

# eFLOW

## Specifications

Version 6.0

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# About this document

This document contains information about eFLOW 6.0 hardware and software requirements.

We strongly recommend checking that all the requirements are met before you start the eFLOW installation.

## eFLOW hardware requirements

This section lists the minimum hardware requirements to install and run eFLOW.

**Important:** All hardware requirements listed here refer to the minimum project configuration and should serve only as a starting point for creating a list of hardware requirements for the specific project.

### Network infrastructure

Component	Minimum requirement
Network adapter	Any type of Fast Ethernet network adapter at 1 Gbit and more.
Bandwidth	Between the eFLOW server and the SQL server there should be a minimum of 100 Mbps, depending on the number of users and the volume. The recommended bandwidth is 1 Gbps.
Throughput	Average of 50% of throughput dedicated to eFLOW at any given point of time.

### Data storage

Server type	Required storage type
Single eFLOW server	Any hardware storage device that can be accessed by the eFLOW server and has enough free disk space for eFLOW data.
Multiple eFLOW servers (cluster configuration)	See <a href="#">Data storage devices</a> .

## Server hardware requirements

Component	Minimum requirement
Processor	Dual processor 2.0 GHz
RAM	2 GB. We recommend increasing the server RAM to 8 GB for the production environment.
Network cards	1GB teamed network card
Hard disk speed	10,000 RPM
Hard disk free space	100 GB. Should be increased for projects processing a large amount of data.

## SQL server hardware requirements

The SQL server hardware should provide the best possible performance for data transactions. The rule of thumb is that it should be the most powerful machine in every eFLOW project.

Component	Minimum requirement
Processor	Dual processor 2.0 GHz
RAM	2 GB. We recommend increasing the server RAM to 8 GB for the production environment.
Network cards	1GB teamed network card
Hard disk speed	10,000 RPM
Hard disk free space	100 GB. Should be increased for projects processing a large amount of data.

## Client hardware requirements

### Automatic stations

Component	Minimum requirement per station
Processor	Pentium 4 2.0 GHz

Component	Minimum requirement per station
RAM	2 GB
Hard disk free space	15 GB for setup and dynamic data 3.5 GB for the OCR installation 0.5 GB for the eFLOW platform installation

### Manual stations

Component	Minimum requirement
Processor	Pentium 4 2.0 GHz
RAM	2 GB
Display resolution	640x480, 16 colors. We recommend using displays with a resolution of 1920x1080 and 32-bit true color.
Hard disk free space	15 GB for setup and dynamic data 0.5 GB for the eFLOW platform installation

### Standalone system hardware requirements

Component	Minimum requirement
Processor	Pentium 4 2.0 GHz
RAM	2 GB
Hard disk free space	30 GB

## Data storage devices

This section describes different eFLOW data storage configurations and explains how to select the best option for your project.

To learn more about the internal eFLOW data storage mechanisms, see the *eFLOW data* section in the *eFLOW Implementation Guide*.

## Data storage

All eFLOW setup and dynamic data can be stored either on the file system or in the MS SQL server database. The selection of the data storage type depends on the specific project requirements.

eFLOW application setup data contains all design time definitions, including forms and fields settings, workflow configuration and OCR engines parameters.

Application dynamic data contains information about all collections that are currently found in the system. Collection data includes the recognition results file (.DRD) and all collection attachments, starting with image files.

The eFLOW application setup and dynamic data can be stored either on the file system or in the SQL server database. The `<UseSqlDynamicStorage>` parameter in the `TisConfiguration.config` file indicates where the data will be stored.

**Note:** The `<UseSqlDynamicStorage>` parameter defines both setup and dynamic data storage types. It is not possible to store the setup data in the file system and dynamic data on the SQL server, or vice versa. This parameter is defined per eFLOW server and not per application. In other words, it defines the storage type for all the eFLOW applications on the current server.

After the storage device has been installed, you must make sure that the **TisAppPool** user has read and write permissions for the storage location. See the *eFLOW users* section in the *eFLOW Implementation Guide* for more information.

## Best practice

The table below shows the possible data storage options. It can help you to determine the most effective method to store eFLOW data.

The recommended configurations are indicated by **bold** text.

- Setup data storage: SQL server, local disk or network share.
- Dynamic data storage: SQL server that uses an NAS device.

To learn more about the data storage options, see [Setup data](#) and [Dynamic data](#).

