

# **Firebird Job Interview Questions And Answers**



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## Firebird Interview Questions And Answers Guide.

### Question - 1:

Why does reading require write privileges on database file?

#### Ans:

In order to run the SELECT statement, it still needs to start a transaction.

If you wish to build a read-only database to place on some read-only media like CD or DVD ROM, you can do it with:

`gfix -mode read_only database.fdb`

...or within your favorite administration tool. It is also available via ServicesAPI, so you may do it from your application as well. Please note that you can only make this change while preparing the database, because the read-only flag needs to be written in the database file.

When the database becomes read-only, the only thing you can write to is the read\_only flag (to reset it back to read-write).

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### Question - 2:

What is the best way to determine whether Firebird server is running?

#### Ans:

If you want to do it from an application, a simple try to connect should suffice. Otherwise you have various options:

a) check if firebird server is in the list of running programs (use task manager on Windows, or 'ps ax' command on Linux). Please note that Classic won't be running until there is a connection established.

b) check whether the port 3050 is open on the machine. First, you can check with netstat command, and if it is open, you can test whether it accepts connections by telnet-ing to the port. Just type:

`telnet [hostname|IPaddress] 3050`

Example:

`telnet localhost 3050`

If you use Linux, you can also check the open port with 'lsof' command. It outputs a lot, so you might want to 'grep' for 3050 or gds\_db strings:

`# lsof | grep gds_db`

`# lsof | grep 3050`

c) if all of this fails, perhaps you should check whether the remote server is reachable at all. You can use 'ping' command:

`ping [hostname|IPaddress]`

Example:

`ping 192.168.0.22`

Please note that ping can still give you 'host unreachable' message even if host is up. This is because the firewall software can drop the ICMP (ping) packets (it's done to prevent some viruses from spreading, or network scans).

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### Question - 3:

Is there some bulk load or other way to import a lot of data fast?

#### Ans:

Currently there is only one way to quickly load a lot of data into database. That is by using external tables. You should read the manual for details, but here's a short explanation. You create a binary or textual file using the external table format and then hook it up in the database using a statement like this:

`CREATE TABLE ext1 EXTERNAL 'c:\myfile.txt'`

`(`

`field1 char(20),`

`field2 smallint`

`);`

To do quick import into regular table, do something like this:

`INSERT INTO retable1 (field1, field2)`

`SELECT field1, field2 FROM ext1;`

This insert would still check constraints, foreign keys, fire triggers and build indexes. If you can, it is wise to deactivate indexes and triggers while loading and activate them when done.

Make sure you drop the external table when done, in order to release the lock on the file.

The main problem with external tables is handling of NULLs and BLOBs. If you need to deal with those, you're better off using some tool like FBExport. However, please note that external tables are much faster.

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### Question - 4:

Is there an example how to configure UdfAccess setting in firebird.conf?

#### Ans:

Well, there's one right there in the firebird.conf, but perhaps it isn't obvious enough. Here are the basic settings ('None' to disallow UDFs completely and 'Full' to allow them anywhere) which you probably understood yourself:

UdfAccess = None

UdfAccess = Full

And here is that tricky Restrict setting:

UdfAccess = Restrict C:somedirectory

For multiple directories, use something like this:

UdfAccess = Restrict C:somedirectory;C:someotherdirectory

For Linux users:

UdfAccess = Restrict /some/directory

In the default setting 'Restrict UDF', 'UDF' is a directory relative to root directory of Firebird installation.

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### Question - 5:

Is there an example how to configure ExternalFileAccess setting in firebird.conf?

#### Ans:

Firebird's config file (firebird.conf) does have descriptions inside that explain everything, but sometimes they are confusing and hard to understand what should you do exactly if you don't have examples. One of such settings is ExternalFileAccess. Some people are even tempted to put Full as it is much easier than trying to guess what's the correct format. Here are the basic settings ('None' to disallow external tables and 'Full' to allow them anywhere) which you probably understood yourself:

ExternalFileAccess = None

ExternalFileAccess = Full

And here are those tricky Restrict settings:

ExternalFileAccess = Restrict C:somedirectory

For multiple directories, use something like this:

ExternalFileAccess = Restrict C:somedirectory;C:someotherdirectory

For Linux users:

ExternalFileAccess = Restrict /some/directory

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### Question - 6:

Is there a way to detect whether fbclient.dll or fbembed.dll is loaded?

