HFSQL®

FREE AND UNLIMITED DEPLOYMENT

REGULATION
GDPR
HFSQL helps you,
see page 16.

UNIVERSAL DATABASE

Windows, UWP, Linux, Mac, Android, iOS
Client/Server, Cluster, Cloud, Standalone, Mobile, Embedded

www.windev.com

WELCOME TO A WORLD OF SECURITY AND PERFORMANCE

An enterprise's data is a strategic resource.

The Relational Database Management System HFSQL allows you to manage this data safely.

The performance is remarkable.

Used on several millions computers the world over, the flexibility and the scalability of HFSQL allows real time responses to the most demanding mission critical applications.

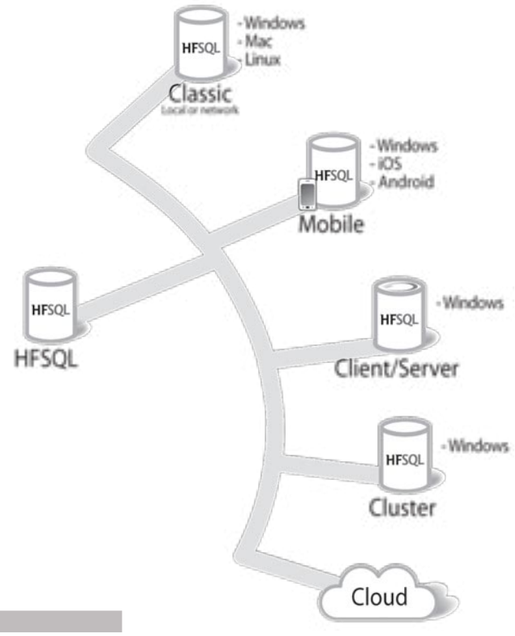
You too, choose HFSQL

Table of contents

HFSQL Technical-commercial documentation.

Some knowledge of WINDEV, WEBDEV or WINDEV Mobile is useful. If you're not familiar with them, don't hesitate to request their complete documentation (for free).

HFSQL®



HFSQL OVERVIEW

A UNIVERSAL DATABASE

HFSQL is a powerful RDBMS (Relational Database Management System).
HFSQL is available in 5 versions.
- local version (standalone or network)
- mobile version (embedded)
- Client/Server version
- cloud version
- cluster version.

HFSQL is suitable for all types of applications: business applications, 24/7 real-time critical applications, software, application servers, Web servers, standalone PC or mobile devices.
HFSQL is fully compatible with HyperFileSQL and Hyper File.

PERFORMANCE, SECURITY, OPENNESS, FLEXIBILITY

HFSQL is the ideal choice for a database engine.
Open: based on industry standards, HFSQL doesn't lock you up into a proprietary technology.
Flexible: support for large volumes of data (tens of billions of rows in a table) is provided.
Platform independent: tables can be moved from a Client/Server implementation to a mobile implementation, from a Windows server to a Linux server, etc.
Scalable: you can freely switch from one user to several thousands of users; from a 2-tier architecture to a multi-tier architecture...
HFSQL works in **heterogenous** environments: Windows, Linux, Mac, iOS, Android, TSE, Citrix, ADSL, VPN, Wi-Fi, 3G, 4G, in the cloud…
The forward and backward **compatibility** of tables is ensured.
Longevity of the publisher: PC Soft has been around for more than 25 years.
Performance, scalability: thanks to an optimized index and cache management, the speed is constant.
Secure access: protection against SQL injection is ensured via the automatic creation of secure UI.

REDUCED TCO

An important characteristic of HFSQL is its unlimited free deployment (see license).
There is no additional cost, neither for the number of CPUs on the server, nor for the number of client computers, nor based on the type of application (commercial,...) etc.
HFSQL comes as a complete product, with all its features.
The maintenance costs are very low.

The technical support is also free (as part of a WINDEV, WEBDEV, or WINDEV Mobile license). It is provided via email.
The DBA and developers can also access very active professional newsgroups.

100% Windows
100% Linux
100% Cloud
100% Mac
100% Android
100% iOS

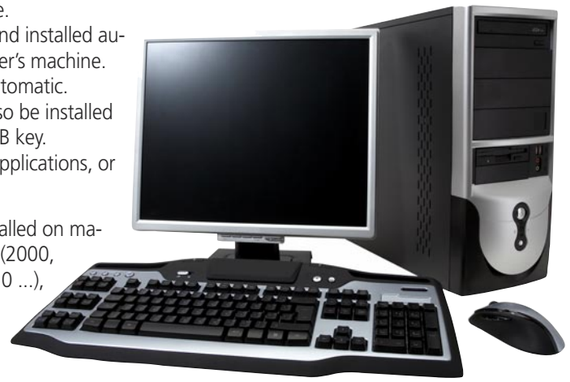
THE HFSQL VERSIONS

HFSQL is available in 5 versions. These versions are binary compatible with each other.

LOCAL VERSION ("CLASSIC" VERSION)

The local version (standalone and network) of HFSQL offers performance, ease of deployment, installation and maintenance. This version is also called "Classic" version because it is the first version that came out, back in 1988.
Compatibility with previous versions is complete (tables, index, relationships, constrains).
This version is specifically designed for standalone computers and small networks.
A common use for the Classic version is integrated into a software.
The database is created and installed automatically on the end user's machine.
Its maintenance is also automatic.
A HFSQL database can also be installed and used directly on a USB key.
This is useful for mobile applications, or for very sensitive data.

HFSQL Classic can be installed on machines running Windows (2000, 2008, 2012, Vista, 7, 8, 10 ...), MacOS, iOS, (iPhone and iPad), Android and Linux.



MOBILE VERSION (EMBEDDED)

HFSQL is totally adapted to mobile devices of all types.
HFSQL only requires a small amount of resources, and installs on all mobile devices (terminal, smartphone, tablet) that run on Windows CE, Windows 10 Mobile, UWP, iOS (iPhone and iPad), Android.
The installation is very simple, and the maintenance is automated.
The performance is amazingly fast.
It is fully compatible with the Local and Client/Server versions: tables, index, relationships, constraints.
Depending on your needs, access to external data of the I.S. from a mobile application can be made with many technologies: Direct access, RPC access, Web services, Sockets, Direct stored procedures...

Imagine, 512 GB on a memory card! Thanks to HFSQL you can now easily and for a low cost embed large size secure databases (**up-to 300 million rows**) on mobiles, tablets, smartphones.

HFSQL

CLIENT/SERVER VERSION

The Client/Server version of HFSQL is the ideal version for managing large number of users and remote accesses.
Local and remote accesses are supported.
The installation is extremely simple, and the administration is easy though very powerful.

HFSQL is not limited in the number of processors used, or memory.
Load balancing is supported for better response time.
The engine is auto-restart.
HFSQL operates both in 32 bits and in 64 bits. Servers and clients can be mixed.
Among the supported windows:
• Windows Server 2016, 2012, 2008, Vista, 7, 8, 10...
in all their versions.
Some of the supported Linux distributions:
• RedHat, Debian, OpenSuse, Ubuntu, Fedora, Mandriva, CentOS...

A Docker image is available*.

Among the supported clients:
• 32-bit and 64-bit Windows
• Linux
• MacOS, iOS
• Windows CE and Mobile • Android
• ...

CLOUD VERSION

HFSQL Client/Server is available in cloud version, from PCSCloud for instance.
Open a cloud account, and your server is immediately operational: no installation, no equipment or system management needed,...

Billing is done based on actual consumption.
Installing a HFSQL database in the cloud frees you from all aspects of management and hardware maintenance.
The cloud version is, for example, well suited for hosting databases used by mobile users.

CLUSTER VERSION (SERVER FARMS)

Thanks to the HFSQL cluster feature, a set of physical servers appears as a single server to the clients.
The potential failure of a physical server does not prevent access to the database (high availability, fault tolerance).
Servers automatically replicate each other in real time.
The read load charge is distributed on all the servers.

You can add and remove servers on the fly.
If a server crashes, it automatically resynchronizes when restarting.
When a user is connected to a server that fails, the application will be automatically reconnected to a valid server (automatic fall over).

HFSQL

DATA AND INDEXES

DATA TYPES

HFSQL supports all data types:
- Text, character
- Numeric (integer, real, decimal with 38 significant digits), Currency
- Date, time, duration, timestamp
- Boolean
- Array type column
- Blob ("memo", binary format: image, video,...)

Powerful features are available:
• Unicode is supported, with support of linguistic sorts • The sort order for different character sets is taken into account • Default value • Calculated items • Management of NULL • Timestamp...

UNICODE

主题	日期	小
Techonologies	2 october 2007	8点
高潮重新加热	2007年10月2日	9点
History of Philosophy	2 october 2007	16点
L农业地方在我们的世界	2007年10月3日	10点 半
地球昨天叻的气候在明天	2007年10月3日	14点 半
Painting in Amazonia	2007年10月4日	10点
巨大天气现象	2007年10月4日	16点
所有在大轰隆	2007年10月7日	9点 半
地球昨天叻的气候在明天	2007年10月7日	14点 半
令人惊讶的植物	2007年10月8日	15点
21世纪的技术	2007年10月9日	11点
L农业地方在我们的世界	2007年10月10日	10点 半
高潮重新加热	2007年10月10日	14点 半

Data in Chinese

HFSQL supports Unicode type text and blob columns.
Indexes can be sorted by the alphabetical order corresponding to each language: Russian from Russia or Ukraine, Chinese from Singapore, Taiwan, Hong Kong, Macao, ...

INDEX AND KEYS

HFSQL manages keys and indexes for any type of column.
In order to ensure optimum performance, the server uses an optimization mechanism based on the data distribution, that gets automatically activated during idle times.
The following types of indexes can be created:
- Simple index
- Composite index
- Partial index
- Full text index.

HFSQL ensures data integrity by managing:
- Unique constraints
- Cardinality constraints
- Automatic Identifier
- Primary and foreign keys.

FULL TEXT INDEX

The "full text" search allows for very fast string (words or expressions) searches inside your data. It allows you for instance to find a word among one million rows in less than 2 ms (average for found occurrence). This enables you to index, without programming, the texts found in a HFSQL database.
Results are offered according to a relevance order ("ranking").
To perform searches on words stored in RTF or HTML documents, HFSQL ignores tags during indexing for these formats.
Texts can be contained inside text or blob type controls.
A full text index can index one or more columns, therefore a single search can be done on several columns at the same time.
The stop words and synonyms are supported.

CAPACITY (VOLUMES)

HFSQL Client/Server offers large storage capacity, in line with current and future storage models, as well as the ever increasing needs of enterprises.
During a recent roadshow, in front of more than 10,000 professional developers, PC SOFT demonstrated the use of a HFSQL database containing more than 20 billion rows: data searches started instantly!

