

Database
Management
System **LINTER**®

Version 5.9

Linter administration utility for
Windows

Relational Expert Systems



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Introduction

This document explains the Linter network administration utility for MS Windows. In the operating system MS Windows NT all components of Linter SQL and replication server run and function as services of MS Windows. Below is the information about services necessary for more precise understanding of functioning features of administrator and his/her distributed administration ability.

Windows Services, general terms

Windows service is a special process, which has a uniform interface for interactions with operating system Windows NT/2000/XP. Services are divided into two types: services Win32, operating with OS through Service Control Manager (SCM), and drivers, working according to the Windows NT device driver protocol. For administration of DBMS Linter only Win32 service is used.

Services features

One of the most important features of a service is that it is not interactive. It is typical when a service operates in the background mode imperceptible for a common user. Due to this, the services are the most appropriate for implementation of the following types of applications:

- Server in the architecture of the client-server (e.g. RDBMS Linter SQL);
- Network Windows NT services (networking LINTER agents);
- Service (in terms of functionality) components of distributed applications (e.g. all kinds of monitoring programs).

Basic services features

Service differs from common Win32 application by 3 main features:

1. Possibility of correct shutdown of service operation. A user or some other applications using standard procedures are able to change service mode: switch it from executing mode to pause mode or even to stop its operation. At the same time before changing its mode the service receives a notification, due to which it can make necessary actions for the switch to a new mode, e.g. release occupied resources;
2. Possibility of running a service before user's registration and, hence, possibility of working without a registered user at all. Any service can be run automatically at start of the operational system and can begin working before a user enters the system;
3. Possibility of working in an arbitrary safety context. The safety context of Windows NT defines a number of process access rights to different system objects and data. Unlike ordinary Win32 application, which is always launched within the safety context of a user registered in the system at that moment, for a service its execution safety context can be defined beforehand. This means that it is possible to define a number of access rights to system objects for a service beforehand and thus restrict its area of activity. As for services there is a special type of safety context used by default and called 'Local System'. A service launched in this context has rights only for local computer resources. No network operations can be executed with 'Local System' rights as this context has its meaning only on the local computer and is not identified by other computers within a net.

Interactions of a service with other applications

Any application, which has the corresponding rights, can interact with a service. Interaction first of all implies a service mode alteration, i.e. its transfer into one of the three modes (Running (Start), Pause and Shutdown), and is carried out with the help of special requests.

Service Database

Information about each service is kept in the MS Windows register - in the key 'HKLM\SYSTEM\CurrentControlSet\Services\ServiceName'. The following information is kept there:

- 1) Type of service. It indicates whether there is only one (exclusive) service realized in this application or there are several of them. Exclusive service can work in any safety context. Several services can work only in 'LocalSystem' context.
- 2) Start type:
 - Automatic – service is launched at system start;
 - By request – service is launched manually by a user;
 - Deactivated – service can not be launched.
- 3) Name of the executed module (EXE-file).
- 4) Order of running in respect of other services. In some cases for correct service work it is necessary that one or several other services were operating. In this case the information about the services, which start operating before the given one, is kept in the register.
- 5) Safety context of service execution (network name and password). By default the safety context equals 'LocalSystem'.
- 6) Applications which need to get information about some service or to change some service parameter, i.e. they have to change information in service database in the register.

Utility assignment

Utility linadm "Network administrator of RDBMS Linter SQL" is designed for administration of local and/or remote Linter server and Linter replication server, functioning in the uniform network medium Windows NT/2000/XP.

Basic capabilities of the utility:

- Start/Shutdown of the Linter server;
- Start/Shutdown of the Linter network agents/listeners;
- Create/Delete of the database;
- Change the existing database parameters;
- Replication management;
- Change the Linter service parameters;
- Manipulation with the local and/or remote database;
- Testing of physical integrity of local database.

Execution environment

Utility linadm functions on MS Windows 95/98/ME/NT/2000/XP.

When linadm running on Windows (95/98/ME), the remote administration is only possible for those Linter servers that are running on Windows NT/2000/XP.

For the remote administration of Linter server it is necessary to have rights of Windows Administrator on the remote computer.

Linadm utility launch

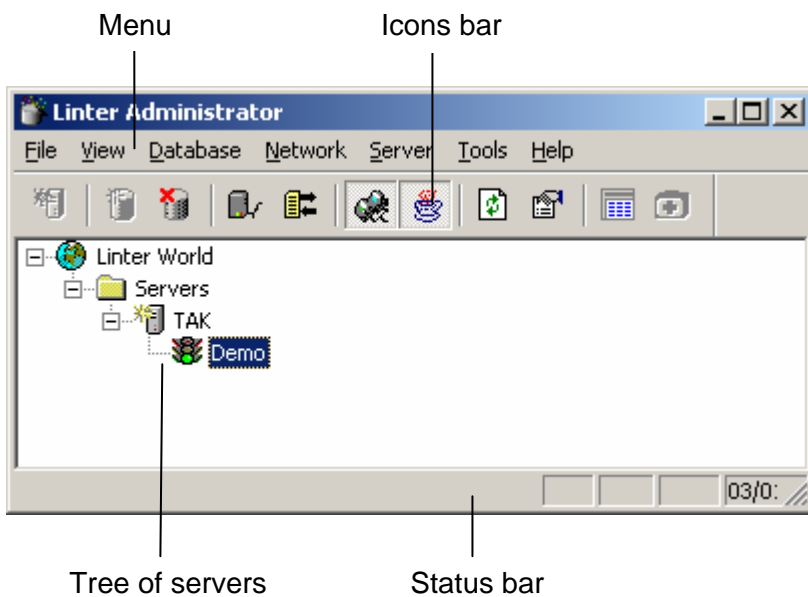
The utility is launched in one of the following ways:

1. Execute the Windows menu items: **Start > Programs > RDBMS Linter SQL > Linter Administrator.**
2. Launch linadm.exe file with the help of standard means of launching program in Windows in the subdirectory ~/bin of the Linter directory.

Utility interface

Linadm utility management is carried out through menu and /or toolbar.

Screen 1 shows the main bar of the LinAdm utility.





Screen 1 – Main bar

Table 1 describes the elements of the utility main bar and rules of the operations with them.

Table 1 – Elements of the main bar

| <u>Element</u> | <u>Description</u> |
|-----------------|--|
| Tree of servers | Graphical representation of the network structure of Linter SQL and replication servers and DB installed on them. Tree node can be open (marked by - icon) or closed (marked by III icon) To open/close a node click left mouse button on the node icon. To mark an element place the mouse pointer on the necessary element and click left |

| <u>Element</u> | <u>Description</u> |
|----------------|--|
| | mouse button. |
| Menu | Popping up list of the utility instructions. |
| Icons bar | <p>A bar with buttons. Pressing on these buttons with the help of mouse causes certain actions. Button can be in the following modes:</p> <ul style="list-style-type: none"> • "available" – an action corresponding to this button can be executed. • "unavailable" – in the current context this operation cannot be executed. <p>In the "available" mode the "pressed" (light field background) button position equals the executed action, the "pulled" button position -the completed action (E.g. network client driver</p> <p>Is launched – , shutdown – ).</p> |
| Status Bar | A bar, showing some information about the current work status or containing a clue concerning the next action. |

Network administration


Adding SQL-server

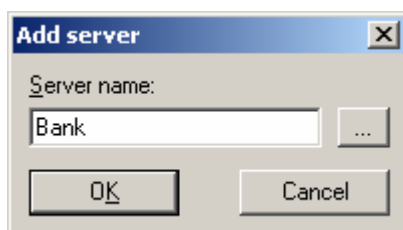
In the utility linadm by Linter server is understood any computer (Server or Workstation) of a local network, which is accessible through Windows and which has the full version of the RDBMS Linter SQL. If a computer is not visible in the network (the computer is off, access error, etc.) it cannot be added to the tree of servers of the linadm utility. It is necessary to eliminate causes of the network inaccessibility of the computer and then repeat adding SQL-server.

To add the server in the servers list (tree of servers):


1. After opening the tree of the Linter-servers choose from the tree the folder Servers



2. Mark the Servers folder.
3. Press the Insert button, or execute menu items **Server > Add server...**, or click right mouse button on the 'Server' folder and choose from the pull down 'Add server' or press the button  on the toolbar. You will see a dialog box for adding server (Screen 2).



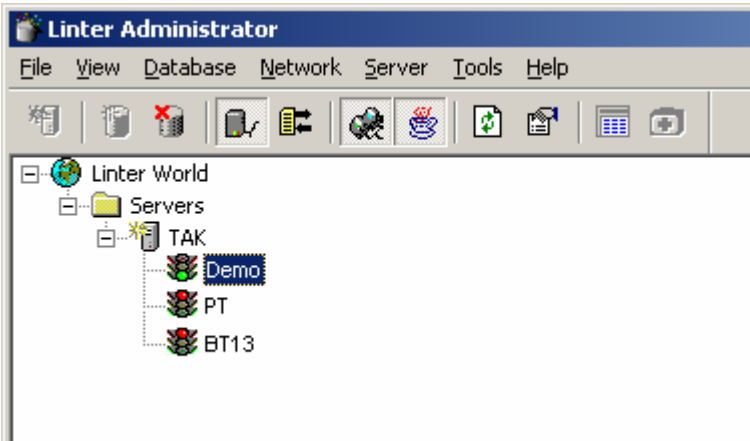
Screen 2 – Dialog box for adding server

4. In the 'Server's name' field enter an active server name (i.e.visible in the network). 'Server's name' can be entered manually, if the network computer name is known for certain. It can also be chosen from the list of available computers. For this click the  button.

5. Press the 'OK' button. If the addition computer is not visible in the network at the moment or it is not a Linter server, there will appear a corresponding diagnostic message and the operation of adding server will be canceled. If the server/workstation has installed Linter database, they will appear on the tree automatically with identification of the current status (Screen 3).

If a remote server/workstation is added to the tree, the information about the addition server is recorded automatically into the list of available database servers (file "nodetab" on the local computer, where linadm is launched). In this record the name of the Linter-server coincides with the name of the addition server, by default access protocol is set TCP/IP through the port number 1060.

If file 'nodetab' has records, there is a possibility of crossing between old records of 'nodetab' and the added record. Thus it is recommended after adding server to look through the 'nodetab' file and, if necessary, correct it manually.



