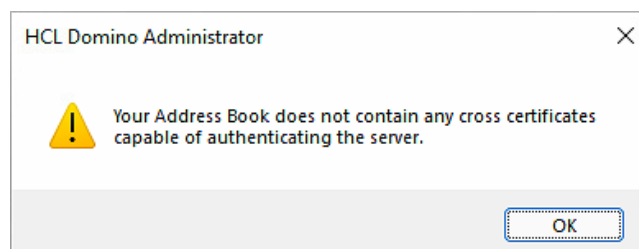


With these settings the own Domino Server »S01/Org1« trusts the foreign Domino Server »S02/Org2« and the Cross Certificate is valid until 01/31/2032.

Confirm this dialog with the button »Cross certify«. With high probability the following dialog appears.



The Domino Administrator would like to inform you that (from his point of view) there is no Cross Certificate stored in the local »names.nsf« yet. Since we do not need such a certificate, you can close this dialog via the »Cancel« button.



Another indication that there is no Cross Certificate in the Notes Client's »names.nsf« application.

Conclusion

As a result of the previously performed steps, a new cross certificate is stored in the Domino Directory ("names.nsf") on the specified own Domino Server.

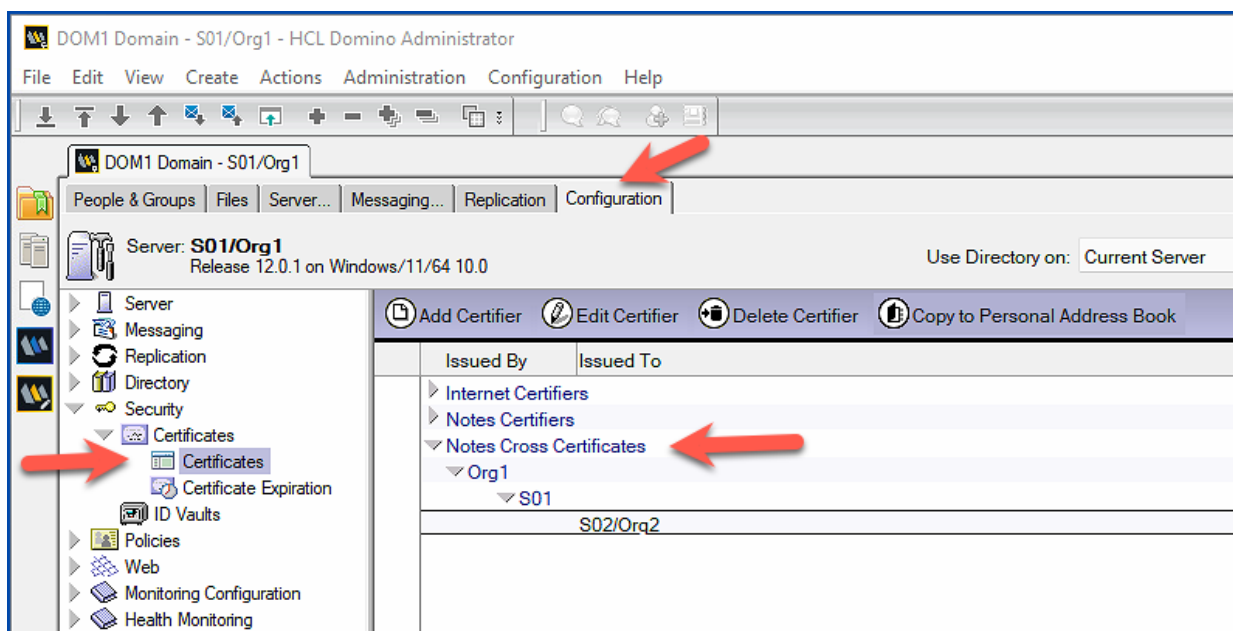
2.4.3. Cross certificate in the Domino Directory

In Domino Administrator, open the Configuration tab and select the »Security« → »Certificates« → »Certificates« view in the navigation on the left.

Hint

You can also find the »Certificates« view on the »People & Groups« tab.

Expand the »Notes Cross Certificates« category.



The Domino Server »S01/Org1« from the organization »Org1« trusts the Domino Server »S02/Org2« from the organization »Org2«. This is shown in the two columns »Issued By« and »Issued To«.

This completes all the required steps in the »Org1« organization.