#### Ans:

There are some ways to detect it:

- check the size of DLL file

- if you are using different versions of Firebird (for example 1.5.4 and 2.0.1, you can query the server version via Services API)

You should understand that fbembed can be used as a regular Firebird client. Checking whether embedded or fbclient is loaded for licensing or similar needs is really not useful. You could use the connection string as guide, but super server can establish direct local connections without localhost prefix.

If you combine all this information, you could get some conclusions:

- if DLL size matches fbembed and connection string doesn't have hostname, you are using embedded

- if DLL size matches fbembed and connection string does have hostname, you are using either super server or classic

- if DLL size matches fbclient and connection string doesn't have hostname, you are using super server via local connection (IPC, XNET)

- if DLL size matches fbclient and connection string does have hostname, you are using either super server or classic

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### Question - 7:

Is there a way to automate SQL execution from the command-line, batch job or shell script?

#### Ans:

Yes. You can use isql for this. It is located in the 'bin' directory of your Firebird installation. If you wish to try it interactively, run isql and then type:

```
isql localhost:my_database -user sysdba -pass *****
```

```
SQL> input my_script.sql;
```

```
SQL> commit;
```

```
SQL>
```

To run it from a batch (.bat) file or a shell script, use -i switch:

```
isql -i my_script.sql localhost:my_database -user sysdba -pass *****
```

If you have some DML statements in your script, make sure you put the COMMIT command at the end of the file. Also, make sure the file ends with a newline, as isql executes the commands on the line only after it gets the newline character.

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### Question - 8:

Is it possible to determine clients IP address?

#### Ans:

To get it from SQL, you need to use Firebird 2.0 (own address), or Firebird 2.1 (anyone's):

If you use Firebird 2.0 or higher, use the GET\_RDB\$Context function with ('SYSTEM', 'CLIENT\_ADDRESS') parameters.

If you use Firebird 2.1 or higher, you can get address of any client by selecting from the monitoring tables.

With Firebird 1.x you can try to get the information from TCP/IP stack, using netstat or lsof commands from the command-prompt. Just search for Firebird's port (3050 or gds\_db).

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### Question - 9:

How to write UDF s in Delphi?

#### Ans:

It's quite simple, the only thing you need to remember is that you must always use `ib_util_malloc()` to allocate memory if your UDF returns string result. The UDF must be declared as `FREE_IT`, so that Firebird releases the memory after it reads the string.

To use `ib_util_malloc()`, you need to import it from `ib_util.dll` into your program - and make sure you use it instead of regular memory allocating functions. Here's a simple example of Delphi UDF:

```
function ib_util_malloc(l: integer): pointer; cdecl; external 'ib_util.dll';
function ChangeMyString(const p: PChar): PChar; cdecl;
```

```
var
s: string;
begin
s := DoSomething(string(p));
Result := ib_util_malloc(Length(s) + 1);
StrPCopy(Result, s);
end;
```

Declaration in Firebird:

```
DECLARE EXTERNAL FUNCTION ChangeMyString
CString(255)
RETURNS CString(255) FREE_IT
ENTRY_POINT 'ChangeMyString' MODULE_NAME '.....'
```

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### Question - 10:

How to use events with ZeBeDee, SSH or stunnel?

#### Ans:

You have to use SuperServer, set up `RemoteAuxPort` setting in `firebird.conf` and create two tunnels (one for data, other for events).

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### Question - 11:

How to tell Firebird to only accept connections from XYZ host or network?

#### Ans:

This isn't really a thing you should be configuring in Firebird. There is a `RemoteBindAddress` setting in `firebird.conf` which configures on which interfaces/addresses the Firebird listens but that's all. You should really use your system's firewall to set this up.