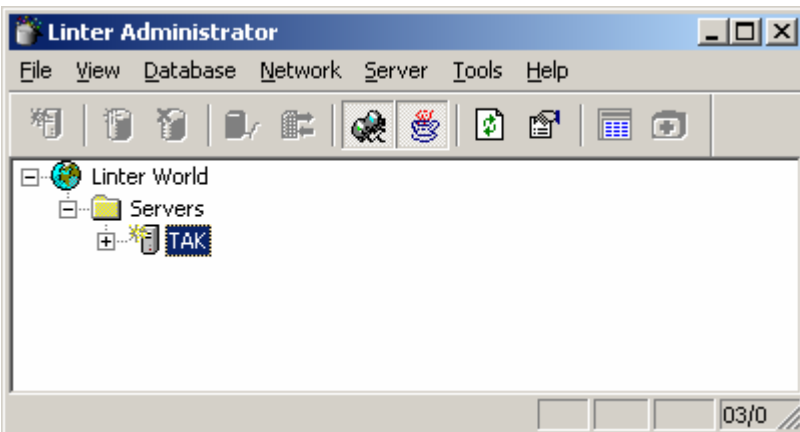
Screen 3 – Utility tree of servers

Information about servers set in the utility is kept in the Windows registry on the computer, where linadm is run.

Remove database server

To remove the server from the tree of servers:

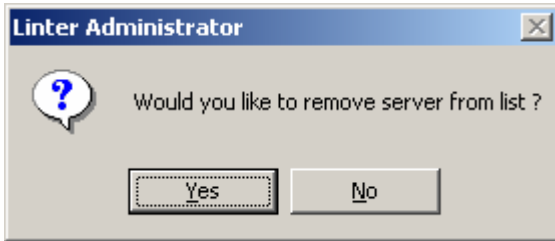
1. Open the Tree of servers.
2. Mark the server you want to delete, as shown on Screen 4.



Screen 4 – Removing server from the tree of servers

3. Press 'Delete' button, or execute the menu items **Server > Remove server** or press buttons Alt + V.

- In the dialog box agree or cancel the server removal. (Screen 5).



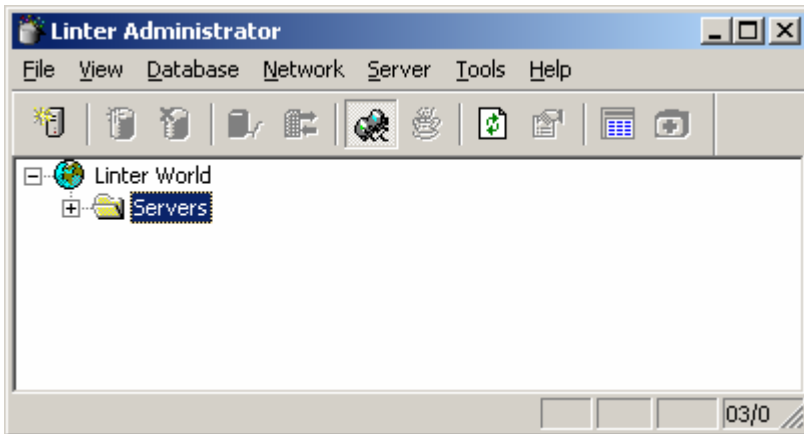
Screen 5 – Confirmation of server removal window

Removal of a server from the tree of servers does not remove it from the database.

Removal of all servers

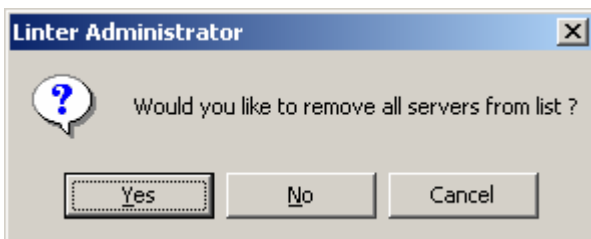
To remove all servers from the tree of servers at the same time:

- Open the tree Linter Word (Screen 6).



Screen 6 – Removal of all servers

- Execute the menu items **Server > Remove All** or click right mouse button on the 'Server' folder and choose from the pulldown 'Remove all servers...' or press 'Alt+a' buttons.
- Press the 'Yes' button in the dialog button (Screen 7) to conform removal operation and button 'No' or 'Cancel' to cancel removal of a group of servers.



Screen 7 – Confirmation of removal of all servers window

Refresh server status

Utility linadm shows the server status for the moment, when it was activated. If some remote server has changed its current status while working (e.g. database has been set and/or added on it or existing DB has been launched/shut down), the new server status is not automatically refreshed. This should be done forcibly.


To refresh the status of a server:

- Open the tree Linter Word.

2. Mark the server the status of which in the tree of servers is necessary to refresh.
3. Execute the menu items **Server > Rescan** or press buttons CTRL+R.

To refresh the status of the whole tree of servers:

1. Execute the menu items **View > Refresh**, or press F5, or press  on the toolbar.

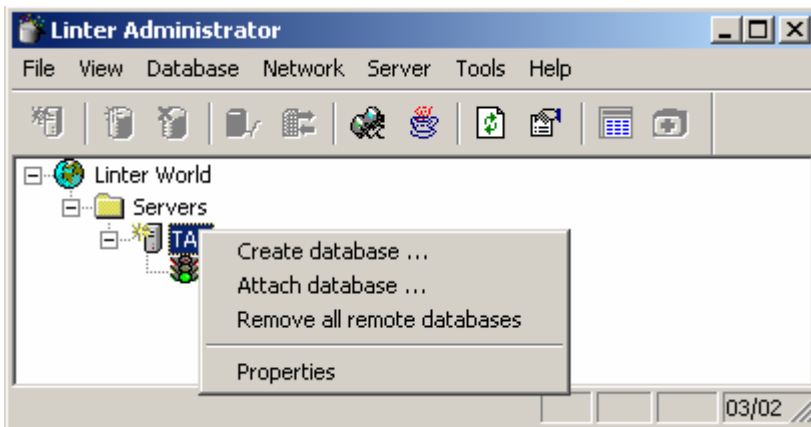
 Refreshing of the tree of servers can be done in any (open or closed) mode of the tree of servers. After refreshing, the tree of servers keeps its former mode.

Database Management

Create database

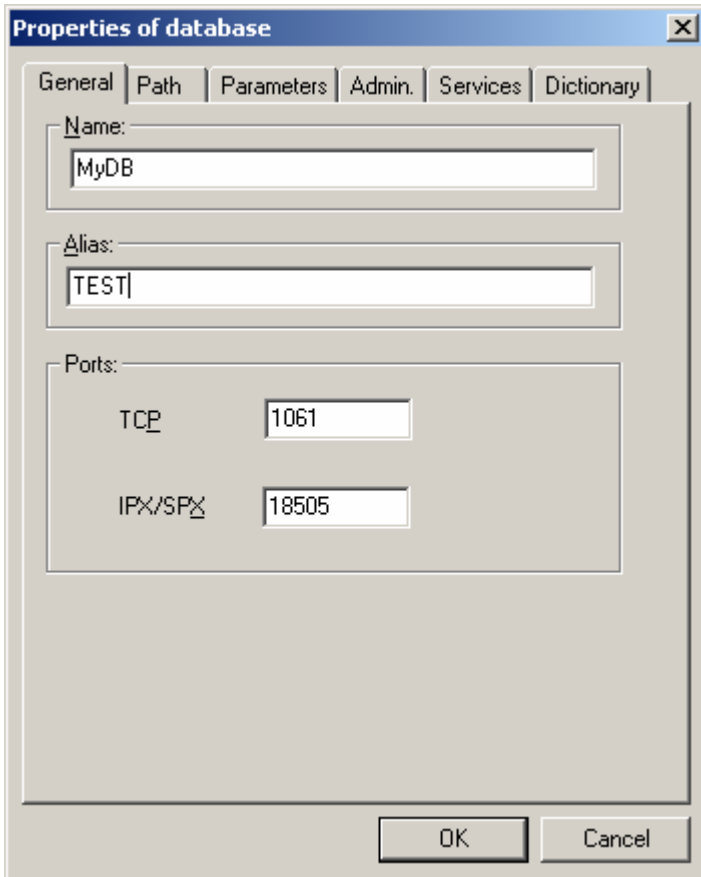
To create a new database:

1. Open the tree of servers and mark the server, where it is necessary to create a database.
2. Execute the menu items **Database > Create ...**, or press F7, or click right mouse button on the marked server and choose from the pulldown (Screen 8) 'Create database...!.



Screen 8 – Pulldown for the database creation

3. With the help of tabs of the dialog box (Screen 9) make the configuration of the creating database.
4. Press OK.



Screen 9 – Dialog box for the database creation

To switch between the tabs, use Ctrl+Tab/Ctrl+Shift+Tab.

Database name


To identify the creating database:

1. Switch to the 'General ...' tab (Screen 9).
2. Fill in the fields of the database properties dialog box (see Table 2).
3. To complete launch parameters changing press OK, to continue switch to another tab.

Table 2 – Fields and elements of the database properties dialog

| <u>Field</u> | <u>Description</u> |
|-------------------|--|
| Name | A unique (within the database on the server) database name maximum of 18 characters. Under this name the database will be displayed in the tree of servers. |
| Alias | A unique (among the Linter-servers names in the 'nodetab' file on this server) Linter-servers name maximum of 8 characters. This name should be indicated when connecting the applications launched on the computer with the database. |
| Network protocols | Type of the network protocol for the access to the database. |
| Ports | The number of the port through which the access to |


| <u>Field</u> | <u>Description</u> |
|--------------|--|
| | the database should be carried out. It is recommended to use the number suggested by the program (i.e. the current free number). If the port number is entered manually it is necessary to make certain that it does not coincide with the port number of other database set on this computer. In case of the TCPIP protocol, the port is the socket port, which shouldn't be used with other applications on a server computer. |

 If 'Alias' is not specified, the first eight characters of the database name are used by default.

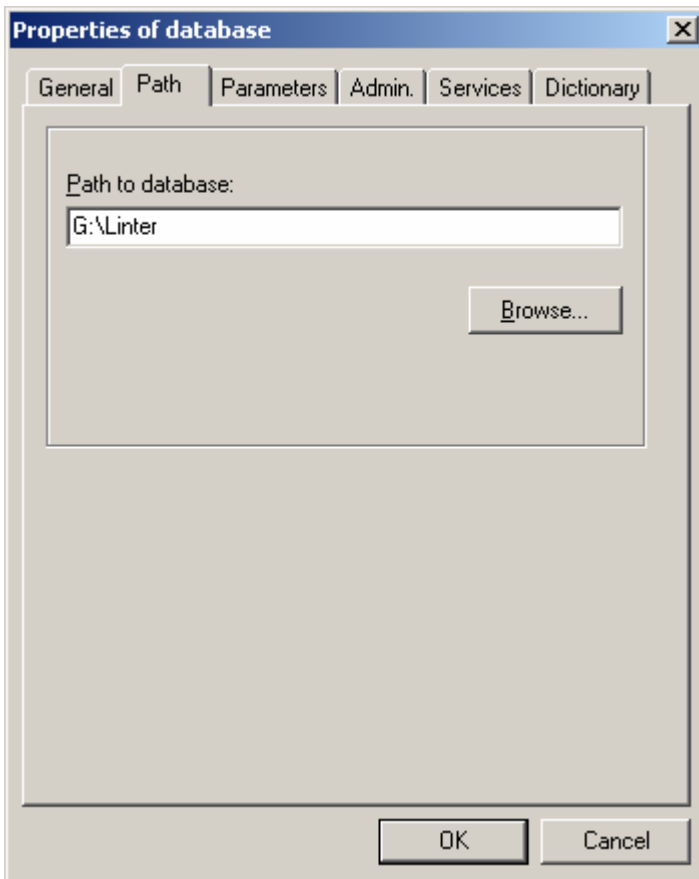
Database path

To specify the path of the creating database:

1. Switch to the 'Path ...' tab (Screen 10).
2. Enter manually the specification of the access to the database. If the specified catalog does not exist it will be created by the linadm' utility.
3. To complete launch parameters changing press on OK, to continue switch to another form tab.

