WinDev®

INTEGRATED DEVELOPMENT PLATFORM

Windows, UWP, .Net, Linux, Java

All databases • Free deployment

Multi-plateform code: Windows, .Net, Linux, Java, PHP, Internet, Android, UWP, iOS...

WinDev® POWERFUL IDE & ALM SUITE

21

WELCOME TO A WORLD OF PERFORMANCE

You are asked to develop Windows, Linux, Java, MAC, .Net, Internet, Intranet, Android, iOS and Cloud applications that are robust, secure, open and high-performance, and you have to do it under always tighter deadlines and budgets.

Regardless of your existing code, you will develop up to 10 times faster. This is probably why WINDEV was voted "most productive language" on the market.

With WINDEV 21, your development teams will build applications that exactly match the requirements, in time frames and budgets you wouldn't have dreamed about.

Join 150,000 professional developers worldwide, choose WINDEV today!
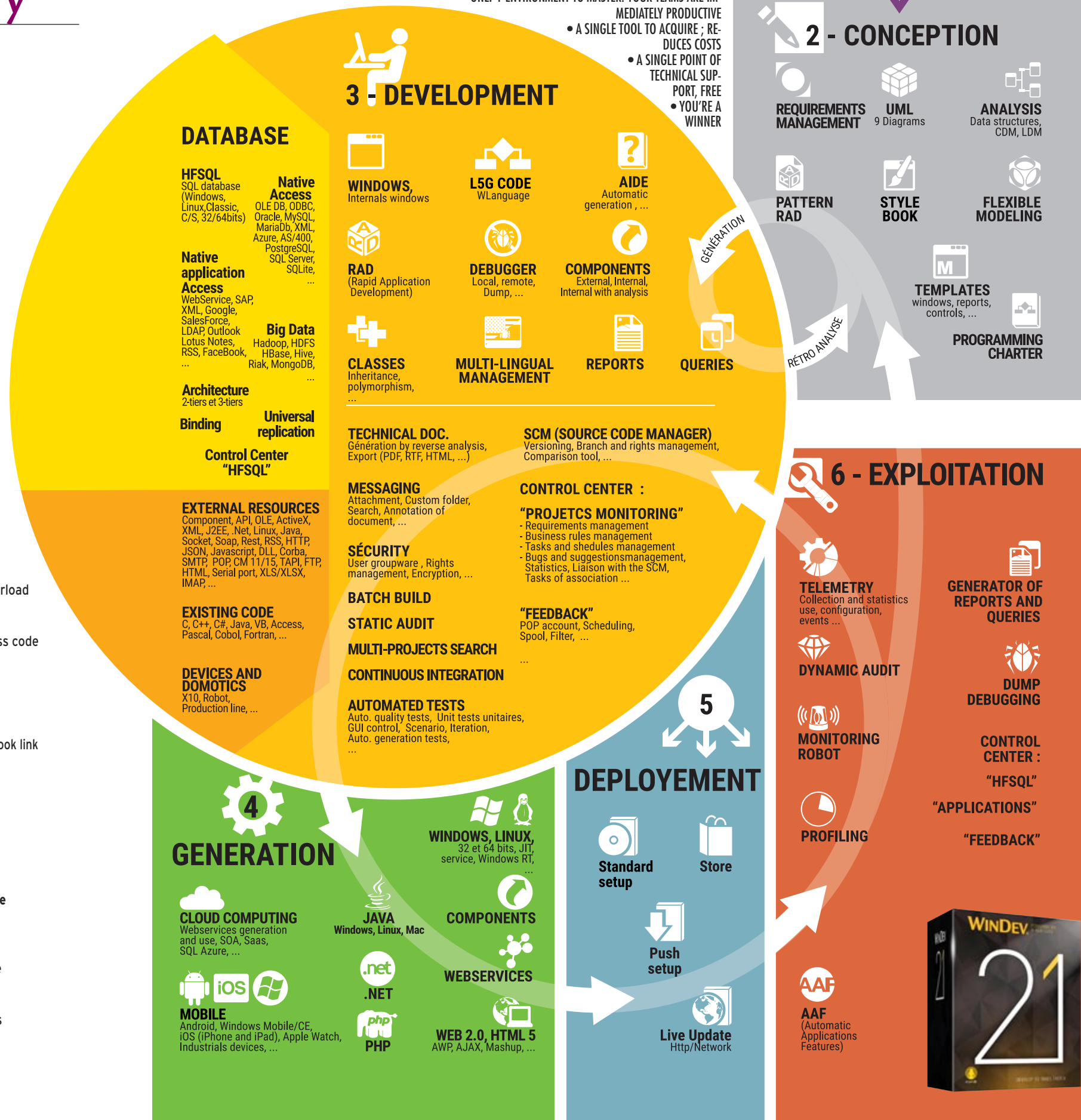
WINDEV keynote

Summary

THE POWERFUL IDE AND ALM SUITE

IN WINDEV 21 EVERYTHING IS INTEGRATED
- ONLY 1 ENVIRONMENT TO MASTER: YOUR TEAMS ARE IMMEDIATELY PRODUCTIVE
- A SINGLE TOOL TO ACQUIRE ; REDUCES COSTS
- A SINGLE POINT OF TECHNICAL SUPPORT, FREE
- YOU'RE A WINNER

1 - IDEAS, REQUIERMENTS

2 - CONCEPTION

REQUIREMENTS MANAGEMENT

UML 9 Diagrams

ANALYSIS Data structures, CDM, LDM

PATTERN RAD

STYLE BOOK

FLEXIBLE MODELING

TEMPLATES windows, reports, controls, ...

PROGRAMMING CHARTER

3 - DEVELOPMENT

DATABASE

HFSQL
SQL database (Windows, Linux,Classic, C/S, 32/64bits)

Native Access
OLE DB, ODBC, Oracle, MySQL, MariaDb, XML, Azure, AS/400, PostgreSQL, SQL Server, SQLite, ...

Native application Access
WebService, SAP, XML, Google, SalesForce, LDAP, Outlook Lotus Notes, RSS, FaceBook, ...

Big Data
Hadoop, HDFS HBase, Hive, Riak, MongoDB, ...

Architecture
2-tiers et 3-tiers

Binding

Universal replication

Control Center "HFSQL"

EXTERNAL RESOURCES
Component, API, OLE, ActiveX, XML, J2EE, .Net, Linux, Java, Socket, Soap, Rest, RSS, HTTP, JSON, Javascript, DLL, Corba, SMTP, POP, CM 11/15, TAPI, FTP, HTML, Serial port, XLS/XLSX, IMAP, ...

EXISTING CODE
C, C++, C#, Java, VB, Access, Pascal, Cobol, Fortran, ...

DEVICES AND DOMOTICS
X10, Robot, Production line, ...

WINDOWS, Internals windows

L5G CODE WLanguage

AIDE Automatic generation , ...

RAD (Rapid Application Development)

DEBUGGER Local, remote, Dump, ...

COMPONENTS External, Internal, Internal with analysis

CLASSES Inheritance, polymorphism, ...

MULTI-LINGUAL MANAGEMENT

REPORTS

QUERIES

TECHNICAL DOC.
Génération by reverse analysis, Export (PDF, RTF, HTML, ...)