Beside firewall, if you use Classic on Linux, you can use `xinetd` or `inetd` access control files `/etc/hosts.allow` and `/etc/hosts.deny`. With `xinetd` you can also edit the `xinetd` configuration file for Firebird service, which is in `/etc/xinetd.d/firebird` and add a line like this:

```
"only_from = 192.168.0.0/24"
```

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### Question - 12:

How to stop SuperServer service on Linux using only Firebird tools?

#### Ans:

The server is started and stopped by 'fbmgr' executable from 'bin' directory of your Firebird installation. It is called 'ibmgr' in Firebird 1.0. To start the server type:

```
/opt/firebird/bin/fbmgr -start
```

To start the server with Guardian (Guardian watches the server and restarts it if it crashes) type:

```
/opt/firebird/bin/fbmgr -start -forever
```

To stop a running server, type:

```
/opt/firebird/bin/fbmgr -shut -user SYSDBA -pass *****
```

To force a shutdown, type:

```
/opt/firebird/bin/fbmgr -shut -force -user SYSDBA -pass *****
```

If you use Firebird 2 or higher, you can also use the regular 'kill' command to shutdown the server, as it handles the signals properly. Make sure you first kill the guardian and then the server (otherwise guardian would restart the server).

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### Question - 13:

How to specify transaction or query timeout?

#### Ans:

In order to keep the server low reasonable, you might want to limit the time a single query can consume. Firebird does not support this directly yet (there are plans for Firebird 3.0).

However, you could periodically query the monitoring tables (Firebird 2.1 and above) to detect and cancel long running queries. You can do:

```
SELECT * FROM MON$STATEMENTS;
```

Look for those having `MON$STATE` set to 1.

Please note that your database needs to be at least ODS 11.1, i.e. created with Firebird 2.1 or above. Older databases won't show you these tables even if you use Firebird 2.1 to access them. To learn more about ODS and how to retrieve it.

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### Question - 14:

How to select a random record from a table?

#### Ans:

There is no such feature in Firebird, but you can use some tricks. The following example requires that you have a unique integer column (primary key is usually



used);  
SELECT ...field\_list...  
FROM table t1  
WHERE conditions  
ORDER BY (t1.int\_col + seed)\*4294967291-((t1.int\_col + seed)\*4294967291/49157)\*49157;

If you just need one random record, limit the result set using FIRST or ROWS clause. This query will give consistent records for the same seed. If you wish to be completely random, you need to change the seed. You could use the value of int\_col from previous run, or simply fetch a new value from a generator (just make sure the same value for seed is used in both places in expression).

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### Question - 15:

How to repair a corrupt Firebird database?

#### Ans:

Here's a short step-by-step walkthrough:

- \* disconnect users and disable incoming connections to the database
- \* make a copy of database file (or two copies) and work on that
- \* use GFIX with -v option to validate the database file
- \* use GFIX with -v and -f to do full validation

If problem is not too serious, you can try to backup the broken db and restore under a new name:

- \* use GFIX -mend to prepare corrupt database for backup
- \* use GBAK -b -g to backup the database. -g disables garbage collection (FAQ #41)
- \* use GBAK -c to restore backup to a new database.

If you succeed, you have fixed the problem and have a functional database. If not, you can try to create an empty database with the same structure and pump the data to it.

One of the reasons why backup or restore can fail is if some broken database triggers exist, and prevent connection to the database. For example, a database trigger might use some table which has a broken index, etc. To work around this, connect to database with isql tool using -nodbtriggers option and then disable those triggers. You can enable them later when you fix other problems and get a working database again.

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### Question - 16:

How to reorder the table columns (fields)?

#### Ans:

While the order should not matter to applications (you should always use explicit column names in queries), perhaps it's easier for you when you work with tables in database administration tools. You can move a column to different location using the following SQL statement:

```
ALTER TABLE table_name ALTER field_name POSITION new_position;
```

Positions are numbered from one. If you wish to exchange two fields, make sure you run the statement for both of them. It's easy to run tools like FlameRobin to do this (Reorder Fields option at table's properties screen).

[View All Answers](#)

### Question - 17:

How to recreate the index on a Firebird table?