329,000,000,000,000,000

329 millions of billions... This is the number of rows (records) that can be found in a HFSQL table: you're safe!

SQL

HFSQL supports the ANSI SQL 92 standard. The SQL supported by HFSQL also accepts a large number of additional and specific syntax for SQL Server and Oracle, among others.
HFSQL supports sub-queries and nested queries.
HFSQL supports union operators (union, cartesian, join, external join), aggregation operators (count, sum, aug, min, max, mean, variance), sort and group operators: (group by, having, order by)...
The speed of the SQL engine is optimized: It uses the most discriminating index for the queries.
The advanced management of memory caches also improves performance.
The engine automatically performs load balancing. If a client executes a large number of queries requiring a lot of resources (CPU, ...), the server automatically balances the load in order not to penalize the other clients.
Simultaneously with the SQL code, you can benefit from the functional richness of the WLanguage 5GL.
The direct use of WLanguage functions and the call to stored procedures (developed in WLanguage themselves) are possible in your applications.
You'll find at the end of this document the list of SQL functions supported by HFSQL, as well as other programming information (cursor programming).

```
SELECT
    Product.Name AS Name,
    SUM(OrderLine.Quantity) AS Quantity_Sum,
    Customer.ZipCode AS ZipCode
FROM
    Product
    LEFT OUTER JOIN
    (
        (
            Customer
            INNER JOIN
            Order
            ON Customer.IDCustomer = Orders.IDCustomer
        )
        INNER JOIN
        OrderLine
        ON Orders.IDOrders = OrderLine.IDOrders
    )
    ON Product.Reference = OrderLine.Reference
WHERE
    Customer.ZipCode LIKE '34%'
GROUP BY
    Product.Name,
    Customer.ZipCode
```

FEATURES

HFSQL offers a large number of features. You'll find the description of the main features below.
The entire online help for HFSQL is available on Internet at **doc.windev.com**

SEVERAL DATABASES ON THE SAME SERVER

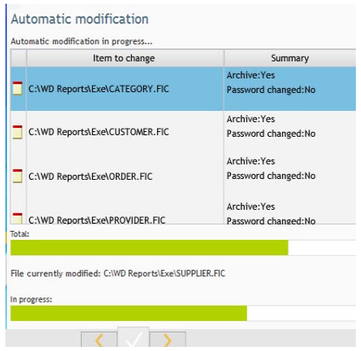
HFSQL classic supports the presence of multiple databases on the same server.
The databases are isolated.
Specific rights can be defined on each database.
This avoids having to use several servers.

AUTOMATIC DATA MODIFICATION (DSS)

Which developer hasn't complained about having to write quick and dirty hack to add a column or increase its size, add an index to an existing table or change the type of data in a column?
Writing those scripts is always tricky because they alter the data.
With HFSQL these will be things of the past!
HFSQL manages the evolution of the data schema transparently thanks to the DSS (Data Schema Synchronization) technology.
No more "hack jobs"! No more scripts! No more risky "Alter table" commands!
DSS automatically performs:
- The comparison and synchronization of the database structure and data against the reference schema
- The addition, deletion or renaming of columns
- The change of type, size
- The addition/deletion of key/index, addition/deletion of constraints
- The addition/deletion of triggers and stored procedures.

DSS can also be started via command line or programming.

This DSS feature can be executed live (hot), without disconnecting the users, transparently, without interfering with the applications running.



DSS: Automatic update of the data schema (also called Auto. Modif.)

INTEGRITY: CONSTRAINTS, DELETIONS, CASCADING UPDATE

It is easy to define integrity constraints.
The cardinalities can be configured: (0,n); (0,1); (1,n); (3,n); etc.
Reflexive links are supported.
Constraints examples:
- Referential integrity:

referential integrity will prevent an author from being deleted, as long as the database contains at least one book referring to this author.
You cannot delete a row in a table if this row is linked to other table rows. For example: you cannot delete a customer if there are orders linked to this customer.
The referential integrity can be defined for each link, from the data model editor.
- Cascading deletion:

If a row is deleted in a table, the corresponding rows in the linked tables are also deleted (this constraint can be enabled or disabled for each relationship).

TRANSACTIONS: ACID

A transaction is a set of indissociable operations: either all the operations of the transaction are performed, or none is performed.
Transaction management is the best way to ensure the integrity of a set of indissociable write operations performed on HFSQL tables.
A transaction is used to make sure that the updates performed on one or more tables have reached completion successfully.
HFSQL supports all the types of transactions, and therefore meet the ACID criteria (ACID is the acronym for Atomicity, Consistency, Isolation and Durability).
HFSQL Client/Server offers 4 isolation modes for transactions.

- Unvalidated data (READ UNCOMMITTED)
- Validated data (READ COMMITTED)
- Instant transaction photography (REPEATABLE READ)
- Serializable transaction (SERIALIZABLE).

REPLICATION

HFSQL proposes 4 types of replication:

- HFSQL server replication
- replication between heterogeneous databases, a HFSQL and Oracle database for example
- replication with mobile devices (iOS, Android, ...)
- offline replication, without permanent link

A replication is easily defined via the replication wizard, or via programming.

AUTOMATIC ROW LOCKING

HFSQL supports locks at the table level and at the row level.
Support for locks at the row level ensures better access security. This management is automatic.

AUTOMATIC RECONNECTION

This feature automatically manages disconnections happening between the client and the server.
Usually, this problem occurs with hardware whose connection with the server is not always on: mobile devices (Wi-Fi, 3G, 4G, ...) notably.
This can also happen on regular wired networks.
When the application is reconnected, the application needs to resume at the point where the connection was interrupted, and make sure the buffers are accurate.
With the automatic resuming of the connection, all the buffers and positions are stored and reassigned.
The application can resume without any error, as if the connection was never interrupted.
You can also manage the connection interruptions by programming, or execute additional processes if you want.

STORED PROCEDURES (UDF)

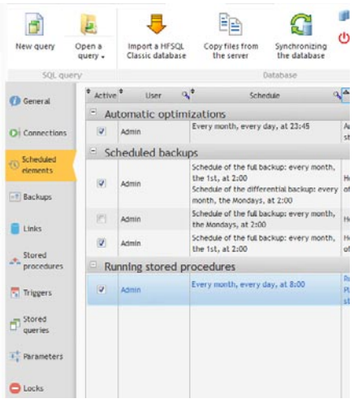
The stored procedures (sometime called UDF) are used to simplify the development and the maintenance of your applications by factorizing the code.
Indeed, when the method for calculating a result or a business rule found in a stored procedure evolves, all you have to do is modify the stored procedure on the server without performing any modification in the deployed applications.
A stored procedure is also used to limit the number of back and forth processes between the client computer and the server, and therefore increasing the speed of processes.
The same stored procedure can be shared among several applications.
Stored procedures are programmed using WLanguage, and therefore benefit from the feature richness and ease of use of the 5GL.
The creation of a stored procedure from the WINDEV or WEBDEV environment is really easy.

TRIGGERS

A trigger allows you to trigger a stored procedure before or after an event on a database table: for example when deleting a row, or after modifying a row.
A trigger brings a lot of security.
The trigger will get triggered regardless of the application or component that accesses the database and that performs the defined operation, without the application's developer having to program anything.
Server triggers, as their name indicate, are run directly on the server.
The right to create a trigger is defined via the database's rights.
The WINDEV environment indicates to the developer the presence of these triggers.
The triggers are viewed in the analysis (the data description).

INTEGRATED SCHEDULER (SCHEDULED TASKS)

HFSQL has an integrated scheduler that lets you define and configure scheduled tasks.
A task consists not only in executing a stored procedure (UDF), but also in triggering a backup, or in forcing a performance optimization request.



Graphical and user-friendly interface of the scheduler (scheduled tasks)
(scheduled tasks)

The definition is done in the Control center or via programming. You can create, add, modify, enable, disable tasks scheduled via programming, or from the administration tool, as long as you have the proper rights.
The scheduler allows the DBA to program the automated execution of tasks on the server: it also allows you to create batch processes.
Tasks can be run at a set date, and repeated at regular intervals.

LOGS

The log is a special table where all the operations performed on one or more tables from a given time are automatically stored.
The log contains the history of the logged tables: author, date and time, before/after value, application name, IP ...

The following operations can be performed from a log:

- restore the content of a logged table if the data is lost or destroyed
- restore the content of a table up to a given date
- find the author, the date and time of an operation performed on a specific row
- store the history of a table use (to perform statistical calculations for example)

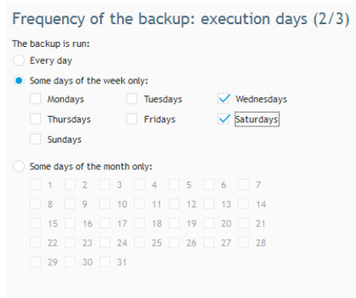
These operations can be run from a command line, from the WDLog tool or via programming.

SQL VIEWS

An SQL view is a "virtual data source", defined via an SQL query.
All the SQL views created are kept on the HFSQL server, and they can be reused from the applications accessing the database.
An application can perform queries on these SQL views.
An application can use SQL views in order not to be dependent of the physical organization of data in the database.
"Materialized views" are also available.
The main difference is that the result of a "materialized view" is physically stored on the server disk.
Unlike an "SQL view" which is re-extracted at each call, a "materialized view" stores the data on the drive.

BACKUPS

Backups are important features of a database.
You can save the entire server's content, only the database, or only a selection of tables with or without index.
HFSQL supports hot backups, as well as differential backups.
A backup is portable, for instance from a Windows server to a Linux server, or from a Client/Server version to a Classic version.



Backup configuration

A backup can be triggered from the administration tool, Control Center (instant backup, scheduled backup), or via programming, directly from the application.
The frequency of full backup and differential backup can be specified. For example: 1 full backup every month and a differential backup once a week.
The execution of stored procedures before and/or after the backup lets you perform automated processes : send email, copy the backup to a network location, etc...
The number of backups to keep can be specified.

A backup can be performed "hot", without disconnecting users, transparently, without interfering with the applications.

"HOT" ADMINISTRATION

A large number of maintenance tasks can be performed live ("hot"), without needing to disconnect users, and without interfering with their running applications.
Applications continue to read and write data during these phases:

- Hot "auto modif" DSS
- Hot reindexing
- Hot automatic optimization of performances
- Hot change of password
- Backup.

FRAME COMPRESSION

A frame is a data packet that flows on the network.
HFSQL, like all the DBMSs, is using frames to establish communication between the server and client computer.
A server's data transfer speed depends on the travel speed of the frames through the network and on the size of these frames.
Frame compression allows you to reduce the size of the packets traveling over the network.
In a context of remote communication, frame compression can be very important.
The speed for remote connection is improved.