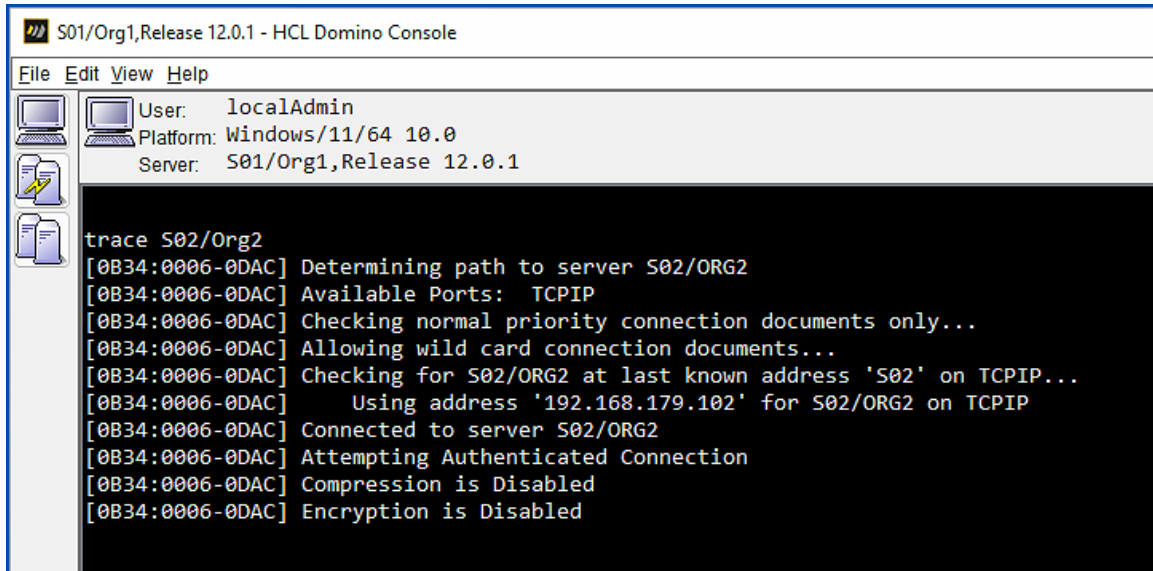
Hint

Cross Certificates only work if they exist in both Notes/Domino environments. Consequently, the responsible administrator on the remote side must also perform these steps.

2.4.4. Successful connection with cross certificates

Provided that all steps have been carried out correctly, there is nothing to prevent the servers involved from establishing a connection.

At the Domino console, the connection setup via »trace« command looks like this:



```
S01/Org1,Release 12.0.1 - HCL Domino Console
File Edit View Help
User: localAdmin
Platform: Windows/11/64 10.0
Server: S01/Org1,Release 12.0.1

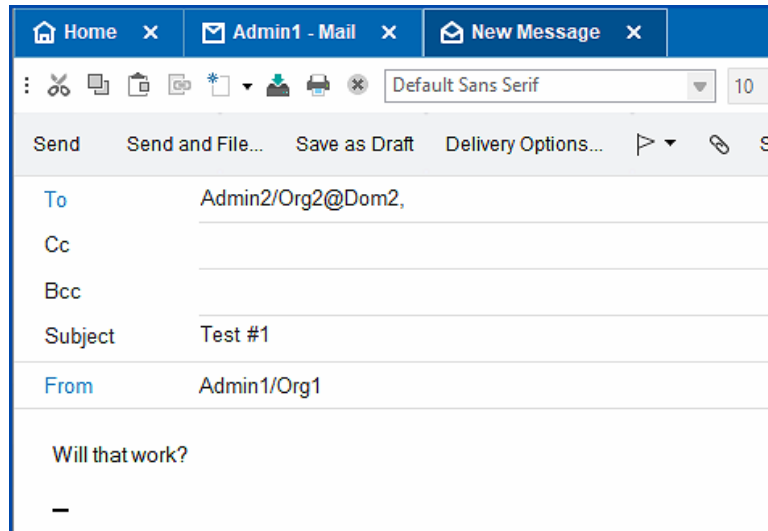
trace S02/Org2
[0B34:0006-0DAC] Determining path to server S02/ORG2
[0B34:0006-0DAC] Available Ports: TCPIP
[0B34:0006-0DAC] Checking normal priority connection documents only...
[0B34:0006-0DAC] Allowing wild card connection documents...
[0B34:0006-0DAC] Checking for S02/ORG2 at last known address 'S02' on TCPIP...
[0B34:0006-0DAC] Using address '192.168.179.102' for S02/ORG2 on TCPIP
[0B34:0006-0DAC] Connected to server S02/ORG2
[0B34:0006-0DAC] Attempting Authenticated Connection
[0B34:0006-0DAC] Compression is Disabled
[0B34:0006-0DAC] Encryption is Disabled
```

There are no error messages, authentication is correct, and the servers involved can perform replication and mail routing with each other properly from this point on.