		Local Server Disk	NAS (shared drive)	SAN
Setup	NTFS	<b>Supported</b>	<b>Supported</b>	Supported
	SQL Server	<b>Supported</b>	<b>Supported</b>	Supported

		<b>Local Server Disk</b>	<b>NAS (shared drive)</b>	<b>SAN</b>
Dynamic	NTFS	Not supported in clustered environments. Single server eFLOW installations can keep the dynamic data on the local server disk.	Not supported	Supported
	SQL Server	<b>Supported</b>	<b>Supported</b>	Supported

## Setup data

eFLOW setup data can be saved either on the file system or in the SQL server database.

The table below summarizes the advantages and disadvantages of different options.

<b>Storage type</b>	<b>Description</b>	<b>Pros</b>	<b>Cons</b>
Local drive	eFLOW setup data is stored on the local server drive and is synchronized manually between the servers.  This approach is good for projects where setup data is not changed too often.	There is no need to define any shared folders.	In a clustered environment, setup data must be synchronized manually between the servers.
Shared (NAS) drive	eFLOW setup data is stored on a shared drive (NAS) and can be read by all eFLOW servers.	All eFLOW servers read the same setup data.  No need to synchronize the data manually between the servers.	It is necessary to have access to a shared drive (NAS).  Setup data on the shared drive cannot be updated directly via the eFLOW Design module. This is because the transactional file storage used by eFLOW does not work with network shared resources. See the <i>Unsupported Scenarios</i> section in <a href="#">When to use transactional NTFS</a> .



Storage type	Description	Pros	Cons
Storage area network (SAN) system	eFLOW setup data is stored in a SAN system and is fully accessible to all eFLOW servers.	All eFLOW servers have full access to setup data.	SAN systems are usually expensive and require more professional maintenance than other storage devices.
SQL server	eFLOW setup data is stored in the SQL server database.	All eFLOW setup and runtime data (management, workflow, and collections) is stored on one device.	Requires additional SQL server configuration.

## Dynamic data

Application dynamic data contains information about all collections that are currently in the system. Collection data includes the recognition results file (.DRD) and all collection attachments, starting with image files.

eFLOW application dynamic data can be stored either on the file system or in the SQL server database.

The table below summarizes the advantages and disadvantages of different choices.

**Note:** After the storage device has been installed, you must make sure that the **TisAppPool** user has read and write permissions for the storage location. See the *eFLOW users* section in the *eFLOW Implementation Guide* for more information.

Storage type	Description	Pros	Cons
Local drive	eFLOW dynamic data is saved in the [AppData]\Server\ [ApplicationName]\Dynamic folder on the local drive.	Can be easily configured for standalone or single server eFLOW projects.  Does not require configuring the SQL server for storing the dynamic data.	Applicable only for standalone or single server eFLOW projects.

Storage type	Description	Pros	Cons
Shared (NAS) drive	eFLOW dynamic data cannot be stored on the shared network drive. This is because the transactional file storage used by eFLOW does not work with network shared resources. See the <i>Unsupported Scenarios</i> section in <a href="#">When to use transactional NTFS</a> .		
Storage area network (SAN) system	eFLOW dynamic data is stored in a SAN system and is fully accessible to all eFLOW servers.	All eFLOW servers have the full access to dynamic data. A SAN storage system is the only NTFS storage option for clustered eFLOW environments. This is because the transactional file storage used by eFLOW does not work with network shared resources. See the <i>Unsupported Scenarios</i> section in <a href="#">When to use transactional NTFS</a> .	SAN systems are usually expensive and require more professional maintenance than other storage devices.
SQL server	eFLOW dynamic data is saved in the SQL server database.	All eFLOW runtime data (management, workflow, and collections) is stored on one device. No expensive SAN devices are needed.	Requires additional SQL server configuration.

## eFLOW software requirements

This section contains information about installing and configuring eFLOW software prerequisites.

The tables below summarize the eFLOW software requirements.

	Server	Client	Web Validate	Web Scan	Web Front Office
<a href="#">.NET 4.7.2 Installation</a>	√	√	√	√	√
<a href="#">MS SQL Server 2012, 2014, 2016, 2017</a>	√				
<a href="#">Windows Roles and Features</a>	√		√	√	√
<a href="#">MSDTC</a>	√		√	√	√

**Note:** MSDTC should also be installed and configured on the SQL server machine. In eFLOW 6, MSDTC is required when a transaction uses more than one database. For example, when SLAs are used, a transaction can include both workflow and monitoring databases.