#### Ans:

Recreating the index:

```
ALTER INDEX indexName INACTIVE;  
ALTER INDEX indexName ACTIVE;
```

Please note that it does not work for indices automatically created by the system like the ones for primary key or foreign key. You might want to drop and recreate the constraints in such case.

To recalculate the index statistics (which is enough for most cases), use:

```
SET STATISTICS INDEX indexName;
```

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### Question - 18:

How to pump the data from one database to another?

#### Ans:

Many recommend IB Pump or IB Data Pump, but the problem is when you have complex relations between tables. In such cases, it is better to use tool like FBCopy which sorts the tables by dependencies (foreign keys, check constraints) into correct order

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### Question - 19:

How to prevent firebird.log file from filling up the disk partition?

#### Ans:

Here are some tips:

a) create a scheduled task or cron job that will truncate or rotate the log file. By rotation, we mean renaming the files in such way that you always have a number of previous logs available. Example:

```
delete firebird.log.5  
rename firebird.log.4 firebird.log.5  
rename firebird.log.3 firebird.log.4  
rename firebird.log.2 firebird.log.3  
rename firebird.log.1 firebird.log.2  
rename firebird.log firebird.log.1
```

This way you'll always have last five logs available, and those too old get deleted. You can also use zip, rar, bzip2 or some other packer to compress the old log files.



Since they are plain text, they compress very well.

b) redirect logging to void. For example, on Linux, you can do it by creating a symlink to /dev/null instead of the regular log file:

```
# cd /opt/firebird
# rm -f firebird.log
# ln -s /dev/null firebird.log
```

Please note that you really shouldn't be doing this, as you will lose all valuable diagnostic information. It's better to try to find what are the errors, what's causing them and fix the problem at the source.

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### Question - 20:

How to disconnect the user connection?

**Ans:**

Currently there is no easy way of doing it. You can bring database to some of shutdown modes, but it affects all users. If you use Classic you can (with some effort) find the users process by detecting the IP address and open database files of that process and simply kill that process. With Super Server it is not possible as the connection is run in a thread of multithreaded SuperServer process.

There are plans for future versions of Firebird to address this. For example, version 2.1 introduces ability to cancel running queries (by deleting the relevant records from MON\$STATEMENTS table).

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### Question - 21:

How to do replication of Firebird databases?

**Ans:**

Firebird does not offer replication out-of-the-box, you need to use some 3rd party tools. Those external tools add specific triggers that log all the changes in database and replicate to other databases.

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### Question - 22:

How to drop all foreign keys in database?

**Ans:**

Deleting all foreign keys can be done by querying the system tables and dropping them one by one. If you use Firebird 2 or higher, it can be done with a single SQL statement:

```
set term !! ;
EXECUTE BLOCK RETURNS (stmt VARCHAR(1000)) AS
BEGIN
FOR
select 'alter table '||r.rdb$relation_name ||' drop constraint '||r.rdb$constraint_name||';'
from rdb$relation_constraints r
where (r.rdb$constraint_type='FOREIGN KEY')
into :stmt
DO begin suspend; execute statement :stmt; end
END!!
set term ; !!
```

If you use Firebird 1.x, you can run the following query to get statements to execute and then copy/paste the result and execute:

```
select 'ALTER TABLE '||r.rdb$relation_name
||' DROP CONSTRAINT '||r.rdb$constraint_name||';'
from rdb$relation_constraints r
where (r.rdb$constraint_type='FOREIGN KEY')
```

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### Question - 23:

How to export data from database and import into another?

**Ans:**

If your databases are on-line, i.e. visible to each other via network, then you can use some data pump tool like freeware IB Pump or some of advanced commercial administration tools which have this option integrated.

If your databases are offline, you should first export the data and then import it on the other end. Most admin. tools can do export to CVS, XML or INSERT statements. If efficiency is important, or you have data with BLOB column, you can use the open source FBExport tool.

If you are looking for a way to easily import CSV or XML data into Firebird, take a look at XMLWizard tool. You can also use it to import data from Microsoft Excel or OpenOffice by saving the sheet to .csv format and then importing via XMLWizard

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### Question - 24:

How to extract metadata for the entire database?