 If the necessary catalog exists you can use 'Browse' button to select it.

In order to partition the database on several file systems, please check the Linter administration document.

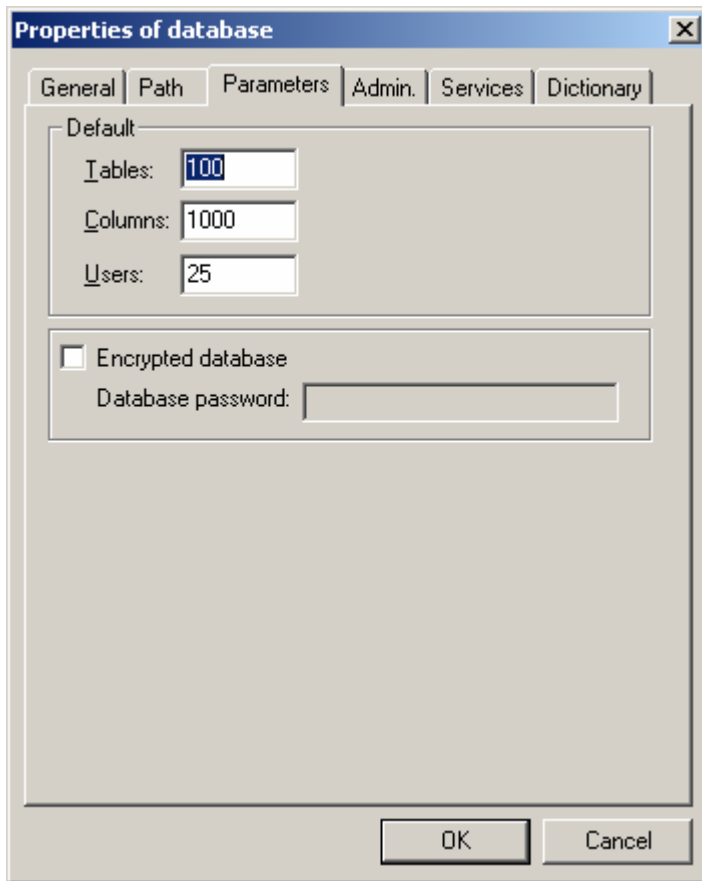


Screen 10 – Specifying database path dialog box

Database parameters

To specify parameters of the creating database:

1. Switch to the 'Parameters' tab (Screen 11).
2. Fill in the fields of the database parameters dialog box (see Table 3).
3. To complete launch parameters changing press OK, to continue switch to another tab.



Screen 11 – Specification of the quantity parameters dialog box

When specifying database parameters you should take into account that all of them, after the database is created, are unalterable. If the database parameters specified in this dialog have later become insufficient, it is necessary to create a new database with the new parameters and to move all the information from the database.

Table 3 – Fields of the database parameters dialog box

| <u>Field</u> | <u>Description</u> |
|--------------|--|
| Tables | The maximum number of the system and user tables and views in the database. 100 is suggested by default. |
| Columns | The maximum total number of columns in all system and user tables and views in the database. 1000 is suggested by default. |
| Users | The maximum number of registered users in the database. 25 is the default. |

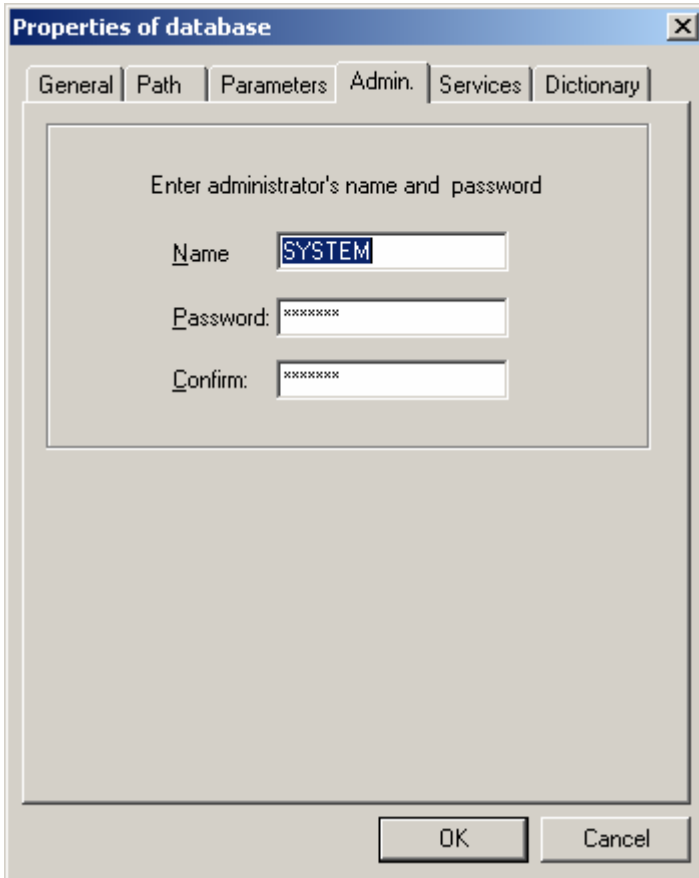
For more detailed description of the influence of these parameters on the RDBMS Linter SQL server work, please see document “Create and Tune a Database” (gendb utility).

Database administrator settings

To assign the database administrator:

1. Switch to the 'Admin' tab (Screen 12).
2. Enter the database administrator information in the dialog box (see Table 4).

- To complete launch parameters changing press OK, to continue switch to another tab.



Screen 12 – Database administration registration dialog box

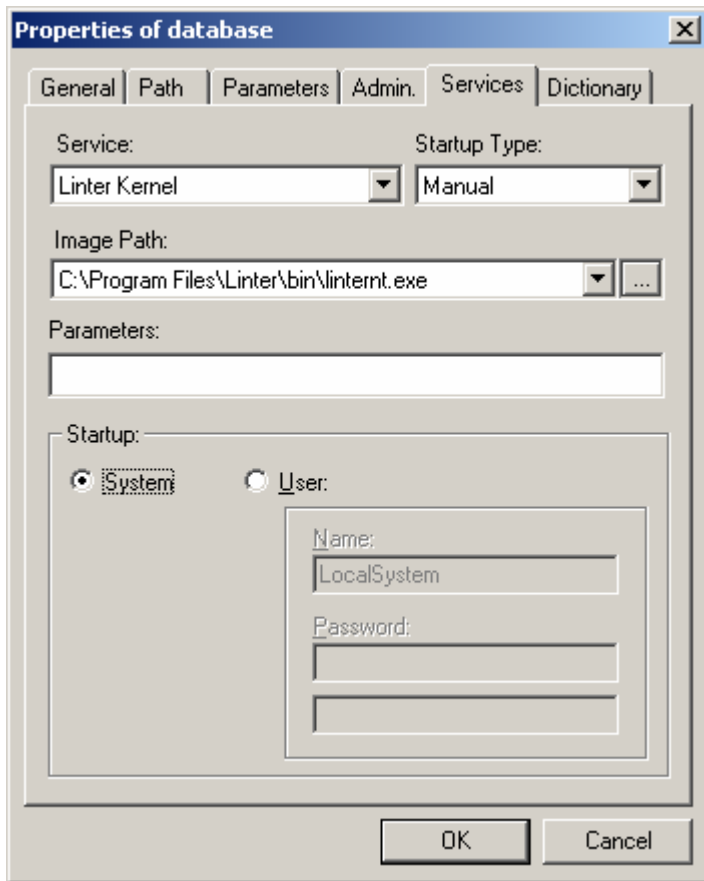
Table 4 – Fields of the Dialog box for the database administration registration

| <u>Field</u> | <u>Description</u> |
|---------------------|--|
| Name | Database administrator login (maximum of 66 characters). By default the database is assigned an administrator named 'SYSTEM'. It is recommended to leave that name as the database administrator name. |
| Password | Database administrator password (maximum of 66 characters). 'MANAGER' is the default password. |
| Confirm | Confirmation of the password (repeat the password entered in the 'Password' field) |

RDBMS Linter SQL service launching parameters

To assign the Linter server service launch parameters:

- Switch to the 'Service' tab (Screen 13).
- Fill in the fields and specify the launching parameters of the Linter service in the dialog box (see Table 5).
- To complete launch parameters changing press OK, to continue switch to another tab.



Screen 13 – Database launching order dialog box

Table 5 – Fields and elements of the dialog box for the database launching order

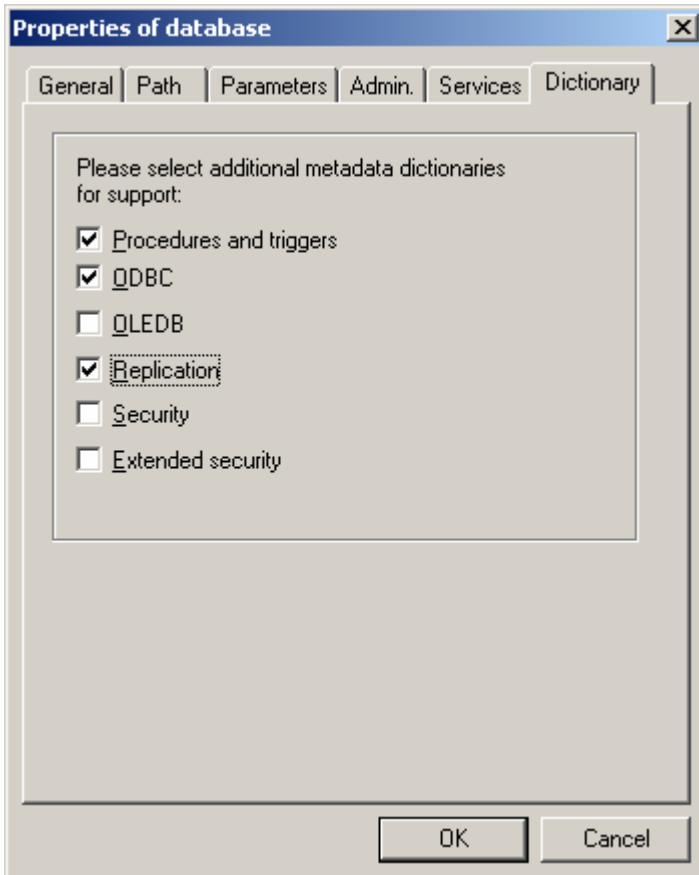
| <u>Group</u> | <u>Description</u> |
|--------------|--|
| Startup | <p>Assigns the launching order of the creating database service (set the corresponding field):</p> <ul style="list-style-type: none"> • Automatic – Linter service is launched at Windows startup; • Manual – Linter service is launched manually by the user with the help of linadm utility; • Disable – Linter service launch is not allowed on this computer. |
| Owner | <p>Defines the rights of the Linter service to the Windows resources:</p> <ul style="list-style-type: none"> • System – Linter service starts on behalf of Windows system owner. This means that the Linter service has full access to all Windows resources; • User – Linter service starts on behalf of the specified Windows user. This means that the Linter service has the same access rights as the specified user. The specified user should have the access right 'Logon as service' and at the least access rights to the directory with the database files. |
| User | <p>Record information of the Windows user, on behalf of whom it is supposed to launch Linter service:</p> <ul style="list-style-type: none"> • Name - Windows user name; • Password - user password and the user password confirmation. |

Setting of additional database dictionary features

The creating database by default provides support for the standard functional capabilities of Linter server. If it is supposed to use additional features of the Linter server, the database should be set in the corresponding way to support them, i.e. there should be necessary system tables created in the database. Those features can be added later by applying correspondent SQL-scripts from linter/dict directory by INL utility.