"BLOB" DATA COMPRESSION

"blob" type data (text and binary memos) can be compressed to optimize the space used on the disk.
The space used can be significantly reduced this way.

UNALTERABLE TABLE: AN UNMODIFIABLE TABLE

An unalterable table is a table in which it is impossible to do anything other than adding lines. It is impossible to modify or delete lines, or to modify the structure of the table.

OBSOLETE TABLES & ITEMS: ZOMBIES

When a table or an item (column) must no longer be used, but it cannot be deleted from the data description, it is possible to mark them as "zombie" tables or items. It exists, but it must not be used in the new code that is created.

GDPR (PERSONAL DATA)

HFSQL allows you to abide by the GDPR rules (see page 16).

LINK WITH OTHER DATABASES

HFSQL can be used simultaneously with other databases. Most IT departments use several heterogeneous databases.
HFSQL also lets you exchange data with other databases.

SECURITY

The integration, the automatic lock management, the Control Center ... ensure by their very own existence a strong security.
Security specific features are also available.

ACCESS RIGHTS: AUTHENTICATION FOR ESTABLISHING THE CONNECTION

The server has a user authentication system.
It checks that a user is authorized to connect, and then that he has sufficient rights to run his queries: for example, rights to delete rows when running a delete query.
You can restrict access for a user based on his IP address or a DNS name.
The tuning of the rights is very granular: at the server level, the database level or the table level.
You can choose to do it by programming or via a user-friendly interface.
You can define an expiration period for password.
You can define groups of users.

For the server:
- Rights to delete and add users or groups
- Rights to see the users and the groups
- Rights to create a database
- Rights to change the rights
- Rights to stop the server
- Rights to change your own password
- Rights to disconnect the client computers
- Rights to send messages to the client computers
- Rights to configure the server
- Rights to configure the priority of users
- Rights to perform backups
- Rights to configure the scheduled tasks
- Rights to see the activity statistics and the logs of the server
- Rights to define a server replication.

At the database level:
- Rights to add new rows into a table (data file)
- Rights to lock the tables or the table rows
- Rights to change the rights
- Rights to modify the integrity rules on a table
- Rights to modify the owner of an element
- Rights to connect to a server (encrypted and unencrypted connection or encrypted connection only)
- Rights to create a table by programming
- Rights to enable and disable the management of duplicates
- Rights to read the table rows
- Rights to start a re-index operation or to calculate statistics
- Rights to perform automatic table modification (DSS)
- Rights to modify the table rows
- Rights to delete the table rows
- Rights to delete a database
- Rights to delete a table by programming
- Rights to enable and disable the management of integrity
- Rights to lock access to a database
- Rights to run stored procedures and/or WLanguage commands in the queries
- Rights to configure the stored procedures
- Rights to debug the stored procedures
- Rights to modify the triggers
- Rights to perform backups.

At the table level:
- Rights to add new rows into a table
- Rights to lock the tables or the table rows
- Rights to change the rights
- Rights to modify the integrity rules on a table
- Rights to modify the owner of an element
- Rights to enable and disable the management of duplicates
- Rights to read the table rows
- Rights to start a re-index operation or to calculate statistics
- Rights to perform automatic table modification (DSS)
- Rights to delete the table rows
- Rights to delete the table rows
- Rights to delete a table by programming.

HFSQL Control Center defining the rights

SQL INJECTION NOT POSSIBLE

The use of the WINDEV window generator and WEBDEV page generator, with their edit controls that are automatically generated based on the data schema, makes attacks via "SQL injection" almost impossible, and it does so automatically.
The use of SQL queries created with the query editor brings the same level of security.
The data that the end user enters is automatically checked in real time as soon as it's entered, and it is not sent to the application if it's unexpected, erroneous or inconsistent.

ENCRYPTED CONNECTIONS

The connection between the client and the server can be encrypted.
To define a high level of security, you can forbid non-encrypted connections to the server.

ENCRYPTING THE DATA

Data access can be secured, and data itself can be secured.
We can specify that the opening of the table requires a password.
The data itself can be encrypted.
Several encryption modes are supported:
- Standard on 128 bits
- RC5 12 rounds in 128 bits
- RC5 16 rounds in 128 bits.

If an attacker obtains an encrypted file (theft, copy, recovered from a recycled machine, on a lost computer, ...), he or she won't be able to use it.

DETECTING INCIDENTS

When the HFSQL server detects an incident (for example an inaccessible replicated server, or a schedule tasks that triggers an error), the server sends a notification of this incident to a list of specified email addresses.

OPENNESS

HFSQL is open to all the technologies, and is easy to integrate into your existing Information System.

32 & 64 BIT ODBC DRIVER

The ODBC driver (32 or 64 bit driver, Windows and Linux) allows third-party applications to access the data stored on a HFSQL server, such as PHP, Python, Ruby, Access…

32 & 34 BIT OLE DB PROVIDER

The OLE DB driver (32 or 64 bit driver) allows third-party applications to access the data stored on a HFSQL server, such as C#, ASP.Net, Crystal Reports, Business Object, PHP, Excel, ...

DATABASE IMPORT

The WDCONVER tool (provided with your product) lets you import third-party databases: Oracle, SQL Server, MySQL, ...
The import of the data schema is automatic.
Data import from text formats (customizable separators: tab, espace…), CSV, XML, is also supported.

THE ADMINISTRATION TOOL

MANAGEMENT: HFSQL CONTROL CENTER

The HFSQL Control Center is an essential management tool with an intuitive and user-friendly graphical interface.
The HFSQL Control Center lets you perform a large number of tasks, from a network computer or from the Internet, such as:
- Managing databases
- Managing data size
- Stop/start various server instances
- Viewing information specific to the server, the database, the tables
- Listing current connections
- Ability to end/disallow connections
- Sending messages to users
- Defining the setting to locate databases, activation and location of the logs and activity statistics
- Defining the connection port to the server
- Defining the port for remote debugging
- Editing accounts
- Managing current transactions, transaction rollback
- Managing scheduled tasks
- Managing backups
- Hot tuning: cache size, log activation, etc.
- Creating, deleting, importing databases
- Database explorer • Running queries

The HFSQL Control Center

- Saving and restoring the data
- Viewing the structure of the tables
- Automate common functions
- Monitoring
- Managing users and groups of users, as well as their rights
- Managing connected users
- User disconnection
- Server usage statistics: computers, queries, logs, parameters, …
- Viewing row locks
- Managing cluster nodes
- Defining the settings for server replications
- Connecting and visualizing data from third-party databases (the native plugin must be installed)
- Managing notifications returned by the HFSQL servers
- Displaying server logs: most used queries, longest ones, most draining ones, etc.
- Real time activity statistics: CPU, memory and network bandwidth consumption
- ...

TOOLS

WDMAP: DATA VIEWER

The WDMAP tool lets you view, edit and modify data in a table.
WDMAP is very useful in the test and debugging phase.
WDMAP is used to filter and sort data, perform immediate export (to Words, Excel, OpenOffice, XML, ...)

WDHFDIFF: DATA COMPARISON TOOL

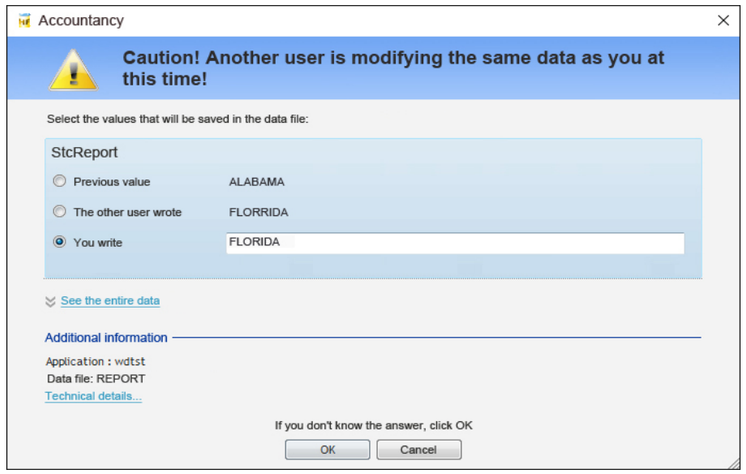
The WDHFDiff tool lets you compare:
- the structure of 2 tables
- the data of 2 tables.

This can be very useful in the implementation step.

MONITORING ROBOT

The monitoring engine (which can be redistributed with your applications) lets you secure your servers.
The monitoring engine always monitors, and instantly detects new unauthorized connections with the server.
The server notifies you by:
- sending a configurable email message to the specified addresses (up to 20 addresses)
- message sent to a specific application (internal messaging,...)
- message sent to the integrated messaging system
- control screen (visual warning and/or sound)
- starting a WLanguage procedure
- third-party program (this program can for instance, send a configurable message via SMS to chosen numbers).

Among the monitoring parameters that can be specified, you'll find:
- the frequency: test interval, from 2 minutes to 1 day
- repetition: in case there's no answer from the monitored element, how often to retry and how long before triggering the warning
- text of the message to send
- the message's medium (SMS, e-mail, …)



In this case, 2 users are trying to modify the same record at the same time! If the case is not supported by programming (locked row), a window automatically comes up and requests the value to use.

USER ASSISTANCE FOR UNEXPECTED ERRORS

In a WINDEV application, the assistance to the end user is automatically provided on HFSQL aspects in the case of the following errors:
- detection of the non-protected concurrent accesses
- duplicates
- non respect of the integrity constraints
- wrong password
- disconnection
- lock.

if one of these errors occurs, the application automatically displays a relevant help window.

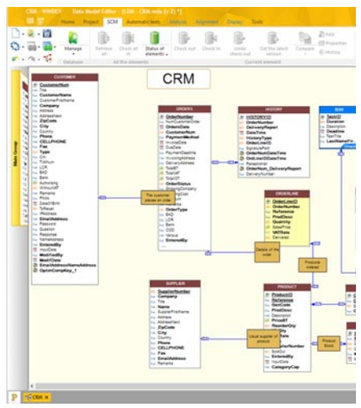
LINK WITH WINDEV, WEBDEV AND WINDEV MOBILE

WINDEV, WEBDEV AND WINDEV MOBILE NATIVE ACCESS

WINDEV, WEBDEV and WINDEV Mobile are Integrated Development Environments.
WINDEV is the #1 IDE in France.
The HFSQL access is "native" in WINDEV, WINDEV Mobile and WEBDEV, which means that the access performance (read, write) is optimized.
HFSQL data schemas are also directly and instantly recognized by the WINDEV, WEBDEV and WINDEV Mobile environments, and therefore benefit from the automation and wizards of these environments: automatic creation of UI, controls, completion in the code editor ...
Data binding is supported, visually in the environment and by programming.