SCM (SOURCE CODE MANAGER)
Versioning, Branch and rights management, Comparison tool, ...

MESSAGING
Attachment, Custom folder, Search, Annotation of document, ...

CONTROL CENTER :
"PROJETCS MONITORING"
- Requirements management
- Business rules management
- Tasks and shedules management
- Bugs and suggestionsmanagement, Statistics, Liaison with the SCM, Tasks of association ...

SÉCURITY
User groupware , Rights management, Encryption, ...

BATCH BUILD

STATIC AUDIT

"FEEDBACK"
POP account, Scheduling, Spool, Filter, ...
...

MULTI-PROJECTS SEARCH

CONTINUOUS INTEGRATION

AUTOMATED TESTS
Auto. quality tests, Unit tests unitaires, GUI control, Scenario, Iteration, Auto. generation tests, ...

GÉNÉRATION

RÉTRO ANALYSE

6 - EXPLOITATION

TELEMETRY Collection and statistics use, configuration, events ...

GENERATOR OF REPORTS AND QUERIES

DYNAMIC AUDIT

DUMP DEBUGGING

MONITORING ROBOT

CONTROL CENTER : "HFSQL"

PROFILING

"APPLICATIONS"

"FEEDBACK"

AAF (Automatic Applications Features)

5

DEPLOYEMENT

WINDOWS, LINUX, 32 et 64 bits, JIT, service, Windows RT, ...

Standard setup

Store

Push setup

Live Update Http/Network

4 - GENERATION

CLOUD COMPUTING
Webservices generation and use, SOA, Saas, SQL Azure, ...

JAVA Windows, Linux, Mac

COMPONENTS

.NET

WEBSERVICES

MOBILE
Android, Windows Mobile/CE, iOS (iPhone and iPad), Apple Watch, Industrials devices, ...

PHP

WEB 2.0, HTML 5 AWP, AJAX, Mashup, ...

WinDev 21

SUCCEED WITH ALL YOUR PROJECTS THANKS TO WINDEV 21

We're going to answer the questions we're most often asked about WINDEV.

97,6% of WINDEV users are satisfied with WINDEV.

Don't wait any longer !

Do you have more questions? Call us, we'll gladly answer them.

#	Question	Answer
1	Who is WINDEV for?	It is for any developer who wants to create Windows, .NET, Linux, Mac, Internet, Java, Android, iOS, cloud applications.
2	What type of applications can I develop?	All! Payroll, industrial, medical, inventory, EDI, CAE, ERP, CRM, EAI, back and front Office, .NET, Web services, catalogs etc. There is no limit. (See the special issue of "01 Net")
3	What do I have to know?	You need to have programmed at least once in your life (in school for instance). The ease of development offered by WINDEV has become legendary.
4	How much time will it take me to come up to speed on WINDEV?	In most cases, one week is enough for self-training. A tutorial comes with the product.
5	How much time will I save by developing with WINDEV?	Our customers have stated gains of a factor 3 to 10 depending on their previous tool. Maintenance will also be much easier and faster. You'll take 1 month to build what used to take you a year...
6	Are all the modules supplied with the product?	Yes, everything is included, from conception to maintenance, the application lifecycle (ALM) is supported with the same operating mode.
7	The Report generator can be distributed at no charge?	Yes. WINDEV 21 lets end users create their own reports and queries. The "Reports and Queries" reporting tool can be deployed freely with your application.
8	I already have an application. Will I be able to use it with WINDEV?	Yes, most certainly, WINDEV supports all the computer standards (languages, databases, protocols, etc...).
9	I am currently using a 4GL for development. Would these skills be useful?	Yes, and you will appreciate even more the power and ease-of-use of WINDEV and its 5GL.
10	My company already uses a specific database. Can I keep it with WINDEV?	Yes, of course, all the industry databases are supported.
11	Can I develop n-tier, SOA, SaaS, Cloud applications with WINDEV?	Yes, of course
12	Can I use Web Services with WINDEV?	Yes, of course, create them, use them and host them.
13	Can I freely distribute the integrated HFSQL database?	Yes. HFSQL comes with the product (Linux, Windows, Mac, Android, iOS) and can be freely redistributed with your applications, regardless of the number of seats, regardless of the number of servers.
14	How powerful is the WINDEV language?	WLanguage is a 5th generation language (5GL), which is simple yet very powerful. The number of code lines you have to write (or generate) is reduced by up to 90% compared to a 4GL.
15	What size development team does WINDEV support?	Unlimited, on the same project, on one or more sites. A versioning tool (SCM) is supplied with the product.
16	My application contains 1,500 windows and tables with several million records...	This is common with WINDEV; see the special testimonial issue of "01 Net" to read about actual implementations.
17	How can you offer such a product at such a low price?	Our high volume sales enables us to keep the price low.
18	I've read that technical support is free. Is this true?	Yes, it's free (15 free custom inquiries). It can be accessed by email. Custom assistance and consulting are also available.
19	Who uses WINDEV?	All kinds of professional entities: consulting companies, IS department, lab engineers, government offices, city halls, administrations, individual consultants, etc.
20	WINDEV is therefore a "must have" for professional developers?	Yes, absolutely. More than 150,000 professional developers have already chosen it.

THE PEACE-OF-MIND THAT YOUR PROJECT WILL BE A HIT ... AND IN RECORD TIME

AN UNMATCHED PROJECT SUCCESS RATE

The average success rate for Information System projects is 47%.

With WINDEV, this rate goes up to 96% (source: September 2013 poll).

Choosing WINDEV is ensuring the success of your projects and of your clients' projects.

With WINDEV your projects get done.

96%

47%

other   WINDEV

WINDEV 21 IS UNIQUE

WINDEV 21 is the only truly integrated professional development environment.

A single environment addresses all the development phases, from proposal to maintenance (Application Lifecycle Management, ALM) and for all the targets: Windows, Linux, Internet, Android, iOS...

The interface is the same for all the modules: training is much faster. A developer is operational in just one week.

The Free Technical Support covers all the modules.

There is no environment that can compare to WINDEV.

The speed at which you will develop applications with WINDEV is legendary.

So is its ease-of-use.

And its power always surprises...

It's the reason for its success, and for your success.

BENEFITS

- A software developed with WINDEV 21 always offers a set of advanced features without any programming or any action from the developer, via our exclusive AAF technology (see page 44)
- The users automatically get a reporting tool (Reports and Queries, see p 50 to 55).
- Industrialization of the software creation process (Continuous integration): With WINDEV, it's automatic.
- Therefore, the high quality of the applications built is less dependent upon the experience of the development team.
- Your teams don't spend their time "reinventing the wheel": you deliver faster.

CREATE SUCCESSFUL PROJECTS WITH WINDEV 21: EASY

What characterize WINDEV the best, is the success rate of your projects: a project started under WINDEV is a project that will be completed.

Because WINDEV is easy to get started with, and everything is integrated, it makes it efficient and intuitive, and it allows you to create successful projects.

You have an idea for an application? Create it right away.

YOUR CROSS-PLATFORM APPLICATIONS

Single code and windows for all the platforms

21 WINDEV®

WINDEV creates application intended to run on Windows, Linux and Mac.