To set the additional capabilities:

1. Switch to the 'Dictionary' tab (Screen 14).




Screen 14 – Setting additional capabilities dialog box

2. Check off those capabilities, which should be included into the creating database(see Table 6).

Table 6 – Check off the dialog box for setting additional DB capabilities

| <u>Check</u> | <u>Description</u> |
|-------------------------|---|
| Procedures and triggers | Stored procedures and triggers support. |
| ODBC | Support of the ODBC-interface. <div style="background-color: #e0e0e0; padding: 2px;"> In addition, when setting the Linter server, the component "ODBC-driver" should be selected. </div> |
| Replication | Support of asynchronous replication. <div style="background-color: #e0e0e0; padding: 2px;"> In addition Linter Replication server should be installed. It is possible not to </div> |

| <u>Check</u> | <u>Description</u> |
|--------------|---|
| | choose 'Replication', if setting the database for asynchronous replication is supposed to make during setting of the Linter Replication server. |
| Security | Support of Linter advanced security. |

 Tabs 'General...' and 'Path...' are obligatory when creating the database.

Attach database

Utility linadm shows in the tree of servers only those objects (Linter servers and database), which were created with its help, and, correspondingly, information about them is kept in the Windows registry. If the database has been created not by linadm utility (e.g. by 'gendb' utility, or copied from another system, or it has been detached from linadm (see section “Detach database”), linadm does not show it (as, in general, the information about it is not kept in the Windows registry). To make such database visible in the linadm utility, it should be attached to the Linter server tree.

To attach a database:

1. Open the tree of servers and select the server, which keeps the attachable database.
2. Execute the menu items ‘Database -> Attach ...’, or press Alt+F7, or click right mouse button on the selected server and from the pulldown (Screen 8) choose 'Attach database ...'.
3. Execute the database property screen (see section “Database name”).
4. Specify the database path (see section “Database path”).
5. Assign the database service properties (see section “RDBMS Linter SQL service launching parameters”).
6. If necessary, set the database for the support of additional capabilities (see section “Setting of additional database dictionary features”).

Detach database

To detach the database means to exclude it from the tree of servers of linadm' utility and, correspondingly, from the MS Windows registry. At the same time the database files itself remain on a hard drive(s).

To detach the database:

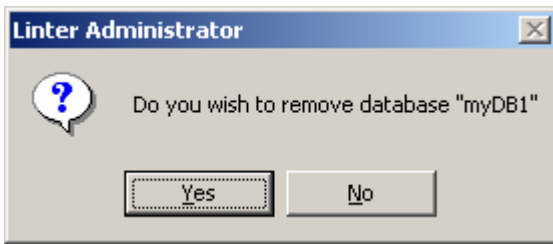
1. Open the tree of servers and mark in it the detachable database. If the detachable database is in the active mode, shut it down before hand.
2. Execute the menu items **Database > Detach ...** or press Alt+F8.

Delete database

To delete the database means deleting of database files and the following exclusion of the database information from the Linter server tree and, correspondingly, from the MS Windows registry. To delete the user should have a DBA privileges.

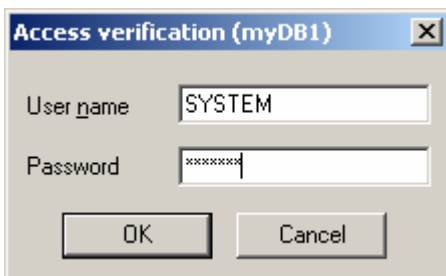
To delete a database:

1. Open the tree of servers and the database you need to delete. If this database is active at the moment, bring the database down



Screen 15 – Confirmation of the database deletion dialog box

2. Execute the menu items **Database > Remove** or press F8.
3. To confirm the deletion press 'Yes' (Screen 15).
4. Enter the identification information of the database administrator (Screen 16).



Screen 16 – Entering the identification information of the administrator of the database necessary to delete dialog box

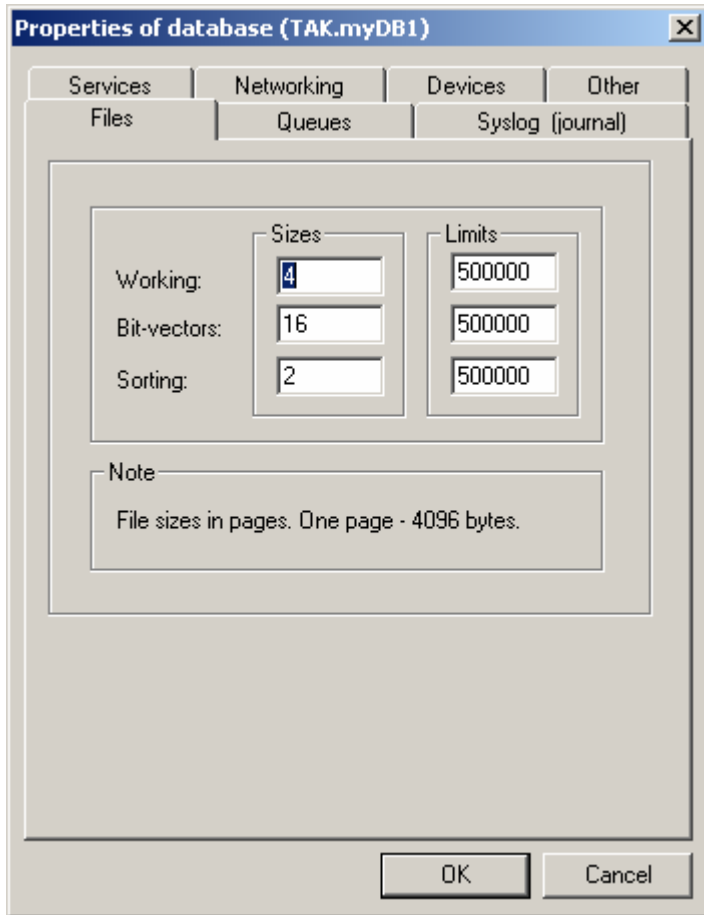
5. Press OK.

Changing database service launch parameters

Database created by linadm utility is launched with the default parameters. In some cases they may not suite to the specific tasks, which the database should serve. Utility linadm allows setup specific settings of the database launching parameters. The parameter settings can be set in several ways. The launching parameters are kept in the MS Windows registry of that Linter server, which has assigned to the database. This means that the database is launched with the specified parameters equally for all users of the local network.

To change database launching parameters:

1. Open the tree of servers and select mark the database, parameters of which should be changed. If this database is active at the moment, bring the Linter server down.
2. Execute the menu items **View > Properties ...**, or press Alter+Enter, or click icon fir, or click right mouse button and choose from the pulldown 'Properties'. You will see a dialog box for changing database launching parameters (Screen 17).




Screen 17 – Changing the database launching parameters dialog box

Work files size

To change the number and size of work files used by Linter server:

1. Switch to the 'Files' tab (Screen 17).
2. Specify the Linter server launching parameters in the dialog box (see Table 7). Field 'Sizes' defines sizes of the work files in pages (one page – 4 kilobytes), the field 'Limits' defines the maximum size of work file (value 0 means there are no restrictions).

 If the entered value is smaller than the allowable, it is denied and the smallest allowable value is used by default.

3. To complete launch parameters changing press OK, to continue switch to another tab.

Table 7 – Work files of Linter SQL-server

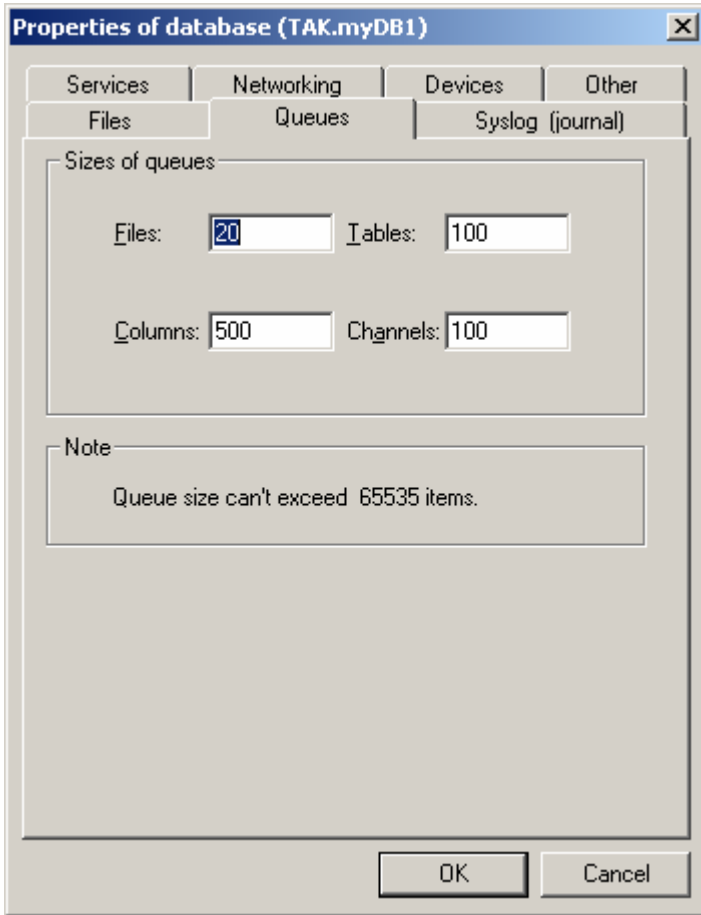
| <u>Parameter</u> | <u>Description</u> | <u>Minimum value</u> |
|------------------|--------------------|----------------------|
| Working | Work file | 4 |
| Bit-vectors | Bit-vector file | 16 |
| Sorting | Sorting file | 2 |

Queue size

To change queue size of the Linter server:

1. Switch to the 'Queues' tab (Screen 18).

2. Specify the queue size of the Linter server in the dialog box (see Table 8). Maximum value of each queue type - 65535 elements.
3. To complete launch parameters changing press OK, to continue switch to another tab.