**Ans:**

It's quite simple, use isql with -x or -a options. Please be careful and test if it works. Some commercial administration tools like to play with system tables directly, and isql isn't always able to understand their hacks.

You can also extract DDL with FlameRobin. Open the properties page for the database and select DDL option at the top.

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### Question - 25:

How to get a list of tables, views and columns in Firebird database?



### Ans:

Tables and views are stored in RDB\$RELATIONS system table. System tables and views have RDB\$SYSTEM\_FLAG set, while user defined ones have zero or NULL. You can distinguish views from tables as they have field RDB\$VIEW\_BLR set. Please note that there is also a field RDB\$VIEW\_SOURCE which stored human-readable view source and can be set to NULL - database would still be completely functional as it uses precompiled BLR. Here's query to list all user tables:

```
select rdb$relation_name
from rdb$relations
where rdb$view_blr is null
and (rdb$system_flag is null or rdb$system_flag = 0);
```

A query to list all views:

```
select rdb$relation_name
from rdb$relations
where rdb$view_blr is not null
and (rdb$system_flag is null or rdb$system_flag = 0);
```

Table and view columns are stored in RDB\$RELATION\_FIELDS. It stores the name, null flag, default value, and domain. In order to get the datatype you need to read domain info from rdb\$fields. Here's a query that lists all tables with their columns:

```
select f.rdb$relation_name, f.rdb$field_name
from rdb$relation_fields f
join rdb$relations r on f.rdb$relation_name = r.rdb$relation_name
and r.rdb$view_blr is null
and (r.rdb$system_flag is null or r.rdb$system_flag = 0)
order by 1, f.rdb$field_position;
```

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### Question - 26:

How to load a file into database column?

### Ans:

While some other database systems might have an SQL function for this, with Firebird you need an application. Datatype that holds binary files is called BLOB, and you should use sub\_type zero, as sub\_type one is for text-only data. Let's create a table to hold the file. We'll have a filename column and a blob column containing the file itself:

```
CREATE TABLE t1
(
  file_name VARCHAR(200),
  file_data BLOB SUB_TYPE 0
);
```

The blobs are loaded via parametrized query:

```
INSERT INTO t1 (file_name, file_data) VALUES (?, ?);
```

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### Question - 27:

How to lock records in a table?

### Ans:

While there shouldn't be many reasons to do this in MGA database system like Firebird, there are ways to do it.

One is to use a dummy update for all the records you wish to lock. Many developers do this by accident and get the deadlocks. Example that locks employee 8:

```
-- start transaction
update employee set emp_no = emp_no where emp_no = 8;
...
update employee set ... where emp_no = 8;
```

-- end transaction

A more elegant way is to use the SELECT ... WITH LOCK syntax.

```
-- start transaction
select * from employee where emp_no = 8 WITH LOCK;
```

```
...
update employee set ... where emp_no = 8;
```

-- end transaction

Please note that locking easily leads to deadlocks with NO WAIT and application hanging with WAIT transactions. Use it only if you're really sure you know what you are doing and why.

[View All Answers](#)

### Question - 28:

How to migrate Paradox, dBase or FoxPro database to Firebird?

### Ans:

The easiest way is to download the freeware IBDataPump by CleverComponents. It will extract the metadata from Paradox/dBase/FoxPro database, create all the tables in a Firebird database and then copy all the data. You'll probably have a ready-to-go Firebird database in less than one hour.

[View All Answers](#)

### Question - 29:

How to monitor Firebird server activity?

### Ans:

Firebird 2.1 introduces server-side monitoring via special system tables. This way you can monitor your server directly from SQL. Those system tables all have prefix MON\$ in their name. To use them, you need to make sure your database file is created with Firebird 2.1 or higher (ODS version 11.1). If you have a database that is created with earlier versions, you need to do backup and subsequent restore with Firebird 2.1 to have those tables.

For detailed information about each monitoring table, read the file README.monitoring\_tables in 'doc' directory of your Firebird installation.

Please note that monitoring tables just offer the data, but you'll probably need some way to aggregate those and spot the problems. Most of these tools can also be





used to monitor earlier Firebird versions as well.

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### Question - 30:

How to move a multi-file database?