WEBDEV recompiles them to run on the Internet or Intranet.

WINDEV Mobile recompiles them so they run on tablets or smartphones...

All these applications can run in the cloud.

multi-target Windows development (all versions), .Net, Linux, Mac, Internet, Intranet, Tablet, Smartphone, Terminal, Windows or Linux server... is a **lot easier** thanks to the **compatibility** between the versions of WINDEV, WEBDEV and WINDEV Mobile 21.

You use **the same project**, the same code, the same objects and the same elements...

WINDOWS, LINUX, JAVA? RECOMPILE!

WINDOWS LINUX JAVA

Develop your applications 10 times faster with WINDEV 21.

Create 32-bit & **64-bit** Windows & **UWP applications**.

WINDEV 21 allows you to create sophisticated and robust Windows applications, that automatically come with rich, secure and user-friendly interfaces.

WINDEV 21 lets you create **native Java applications.**

Simply ask WINDEV 21 to generate the Java code for your project.

WINDEV creates a Java archive (.JAR) directly executable on any platform. Over 1,000 WLanguage functions are already supported in Java.

WINDEV 21 lets you create **native Linux applications**.

With WINDEV 21, without knowing Linux, **you create sophisticated and robust Linux applications**.

Over 1,600 WLanguage functions are available on Linux.

CROSS-PLATFORMS

MANAGER
Simply recompiling an application when changing target gives you a competitive advantage. It guarantees your future and your ability to respond to changes

NEW
Support for UWP, Windows 10 Mobile.

AAF TECHNOLOGY
Several automatic features are available

MAIN POINTS
Portable code and objects (including for Web browser and Mobile code)
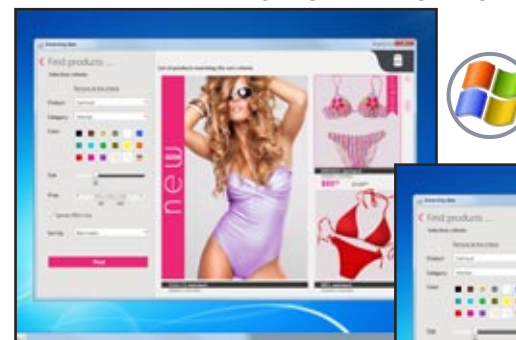
CAPITALIZE ON YOUR EXISTING CODE

THE SAME SOURCE APPLICATION, RECOMPILED FOR DIFFERENT PLATFORMS

(SOME EXAMPLES)

WINDOWS APPLICATION

JAVA APPLICATION

LINUX APPLICATION

Site with **LINUX server** with WEBDEV

PHP site with WEBDEV

Site on **Mobile** with WEBDEV

UWP application

Application on **Smartphone** and **Tablet** with WINDEV Mobile

With WINDEV, WEBDEV and WINDEV Mobile, by developing "only once", you can create:

Native applications for:
• Windows
• Linux
• Mac
• Java

Sites for engine:
• Windows
• Linux
• PHP sites
• sites for Mobile

Native mobile applications for smartphones and tablets for:
• Android
• iOS
• Windows 10 Mobile-UWP
• Windows CE.

All the applications run natively.

A COMPLETE, TOTALLY INTEGRATED, ENVIRONMENT

The environment for your success

The WINDEV 21 environment's features are all interconnected: data, controls, queries, business rules, tests... Everything is integrated, each feature is aware of the others.

For example, the feature that displays a table is aware of all the characteristics for each piece of data in each cell, the link with the database is always updated, automatically.

This **saves a lot of time**, reduces the potential for forgetting something or for bugs, avoids unnecessary or redundant programming, increases the application's speed, and makes development a lot easier.

This **integration, which is unique in the market**, provides multiple and immediately **profitable** benefits.

MANAGER
A single environment for all the development tasks, resulting in a phenomenal productivity. Everything being integrated, the security is greatly increased.
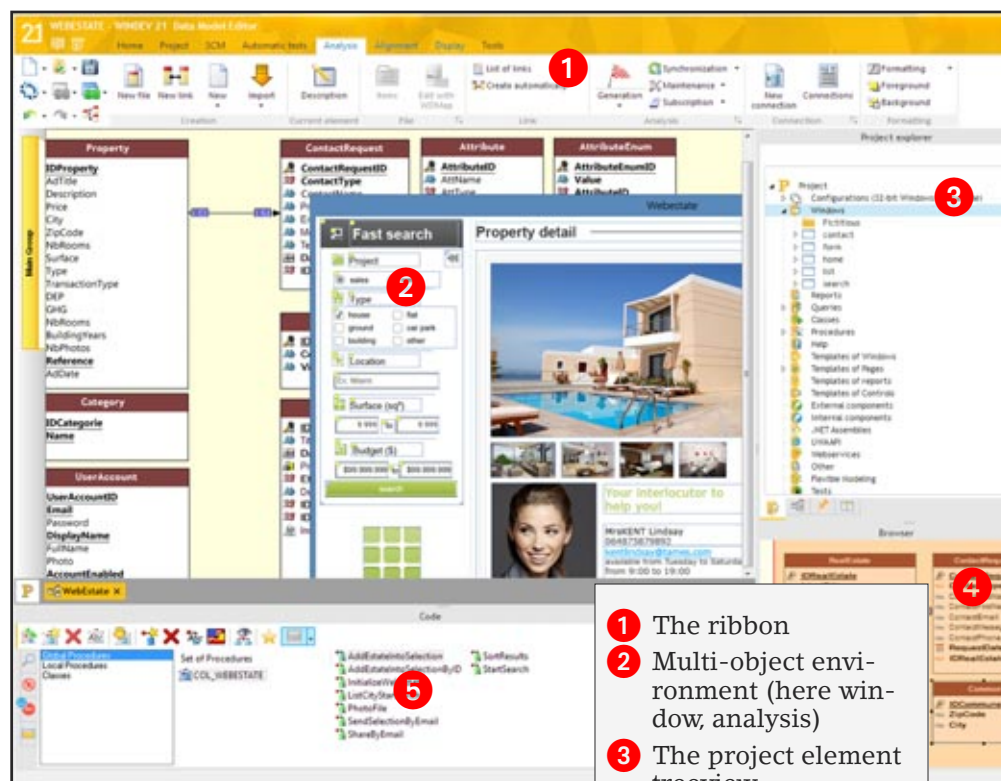
NEW
Support for 4K mode
Natural language search

AAF TECHNOLOGY
A lot of automatic features are available in your applications

MAIN POINTS
Complete integration
Very intuitive
Unique concept on the market

1. The ribbon
2. Multi-object environment (here window, analysis)
3. The project element treeview
4. The project browser, to quickly navigate inside a large project
5. The bottom pane for advanced information

THE ONLY ONE IN THE WORLD!
The environment is truly unique (which explains its success) in term of integration and richness.
Everything is supplied with the product: No need to get libraries or add-ons for each feature (PDF, images, database management, help, bar code, OPC, link with SAP, Lotus Notes, Outlook, SNMP, Google Apps...)
Everything is immediately available and totally integrated, which contributes to the

incredible development speed possible with WINDEV 21.