MODELING A DATABASE

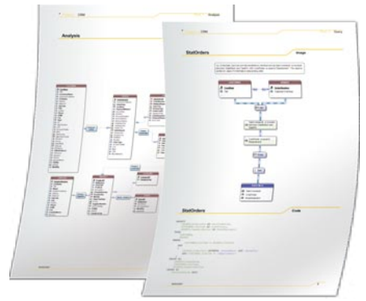
Defining a database schema is easy thanks to the powerful visual editor provided: the data model editor



Numerous wizards are available to guide you.
The visual editing of the data model (creation, deletion, modification of the tables, columns, relationships, constraints, index, triggers,...) enables you to define a database schema without having to write any SQL code.
The editor displays graphically the organization of the data and processes.

An automatic import of existing schemas can be performed.
The editor knows how to import schemas from databases such as HFSQL, SQL Server, Oracle, OLE DB, …

To create a data description, we start by specifying the type of columns, the type of keys (index) ...
Any new column is stored in the data dictionary.
Then, all you have to do is define the relations between the tables.
To link tables, simply draw a link with the mouse!
The wizard asks questions in natural language to determine the nature of the relationships. For example "*A customer can have several orders: YES or NO*", "*Each order can have several products: YES or NO*", etc.
The wizard also asks whether the check for referential integrity must be automatic or not.
The wizard then asks whether to generate any necessary relationship tables, or use existing ones.
Finally, the wizard asks for the caption of relationships: the schema is defined.
A documentation of the database schema can be printed at any time (paper, HTML, PDF, Word, OppenOffice).
The visual data model editor also supports:
- Reverse analysis from a server
- Logical or physical modeling
- Connection editing
- Schema comparison
- Schema history
- The generation of DDL scripts
- The export of the data model in a vector image format.



Pages taken from a documentation

CURSOR IN WINDEV AND WEBDEV

Bi-directional cursors are automatically created for reading queries.
Native programming in WINDEV and WEBDEV is greatly facilitated by a set of highly advanced automations and wizards.
Relationships between tables are automatically detected.
The access to a database control is easily defined using a clear and intuitive syntax: table name, column name (For example: `customer.name`).

PERFORMANCE TUNING, AUDIT

The Profiler and the Dynamic Audit let you analyze an application's performance, and thus verify that the data access is programed in an optimum way.
Tuning allows you to optimize queries, check index, set up statistics, monitor the server and control the memory, the CPU use, disk space, connections, etc.
The SQL `Explain` function allows you to monitor the order in which a query is run.

MULTICONTEXT

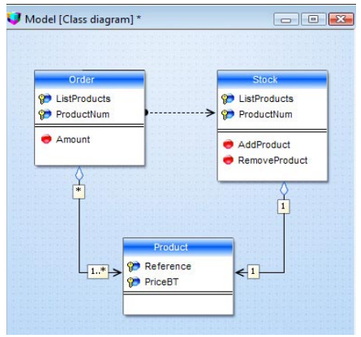
You can use several contexts and several different connections on the same database at the same time.

FRONT END, BACK END, 3-TIER...

By default, WINDEV AND WEBDEV support all architectures.

RELATIONAL OBJECT MAPPING

WINDEV proposes powerful functionalities to manage and update classes automatically from the database schema.
WINDEV allows an easy implementation of Relational Object Mapping.
Besides, WINDEV supports the 9 types of UML diagrams.
The class diagram can be generated automatically from the classes of the project.

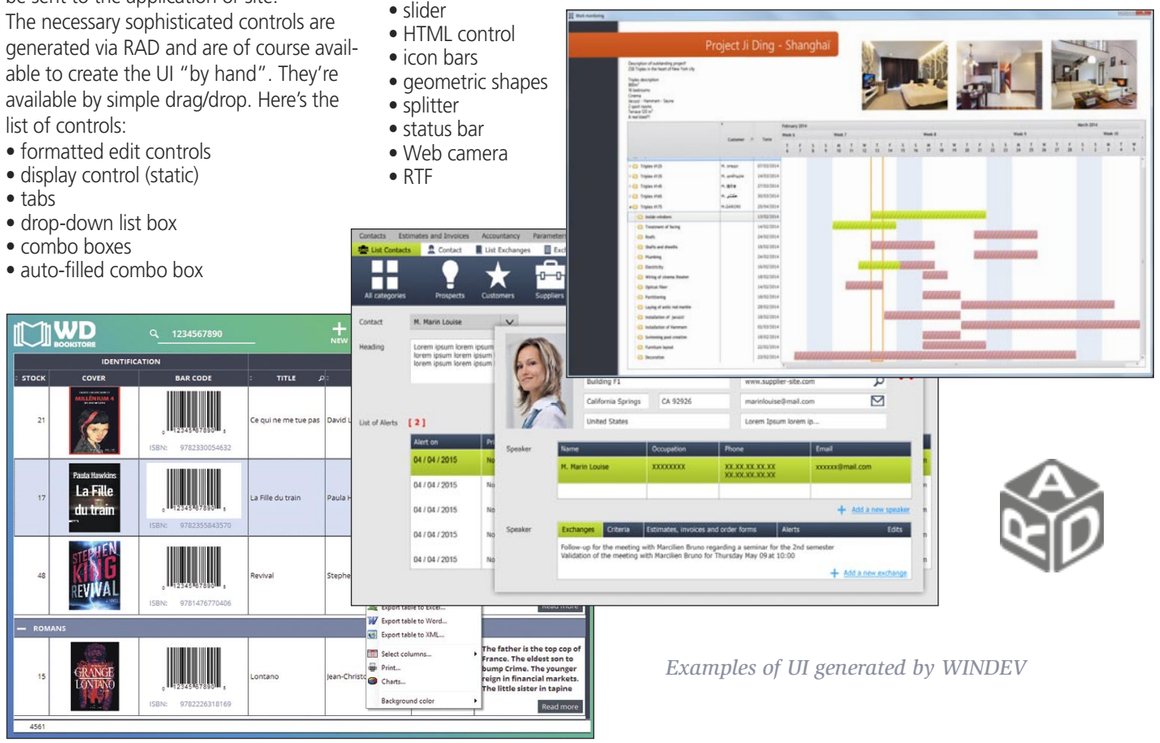


The UML class diagram

RAD: AUTOMATIC WINDOW GENERATOR FROM TABLES

The GUI (UX / UI) windows, pages, controls,... (as well as the code) can be generated automatically.
The generated UIs take into account the table's definitions.
For example, if a column is a numeric type column, with a maximum length of 8, only data of this type will be authorized in input in the corresponding control.
It will be impossible for the end user to enter a text or a number of greater length.
An error message automatically comes up, and the erroneous value entered will not be sent to the application or site.
The necessary sophisticated controls are generated via RAD and are of course available to create the UI "by hand". They're available by simple drag/drop. Here's the list of controls:

- formatted edit controls
- display control (static)
- tabs
- drop-down list box
- combo boxes
- auto-filled combo box
- image
- animated image
- scrollbar
- graphic button (icon)
- animated graphic button
- text button
- on/off button
- delay button
- check box
- single or multi-column radio buttons
- array
- listview
- treeview list
- treeview table
- hideshow
- OLE control
- ActiveX control
- click area
- spin buttons
- slider
- HTML control
- icon bars
- geometric shapes
- splitter
- status bar
- Web camera
- RTF
- looper
- progress bar
- sidebar
- chart
- bar codes
- carousel
- calendar
- Gantt
- organizer, scheduler
- word processing
- spreadsheet control
- PDF reader
- etc.



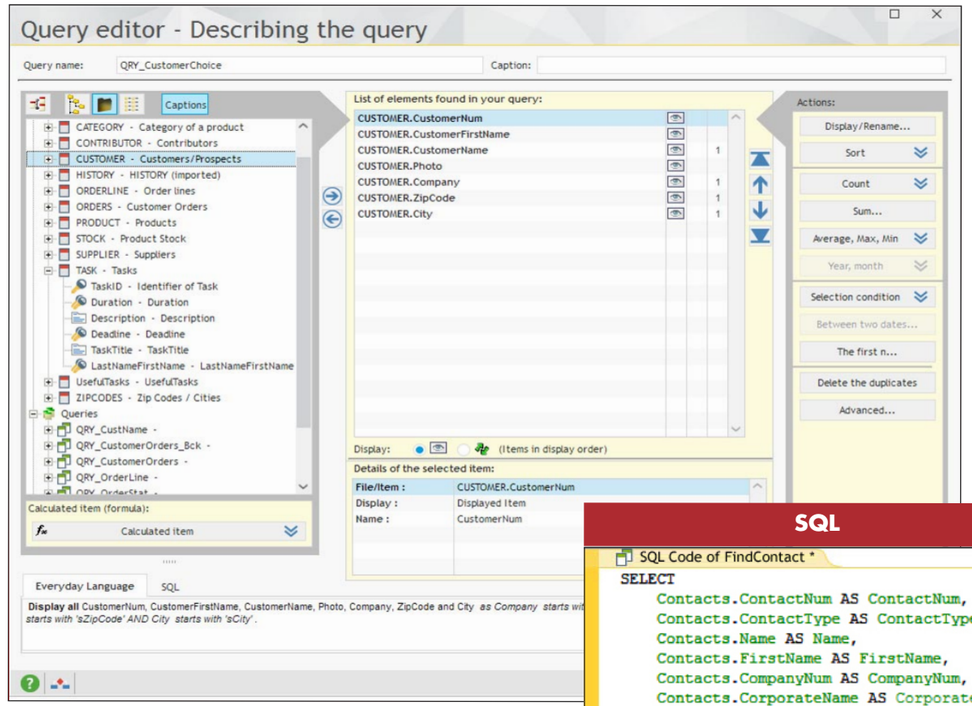
Examples of UI generated by WINDEV

QUERY EDITOR: SQL OR GRAPHICAL

Query creation is done in SQL or in WLanguage 5GL.
The queries can be directly coded, or generated by the query editor (Reports & Queries).
This editor comes with WINDEV and WEBDEV, and can be **freely distributed** to the end users of the applications you've created.

The query editor is used to optimize the database description (schema) by detecting and defining the necessary indexes for the best runtime performance of queries.
The query editor displays the query graphically, generates it in natural language, and then it generates the SQL code!
This way there's no risk of error.
The query is also generated in schematic form (animated graphic).

Creating a query is simple: using the wizard, choose the columns to include, specify the selection conditions, then the query is automatically generated in optimized SQL code.
The editor can also perform a reverse-analysis of existing queries.
A query can use the result of another query as its source.