#### Ans:

You are probably used to having a single-file database which you can move around as much as you want. But, your database has grown too big and now you need a multi-file database. Paths to the secondary files are absolute and stored in the header page of the first database file. If you need to move those files, it is recommended that you backup the database and restore at new location. However, if you really, really need to copy them around, you can use freeware tool GLink by Ivan Prenosil:

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### Question - 31:

How to open the database in exclusive mode?

#### Ans:

You need to shutdown the database (using gfix or some other tool). Firebird 2.0 offers various shutdown modes (single-user, single-connection, multiple connection, etc.). Take a look at Firebird 2 release notes for details.

[View All Answers](#)

### Question - 32:

How to pipe multiline string to isql?

#### Ans:

Using Bash shell you may use the following construct:

```
{
echo "DROP VIEW v1;"
echo "CREATE VIEW..."
} | isql -user SYSDBA -pass masterkey srv:db
each echo statement outputs newline at the end.
Because that's a lot of writing, use the so called 'document here' feature of the shell:
cat <<- _END_ | isql user SYSDBA -pass masterkey srv:db
DROP VIEW v1;
CREATE VIEW ...
...
_END_
```

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### Question - 33:

How to determine who is and change the owner of database?

#### Ans:

Use the following query:

```
SELECT DISTINCT RDB$OWNER_NAME AS DATABASE_OWNER
FROM RDB$RELATIONS
WHERE (RDB$SYSTEM_FLAG = 1);
```

Please note that in order to change the owner, it is not enough (or even advisable) to change this column only, as many other metadata fields are involved (there are multiple tables which have this field and SQL privileges need to be updated as well). There is a handy tool by Thomas Steinmaurer that can do this automatically, but you'll have to e-mail him directly to get it.

[View All Answers](#)

### Question - 34:

How to detect the server version?

#### Ans:

You can get this via Firebird Service API. It does not work for Firebird Classic 1.0, so if you don't get an answer you'll know it's Firebird Classic 1.0 or InterBase Classic 6.0. Otherwise it returns a string like this:

LI-V2.0.0.12748 Firebird 2.0

or...

LI-V1.5.3.4870 Firebird 1.5

The use of API depends on programming language and connectivity library you use. Some might even not provide it. Those that do, call the isc\_info\_svc\_server\_version API.

If you use Firebird 2.1, you can also retrieve the engine version from a global context variable, like this:

```
SELECT rdb$get_context('SYSTEM', 'ENGINE_VERSION')
from rdb$database;
```

[View All Answers](#)

### Question - 35:

How to detect applications and users that hold transactions open too long?

#### Ans:

To do this, you need Firebird 2.1 or a higher version. First, run gstat tool (from your Firebird installation's bin directory), and you'll get an output like this:

```
gstat -h faqs.gdb
```

Database "faqs.gdb"

Database header page information:



Flags 0  
Checksum 12345  
Generation 919  
Page size 4096  
ODS version 11.1  
Oldest transaction 812  
Oldest active 813  
Oldest snapshot 813  
Next transaction 814

Now, connect to that database and query the MON\$TRANSACTIONS table to get the MON\$ATTACHMENT\_ID for that transaction, and then query the MON\$ATTACHMENTS table to get the user name, application name, IP address and even PID on the client machine. We are looking for the oldest active transaction, so in this case, a query would look like:

```
SELECT ma.*  
FROM MON$ATTACHMENTS ma  
join MON$TRANSACTIONS mt  
on ma.MON$ATTACHMENT_ID = mt.MON$ATTACHMENT_ID  
where mt.MON$TRANSACTION_ID = 813;
```

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### Question - 36:

How to debug stored procedures?