To learn how to install and configure eFLOW software prerequisites, see the following sections:

- [Windows Roles and Features](#)
- [MS SQL Server](#)
- [MSDTC](#)

## Supported operating systems

eFLOW can be installed on both 32-bit and 64-bit machines.

Operating System	Server	Client	Web Validate*	Web Scan*	Web Front*
Microsoft Windows Server 2016	√	√	√	√	√
Microsoft Windows 10	√	√	√	√	√
Microsoft Windows 8 / 8.1	√	√	√	√	√
Microsoft Windows Server 2012 R2	√	√	√	√	√
Microsoft Windows Server 2012	√	√	√	√	√

\* Web server side

## Windows Roles and Features

All required Windows features and Web Server (IIS) options can be enabled using the command line DISM utility.

**Note:** Command line options differ slightly between operating systems. Make sure you run the relevant script.

### Windows Server 2016

```
DISM.EXE /enable-feature /online /quiet /featureName:IIS-WebServerRole /featureName:IIS-WebServer /featureName:IIS-CommonHttpFeatures /featureName:IIS-StaticContent /featureName:IIS-DefaultDocument /featureName:IIS-DirectoryBrowsing /featureName:IIS-HttpErrors /featureName:IIS-ApplicationDevelopment /featureName:IIS-NetFxExtensibility /featureName:IIS-ASPNET /featureName:IIS-NetFxExtensibility45 /featureName:IIS-ASPNET45 /featureName:IIS-ISAPIExtensions /featureName:IIS-ISAPIFilter /featureName:IIS-HealthAndDiagnostics /featureName:IIS-HttpLogging /featureName:IIS-LoggingLibraries /featureName:IIS-RequestMonitor /featureName:IIS-Security /featureName:IIS-WindowsAuthentication /featureName:IIS-
```

```
RequestFiltering /featureName:IIS-Performance /featureName:IIS-WebServerManagementTools /featureName:NetFx4Extended-ASPNET45 /featureName:IIS-ManagementConsole /FeatureName:NetFx3 /FeatureName:NetFx3ServerFeatures /FeatureName:WAS-WindowsActivationService /FeatureName:WAS-ProcessModel /FeatureName:WAS-NetFxEnvironment /FeatureName:WAS-ConfigurationAPI /FeatureName:WCF-NonHTTP-Activation /FeatureName:WCF-HTTP-Activation /FeatureName:WCF-HTTP-Activation45
```

## Windows Server 2012

```
DISM.EXE /enable-feature /online /quiet /featureName:IIS-WebServerRole /featureName:IIS-WebServer /featureName:IIS-CommonHttpFeatures /featureName:IIS-StaticContent /featureName:IIS-DefaultDocument /featureName:IIS-DirectoryBrowsing /featureName:IIS-HttpErrors /featureName:IIS-ApplicationDevelopment /featureName:IIS-NetFxExtensibility /featureName:IIS-ASPNET /featureName:IIS-NetFxExtensibility45 /featureName:IIS-ASPNET45 /featureName:IIS-ISAPIExtensions /featureName:IIS-ISAPIFilter /featureName:IIS-HealthAndDiagnostics /featureName:IIS-HttpLogging /featureName:IIS-LoggingLibraries /featureName:IIS-RequestMonitor /featureName:IIS-Security /featureName:IIS-WindowsAuthentication /featureName:IIS-RequestFiltering /featureName:IIS-Performance /featureName:IIS-WebServerManagementTools /featureName:NetFx4Extended-ASPNET45 /featureName:IIS-ManagementConsole /FeatureName:NetFx3 /FeatureName:NetFx3ServerFeatures /FeatureName:WAS-WindowsActivationService /FeatureName:WAS-ProcessModel /FeatureName:WAS-NetFxEnvironment /FeatureName:WAS-ConfigurationAPI /FeatureName:WCF-NonHTTP-Activation /FeatureName:WCF-HTTP-Activation /FeatureName:WCF-HTTP-Activation45
```