HUNDREDS OF EXAMPLES AND WIZARDS
In addition to the **provided tutorial**, WINDEV 21 comes with **hundreds of examples** and wizards: this makes being productive easier.
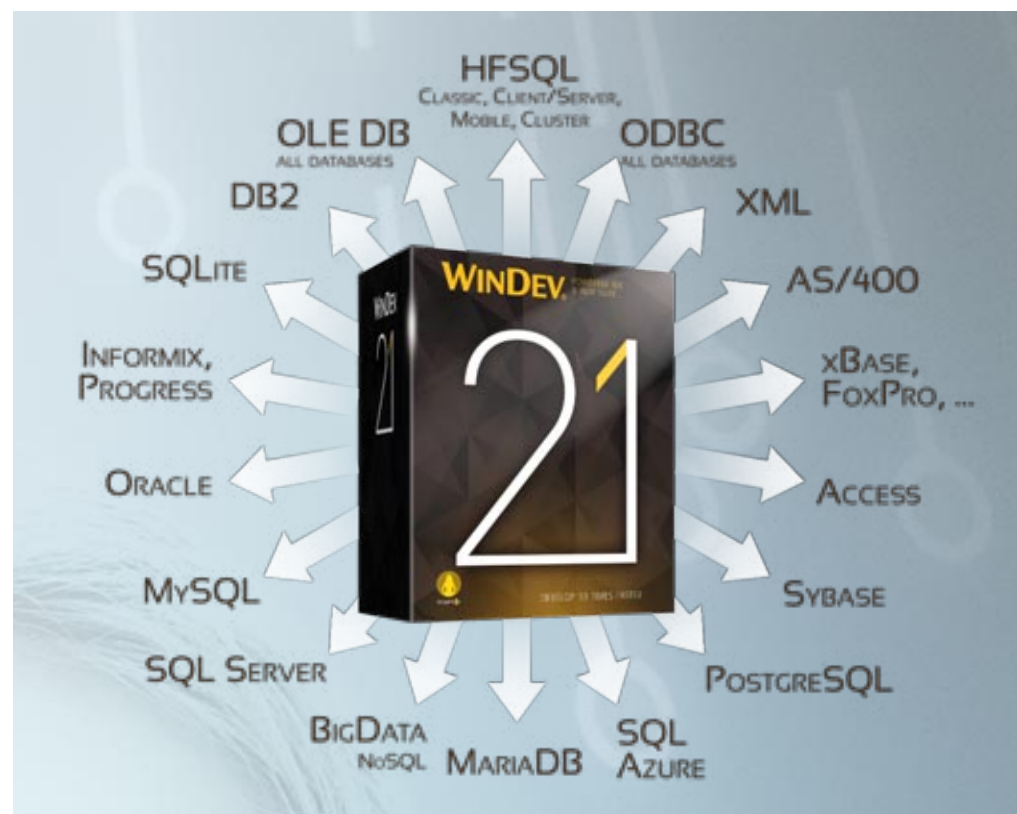
FULLY COMPATIBLE WITH THE EARLIER VERSIONS

WINDEV 21 respects your existing work.
No migration is needed between WINDEV 7.5 to WINDEV 20 and WINDEV 21: all you have to do is re-compile the application and it will work in version 21.

The existing components (version 8 to 20) work directly without needing to be recompiled with applications in version 21. Version 21 directly opens a project saved in version 7.5, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19 or 20.

Different versions of the environments can coexist on your PC; a version 21 license can also run older versions (20, 19, 18, 17, 16, 15, 14, 12, 11, 10, 9, 8, 7.5, 5.5).

CTRL E: SEARCH EVERYWHERE
Using the Ctrl E key combination allows you to search for an element anywhere inside your project and open it.

F4: REDO ACTIONS
This feature allows you to re-execute one or more actions that were just run on an element, onto other elements. The [Shift] [F4] key combination will redo all the actions performed since the control's selection.
This feature allows you to speed up a series of modifications in the editor.

INTEGRATED TECHNOLOGIES
These technologies bring standardization, ease of development, sharing of existing code, increased reliability and better overall quality of applications.

ALM	Full application lifecycle management
AAD	Aided Application Development, automatic operations to improve your applications
POC	Performance Optimization Center (Profiler)
SCM	Collaborative Source Code Manager (SCM, versioning tool)
AAF	Automatic Application Features
ADU	Automated Deployment and Upgrades ("Live Update" for your applications)
SDD	Synchronization with the data schema
ʳRAD	"real RAD", automatically generates complete applications
AAA	Automatic Application Architecture: code and window patterns
ASBS	Automatic support for style book
EDA	Embedded Database Access
CUSTOM-FOLDER	Organization of the data schema, analysis and projects
AAF	Automatic Application Features

TECHNOLOGIES

Refactoring (intelligent renaming)
Unlimited Undo/Redo
Live data
Zoom
Rulers, snap-on
Customizable style with your images
WYSIWYG
Multi-screen mode
Unlimited backup

YOUR TEAMS ARE IMMEDIATELY PRODUCTIVE
The architecture of the editor allows for its total control within a few minutes. Everything is very intuitive and always a keystroke or a mouse click away.
The modules are totally integrated, sharing the same data dictionary: each module (project, database, GUI, setup, queries, reports, ...) shares the information of the other modules, and can, by default, propose the most logical actions.

SOME EXCLUSIVE TECHNOLOGIES EASE YOUR TASKS
To improve your ease-of-use and your productivity, the environment proposes an important number of exclusive technologies:
• perfect WYSIWYG (with zoom)
• "7-tab" technology, to define all the control parameters via a simple click (saving thousands of code lines)
• Modifier, for quick access to properties
• Panel, for the list of project elements
• Permanent popup menu
• AAD and POC
• Unlimited UNDO and REDO, copy/paste history
• "Immediate "GO" of the project without recompilation, etc.

FULL DOCUMENTATION IN 1 CLICK
WINDEV can generate a full documentation in just 1 click (printer, PDF, HTML...) The documentation is built by reverse analysis of the project, and therefore it is always updated (see page 92).

COMPARATOR ("DIFF")
Immediately detect all the modifications made to an element (interface, code, analysis, ...) between 2 versions with the integrated versioning tool

FREE TECHNICAL SUPPORT
We trust our tools: Technical Support is offered for free*, for all the modules included in WINDEV 21!

TIME SAVINGS MONEY SAVINGS
WINDEV 21 helps you reduce development times.
You will save large amount of money.

WINDEV 21, is a complete environment, integrated, user-friendly, which automates tasks, and saves you a lot of time during all the phases of development: state of the art...

ALL THE DATABASES ARE SUPPORTED

WINDEV integrates nicely with any I.S.

WINDEV 21 lets you use the **databases of your choice**: HFSQL of course, the powerful database that comes with the product, but also all the other databases on the market through Native connection (additional module), ODBC or OLE DB.

This **total openness** insures that you'll be able to interface with any existing code.

MANAGER
WINDEV is open to all the databases on the market. The same code is used regardless of the database.