Only a few clicks are required

- *to create an SQL query.*
- *check it using natural language,*
- *and view it graphically.*

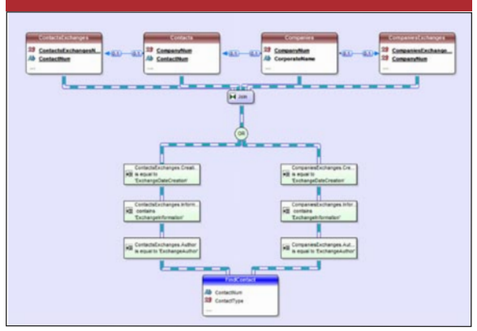
SQL

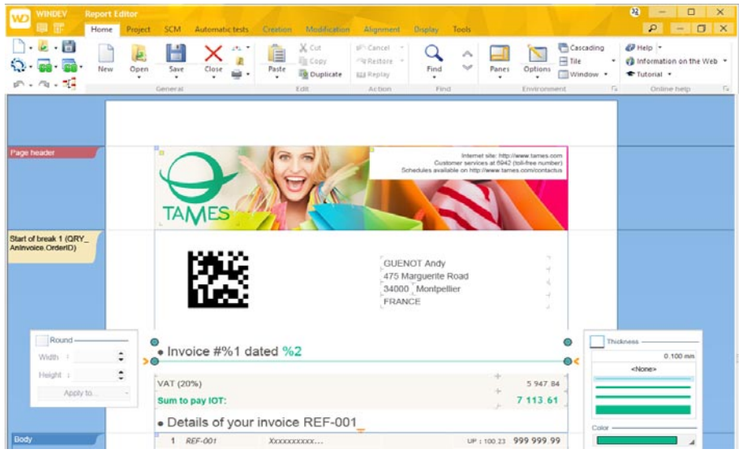
```
SQL Code of FindContact *
SELECT
    Contacts.ContactNum AS ContactNum,
    Contacts.ContactType AS ContactType,
    Contacts.Name AS Name,
    Contacts.FirstName AS FirstName,
    Contacts.CompanyNum AS CompanyNum,
    Contacts.CorporateName AS CorporateName
FROM
    Contacts INNER JOIN ContactsExchanges ON Co
    Companies INNER JOIN Contacts ON Companies.
    Companies LEFT OUTER JOIN CompaniesExchange
WHERE
    (
```

Everyday language

Display all LastName, FirstName, BusPhone, MobilePhone, eMail, Zip, City, OrderNum, OrderDate, InvoiceNum and InvoiceDate ***such as LastName is equal to LastNameParam AND FirstName is equal to FirstNameParam AND Zip is equal to ZipParam OR OrderNum is equal to OrderNumParam AND OrderDate is equal to OrderDateParam OR InvoiceNum is equal to InvoiceNumParam AND InvoiceDate is equal to InvoiceDateParam*** .

Chart

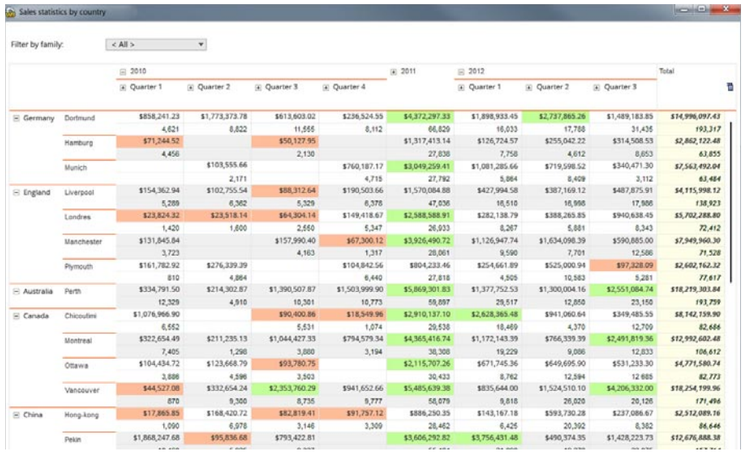




A report created with Reports & Queries

REPORTING TOOL ("REPORTS & QUERIES" TOOL)

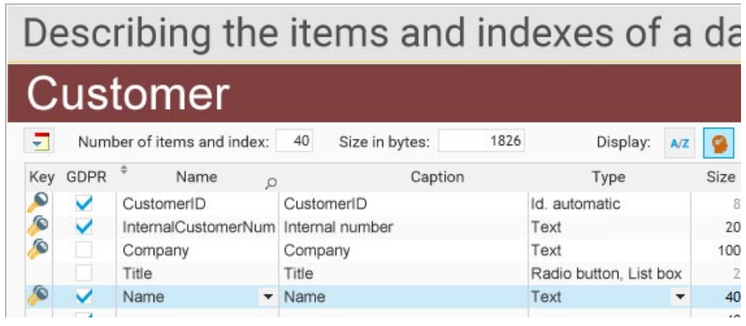
The "Reports & Queries" tool is a report editor supplied with WINDEV and WEBDEV.
It can be freely distributed to your end users, for any application created with WINDEV or WEBDEV.
This report editor interfaces natively with HFSQL, and allows for easy creation of very sophisticated reports using data stored in HFSQL databases (or other databases).
By default, the PDF format is supported, as well as page background, bar codes, labels, export to Word and Excel, ... and everything you need!



Example of a cube on HFSQL data

ROLAP CUBE: PIVOT TABLE

Decision makers love it! The Pivot Table control dynamically displays in n dimensions data coming from the crosscheck of different files found in a database.
For example: the volume of sales according to product families, products, regions, over time, with or without details. The end user can expand information, hide it, ...
The pivot table performs the calculations: everything is automatic, no programming is needed to fill it.

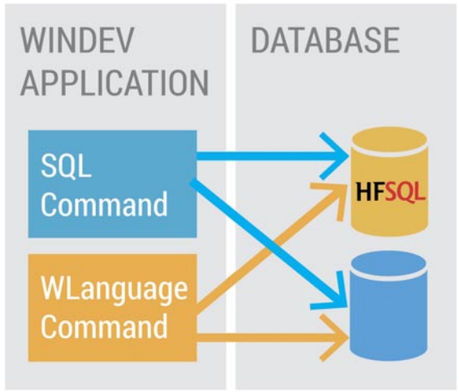


In the data file description, a column (an item) can be identified as "Personal Data", affected by the GDPR

GDPR: PERSONAL DATA PROTECTION

GDPR defines a set of restrictions regarding the collection, storage, treatment and manipulation of personal data, such as names, surnames, addresses, etc.
Every time personal data is used, its storage or treatment must comply with the regulation.
For every item of a data file (column in a table), it is possible to indicate if the data used is personal data affected by the GDPR.
An GDPR Audit window offers a general and detailed vision of the use of personal data in all the tables and elements of the project.
Folders can be edited.

PROGRAMMING: SQL AND 5GL LANGUAGE



EASY YET POWERFUL PROGRAMMING

The programming of the HFSQL database is both powerful and easy.
This programming is done in SQL and/or in WLanguage 5GL.
Programming with the SQL language is universally known.
Programming with the 5th generation WLanguage allows for the streamlined and powerful cursor programming.
Thus, automation with the applications and sites developed in WINDEV and WEBDEV is very strong.

RAD: TO GENERATE CODE

The code can be generated on demand by WINDEV and WEBDEV by using the RAD functionality, or by using the large number of wizards available for these environments.
The generated code can be modified later.
RAD supports the pattern concept, which lets you define by yourself the code to be generated.

LIST OF SUPPORTED SQL STATEMENTS

Let's see the list of supported SQL functions (this list is not exhaustive).
Each SQL function is not presented in details here.

ABS	ACOS	ADD_MONTHS	ALL
ALTER TABLE	AND	ANY	AS
ASC	ASCII	ASIN	ATAN
ATAN2	AUTO_INCREMENT	AVG	BEGIN TRANSACTION
BETWEEN	BIGINT	BIN	BINARY
BITAND	BITOR	BITNOT	BITANDNOT
BLOB	BOTH	BOTTOM	BTRIM
CASE	CAST	CBRT	CEIL
CEILING	CHAR_LENGTH	CHARACTER_LENGTH	CI
CLOB	COALESCE	COLLATE	COLUMN
COMMENT	COMMIT	CONCAT	CONSTRAINT
COS	COUNT	CREATE TABLE	CREATE VIEW
CROSS	CURRENT_DATE	DATE	DATETIME
DAY	DAYOFWEEK	DAYOFMONTH	DAYOFYEAR
DECIMAL	DECODE	DEFAULT	DEGREES
DELETE	DESC	DISTINCT	DIV
DOUBLE	DROP TABLE	DROP VIEW	ELSE
ELT	END	ESCAPE	EXISTS
EXP	EXPLAIN	EXTRACTVALUE	FIELD
FIND_IN_SET	FLOAT	FLOOR	FOR
FROM	FULL OUTER JOIN	GRANT	GREATEST
GROUP BY	HAVING	HEX	IF
IFNULL	IN	INDEX	INITCAP
INNER JOIN	INSERT	INSTR	INTO
ISNULL	LAST_DAY	LAST_INSERT_ID	LCASE
LEADING	LEAST	LEFT	LEFT OUTER JOIN
LEN	LENGTH	LIKE	LIMIT
LN	LOG	LOG10	LOWER
LPAD	LTRIM	MATCH AGAINST	MAX
MD5	MID	MIN	MOD
MONEY	MONTHS_BETWEEN	NATURAL	NCLOB
NEW_TIME	NEXT_DAY	NOT	NTEXT
NULL	NUMBER	NUMERIC	NVARCHAR
NVL	OCT	OCTET_LENGTH	Offset
ON	OR	ORDER BY	OVERLAY
PATINDEX	PERCENT	PI	PLACING
POSITION	POWER	PRECISION	RADIANS
RANDOM	REAL	REFRESH VIEW	REGEXP/REGLIKE
RENAME	REPEAT	REPLACE	REVERSE
REVOKE	ROLLBACK	RIGHT	RIGHT OUTER JOIN
ROUND	RPAD	RTRIM	SELECT
SET	SHA	SHA1	SIGN
SIN	SMALLINT	SOME	SOUND
SOUND2	SOUNDEX	SOUNDEX2	SPACE
SPLIT_PART	SQRT	STDDEV	STDDEV_POP
STDDEV_SAMP	STRING_AGG	SUBSTR	SUBSTRING
SUM	SYSDATE	TAN	TEXT
THEN	TIME	TINYINT	TO_CHAR
TO_DATE	TOP	TRAILING	TRANSLATE
TRIM	TRUNC	UCASE	UNHEX
UNICODE	UNION	UNIQUE	UNSIGNED
UPDATE	UPPER	USING	UUID
VALUES	VAR_POP	VAR_SAMP	VARBINARY
VARCHAR	VARIANCE	VARYING	WHEN
WHERE	WITH	XOR	