## Windows 10

```
DISM /Online /quiet /enable-feature /FeatureName:IIS-WebServerRole /FeatureName:IIS-WebServer /FeatureName:IIS-WebServerManagementTools /FeatureName:IIS-ManagementConsole /FeatureName:IIS-ApplicationDevelopment /FeatureName:IIS-ISAPIExtensions /FeatureName:IIS-ISAPIFilter /FeatureName:IIS-CommonHttpFeatures /FeatureName:IIS-DefaultDocument /FeatureName:IIS-DirectoryBrowsing /FeatureName:IIS-HttpErrors /FeatureName:IIS-StaticContent /FeatureName:IIS-HealthAndDiagnostics /FeatureName:IIS-HttpLogging /FeatureName:IIS-RequestMonitor /FeatureName:IIS-Performance /FeatureName:IIS-Security /FeatureName:IIS-RequestFiltering /FeatureName:IIS-WindowsAuthentication /FeatureName:NetFx3 /FeatureName:IIS-NetFxExtensibility /FeatureName:NetFx4Extended-ASPNET45 /FeatureName:IIS-NetFxExtensibility45 /FeatureName:IIS-ASPNET /FeatureName:IIS-ASPNET45 /FeatureName:WAS-WindowsActivationService /FeatureName:WAS-ProcessModel /FeatureName:WAS-NetFxEnvironment /FeatureName:WAS-ConfigurationAPI /FeatureName:WCF-NonHTTP-Activation /FeatureName:WCF-HTTP-Activation /FeatureName:WCF-HTTP-Activation45
```

## Windows 8 / Windows 8.1

```
DISM /Online /quiet /enable-feature /FeatureName:IIS-WebServerRole /FeatureName:IIS-WebServer /FeatureName:IIS-WebServerManagementTools /FeatureName:IIS-ManagementConsole /FeatureName:IIS-ApplicationDevelopment /FeatureName:IIS-ISAPIExtensions /FeatureName:IIS-ISAPIFilter /FeatureName:IIS-CommonHttpFeatures /FeatureName:IIS-DefaultDocument /FeatureName:IIS-DirectoryBrowsing /FeatureName:IIS-HttpErrors /FeatureName:IIS-StaticContent /FeatureName:IIS-HealthAndDiagnostics /FeatureName:IIS-HttpLogging /FeatureName:IIS-RequestMonitor /FeatureName:IIS-Performance /FeatureName:IIS-Security /FeatureName:IIS-RequestFiltering /FeatureName:IIS-WindowsAuthentication /FeatureName:NetFx3 /FeatureName:IIS-NetFxExtensibility /FeatureName:NetFx4Extended-ASPNET45 /FeatureName:IIS-NetFxExtensibility45 /FeatureName:IIS-ASPNET /FeatureName:IIS-ASPNET45 /FeatureName:WAS-WindowsActivationService /FeatureName:WAS-ProcessModel /FeatureName:WAS-NetFxEnvironment /FeatureName:WAS-ConfigurationAPI /FeatureName:WCF-NonHTTP-Activation /FeatureName:WCF-HTTP-Activation /FeatureName:WCF-HTTP-Activation45
```

## MS SQL Server

This section provides information about settings for MS SQL server. It is possible to use the default settings and change them later or select the correct values during the installation.

### Supported versions

- MS SQL server 2012
- MS SQL server 2014
- MS SQL server 2016
- MS SQL server 2017

Tested editions:

- Standard
- Enterprise

### Authentication modes

eFLOW can work with either Windows or SQL authentication. After selecting the authentication mode, you must make sure that the corresponding login is defined on the SQL Server.

#### SQL Server authentication

Make sure that SQL Server authentication is supported and you can log in with the credentials of the planned eFLOW user. If no specific eFLOW user is required, you can start with the user **sa** and password **sa**. The **sa** user settings can be changed either via the SQL Management Studio GUI or using the [SQLCMD](#) utility:

```
SQLCMD -S localhost -Q "ALTER LOGIN sa WITH CHECK_POLICY = OFF" SQLCMD -S localhost -Q "ALTER LOGIN sa WITH PASSWORD = 'sa'"
```

#### Windows authentication

To use the Windows authentication (integrated security) in eFLOW, you must add the **TisAppPool** user to the SQL server logins. Note that this should be the same user as the IIS Application Pool identity set during installation.

By default, **TisAppPool** runs with the credentials **IIS APPPOOL\TisAppPool**. See [https://technet.microsoft.com/en-us/library/cc771170\(v=ws.10\).aspx](https://technet.microsoft.com/en-us/library/cc771170(v=ws.10).aspx) for more information about the IIS Application Pool identity.

The eFLOW installation will create a new SQL login, provided that the installing user has the permissions to create new SQL server logins. If, for some reason, the required **TisAppPool** identity login was not created automatically during the installation, you can add it manually later.

The login can be added either via the SQL Management Studio GUI or using the [SQLCMD](#) utility.