The additional steps required to configure replication and mail routing are described in the following chapters.

2.5. Mail routing between foreign domains

Once Domino Servers from different domains/organizations communicate based on the Cross Certificates , NRPC mail routing will still not work.

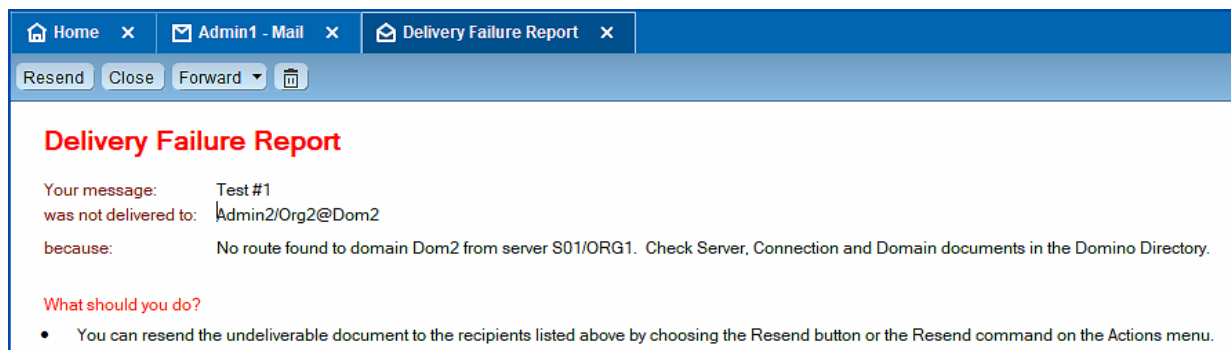


A mail is sent from »Admin1/Org1@Dom1« to the person »Admin2/Org2@Dom2«.

Hint

The recipient **cannot** be selected by the link »To« from the own Domino Directory - there is no person document for this person.

In the chapter [2.8. Activation of foreign Directories](#) on page 35 you will learn how to integrate foreign directories into your own Domino environment for convenient selection of recipients.

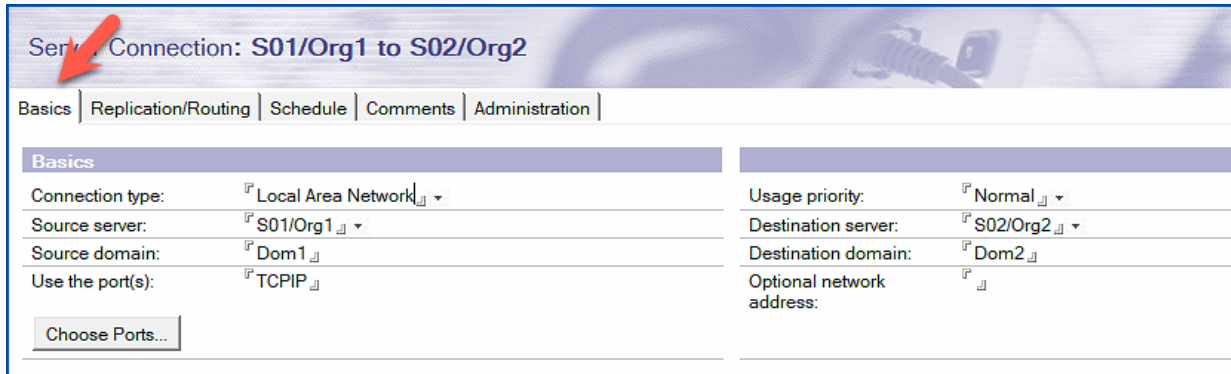


The sender receives this »Delivery Failure Report« - the mail cannot be delivered.

The note »Check Server, Connection and Domain documents in the Domino Directory« is correct - the required connection documents are missing at the moment.

2.5.1. Connection documents

Create a new connection document.