NEW
Hadoop Big Data Native Access

AAF TECHNOLOGY
Several automatic features are available

MAIN POINTS
Same programming regardless of the database
Use your existing IS databases.
Universal replication

GENERATE SQL QUERIES
Illustration of the integration of WINDEV 21: it knows your data structures, therefore it knows how to create the default queries.
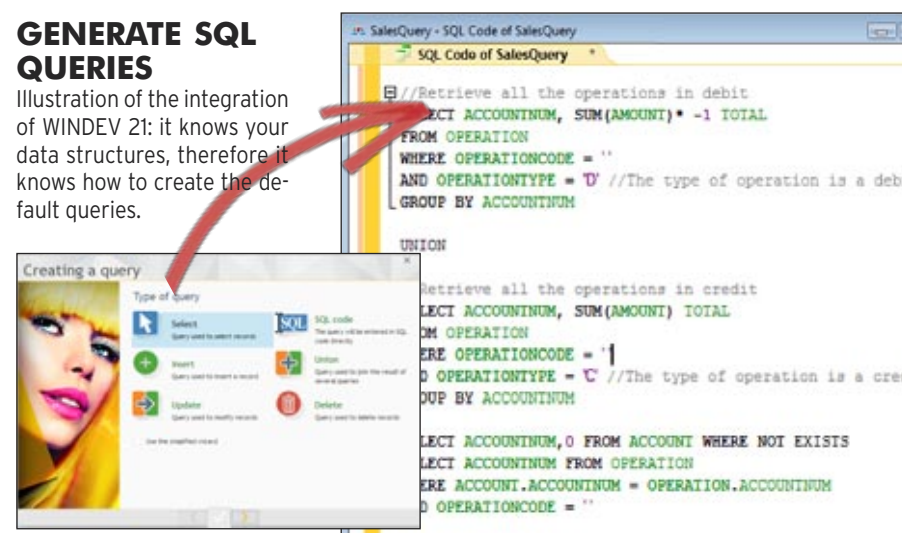
BIG DATA, NOSQL
Version 21 of WINDEV lets you easily use Hadoop Big Data technology, directly in WLanguage.
Version 21 offers native access to Hadoop.
Hadoop uses 3 hierarchical levels for writing and accessing data:
• the column level (HBASE)
• the "query" level (Hive)
• the "file" level, entire file or block (HDFS)
With WINDEV 21 you're ready for Big Data!

Defining or reusing a database is very simple with WINDEV
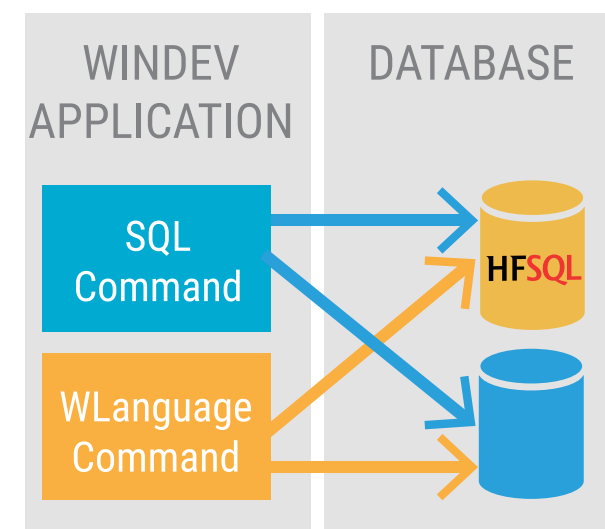
Programming is the same regardless of the database used

HFSQL:
HFSQL Classic
HFSQL Client/Server HFSQL Mobile

Third-party database:
Oracle
SQL Server
MySQL,
etc.
? Native
? ODBC
OLE DB

REPLICATION BETWEEN HETEROGENEOUS DATABASES

Replicate any database:
HFSQL, Oracle, AS/400, MySQL, SAP, mobile...

With any database: HFSQL, Oracle, AS/400, MySQL, SAP, mobile...

ALL THE DATABASES ARE SUPPORTED
WINDEV can read and write in all the databases, using native access (connector), OLEDB or ODBC (JDBC in Java).

WINDEV 21 NICELY INTEGRATES WITH YOUR IS
WINDEV 21 is open, and integrates perfectly with your existing Information System, to energize it!

THE STORED PROCEDURES
WINDEV applications support database stored procedures.

EASY CLIENT/SERVER
Client/Server development is very simple with WINDEV 21, because on top of the SQL commands, the 5GL commands from the **HRead*** WLanguage family are also supported.
This makes your source code more independent from the database, and programming more flexible.

A REVOLUTIONARY PROGRAMMING MODEL
In addition to SQL, WINDEV 21 offers a 5th generation language totally suited for managing databases.
A command such as **ScreenToFile** corresponds to hundreds of lines of traditional code!
ScreenToFile assigns all the window controls' content into the right database columns without having to program anything.
No risk of oversight from the developer, no maintenance needed if the window or database evolve. That's how data should be managed: without any risk.

WINDEV 21: THE IDEAL TOOL FOR MANAGING DATA
WINDEV 21 is the ideal tool for accessing all kind of data.
The complete integration of the database structure in the development environment allows for incredibly fast development: each environment module knows the data you're using, and offers you the names of databases or items for each operation.

PERFORMANCE
The WinDev 21 Client/Server mode is implemented in the WINDEV kernel, and therefore is extremely fast.

HFSQL
WINDEV 21 comes with the powerful HFSQL database (see p 70 to 73).

WINDEV 21 supports all the databases of the market, with the same programming.

RAD AND APPLICATION GENERATOR: INDUSTRIALIZE CODE GENERATION

OF COURSE, OPTIONAL USE

Generating entire applications or subroutines in just **a few clicks** is a standard feature of WINDEV.

There are a large number of preset programming models, including MVP models.

You create a complete application, ready to use, in just a few clicks.

This enables you to answer a request for proposal really fast or validate a model really quickly.

WINDEV 21 also lets you **create your own RAD patterns**: you choose the code to generate, as well as the positioning of the controls!

Time to market is crucial in a competitive world: with WINDEV 21, you can offer fast time to market to your company and to your customers.

MANAGER
RAD (whose use is optional) can generate full applications or specific processes. RAD also enables you to create prototypes. The time saving is really noticeable.