## Local SQL Server login

By default, the IIS Application Pool identity is the local user **[IIS AppPool\TisAppPool]**. You can add the corresponding SQL login as follows:

```
SQLCMD -S localhost -Q "CREATE LOGIN [IIS APPPOOL\TisAppPool] FROM WINDOWS" SQLCMD -S localhost -Q "EXEC sp_addsrvrolemember 'IIS APPPOOL\TisAppPool', 'sysadmin'"
```

## Remote SQL Server login

If Windows authentication is requested, you must add the domain user login **[DomainName\UserName]**.

You can add the corresponding SQL login using the following script:

```
SQLCMD -S localhost -Q "CREATE LOGIN [DomainName\UserName] FROM WINDOWS" SQLCMD -S localhost -Q "EXEC sp_addsrvrolemember 'DomainName\UserName', 'sysadmin'"
```

## SQL Server Agent

The SQL Agent service should be running to perform database management tasks, such as cleanup jobs for eFLOW databases.

## MSDTC

The Distributed Transaction Coordinator service should be running on all machines hosting eFLOW servers and SQL server.

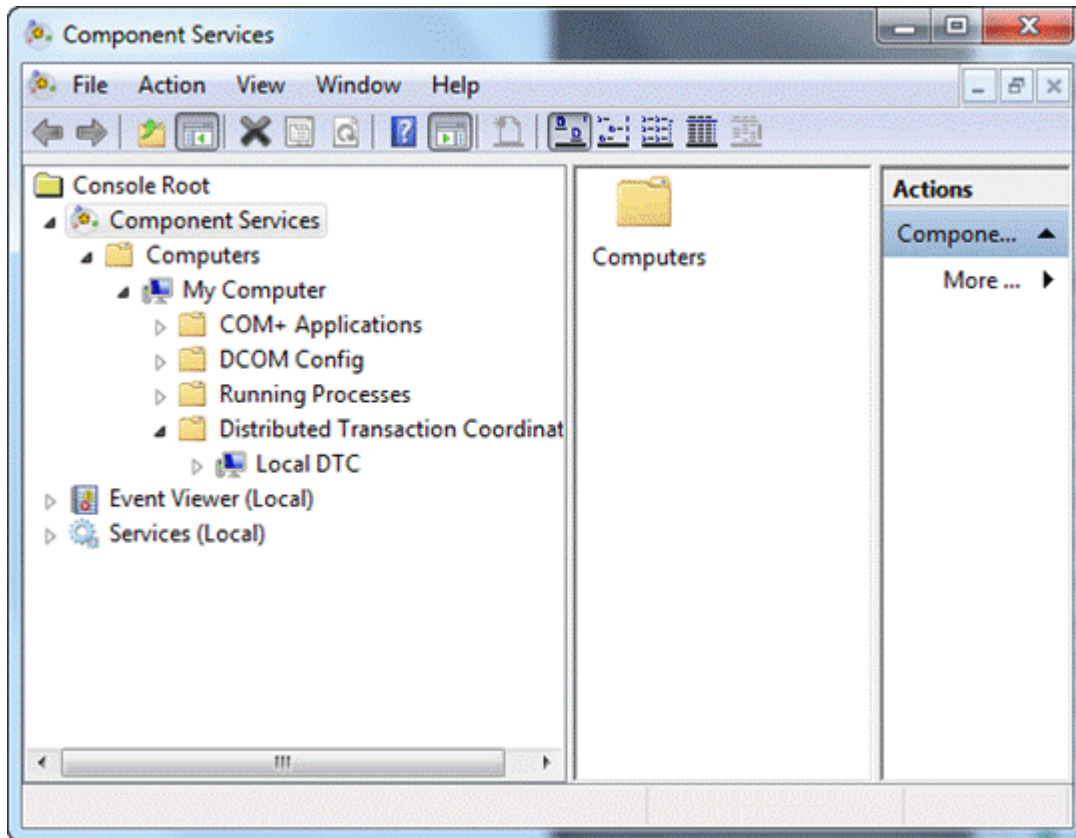
eFLOW uses the Distributed Transaction Coordinator to enable transactions between the file system and database transaction resources.

In eFLOW 6, MSDTC is required when a transaction uses more than one database. For example, when SLAs are used, a transaction can include both workflow and monitoring databases.

## Verify that MSDTC is installed

1. Open **Component Services**: click **Start**, type **dcomcnfg** in the search box, then press ENTER.
2. In the **Component Services > Computers** node, locate the computer for which you want to configure the Distributed Transaction Coordinator.