**Ans:**

Firebird still doesn't offer hooks for stored procedure debugging yet. Here are some common workarounds:

- \* You can log values of your variables and trace the execution via external tables. External tables are not a subject of transaction control, so the trace won't be lost if transaction is rolled back.
- \* You can turn your non-selectable stored procedure into selectable and run it with 'SELECT \* FROM' instead of 'EXECUTE PROCEDURE' in order to trace the execution. Just make sure you fill in the variables and call SUSPEND often. It's a common practice to replace regular variables with output columns of the same name - so that less code needs to be changed.
- \* Some commercial tools like IBExpert or Database Workbench parse the stored procedure body and execute statements one by one giving you the emulation of stored procedure run. While it does work properly most of the time, please note that the behaviour you might see in those tools might not be exactly the same as one seen with actual Firebird stored procedure - especially if you have uninitialized variables or other events where behavior is undefined. Make sure you file the bug reports to tool makers and not to Firebird development team if you run such 'stored procedure debuggers'.
- \* Since Firebird 2.0 you can also use EXECUTE BLOCK to simulate stored procedures. EXECUTE BLOCK does not support input parameters, so you need to convert all of those to local variables (with DECLARE VARIABLE)

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### Question - 37:

How to deactivate triggers?

**Ans:**

You can use these SQL commands:

```
ALTER TRIGGER trigger_name INACTIVE;  
ALTER TRIGGER trigger_name ACTIVE;
```

Most tools have options to activate and deactivate all triggers for a table. For example, in FlameRobin, open the properties screen for a table, click on Triggers at top and then Activate or Deactivate All Triggers options at the bottom of the page.

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### Question - 38:

How to create a database from my program?

**Ans:**

Firebird doesn't provide a way to create database using SQL. You need to either use the Services API, or external tool. As API for database creation is often not available in libraries, you can call Firebird's isql tool to do it for you.

Let's first do it manually. Run the isql, and then type:

```
SQL>CREATE DATABASE 'C:\bases\database.fdb' user 'SYSDBA' password 'masterkey';
```

That's it. Database is created. Type exit; to leave isql.

To do it from program, you can either feed the text to execute to isql via stdin, or create a small file (ex. create.sql) containing the CREATE DATABASE statement and then invoke isql with -i option:

```
isql -i create.sql
```

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### Question - 39:

How do convert or display the date or time as string?

**Ans:**

Simply use CAST to appropriate CHAR or VARCHAR data type (big enough). Example:

```
CREATE TABLE t1 ( t time, d date, ts timestamp );  
INSERT INTO t1 (t,d,ts) VALUES ('14:59:23', '2007-12-31', '2007-12-31 14:59');  
SELECT CAST(t as varchar(13)), CAST(d as varchar(10)), CAST(ts as varchar(24))  
FROM t1;
```

Firebird would output times in HH:MM:SS.mmmm format (hours, minutes, seconds, milliseconds), and dates in YYYY-MM-DD (year, month, day) format.

If you wish a different formatting you can either use SUBSTRING to extract the info from char column, or use EXTRACT to build a different string:

```
SELECT extract(day from d)||'.'||extract(month from d)||'.'||extract(year from d)  
FROM t1;
```

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**Question - 40:**

How to configure events with firewall?

**Ans:**

If firewall is on client, you don't have to do anything special. If firewall is on the server, you need to set RemoteAuxPort setting in Firebird.conf file and forward traffic from firewall to that port.

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**Question - 41:**

How to change database dialect?

**Ans:**

While you could simply change a flag in database file it isn't recommended as there's much more to it. Different dialects have different ways of handling numeric and date operations, which affects all object that are compiled into BLR (stored procedures, triggers, views, computed fields, etc.) Fixing all that on-the-fly would be very hard, so the recommended way is to create a new database and copy the data. You can easily extract the existing database structure using isql and then copy the data using some of the tools

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**Question - 42:**

How to add, remove, modify users using SQL?

**Ans:**

It is currently not possible. You need to use service API. Access to it is provided by most connectivity libraries (except ODBC).

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**Question - 43:**

How to activate all indexes in Firebird?

**Ans:**

If you run Firebird 1.x which doesn't have EXECUTE BLOCK, you can run the following query:

```
select 'ALTER INDEX '|rdb$index_name || ' ACTIVE;'
from rdb$indices
where rdb$system_flag is not null and rdb$system_flag = 0
```

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**Question - 44:**

Can I concurrently access a Firebird database with embedded and with regular server?

**Ans:**

If you mean it's one database and two applications then: NO  
If you mean it's two databases and one application then: YES

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