NEW
"Ribbon" mode RAD

AAF TECHNOLOGY
The generated applications automatically benefit from all the AAF

MAIN POINTS
Immediately usable application
A prototype in a few minutes
Patterns
Customization

AUTOMATICALLY GENERATE YOUR APPLICATIONS

DATABASE → PATTERN → STYLE BOOK

RAD

EVERYTHING THAT IS GENERATED CAN BE MODIFIED

⚙ EXECUTABLE
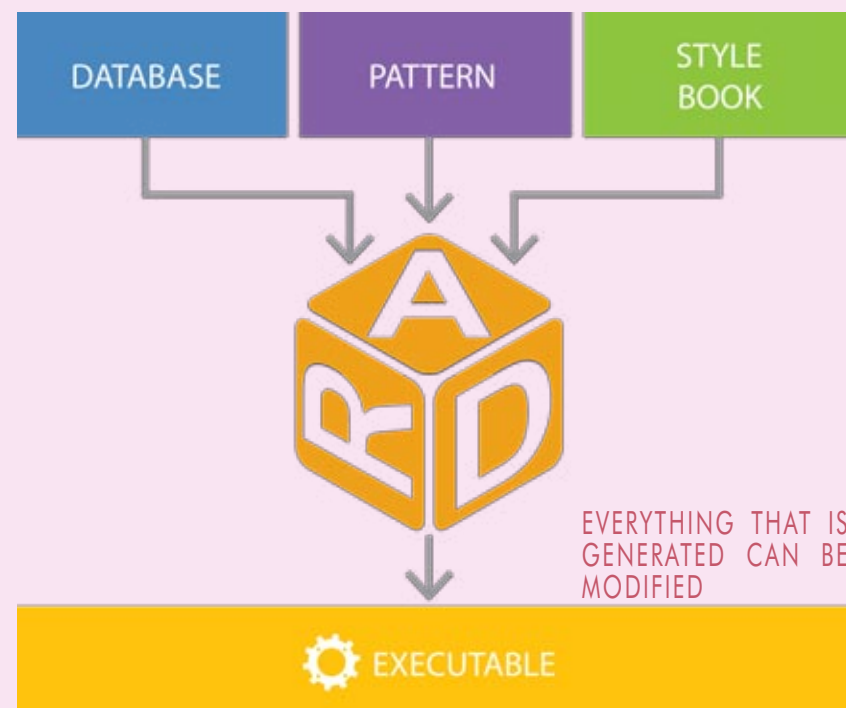
INDUSTRIALIZE THE CODE GENERATION: CREATE PATTERNS

AAA: AUTOMATIC APPLICATION ARCHITECTURE ("PATTERN")

A constant worry for the project manager is to ensure that programmers in the development team follow the company standards when developing applications: GUI, code etc.

The AAA technology lets you create your own RAD generation patterns.

You decide what goes into the windows, the control location, what code will be gene-rated by the various RAD options: entire application or partial code.

The increase in productivity and in code security is phenomenal.

For a small investment (pattern creation), each use of the pattern will help standardize the future developments without imposing constraints.

A RAD pattern is easy to create: it is a simple WINDEV project.

The applications automatically respect the style book.

The project manager is therefore sure of the consistency of the programs built (code and UI).
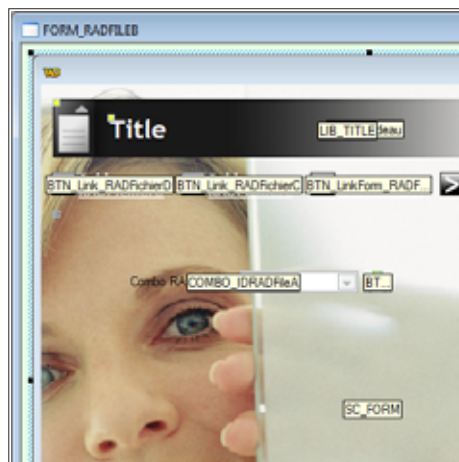
And the product code is already tested!

Patterns are the answer to your constant needs for quality control and style book enforcement.

Create an application (or a prototype) in 6 clicks
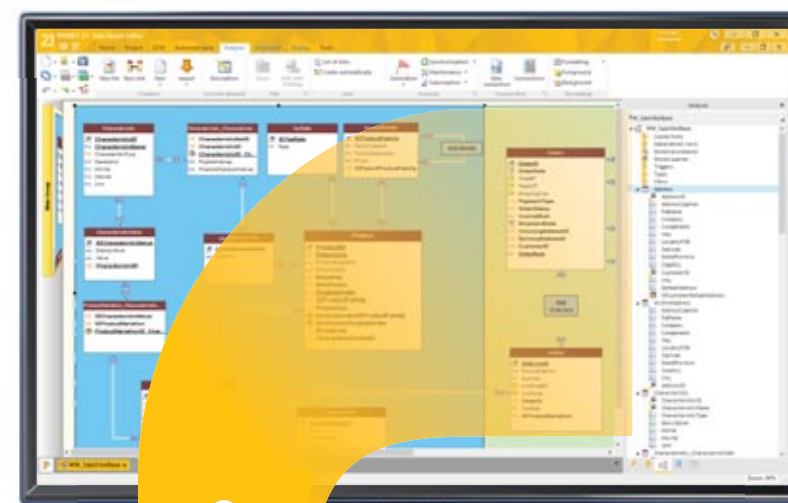
Example of an application automatically generated by RAD.

Here are some of the windows generated by the "Application RAD": the entire application can be used right away.

Everything can be modified and customized.
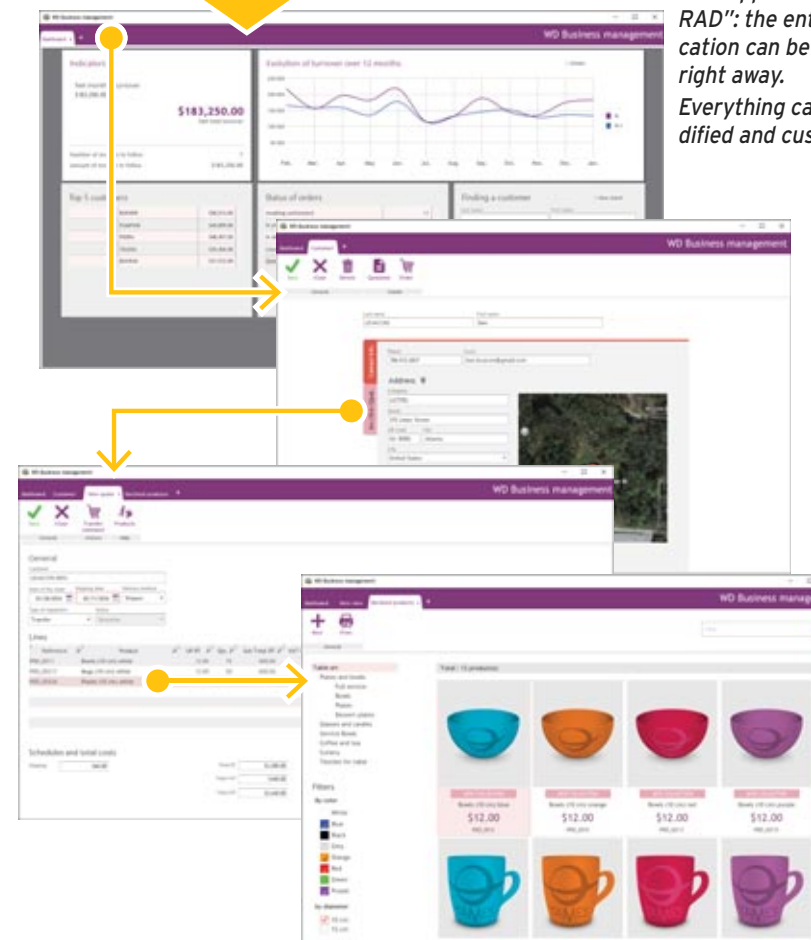
With WINDEV 21 you can write your own programs, or use RAD. Rapid Application Development gets its full meaning!