The "**Select**" type SQL queries accept a large number of WLanguage functions as parameters, which lets you easily refine the selection.
The accepted WLanguage functions are:

Abs	Age	CurrentYear	AnsiToOem
AnsiToUnicode	ArcCos	ArcSin	ArcTang
ArcTang2	Round	RoundDown	RoundUp
Asc	BufferToInteger	BufferToHexa	BufferToReal
Charact	CharactTypeOccurrence	CharactType	CharactUnicode
StringStartsWith	StringCompare	StringBuild	StringEndsWith
StringFormat	StringIncrement	StringInsert	StringReverse
StringCount	StringDelete	StringToDate	StringToDuration
StringToUTF8	Complete	CompleteDir	Compress
MakeInteger	Contains	Conversion	Cos
CoTan	ColorLightness	ColorSaturation	ColorHue
Crypt	DateDifference	Today	DateTimeDifference
DateTimeLocalToUTC	SysDateTime	DateTimeUTCToLocal	DateTimeValid
DateSys	DateValid	DateToString	DateToInteger
DateToDay	DateToDayInAlpha	DateToMonthInAlpha	DateToWeekNumber
DecimalToSexagesimal	UncompleteDir	Uncompress	Uncrypt
LastDayOfWeek	LastDayOfMonth	GetGUID	Right
DurationToString	EmailCheckAddress	IntegerToDate	IntegerToTime
IntToHexa	IntegerToDay	IntegerToDayInAlpha	IntegerToMonthInAlpha
IntegerToWeekNumber	IsOdd	IsNumeric	IsEven
BinaryAND	ExeInfo	Exp	ExtractString
ExtractLine	Factorial	fAttributeReadOnly	fLoadBuffer
fLoadText	fShortPath	fLongPath	fCompress
fCompare	fBuildPath	fCopyFile	fCreateLink
fCrypt	fDate	fDateTime	fUncompress
fUncrypt	fMoveFile	fDriveInfo	fExtractPath
fFileExist	fTime	fShortName	fLongName
fDirAttribute	fCopyDir	fMakeDir	fDirAttrib
fDirectoryExist	fTempPath	fParentDir	fRemoveDir
fDirSize	fSaveBuffer	fSaveText	fSep
fSeparator	fDelete	fSize	fSizeUncompressed
Left	GeneratePassword	Random	TimeDifference
TimeSys	TimeValid	TimeToString	TimeToInteger
HexaToBuffer	HexaToInt	HTMLToRGB	HTMLToText
INIWrite	INIRead	InitRandom	Reverse
ExeRun	LineToPosition	Ln	Log
Now	Upper	Max	Middle
Min	Lower	CurrentMonth	WordOccurrence
NetMACAddress	NetIPToMAC	NetMACToIP	NumberInWords
BinaryNOT	NumToString	DayNumberInAlpha	MonthNumberInAlpha
WeekNumber	OemToAnsi	BinaryOR	BinaryXOR
Easter	DecimalPart	IntegerPart	Phonetic
LoWord	HiWord	Position	PositionOccurrence

PositionToLine	FirstDayOfWeek	FirstDayOfMonth	Power
Root	RegistrySeek	RegistryNextKey	RegistryCreateKey
RegistrySetValue	RegistryExist	RegistryListValue	RegistryQueryValue
RegistryFirstSubKey	RegistryDeleteKey	RegistryDeleteValue	RegistryValueType
Replace	RepeatString	NetworkConnect	NetworkDisconnect
NetworkDomainName		NetworkDirName	NetworkUser
RGB			
RGBBlue	RGBRed	RGBToHTML	RGBGreen
NoAccent	NoCharacter	NoRightCharacter	NoLeftCharacter
NoSpace	sComputeCrc16	sComputeCrc32	WeekToDate
SexagesimalToDecimal	Sin	SysColor	SysColorRes
SysEnvironment	SysSpace	SysInstance	SysNameExe
SysDir	SysWindowsVersion	SysXRes	SysYRes
Length	CommonLength	LengthToString	Tangent
TextToRTF	Truncate	TSL	UnicodeToAnsi
URLDecode	URLEncode	URLExtractPath	UTF8ToAnsi
UTF8ToString	UTF8ToUnicode	UUDecode	UUEncode
Val	MatchRegularExpression	WindowsVersion	

LIST OF WLANGUAGE COMMANDS

The WLanguage commands let you program cursors, or program all the processes you want.
The 5GL WLanguage programming is very powerful and very intuitive.
For example, searching for a row (a record), and all the associated processes (opening the table, assigning data, etc.) is done in one simple, powerful line of code:

```
HReadSeek(CUSTOMER,NAME,"DOE")
```

The source programs are clear, easy to write and especially easy to maintain; this reduces the chance for errors, and makes the applications you develop more reliable, and faster.
Plain word commands make it easier to use: the code is self-commented!
The **HReadSeek** command can be understood by any developer, even rookies!

Other example, the creation of a table is done in 1 line of code, without any script: **hCreate**.

Non-exhaustive list of WLanguage functions (5GL used by WINDEV, WEBDEV and WINDEV Mobile), with summary of their action.

ScreenToFile	Automatically initializes: - the memory value of the items of a data file with the value of the controls found in the window or in the page. - the value of the WLanguage variables with the value of the controls found in the window or in the page.
ScreenToSource	Automatically initializes: - the memory value of the items of a data file with the value of the controls found in the window or in the page. - the value of the WLanguage variables with the value of the controls found in the window or in the page.
FileToScreen	Automatically initializes the controls found in a window or in a page with: - the values of the associated items in the current record (loaded in memory) of the data file. - the values of the associated WLanguage variables.
SourceToScreen	Automatically initializes the controls found in a window or in a page with: - the values of the associated items in the current record (loaded in memory) of the data file. - the values of the associated WLanguage variables.
WithSpace	Adds or deletes the spaces found on the right of a text item when reading it.
HAccelerateSpeed	Reorganizes the internal structure of the indexes to optimize the speed for accessing the data.
HActivateFilter	Enables the filter that was previously created for the specified data file (view or query).
HActivateAutoFilter	Enables an automatic filter on the linked files when browsing an XML file.
HActivateTrigger HActivateServerTrigger	Re-enables a trigger that was disabled by HDeactivateTrigger. Re-enables a server trigger that was previously disabled by HDeactivateServerTrigger.
HAdd	Adds the record found in memory into the data file (query or view).
HAddGroup	Adds a group of users.
HAddLink	Adds an integrity rule between two files on the server.
HAddScheduledOptimization	Adds an optimization task of HFSQL Client/Server data files.
HAddScheduledBackup	Adds a scheduling for full backup (with or without differential backup) on the server defined by the connection.
HAddTask	Adds a scheduled task on the server defined by the connection.
HAddUser	Adds a user to a database.
HAlias	Creates a logical alias of data file (or query) or cancels all existing aliases.
HCancelAlias	Cancels an alias that was previously declared by HAlias.
HCancelDeclaration	Deletes a declaration performed by HDeclare, HDeclareExternal or HDescribeFile
HCancelSeek	Cancels the current search criterion.
HCancelBackup	Cancels a current backup.
HStopServer	Stops a HFSQL server.
HLinkMemo	Used to associate a file with a binary memo item or to cancel the existing link between a file and a binary item.
HForward	Moves several records forward from the current position in the data file, according to a specified item.
HLockFile	Locks a data file and restricts the access to this data file for all other sites or applications.
HLockRecNum	Locks a record and restricts the access to this record for all the other applications.
HChangeKey	Changes the search key.
HChangeConnection	Dynamically changes the connection associated with a data file.
HChangeLocation	Modifies the search mode of data files.
HChangePassword	Changes the password of a HFSQL Client/Server data file.
HChangeName	Modifies the physical name of a data file.
HChangeDir	Modifies the access path to a data file (which means the directory where the file will be used).
HChangeLogDir	Modifies the location of log files corresponding to a HFSQL data file.
HLoadParameter	Reads a parameter that was saved from a stored procedure by HSaveParameter.
HClusterAddNode	Enables a node in a HFSQL cluster.
HClusterStop	Suspends the execution of a HFSQL cluster.
HClusterStart	Starts a HFSQL cluster.
HClusterState	Returns the status of a HFSQL cluster by interrogating its coordinator
HClusterIgnoreSynchro	Defines a node of the HFSQL cluster as data source to perform the cluster synchronization.
HClusterNodeInfo	Returns the status of each cluster node by interrogating the coordinator.
HClusterParameter	Reads and modifies the parameters of a HFSQL cluster.
HClusterDeleteNode	Disables a node in a HFSQL cluster.
HConnect	Redefines one or more parameters of a connection to a specific table or to a set of tables.
HConnectRemoteAccess	Opens an analysis in HFSQL Classic format via a remote access
HBuildKeyValue	Builds the value of a composite key to create a filter or to perform a search.
HBuildKeyValueANSI	On a Unicode platform, used to build the value of a composite key.
HConvert	Converts a numeric value into a binary string in order to perform a search on a numeric key.
HCopyRecord	Copies the content of the current record (loaded in memory) into the current record of a data file.
HCopyFile	Copies a HFSQL file.
HCreation	Creates an empty data file with the index file and the memo file if necessary.
HCreationIfNotFound	Creates an empty data file (if the file does not exist) or opens a data file (if the file exists).
HCreateServerTrigger	Adds or modifies a server trigger on the HFSQL server.
HCreateView	Creates a HFSQL view.
HRecordDate	Returns the date and time of the last write operation performed on a record found in a HFSQL file.
HDBCreation	Ends the description of the structure of an xBase data file by programming.
HDBDescribeFile	Describes by programming a file in dBase3 format.
HDBDescribeIndex	Describes by programming the different index files that will be created.
HDBDescribeField	Describes by programming each item of the structure of an xBase file.
HDBIndex	Opens an xBase index file.
HDBOpen	Opens the xBase data file and the file if it exists.
HDBOpenNoLock	In single-user mode, opens an xBase data file without locking it.
HDBSortType	Returns or modifies the sequence of text items in the xBase files.