Screen 18 – Specifying queues dialog box

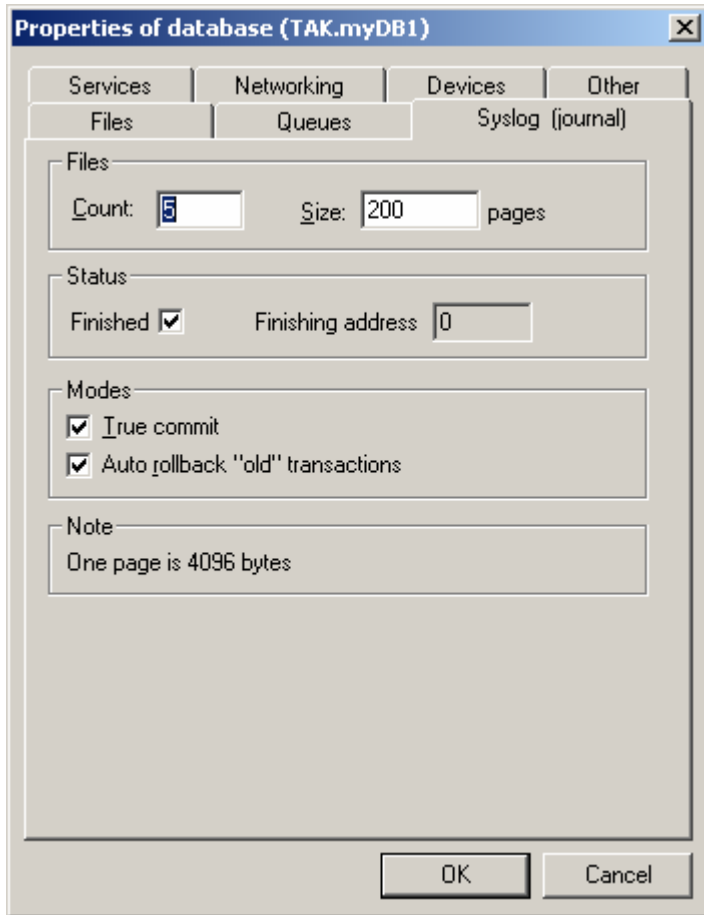
Table 8 – Linter-server queues

| <u>Field</u> | <u>Description</u> |
|--------------|---------------------------------------|
| Files | Opens the files queue file size. |
| Tables | Table descriptions queue size. |
| Columns | Column descriptions queue size. |
| Channels | Channel/cursor/connection queue size. |

Database journal settings

To set system journal (SYSLOG):

1. Switch to the 'Syslog' tab (Screen 19).
2. Specify the parameters of SYSLOG in the dialog box (see Table 9).
3. To complete launch parameters changing press OK, to continue switch to another tab.



Screen 19 – SYSLOG setting dialog box

Table 9 – Fields and elements of the dialog box for system log setting

| <u>Group of Parameters</u> | <u>Fields</u> | <u>Description</u> |
|----------------------------|--|---|
| Files | Quantity parameters | |
| | Count | Number of SYSLOG files. |
| | Size | Size of each SYSLOG file (in 4Kbytes pages). |
| Status | Information group of fields. Displays the current state of the SYSLOG. | |
| | Finished | checkbox informs of normal state of the SYSLOG (log file is processed correctly), if not checked the SYSLOG is not closed and after Linter server start the last incomplete transaction will be rolled back.. |
| | Finishing address | The number of SYSLOG page, in which the information about the last incomplete transaction is kept (field is active in case of absence of the checkbox 'Finished'). Modes Mode of transaction management |
| Modes | Mode of transaction management | |
| | True commit | Deferred 'commit' (information about confirmed |

| <u>Group of Parameters</u> | <u>Fields</u> | <u>Description</u> |
|----------------------------|----------------------------------|---|
| | | transactions is first kept in the Linter server cache, than it is moved to the SYSLOG). This improves the performance of the system, but in case of system crash several last transactions are lost (transactions placed in the buffer). If the check is placed it allows deferred 'commit', absence of the tick disables it. |
| | Auto rollback 'old' transactions | Rollback of old transactions when the SYSLOG is overloaded. If the tick is set, the oldest incomplete transactions roll back automatically. If there is no tick, the state of SYSLOG overload is recorded. |

Change service launch properties

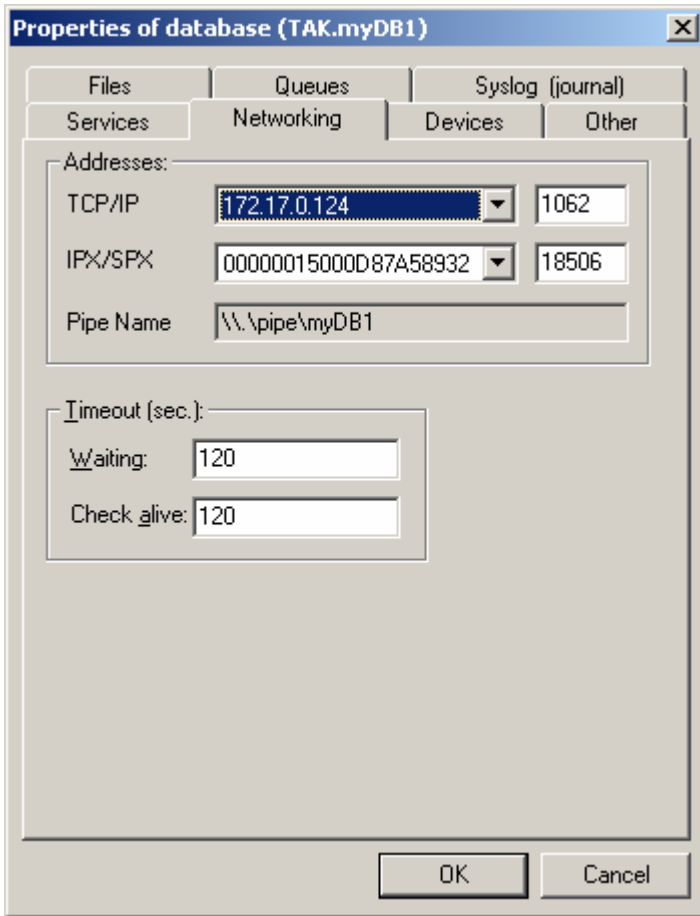
To change the Linter service launch:

1. Switch to the Service tab.
2. The setting of a new launching order is done in the same way as when creating database (see section "RDBMS Linter SQL service launching parameters").
3. To complete launch parameters changing press OK, to continue switch to another tab.

Database network access

To change database network access:

4. Switch to the Network tab (Screen 20).
5. Specify the setting parameters of the Linter server in the dialog box network access (see Table 10).
6. To complete launch parameters changing press OK, to continue switch to another tab.




Screen 20 – Setting network access dialog box

Table 10 – Fields and elements of the dialog box for setting network access

| <u>Group of parameters</u> | <u>Field</u> | <u>Description</u> |
|----------------------------|---|---|
| Addresses | Parameters of the network access (first field – server network address, second field – port number on the given computer, through which the access to the remote database is carried out). You can change only the port number; the server network address is fixed. | |
| | TCP/IP | Network access parameters according to the TCP/IP protocol. |
| | IPS/SPX | Network access parameters according to the IPX/SPX protocol. |
| | Name Pipes | Network access parameters according to the Name Pipes protocol. |
| Protocol | Type of the protocol of access to the remote database. Set the switch on the necessary protocol type. | |
| | TCP/IP | Access according to the protocol TCP/IP. |
| | IPS/SPX | Access according to the protocol IPX/SPX. |
| | Name Pipes | Access according to the protocol Name Pipes. |
| | Local | Access according to the protocol Local. |

| <u>Group of parameters</u> | <u>Field</u> | <u>Description</u> |
|----------------------------|--------------------------------------|---|
| Timeout | Temporary network access parameters. | |
| | Waiting | Maximum time (in sec.) of waiting for the answer for the confirmation of successful data transfer. If the confirmation is not received after the specified interval transmission error is recorded. |
| | Check alive | Client connection poll timeout |

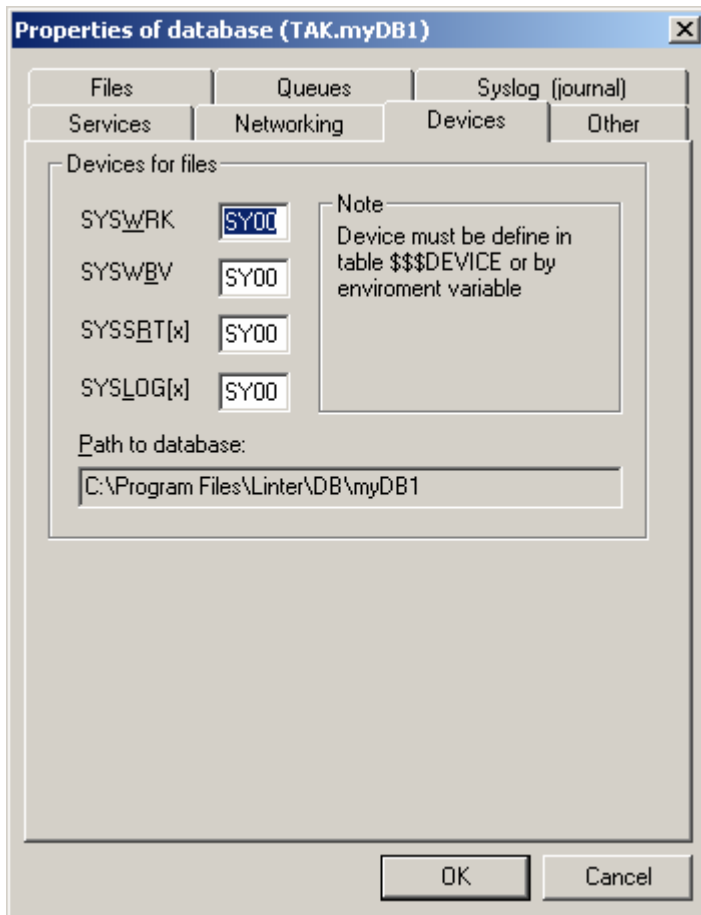
 The new network access parameters values are put into the 'nodetab' file to make certain that all values are formed correctly.

Change database files path

In some cases it is necessary to move the database files. E.g. lack of free space for extension of SYSLOG, necessity of moving the database files to the different devices for improving of general performance of the database, etc.