6 STEPS FOR CREATING AN APPLICATION WITH RAD

An application is defined in 6 quick steps via the WINDEV 21 RAD:

1. Define or retrieve the analysis: the tables, the columns, the keys, the indexes, the links...

2. Click the "RAD" icon...

3. Select the tables that will be used by the application.

4. Choose your application's style book (skin template) and pattern.

5. Choose the additional features to include: automatic backup, help, report generator...

6. Validate: the application is generated.

It's that simple. The entire application (code, menus, windows, reports, ...) is generated in a few seconds.

EVERYTHING CAN BE CUSTOMIZED
The application created is ready to run. You can modify it and customize it as you wish.

AUTOMATIC DEPLOYMENT
Deploying the application (CD, network, HTTP, ...) is automatic via the generator of setup procedure supplied with the product.

ANSWERING A REQUEST FOR PROPOSAL? A PROTOTYPE!
You can also use a RAD application as an answer to a request for proposal: the prospect will directly use the future application.

You're a consulting company? You'll win bids thanks to WINDEV 21!

## INSTALL A READY-TO-USE APPLICATON IN RECORD TIMES
An urgent application must be created and deployed as quickly as possible? Create this application with RAD, and release it immediately.

You can customize it and develop additional features while users can already use this first version.

Time to market is crucial in a competitive world. Thanks to WINDEV, you can offer fast time to market to your company and your customers.

EASILY CREATE RAD PATTERNS
WINDEV lets you create your own RAD patterns: see opposite.
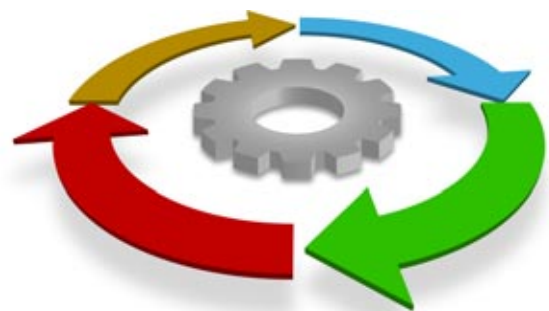
MASTER THE LIFE CYCLE.
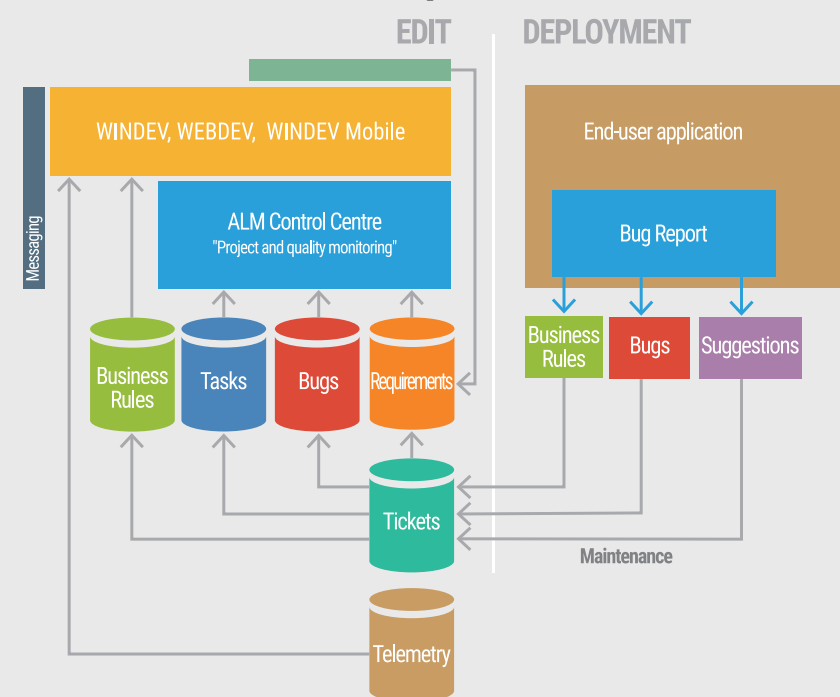# ALM CONTROL CENTER.

Agile development

WINDEV 21

The Project Monitoring Center allows you to easily manage all aspects of your **applications' lifecycle**.

The project Monitoring Center is completely integrated to the environment and interacts with the editors: window editor, project editor, code editor (SCM), ...

All the information is shared.

WINDEV 21 comes with a powerful integrated ALM Control Center for managing projects and quality.

MANAGER
The Control Centers allow you to manage all the organizational tasks required for developing applications.

NEW
Interactive Gantt chart
Burn Down Chart

AAF TECHNOLOGY
The feedback and suggestions from customers can be processed automatically.

MAIN POINTS
Fully integrated to the environment
Industrialization without constraints.

MANAGE THE LIFE CYCLE, MANAGE THE SCHEDULES

MAIN FEATURES
The ALM Project and Quality monitoring center offers the required features for managing a project's life cycle.

A BENEFICIAL INTEGRATION
Unlike the third-party tools that are heavy to implement, the WINDEV control centers are natively integrated in the editors.
The link with the environments is natural.
The use is intuitive and non intrusive.
The development cycle is mastered, the project manager has access in real time to specific information about the project's status and quality.

Feature	
Multi projects, multi teams	✔
Scheduling: assignment to teams, progress monitoring, ...	✔
Requirement management, organization in folders	✔
Task management	✔
Incident management	✔
Customer feedback and request management (p 101)	✔
Dashboard	✔
Progress statistics, block list, counters	✔
Integration in the IDE (see p 8-9)	✔
Link with the continuous integration (p 16-17)	✔
Link with the test tool (see p 90-91)	✔
Link with SCM (link between check-in and task or incident) (see p 76-77)	✔
Data access via a component	✔
Deployment tool (see p 96-97)	✔

The dashboard of the ALM Control Center, project and quality monitoring

Interface example: requirement list for a folder

REQUIREMENT MANAGEMENT (BACKLOG ITEMS)
The Project Monitoring Center allows you to define and follow the status of each requirement for each version of the project.

A requirement corresponds to a feature that must be developed/corrected in the software.

Each requirement can be linked to several tasks (development task, test task, documentation task, ...), bugs, business rules...

MANAGING THE TASKS
Each member of the team can access his task list and change the priorities, add comments, see the linked requirements...

The project manager has access to an overview of the team tasks and their status.

MANAGING THE QUALITY
The Project Monitoring Center lets you inventory the incidents reported for an application, and assign them to a developer.

It enables you to centralize the information, to track bugs, to calculate statistics, and prevent oversights (see the bug tracking "Feedback" component later in this same document).

ALM: APPLICATION LIFECYCLE MANAGEMENT
The full lifecycle management of your application by WINDEV is a guarantee of success for your applications. Application governance, software production and their implementation are industrialized by the integrated WINDEV tools.

AGILE METHODS
The methods for Agile development are based on an iterative development: instead of delivering all at once a program meant to answer a set of requirements set in stone, development is done through iterative deployments in short time frames.
WINDEV 21 has been conceived for agile development: Scrum, eXtreme Programming, RUP, CMMI,...

TIME TRACKING
A time management tool is included with the environment.
Based on an intuitive communication method, this tool asks each team member to validate the task on which he's working in real time.
The current task is proposed by the tool, that deduces it from the current action.

SOURCE CODE MANAGEMENT
A powerful versioning tool (SCM see page 76) is included in the environment.