HUnlockFile	Unlocks the records of a data file.
HUnlockRecNum	Unlocks a record.
HDeclare	Declares a description of data file (found in an analysis) in the current project.
HDeclareExternal	Temporarily imports into the current analysis the description of a file from an existing HFSQL file.
HDisconnectClient	Displays a message on the client computers and disconnects the application.
HDescribeConnection	Describes a new connection to an external database.
HDescribeFile	Describes a data file by programming.
HDescribeFullTextIndex	Describes a full-text index of data file created by programming.
HDescribeLink	Describes a link between two files by programming
HDescribeItem	Describes a file item by programming.
HDescribeTrigger	Adds or modifies a trigger on a HFSQL data file.
HDescribeServerTrigger	Adds or modifies a server trigger.
HStartServer	Used to start a HFSQL server (uses MantaManager).
HLast	Positions on the last file record according to a search item.
HDeactivateFilter	Temporarily disables the filter on a data file (view or query).
HDeactivateAutoFilter	Disables an automatic filter on the linked files when browsing an XML file.
HDeactivateTrigger	Disables a trigger.
HDeactivateServerTrigger	Disables a HFSQL Client/Server server trigger on a server.
HDeleteTrigger	Destroys a trigger.
HDeleteServerTrigger	Destroys a server trigger.
HDeleteView	Destroys a view that was created beforehand.
HDuplicateRecord	Duplicates the record read in a data file: the record found in memory is added into the data file (query or view).
HWrite	ÉWrites a record into the data file without updating the corresponding indexes.
HOut	Allows you to find out whether the record on which you want to be positioned is located outside the data file, filter, view or query.
HRecordToXML	Retrieves the structure and the value of the current record and exports them into a character string in XML format.
HSendMessageToClient	Displays a message on the client computers.
HError	Returns the number of the last error triggered by the HFSQL engine.
HErrorLock	Used to find out whether a lock error occurred.
HErrorDuplicates	Allows you to find out whether a duplicate error occurred.
HErrorStatusModification	Returns the status of a record during a modification conflict
HErrorInfo	Returns a detailed information about the last error triggered by the HFSQL engine.
HErrorIntegrity	Allows you to find out whether an integrity error occurred.
HErrorModification	During a modification conflict, returns the value of a record item.
HErrorPassword	Allows you to find out whether a password error occurred on this data file.
HState	Used to find out the record status.
HServerStatus	Used to find out the status of a HFSQL server.
HExecuteProcedure	Runs a stored procedure.
HExecuteQuery	Declares a query created in the query editor to the HFSQL engine and runs this query.
HExecuteSQLQuery	Initializes a query written in SQL language and declares this query to the HFSQL engine.
HExecuteScheduledBackup	Forces the execution of a scheduled backup.
HExecuteView	Runs a view that was created beforehand.
HExportXML	Exports the records from a file (HFSQL or OLE DB), view or query into an XML file.
HExtractMemo	Extracts the content of a blob item (binary memo) from a physical file.
HClose	Closes a data file or all the opened data files.
HCloseAnalysis	Closes the current analysis.
HCloseConnection	Closes a connection to a database.
HFileExist	Allows you to find out whether a file exists, or whether a view or a query has been defined.
HFilter	Defines and enables a filter on a data file, view or query.
HFilterStartsWith	Defines and enables a “Start with” filter on a file, view or query.
HFilterIncludedBetween	Defines and enables an “Included between” filter on a file, view or query.
HFilterContains	Defines and enables a “Contains” filter on a data file, view or query.
HFilterIdentical	Defines and enables a filter used to find the exact value of a string item.
HEndNoDatabaseAccess	Re-authorizes the access to one or more databases accessible by a connection.
HEndNoModif	Unlocks a file locked by the same program with HNoModif.
HFlush	Forces the operating system of the computer where the data files are found to write data onto the disk.
HMergeView	Creates a HFSQL view from two views created beforehand
HSetRemoteAccess	Temporarily disables the remote access in order to access HFSQL Classic data files found locally.
HSetCache	Allows you to configure the management of caches in the HFSQL Client/Server engine.
HSetDuplicates	Enables or disables the management of duplicates on a unique key
HSetIntegrity	Enables or disables the management of an integrity constraint on a file link.
HSetLog	Enables or disables the log management for a logged file.
HSetMemo	Used to modify the management mode of memo items.
HSetREP	Enables or disables the management of .REP file.
HSetServer	Allows you to find out and modify some settings of HFSQL Client/Server server.
HManageTask	Enables or disables a scheduled task on a HFSQL Client/Server server.
HSetTransaction	Enables or disables the management of transactions for one or more files.
HSetTrigger	Enables or disables the management of triggers.
HHistoryModification	Returns the modifications made to one or more items of a given record.
HImportHF55	Imports a Hyper File 5.5 file into a file in HFSQL Classic format.
HImportText	Imports a Text file into a data file in HFSQL Classic format.
HImportXML	Imports an XML file into a file in HFSQL Classic format
HInfoAnalysis	Returns information about an analysis (WDD file).
HInfoLock	Returns information about the lock performed on a data file, on a record or on all the records found in a data file.
HInfoDatabaseRights	Allows you to find out the rights granted to a user or to a group on a database.
HInfoFileRights	Allows you to find out the rights granted to a user or to a group on a HFSQL Client/Server data file.
HInfoServerRights	Allows you to find out the rights granted to a user or to a group on a server.
HInfoFile	Returns the characteristics of a file found on a HFSQL server.
HInfoGroup	Returns information about the specified group of users.
HInfoLog	Returns information about the server logs.
HInfoMemo	Returns the characteristics of binary and text memos.
HInfoDatabaseProperty	Allows you to find out the properties of a database found on an HFSQL server.
HInfoFileProperty	Allows you to find out the properties of a data file found on an HFSQL server.
HInfoServerProperty	Allows you to find out the properties of an HFSQL server.
HInfoBackup	Returns information about one or more backups performed on a HFSQL Client/Server server.
HInfoServer	Returns the specified information about the server.
HInfoTask	Returns the characteristics of a scheduled task.
HInfoUser	Updates the variables for user management with the information about the specified user.
HNoDatabaseAccess	Forbids all the accesses to a database or to all the databases.
HNoModif	Prevents from modifying a file (for all the programs, including the program that requested the restriction)
HLogInfo	Adds comments into the log when saving the logged operation.
HLogRecreate	Used to re-create an empty log.
HLogRestart	Restarts the log process on a file.
HLogStop	Stops the log process of a file.
HFree	Transforms the crossed records of a data file into deleted records.
HFreePosition	Deletes a position saved by HSavePosition
HFreeQuery	Frees the resources of a query.
HListAnalysis	Lists the analyses in HFSQL Classic format available in a given directory.
HListDatabase	Lists the Client/Server databases associated with a connection.
HListKey	Lists the keys of a file (a query or a view) recognized by the HFSQL engine.
HListConnection	Lists the connections currently described in the application.
HListStoredElement	Lists the elements stored on a HFSQL server (sets of procedures, stored procedures or queries).
HListFile	Lists the files in the current analysis or in a specific analysis recognized by the HFSQL engine.
HListGroup	Lists the user groups defined for a connection.
HListFullTextIndex	Lists the full-text indexes of a file (a query or a view) recognized by the HFSQL engine.
HListLink	Lists the links found in the current analysis or in a specific analysis.
HListScheduledOptimization	Lists the scheduled optimization tasks of HFSQL Client/Server data files for a connection.
HListParameter	Lists the parameters saved from the procedures stored on the server.
HListQueryParameter	Lists the parameters of a query created in the query editor
HListCustomFolder	Lists the custom-folders defined in the analysis.
HListProvider	Lists the OLE DB providers and/or Native Access installed on the computer.
HListREP	Lists the assignments for the data files used by the current application.

HListItem	List the items in a file (a query or a view) recognized by the HFSQL engine.
HListScheduledBackup	Lists the full and differential backups that have been scheduled on a HFSQL Client/Server server.
HListServer	Lists the HFSQL servers installed on a computer.
HListTask	Returns the list of scheduled tasks found on a HFSQL Client/Server server for a given connection.
HListTrigger	Lists the triggers applied to one or more HFSQL data files.
HListServerTrigger	Lists the different triggers available on a connection or on one of the connection files.
HListUser	Lists the users defined for a connection.
HListConnectedUser	Lists the users currently connected to one or more files handled by a Client/Server connection.
HRead	Reads a record in a file according to a given record number.
HReadLast	Positions on the last file record according to a search item.
HReadPrevious	Positions on the previous file record according to a search item.
HReadFirst	Positions on the first file record according to a search item.
HReadSeek	Positions on the first file record whose value for a specific item is greater than or equal to a sought value (generic search).
HReadSeekLast	Positions on the last file record whose value for a specific item is less than or equal to a sought value (exact-match search).
HReadSeekFirst	Positions on the first file record whose value for a specific item is strictly equal to a sought value (exact-match search).
HReadNext	Positions on next file record according to a search item.
HMigrateLinkedCompositeKey	Migrates the values of the linked composite keys coming from a file in Hyper File 5.5 format to the HFSQL Classic format.
HRefreshSet	Creates or refreshes a set of procedures on a server
HRefreshQuery	Creates or refreshes a query on a HFSQL server.
HMode	Changes the mode for locking data files.
HModify	Modifies the specified record or the record found in memory in the data file (query or view).
HModifyDatabaseRights	Modifies the rights granted to a user or to a group for a HFSQL Client/Server database.
HModifyFileRights	Modifies the rights granted to a user or to a group on a HFSQL Client/Server data file.
HModifyServerRights	Modifies the rights granted to a user or to a group on a HFSQL server.
HModifyGroup	Modifies the group information according to the elements found in the corresponding variables for group management.
HModifyScheduledOptimization	Modifies a scheduled optimization task on the HFSQL server defined by the connection.
HModifyDatabaseProperty	Modifies the properties of a database found on a HFSQL server.
HModifyFileProperty	Modifies the properties of a HFSQL file found on a server.
HModifyServerProperty	Modifies the properties of a HFSQL server.
HModifyScheduledBackup	Modifies a backup scheduling.
HModifyStructure	Updates the structure of a HFSQL data file by performing a synchronization of data.
HModifyTask	Modifies a scheduled task on the HFSQL server defined by the connection.
HModifyUser	Modifies the user information according to the elements found in the corresponding variables for user management.
HNbRec	Returns the number of records in a file, a query or a HFSQL view: active records, crossed records, deleted records, etc.
HNotifAddCCRecipient	Adds recipients for the notifications sent via the Control Centers.
HNotifAddEmailRecipient	Adds recipients for the notifications sent by email.
HNotifConfigure	Specifies and configures the server used to send notifications by the HFSQL server.
HNotifListCCRecipient	Returns the list of recipients for a notification sent via the Control Centers.
HNotifListEmailRecipient	Returns the list of recipients for a notification by email.
HNotifDeleteCCRecipient	Deletes the recipients of a notification sent via the Control Centers.
HNotifDeleteEmailRecipient	Deletes the recipients of a notification by email.
HRecNum	Returns the number of the current record in the HFSQL data file or in the HFSQL view.
HOptimize	Uses idle periods (period without processing) to optimize the queries and the read operations that will be run thereafter.
HOptimizeQuery	Optimizes the selection queries by using idle times (period without processing)
HOpen	Opens a data file.
HOpenAnalysis	Opens an analysis in HFSQL Classic format.
HOpenConnection	Opens a connection to a specific database.
HPass	Defines the password used to create or open a data file.
HGetCurrentPosition	Returns the approximate position of current record in the data file.
HSetPosition	Positions on a record from the approximate position of one of its items.
HPost	Stores a unique computer number or identifier in order to use the log and transactions in network.