To change the database files path:

1. Shut down the database.
2. Physically move (copy) the necessary files to the new catalogs or other devices. Some database files have one logic name, but consist of several files (e.g. files of the system log 'SYSLOG' are files with names '00000000.61', '00000000.62', etc.). In this case it is necessary to move to the new place all files. The label [x] is added to the names of such files in the dialog box for setting files path (see below).
3. For each new file path define the name of the variable environment, e.g. SY01, SORT, SLOG and so on, or, if the previous variable name is used, assign it a new value (see operation 4).
4. Using MS Windows tools assign values to the chosen environment variables. E.g. SORT=d:/sort
5. Switch to the 'Devices' tab (Screen 21).



Screen 21 – Defining database files path dialog box

6. Assign every database file the corresponding environment variable.
7. To complete launch parameters changing press OK, to continue switch to another tab.

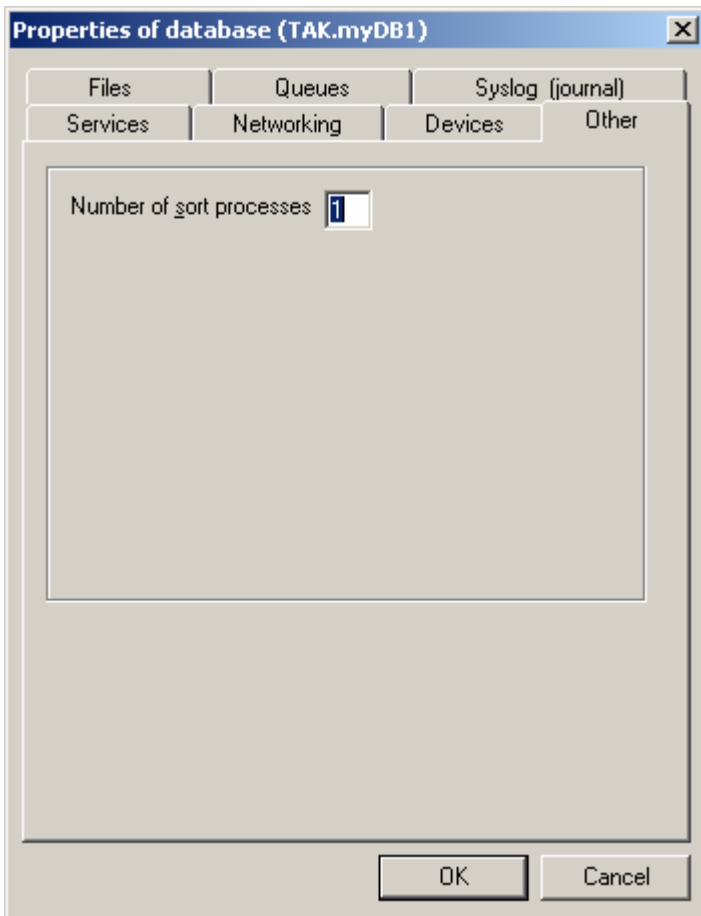
 After the change of the database files path it is recommended to run this database and to put variable environments to the system table SYSTEM.\$\$\$DEVICE (if it is created in the database).

Change the number of sorting processes

By default the database, created by the linadm utility uses one sorting process. If necessary this number can be changed (temporarily or permanently).

To change the number of sorting processes:

1. Switch to the 'Other' tab (Screen 22).



Screen 22 – Changing the number of sorting processes dialog box

2. In the field 'Number of sort processes' enter the necessary value (max. 255).
3. To complete launch parameters changing press OK, to continue switch to another tab.

Management of the Linter server


Launching Linter server

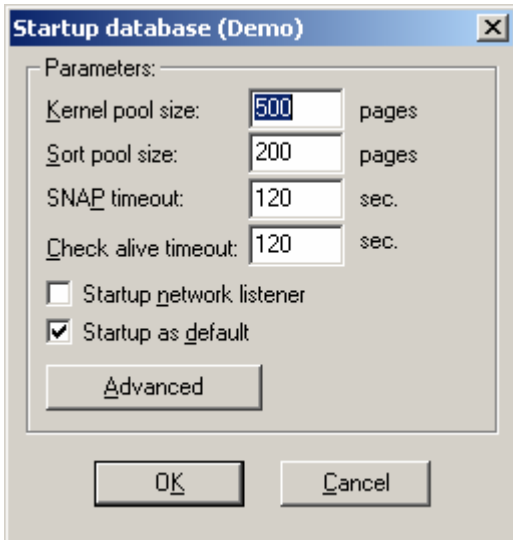
To launch the Linter server:

1. Open the tree of servers and select on it the database for which Linter server should be launched (Screen 23).



Screen 23 – Selecting the database for launching Linter server

2. Execute the menu items 'Database -> Startup ...', or press F9, or click on the icon , or click right mouse button and choose from the pulldown the entry 'Startup'. The dialog box for changing database startup parameters will be displayed (Screen 24).



Screen 24 – Linter server startup parameters dialog box

3. Specify Linter server startup parameters in the dialog box (see Table 11, Table 12).

The startup parameters, specified during the Linter server startup, are kept in the MS Windows registry on the computer, which has the Linter server. The parameters of the database (see points) are kept directly in the database.

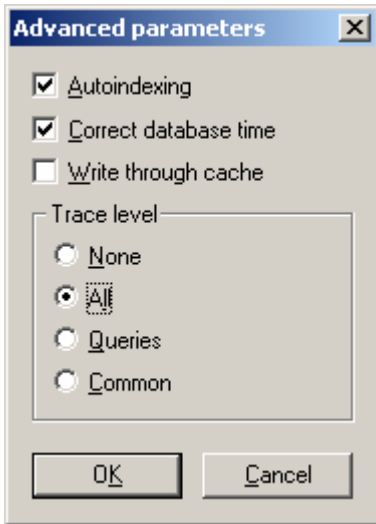
Table 11 – Fields of the dialog window for launching the Linter server

| <u>Parameter</u> | <u>Description</u> |
|---------------------|--|
| Kernel pool size | Specifies the size in 4Kbytes pages of the main memory allocated for the Linter server for queuing and caching user data. |
| Sort pool size | Specifies the size in 4 Kbytes pages of the memory provided for the Linter server for the sorting processes. Usually it should not exceed half of 'Kernel pool size'. |
| Snap timeout | Specifies the timeframe for synchronizing the Linter server cache and the database data on hard drive. |
| Check alive timeout | Specifies the timeout for polling the client’s connections. If it were found that some client has finished the work, but has not notified the Linter server about it (didn’t execute close connection for example), Linter server would automatically release the resources relating to this client. |

Table 12 – Checks of the dialog box for launching Linter server

| <u>Checks</u> | <u>Description</u> |
|--------------------------|--|
| Startup network listener | If the check is set it informs the linadm utility of the necessity to launch the Linter server network listener. |
| Startup as default | Defines the Linter server as the default Linter database server on local computer. |

4. To specify additional launching parameters press button 'Advanced'. You will see a dialog box for additional startup parameters of Linter server (Screen 25).



Screen 25 – Additional startup parameters of Linter server

5. Specify, if it is necessary, additional startup parameters of the Linter server in the dialog box.
6. Press OK.

Table 13 – Checks and switches of the dialog box for additional startup parameters of launching Linter server


| <u>Checks</u> | <u>Description</u> |
|-----------------------|--|
| Auto indexing | Create indices against user table automatically as needed by the Linter query optimizer |
| Correct database time | If the computer time is changed backward, that option forces Linter server to use current time. |
| Write through cache | Every database page update will be completed with the committed write I/O operation. |
| Trace level | Specifies the mode of Linter server work logging. The work log is kept in the file 'LINTER.LOG' in the database directory. This mode is applied mainly for debugging purposes. |
| None | Do not produce trace information. |
| All | Trace all requests processed by Linter. |
| Queries | Trace only SQL-queries and the execution time processed by Linter. |
| Common | Trace SQL queries |


 If the Linter server is launched Light on the traffic lights icon.


Linter server shutdown

To shutdown the Linter server:

1. Open the tree of servers and mark on it the database, for which it is necessary to shut the Linter SQL-server down.

2. Execute the menu items 'Database -> Shutdown', or press F10, or click on the icon , or click right mouse button and from the pulldown choose 'Shutdown' entry. Enter the database administrator user name and password to process the shutdown request.
3. Press the 'OK' button.

 If the shutdown for the Linter server is executed successfully, there should be red light on the traffic lights icon.

 Server network listener (if it runs) shuts down automatically.

Access to a remote database server



It is necessary to keep to the following conditions, so that a client application of a local computer could query the remote database server:

- Server network listener should be running on the remote database server;
- On the client computer there should be file 'nodetab', containing information about the remote database server;
- Network client agent should be running on the application computer.

Linter server network listener management



Launching Linter server network listener

To launch the Linter server network listener:

1. Open the Linter server tree and select the database, for which Linter server network listener should be launched. Launch the Linter server, if it is not launched (see section “Launching Linter server”).
2. Execute the menu items **Network > Remote listener > Startup** or click on the icon . If the network listener is launched successfully, the icon will turn to .

Linter server network listener shutdown

To shutdown the Linter server network listener:

1. Open the Linter server tree and select the database, for which it is necessary to shutdown the Linter server network listener. For this database Linter server should be launched.
2. Execute the menu items **Network > Remote listener > Shutdown** or click on the icon . If the network listener is shut down successfully, the icon will turn to .

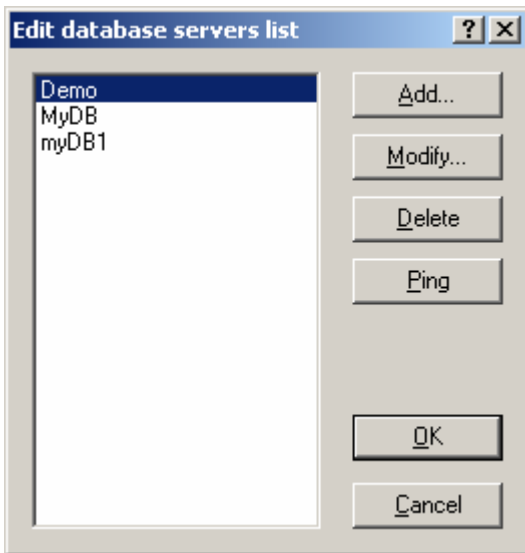
Management of the remote database server list

As mentioned above, Linter client network agent receives the information about the remote database server available for client application from the list of available databases. The list of available databases is kept in the file 'nodetab'. This file should be created and configured on every client computer, from which a remote access to the databases is supposed.