Server Connection: S01/Org1 to S02/Org2

Basics | Replication/Routing | Schedule | Comments | Administration

Basics	
Connection type:	Local Area Network
Source server:	S01/Org1
Source domain:	Dom1
Use the port(s):	TCPIP
Usage priority:	Normal
Destination server:	S02/Org2
Destination domain:	Dom2
Optional network address:	

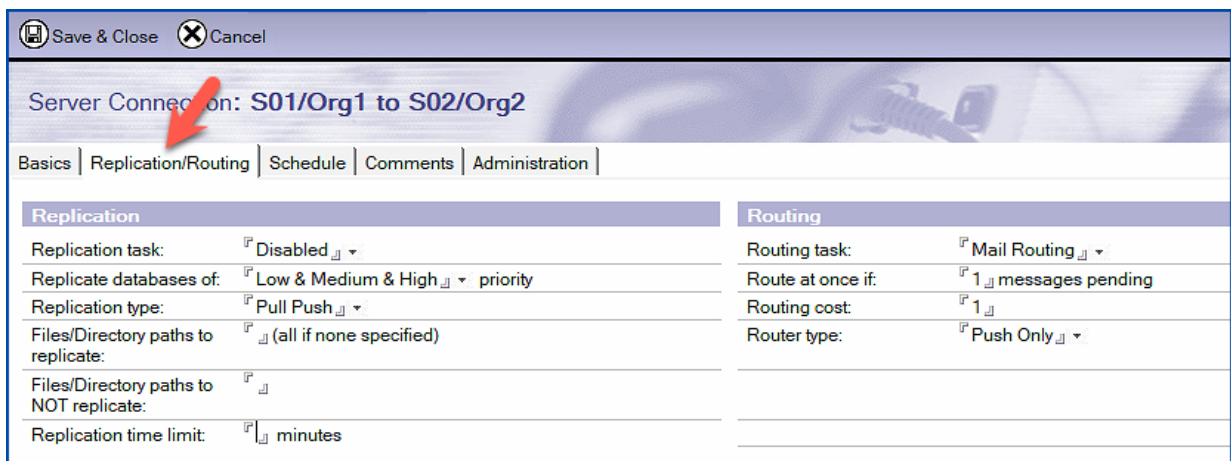
Choose Ports...

On the Basics tab, the source and target servers and the source and target domains are named.

Hints

You may have wondered why the source and destination domains are always specified in the connection documents - they are always the same for internally sent mails.

However, as soon as mails are sent to foreign domains via NRPC, the own Domino Servers know which Domino Server is taking care of the transfer by specifying it in the »Destination domain« field. If you have several Domino Servers in use (in several named networks), they will deliver all mails addressed to the foreign domain to the Domino Server selected in the »Source server« field.



Save & Close Cancel

Server Connection: S01/Org1 to S02/Org2

Basics | Replication/Routing | Schedule | Comments | Administration

Replication		Routing	
Replication task:	Disabled	Routing task:	Mail Routing
Replicate databases of:	Low & Medium & High priority	Route at once if:	1 messages pending
Replication type:	Pull Push	Routing cost:	1
Files/Directory paths to replicate:	(all if none specified)	Router type:	Push Only
Files/Directory paths to NOT replicate:			
Replication time limit:	minutes		

Replication is disabled on the Replication/Routing tab and the settings in the Routing section are as specified.

Server Connection: S01/Org1 to S02/Org2

Basics | Replication/Routing | Schedule | Comments | Administration

Scheduled Connection

Schedule: Enabled

Connect at times: 12:00 AM - 11:59 PM each day

Repeat interval of: 5 minutes

Days of week: Sun, Mon, Tue, Wed, Thu, Fri, Sat

Mail routing should be enabled around the clock.

Save the new connection document. After the server accepts the settings (see chapter 9.9. [Why are changes not applied immediately?](#) on page 220), mails are routed to the foreign domain.

At the Domino console, you can use the »show schedule« command to check whether the Domino Server is using the settings from the connection document.

```
sh sch
[235C:0006-12B4] Scheduled   Type   Next schedule
[235C:0006-12B4] S02/Org2           Mail Routing           02.02.2022 14:05:00
```

2.5.2. Functional test through mails

Send another mail to a recipient in the foreign Notes/Domino domain.

If all settings in the connection document are correct and the Domino Server has accepted them, the mail will be delivered without any problems.

```
[2110:000C-0E6C] 02.02.2022 14:19:19 Router: Transferring mail to S02/ORG2 via Notes
[2110:000C-0E6C] 02.02.2022 14:19:19 Router: Transferred 1 messages to S02/ORG2 via Notes
[2110:0006-1F2C] 02.02.2022 14:19:20 Router: Message 00287519 transferred to S02/ORG2 for Admin2/Org2@Dom2 via Notes
```