HPrevious	Positions on the previous file record according to a search item.
HFirst	Positions on the first record of a data file according to the specified search item.
HPrepareQuery	Initializes a query and declares this query to the database server in order to optimize the next executions of this query.
HPrepareSQLQuery	Initializes a query written in SQL and declares this query to the database server in order to optimize the next executions of this query.
HPriority	Allows you to find out and modify the priority of the calling application.
HPriorityClient	Modifies the priority of a client application.
HClearWorkingDir	Clears and destroys the temporary directory that was previously created during the execution of HServerWorkingDir.
HConnectionQuality	Returns the quality level of connection: the higher the level is, the faster the connection will be.
HCross	Crosses a record in a data file.
HReset	Initializes one or more variables of the items found in a data file with their default values.
HResetClient	Initializes the structure for managing the client computers (HClient structure)
HResetGroup	Initializes the structure for group management with the default values.
HResetUser	Initializes the structure for user management with the default values.
HSeek	Points to the first file record whose value for a specific item is greater than or equal to a sought value (generic search by default).
HSeekLast	Positions on the last file record whose value for a specific item is less than or equal to a sought value.
HSeekFirst	Positions on the first file record whose value for a specific item is greater than or equal to a sought value.
HReconnect	Establishes a reconnection to the server for all the interrupted connections.
HBackward	Moves backward several records from the current position in the data file, according to a specified item.
HRetrieveRecord	Returns the content of the current record (in a file, a view or a query, ...).
HRetrieveLog	Creates a text file containing the server logs between two given dates.
HRetrieveItem	Returns the content of an item found in the current record (in the data file, view, query, ...).
HRegenerateFile	Regenerates a data file from its log.
HIndexingInProgress	Indicates that a data file is currently re-indexed and returns the percentage of the file already re-indexed.
HIndex	Rebuilds the index of a data file
HServerWorkingDir	Returns the path of a temporary directory on the server.
HRestoreBackup	Restores a backup performed by the HBackup function or via the HFSQL Control Center
HRestorePosition	Restores the context of a previously saved data file.
HRSAddConfig	Adds a replication between two HFSQL server onto the master server.
HRSExecute	Immediately runs a recurring replication between HFSQL servers: the replication is triggered before the scheduling
HRSInfo	Allows you to read the configuration of the replication for a HFSQL server taking part in one or more replications.
HRSInit	Configures a HFSQL server in order for this server to be a master server or a subscriber server for a replication between HFSQL servers.
HRSListConfig	Lists the replications available on a master HFSQL server.
HRSModifyConfig	Modifies some parameters of an existing replication between two HFSQL servers.
HRSDeleteConfig	Deletes a replication between two HFSQL servers.
HBackup	Saves the content of a HFSQL server.
HSaveParameter	Saves a persistent value from a stored procedure.
HSavePosition	Stores the current context of a data file.
HSecurity	Enables or disables the security mechanism..
HSimulateNetwork	Simulates the operating mode of HFSQL Client/Server on an ADSL or 3G network.
HStatCalculate	Performs statistical calculations on the keys of a file.
HStatDate	Returns the date of the last update for the index statistics
HStatTime	Returns the time of the last update for the index statistics
HStatNbDuplicates	Returns the number of duplicates for a given key item.
HStatNbRec	Returns the number of entries for a given key item.
HStatNbRecRange	Returns an estimate regarding the number of entries for a given key item in a given interval of values.
HSubstDir	Associates the data directory specified in the analysis with a directory found on disk.
HNext	Positions on next file record according to a search item.
HDelete	Deletes a record from a data file (query or view).
HDeleteDatabase	Deletes a database found on a HFSQL server.
HDeleteSet	Deletes a set of stored procedures from a HFSQL server.
HDeleteFile	Deletes the HFSQL data files (.fic, .ndx, .ftx and .mmo files if they exist) from the server.
HDeleteGroup	Deletes (from the server) a group of users associated with a connection.
HDeleteLink	Deletes an integrity rule between two data files on the server.
HDeleteScheduledOptimization	Deletes a scheduled optimization task of HFSQL Client/Server data files.
HDeleteParameter	Deletes a parameter that was previously saved by HSaveParameter.
HDeleteDirectory	Deletes a directory found in a HFSQL Client/Server database.
HDeleteQuery	Deletes a query (used by stored procedures) from a HFSQL server.
HDeleteBackup	Deletes a backup that was performed by HBackup.
HDeleteScheduledBackup	Deletes a scheduling for backup from a HFSQL Client/Server server.
HDeleteTask	Deletes a scheduled task from a HFSQL Client/Server server.
HDeleteAll	Deletes all records from a data file, a HFSQL view or a query.
HDeleteUser	Deletes a user associated with a connection from the sever
HOnServerCall	Customizes the management of message display on the client computer and the management of disconnection from a client computer.
HOnError	Customizes the management of HFSQL errors.
HTransactionCancel	If a transaction is in progress, cancels all the operations performed on the data files in transaction since the start of transaction.
HTransactionStart	Starts a transaction on the HFSQL files and creates the transaction file.
HTransactionEnd	Validates the current transaction.
HTransactionInterrupted	Used to find out whether a transaction was interrupted (the transaction was neither validated nor canceled).
HTransactionIsolation	Configures the transaction isolation level for a connection to a given HFSQL server.
HTransactionFree	Transforms all the "in transaction" records into "Normal" records if they do not belong to an ongoing transaction.
HTransactionList	Returns the list of current or interrupted transactions found on the server for the specified connection.
HSortView	Sorts a view by creating an index on a view item.
HFound	Checks whether the current record corresponds to the current filter or to the current search.
HCheckIndex	Checks whether the data found in the index file (.NDX file) properly refers the data found in the data file (.FIC file).
HCheckStructure	Defines the mode for comparing data files.
HToFile	Copies a data source (file, query, view, ...) to a physical HFSQL file with the same description. This file is neither encrypted nor password protected.
HVersion	Allows you to find out whether the file's content was modified.
HToItem	Assigns the specified value to an item of the current record.
HViewToFile	Saves the modifications made to a view in the corresponding file.

VOCABULARY

The vocabulary varies based on the interlocutors.
The same concept is often described using different words.
Different standards, different practices, side by side!
Let's see a small glossary of the terms used in databases.

PC SOFT vocabulary	*Other publishers*
Analysis (CDM, LDM)	Schema, relational model, entity/relationship model
Analysis chart	Template of schema
Data File	Table
Item	Column, Field (a field is the intersection of a column and a row)
Record	Line, tuple, row
Link	Relation
Lock	Lock
Key	Index
Unique key	Primary key
Key with duplicates	Foreign key or key without uniqueness constraint
Link Item	Foreign key
Window	Form
Control	Control
Report	Report
Viewing table	Datagrid, Browse
Scheduled task	Scheduler
Text memo	Lob or clob
Binary Memo	Lob or blob
Stored procedure	UDF (User Defined Function)

A **database** is a set of tables (files) linked via relationships (links).
A **table** (**data file**) is a set of data organized in columns (items), made of rows (records) The intersection of a row and a column is a field (item value).
An **index** is a way to accelerate searches, queries and accesses to a table.
An index can be defined on a column (key item) or on several columns (composite key).
A **primary key** is a **unique** key that can't be null.
A **foreign key** is a key that accepts **duplicates**, used jointly with a primary key to establish a relationship (link) between 2 tables.

WHICH COMPANIES USE HFSQL?

Tens of millions of copies of HFSQL are deployed in over 100 countries. HFSQL is deployed on the most demanding web sites (Web, telecoms, enterprises, banks, hospitals, research, software publishers, administrators, government, etc.) that require high availability (24/7) with top performance in real time.

TESTIMONIALS

Here are some testimonials:

" HFSQL: light speed!" "

" HFSQL completely delivers in terms of robustness and flexibility "

" HFSQL allows us to save several hundred millions of euros thanks to the fact that we don't need individual licenses for the database "

" This represents close to a billion operations hosted and processed by HFSQL corresponding to about 24 billions euros in debit operations "

" All the applications rely on the HFSQL database to ensure complete data security "

" The data is stored on our dedicated server with an HFSQL database that supports our entire Information Services"

" In terms of performance, HFSQL delivers. It's always instantaneous" "

" We're managing more than one TB of data (with HFSQL) and we're thrilled with the database performance ".

You'll also find technical videos and testimonial videos on www.windev.com

HFSQL BENEFITS

SUMMARY OF THE MANY BENEFITS OF ADOPTING HFSQL:

- Feature rich
- Free
- Data schema description tool
- Easy to install
- Easy to embed
- Easy administration (auto-administered, auto-optimized)
- Powerful administration tools
- GDPR compliance
- Integrated with market leaders WINDEV, WEBDEV, WINDEV Mobile
- All-in-one solution with WINDEV and WEBDEV: RAD oriented, it generates the tables, processes, windows and reports
- Encryption of the data, tables and indexes
- Encryption at column, backup, network traffic level
- Compatibility: Windows (10, 8, 7, Vista, Mobile, CE...), Linux, Mac, iOS, Android...
- Binary compatibility of the databases and indexes: local, network, mobile, embedded, client/server, cluster
- Stored procedures
- Hot and incremental backups
- Protection against SQL code injection
- Unicode
- Efficient language and character set management, sort order, granularity at the column level
- Easy replication
- Automatic reconnection
- Easy monitoring
- High availability cluster
- Performances
- Sustainability
- Audit, tuning functions
- Optimizing the queries
- Full Text indexing support
- Blob, Lob
- Integrity constraints
- Automatic schema (DDS) maintenance , on an unlimited number of deployed databases
- Robustness for large volumes of data
- Low resource requirements
- Secure access
- Automatic load distribution among clients
- Ease of deployment and use
- Free technical support*
- All in English

HFSQL® is included for free with the WINDEV, WEBDEV and WINDEV Mobile IDE. HFSQL is optimized to run with these IDE. The use and distribution of the HFSQL database is free with applications and sites created using these IDE, regardless of the quantity deployed and the type of applications (educational applications, personal applications and commercial applications). There's no royalty to pay, no reporting to do. The deployment is free and unlimited.

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