Adding remote database server to the list

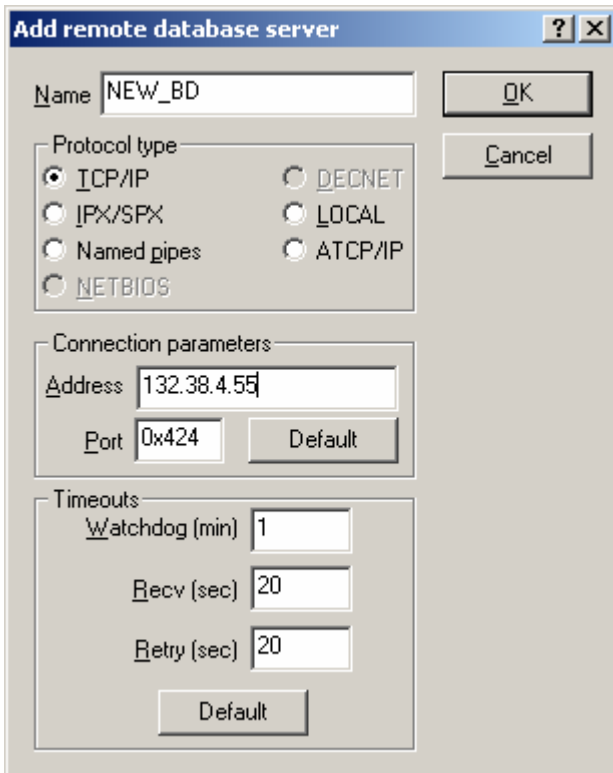
To add the remote database server to the list:

1. Execute the menu items **Network > Bases list**. There will appear a dialog box for remote database list management (Screen 26).



Screen 26 – Remote database list management dialog box

- Press the button 'Add'. There will appear a dialog box for entering parameters of the remote database that need to be added (Screen 27).





Screen 27 – Remote database properties dialog box


- Specify the parameters of the addition database in the dialog box (see Table 14).

Table 14 – Fields and elements of the remote database properties

| <u>Parameter</u> | <u>Description</u> |
|------------------|--|
| Name | Name of the remote database server (maximum 8 characters), which will be used by the application. |
| Server type | Type of the network protocol, though which the access to the remote database server should be carried out. Set the corresponding switch. |

| <u>Parameter</u> | <u>Description</u> | |
|-----------------------|---|--|
| Connection parameters | Network access parameters: network address or network name of the addition database (see operation 3): | |
| | Address | network address or network name of the addition database (see operation 3); |
| | Port | port number on the database server computer, through which the access to the database should be carried out. For TCP/IP networking protocol this is a socket port. |
| |  The button 'Default' in this dialog group of parameters sets up the default port value. | |
| Timeouts | Network access parameters: | |
| | Watchdog [min] | the timeout to verify the connection status; |
| | Send [sec] | the timeout for connection alive confirmation messages; |
| | Retry [sec] | in case of the connection error, the timeout for operation retry. |
| |  The button 'Default' in this dialog group of parameters sets up the default temporary parameter values. | |

4. Press OK. The dialog box for the available database list management will appear once more (Screen 26).
5. If it is necessary to continue adding new remote database properties, repeat operations 5, 6.
6. To complete operations of adding the remote databases press OK button (Screen 26).

 Note. After adding a new database to the remote database list, the utility linadm automatically tries to verify the specified remote database server parameters (Screen 28).



Screen 28 – Impossibility of checking access to the added remote database diagnostic message

To verify the entered remote database parameter execute the 'ping' menu item.

Deleting remote database server from the list

To delete a remote database server from the list of available from the given computer:

1. Execute the menu items **Network > Bases list**. There will appear a dialog box for remote database list management (Screen 26).
2. Select in the database list the remote database server needed to be deleted.
3. Press the 'Delete' button.
4. Repeat, if necessary, operations 2, 3 for deleting another database.
5. Press the 'OK' button to confirm all done operations or 'Cancel' to cancel them.

Update the remote database properties

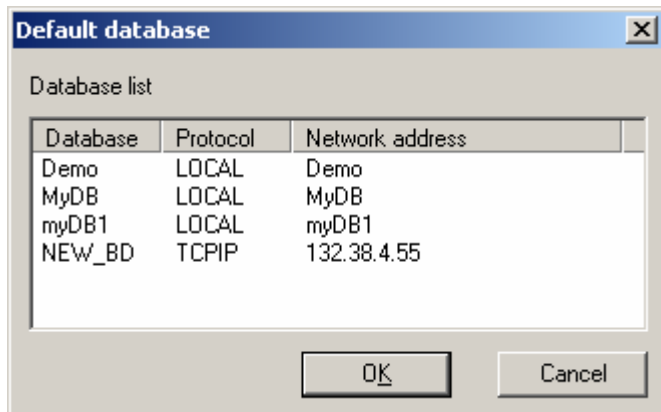
To update the remote database properties:

1. Execute the menu items **Network > Bases list**. There will appear a dialog box for the remote database list (Screen 26).
2. Select the remote database needed to be modified
3. Press 'Modify...'
4. The remote database properties dialog box will be displayed (Screen 27). Modify the parameters (see section “Adding remote database server to the list”).
5. Repeat, if necessary, operations 2–4 to modify other database parameters
6. Press the 'OK' button to confirm all done operations or 'Cancel' to cancel them.

Verify remote database parameters

To verify the remote database parameters:

1. Execute the menu items **Network > Local agent > Startup**. You will see a dialog box (Screen 29) containing the list of the remote database servers. Press OK button.



Screen 29 – Remote database server list dialog box


2. Execute the menu items **Network > Bases list ...**. There will appear a dialog box (Screen 29) containing the list of available remote database servers.
3. Select a remote database server.
4. Press the 'Ping' button. The diagnostic message with the remote database server status will be displayed.


Linter client network agent management

Launching client network agent

Linter client network agent should be launched on the client computer, so that applications had access to a remote Linter server.


To launch the client network agent:

1. Select the tree of servers (it should not be necessarily open, as launch of client network agent is always carried out on a local computer).
2. Execute the menu items **Network > Local agent ... >Startup** or click on the icon . There will appear a window with the list of available remote databases (Screen 29).
3. Select the remote database server to which it is supposed to refer from the local computer as a 'default' server

4. Press the 'OK' button. If the network agent has been launched successfully, the icon will turn to .

Linter client network agent shutdown

To shut the Linter client network agent down:


1. Enter the server tree (it should not be necessarily open, as shutdown of client network driver is always carried out on a local computer).
2. Execute the menu items menu items **Network > Local agent ...> Shutdown** or click on the icon .

Access to database from Java-applications

Linter server supports access from Java-applications. That feature is provided by Linter server and client components of the Linter JDBC-driver. The client component of the Linter JDBC driver is always launched by the Java-application (LinJDBC.jar). The Linter server-side component of JDBC driver (Linter JDBC listener) can be launched manually or via linadm utility. If the Linter JDBC listener is launched on a local computer, linadm automatically launches Linter client network agent (if it has not been launched already).

Launching the Linter JDBC listener

To launch the Linter JDBC listener:

1. Open the Linter server tree and select the database server, for which the Linter JDBC listener should be launched.
2. Execute the menu items **Network > JDBC listener > Startup** or click on the icon . There will appear a dialog box of the Linter JDBC listener launching parameters (Screen 30);



Screen 30 – Linter JDBC listener parameters dialog box

3. Specify the parameters of the Linter JDBC listener dialog box (see Table 15).
4. Press the 'OK' button to confirm all performed operations or 'Cancel' to cancel them.

Table 15 – Fields of the dialog box of the Linter JDBC listener startup parameters


| <u>Parameter</u> | <u>Description</u> |
|------------------|---|
| Port | Linter JDBC listener socket port number, through which an access to a database from Java-applications is carried out. 1070 is suggested by default. |
| Memory | Number of pages of the main memory on a remote site (one page - 4 Kbytes) available for the Linter JDBC listener. |

Shutdown of the Linter JDBC listener

To shut the Linter JDBC listener down:

1. Open the tree of servers and mark on it the server, for which the Linter JDBC listener should be shutdown.

- Execute the menu items **Network > JDBC listener > Shutdown** or click right mouse button on the icon .

 When the shutdown of Linter JDBC listener on a local computer is done, the shutdown of Linter server network agent is not.

Managing Linter Replication server


Along with administration of the Linter server, utility linadm can be used for administration of the Linter Replication server.

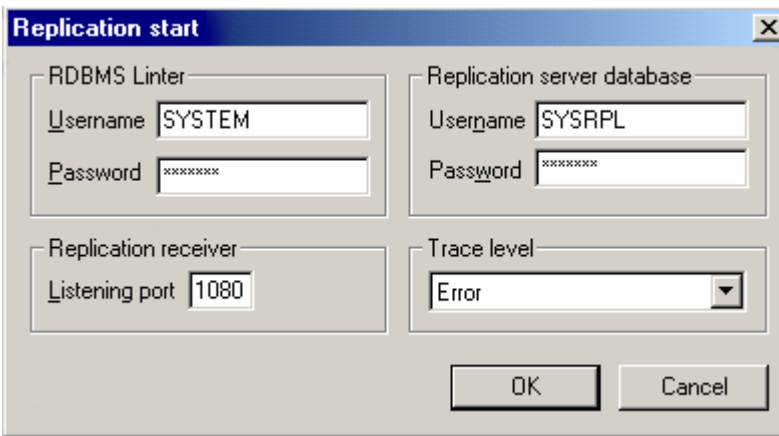
Display and change of the Linter Replication server startup parameters are done in the same way as display and change for the Linter server (see section “Changing database service launch parameters”).

Launching Linter Replication server

In the server tree of Linter replication server is represented by two objects: the source database for replication and the Linter Replication server database (name RDSTG).

To launch the Linter Replication server:

- Open the server tree and select the source database for replication. If the database is not launched, launch it (see section “Launching Linter server”).
- Execute the menu items **Network > Replication server > Startup** or click right mouse button on the icon . You will see a dialog box for replication components parameters (Screen 31).



Screen 31 – Replication components parameters dialog box

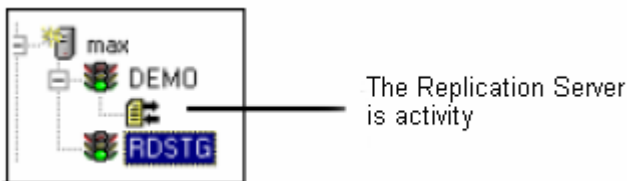
- Specify the replication server parameters in the dialog box (see Table 16).

Table 16 - Fields of the dialog box of replication components parameters

| <u>Parameters</u> | <u>Description</u> | |
|--------------------|---|---------------------------|
| RDBMS Linter | Identification parameters of the administrator for source database. | |
| | Username | Administrator's user name |
| | Password | Administrator's password |
| Replication server | Replication parameters of the Linter replication database. | |

| <u>Parameters</u> | <u>Description</u> | |
|----------------------|---|---|
| database | Username | Administrator's user name |
| | Password | Administrator's password |
| Replication receiver | Linter Replication server listener. | |
| | Listening port | The Linter Replication communication is done through the TCP/IP protocol. That port is a socket port number, through which receiving Linter Replication listener receives the replication requests. 1080 is suggested by default. |
| Trace level | This is a Linter Replication server diagnostic messages trace information level. Possible values are chosen from the pull-down: <ul style="list-style-type: none"> • none; • error messages; • warning messages. | |

4. Press OK. There will appear a dialog box for entering the startup parameters of the Linter Replication server similar to the one described in 9.7.5 .
5. Press OK. If the replication Linter-server is launched successfully, in the tree of servers of the utility linadm' there will appear the icon showing the active mode of replication components (Screen 32).