3. Check that **Local DTC** is in the **Distributed Transaction Coordinator** folder.

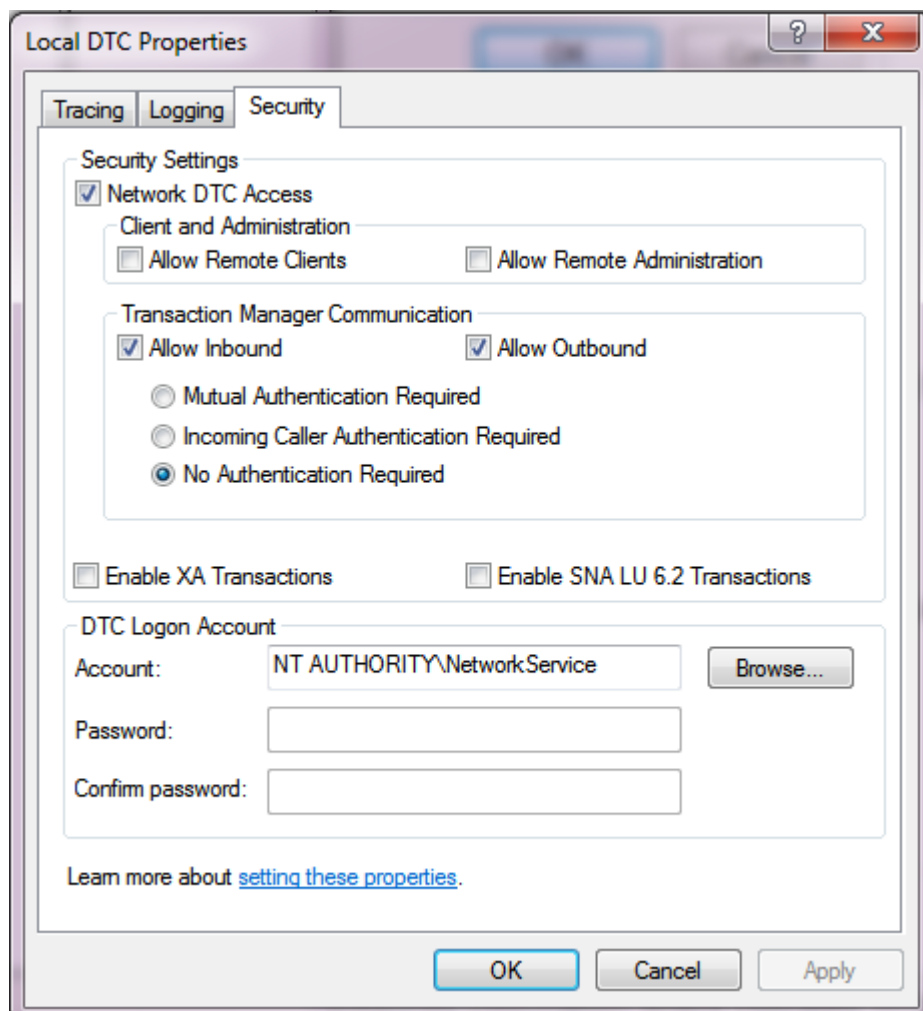


## Install MSDTC

If the **Distributed Transaction Coordinator** folder does not exist, you must install MSDTC by running **msdtc -install** from the command line.

## Define security properties

1. Open **Component Services**: click **Start**, type **dcomcnfg** in the search box, then press ENTER.
2. In the **Component Services > Computers** node, locate the computer for which you want to define security properties.
3. In the **Distributed Transaction Coordinator** folder, right-click on the **Local DTC** folder and select **Properties**.
4. Select the **Security** tab and modify the DTC settings if required.





The table below shows which DTC settings must be enabled for different eFLOW installations.

	Network DTC Access	Transaction Manager Communication		
		Allow Inbound	Allow Outbound	Mutual Authentication Required*
Standalone	√			
Client				
Server	√	√		√
SQL Server	√		√	√

\* This is the recommended setting for Windows 2008 and higher. This is the highest security and the default option.

### Start the DTC service

This can be done either using the user interface or from the command line:

- In the Windows Control Panel, go to **Administrative Tools > Services** and start the **Distributed Transaction Coordinator** service if it is not running.
- Run **net start msdtc** from the command line.

### Configure MSDTC on other machines

Make sure that MSDTC is configured and running on all the relevant computers (SQL server and eFLOW servers). Repeat the steps above if required.