Screen 32 – Graphical representation of replication Linter-server is activity

Restart of Linter Replication server

To restart the Linter Replication server:

1. Open the tree of servers and select on it the launched Linter Replication database.
2. Execute the menu items **Network > Replication server > Startup** or click on the icon . You will see a dialog box for entering replication component parameters. (see section “Launching Linter Replication server”).

Linter Replication server shutdown

To shut the Linter Replication server down:

1. Open the tree of servers and select on it the launched source database for replication.
2. Execute the menu items **Network > Replication server > Shutdown** or click right mouse button on the icon . If the Linter Replication server is shut down successfully, the replication server activity icon will disappear.
3. Shut the replication server database down (see section “Linter server shutdown”).

4. Shut down, if necessary, the source database of replication server (see section “Linter server shutdown”).


Operations with databases

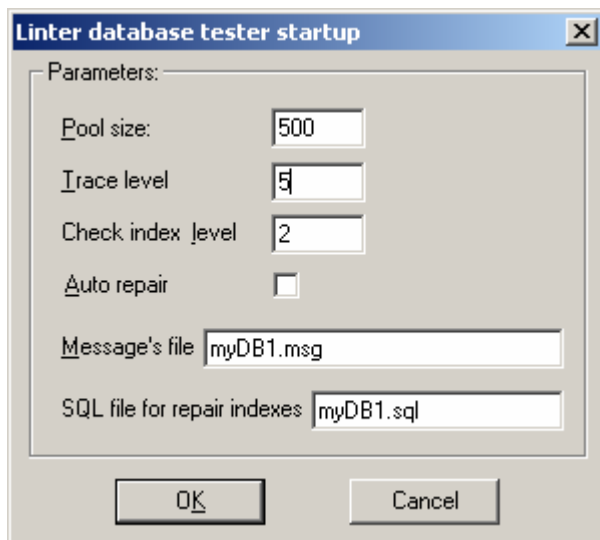
It is possible to operate with local and a remote databases via linadm utility and built-in lindesk utility. Utility lindesk provides a lot of features for both database administration and objects manipulation (see document 'LINTER Desktop').

Database structure testing

Using linadm utility and built-in it testdb utility it is possible to verify the database structure integrity and, as far as possible, fix the found problems. As utility testdb operates with database files directly (omitting Linter server), it can test only database which files are accessible. Features of testdb utility are described in the document "Database testing".

To test a database:

1. Open the tree of servers and select the local database, which is supposed to be tested. The tested database server should be inactive.
2. Execute the menu items **Tools > Base tester ...** or press 'Ctrl+T' or click on the icon . You will see a dialog box for entering testdb utility startup parameters (Screen 33).



Screen 33 – Testdb utility startup parameters dialog box

3. Specify the testdb utility startup parameters in the dialog box (see Table 17).

Table 17 – Fields and elements of the dialog box of testdb startup parameters

| <u>Parameters</u> | <u>Description</u> |
|-------------------|--|
| Pool size | Size of the testdb workspace (in pages by 4 Kbytes). It should not be less than 10 pages. 500 pages is a suggested number by default. |
| Trace level | Database test thoroughness. The value between 1 -5 (see document "Database testing"). |
| Check index level | Test thoroughness of database indexes. The value between 1 -3 (see document |

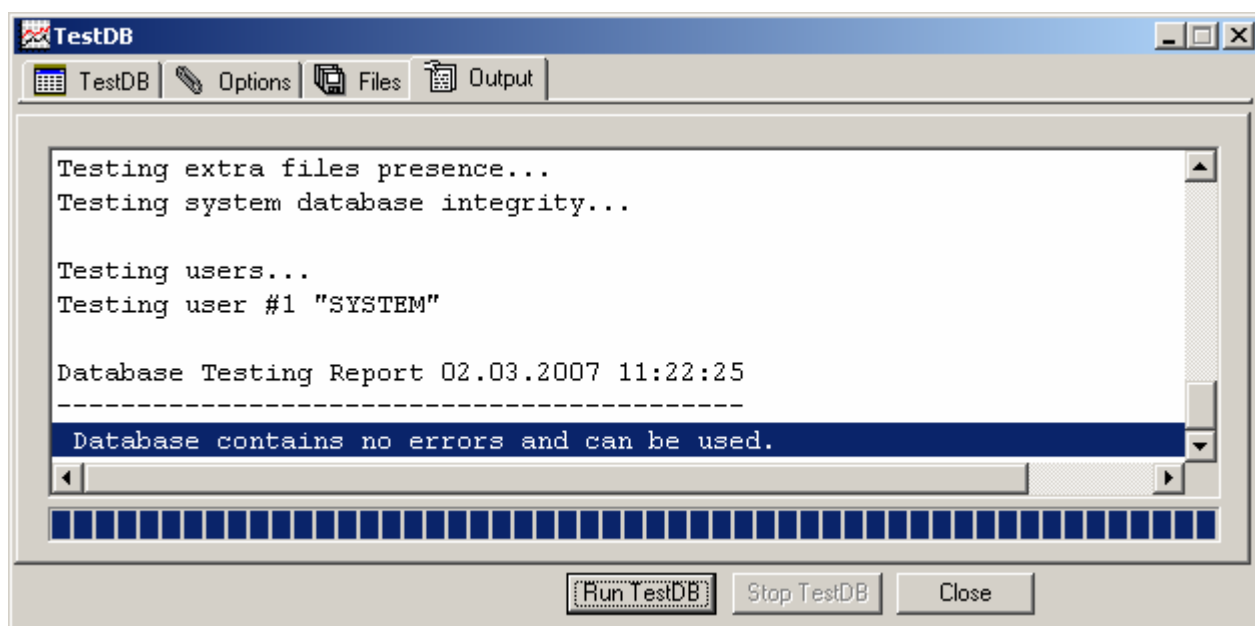
| <u>Parameters</u> | <u>Description</u> |
|-----------------------------|--|
| | "Database testing"). |
| Auto repair | The check of automatic fix of found discrepancies in the database files structure. |
| Message's file | Name and path of the testdb output file. |
| SQL file for repair indexes | Name and path of the SQL-file for correction of indices. |

4. Press OK.
5. Wait till the end of the database testing (Screen 34).

This is a Linter Replication server diagnostic messages trace information level.

Possible values are chosen from the pull down:

- none;
- error messages;
- warning messages.



Screen 34 – Testdb utility output window

6. Review the testdb output and press on the 'Close' button to continue.

Interface setting

User can customize the linadm utility interface properties:

- Select the interface language;
- Set the mode of displaying the icon bar and the status bar.

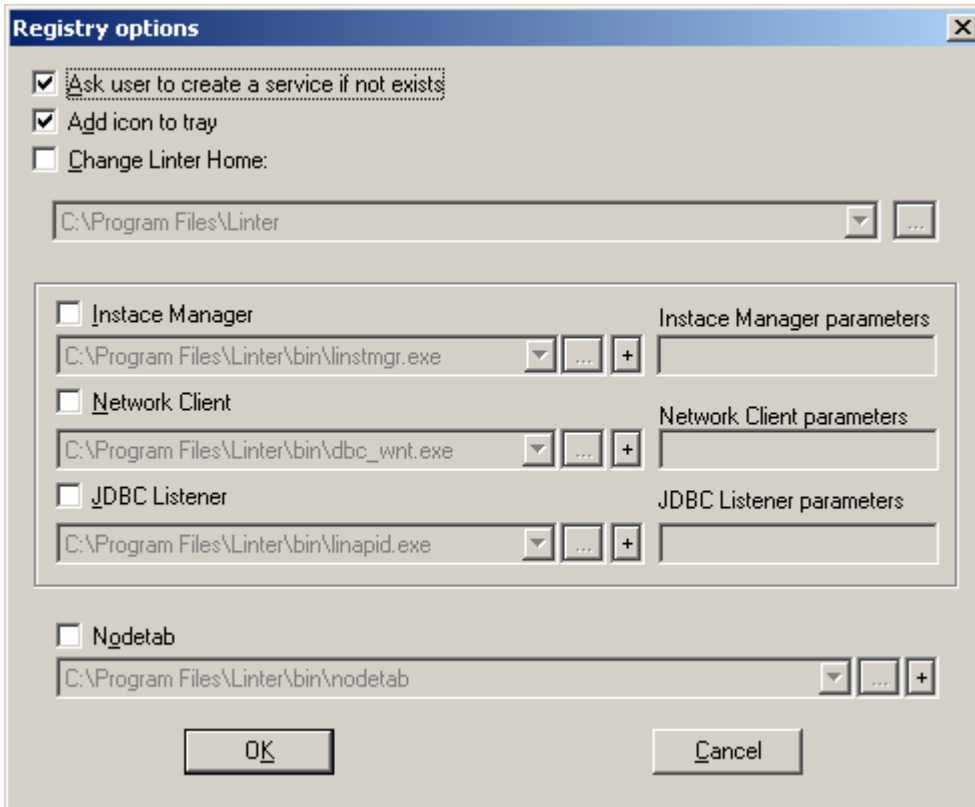
Program setting

As mentioned above, the utility linadm uses the mechanism of Windows services for network database administration. If during its operation linadm has not found the necessary services,

some of them it can create independently. This feature of the utility can be enabled or disabled. If the automatic creation of services is prohibited, the utility, when necessary, will be asking for enable to create it.

To allow (cancel) automatic creation of services:

1. Launch the linadm utility.
2. Execute the menu items **Tools > Options ...**. You will see a dialog box for setting the corresponding option (Screen 35).

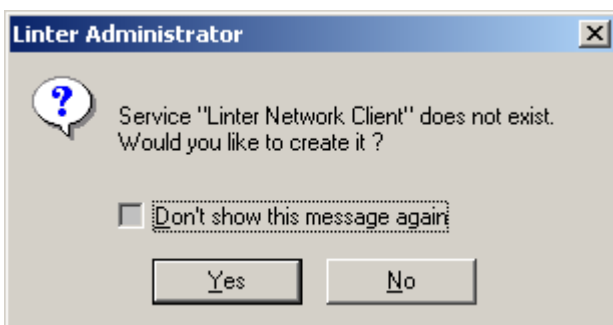


Screen 35 – Administration utility options dialog box

3. To cancel the automatic creation of services set the check (to allow drop it).
4. Press OK to confirm the executed action or Cancel to cancel it.

If automatic creation of services is canceled, every time when it is necessary to create the service there will appear a dialog box (Screen 36) for allowance 'Yes' or prohibition 'No' of creating the service.

If you set the check 'Don't show this message again', after answering 'Yes' the window on the Screen 36. will not be shown and creation of services will be done automatically. After answering 'No', the window will also not be shown, but the services will not be created automatically.



Screen 36 – Dallow/Cancel of creating services dialog box