LOCAL, REMOTE, IN THE CLOUD
Control Centers can be used remotely, via Internet, VPN or via the Cloud.

EASY MONITORING OF SCHEDULES
The Project Monitoring Center lets you easily manage a team's schedule, define the requirements for each iteration and analyze iteration analysis!
Totally integrated in the development environment, the Project Monitoring Center provides vital help in making your projects successful within deadline.
If you invoice by the hour, the Project Monitoring Center enables you to easily keep track of your resources.
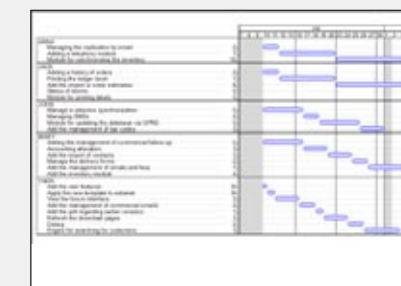
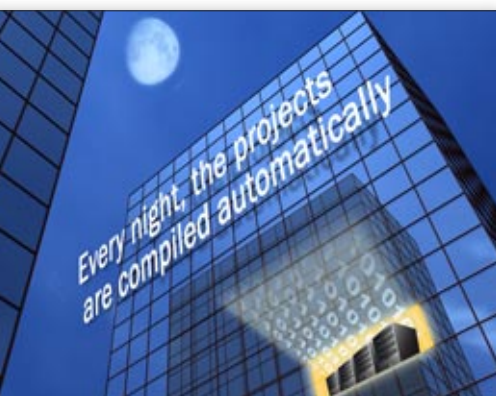# CONTINUOUS INTEGRATION: AUTOMATE BUILDS

T he software factory concept is used to automate the process for creating applications.

It allows you to setup a **"continuous integration" methodology.**

The Software Factory allows you to **save man** weeks of work each year. It also allows to **avoid human errors**, increase the correction speed, automatically increasing the quality level.

Software **industrialization** is made easier by WINDEV 21.

MANAGER
The software factory automates hundreds of version creation tasks. This automatically industrializes processes.

NEW
API call in WLanguage

MAIN POINTS
Saves time on operations
No risk of operation oversights
Automatically increases quality
Decreased project cost

NO MORE ERRORS, OVERSIGHTS AND LOST TIME: EASILY AUTOMATE ALL THESE TASKS THANKS TO CONTINUOUS INTEGRATION.

Checklist:
☑ Recompile the components
- Retrieve the last versions
- Update the templates
- Recompile the projects
- Rename the Tar file
- Remove the read flags
- Create the setup
- Delete the temporary files
- Update the license numbers
- Copy the sources onto NAS

GO

USE EXAMPLES

There are a lot of use examples for continuous integration; we'll just mention:
• automatic compilation of projects at night: the smallest error, the smallest incompatibility is detected
• executing automated tests on different machines
• identical reproduction of an already performed compilation (to perform maintenance on an already deployed application)
• automation of manual tasks: compilation of course, but also updates, flag positioning, deletion of temporary files, file renaming, license number update, create the install program...

A VERY EASY IMPLEMENTATION

Implementing continuous integration is very easy.
Using the editors, simply:
1 - Define "generic" action plans containing actions to perform (using the action plan editor)
2 - Deploy action plans on the coordinator (from the environment)
3 - Trigger the action plans: instantly or schedule their execution (at night...) using the software factory administrator
4 - View the execution's status reports

STATUS REPORTS, REPORTS, METRICS

All the execution status reports for the action plans are stored.
Execution times, potential errors are stored.
Statistics can be edited.
A history of all the builds is kept.

Continuous integration saves you weeks year after year, eliminate human errors, and therefore reduces costs while automatically increasing the quality of your applications.

Application creation time is reduced 3 folds

DEVELOPMENT COMPUTERS
- Development projects
- Action plans

COORDINATOR
- Action plans compiled

SCM
- Development projects

COMPILATION COMPUTERS
- Execution of action plans
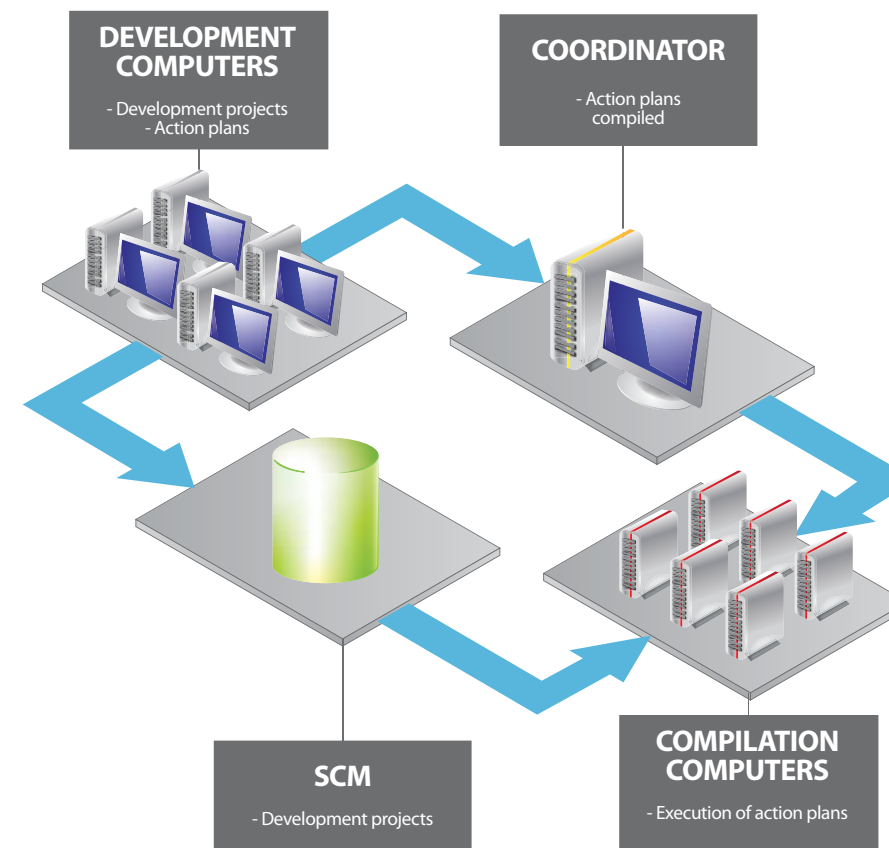
NIGHT_BUILD
001 Starting WINDEV
002
003 Recompiling the project
004 Starting the static audit
005 Running the automatic tests

ACTION PLAN EDITOR

The first step in a continuous integration is to define an "action plan".

The action plan editor lets you define the sequence of actions to perform automatically.

Among the proposed actions, you'll find:
• Project opening (full project name on the network or in the SCM)
• SCM update
• Refresh the templates

• Update the components
• Refresh the styles
• Projet directory clean up
• Delete automatic tests' data
• Clean the _WEB directory
• Clean up project's system files
• Delete a HFSQL file's records
• Compilation
• Rebuild the graph
• Run tests
• Generate a component's documentation
• Add a user manifest
• Select a configuration (#configuration)

• Generate a configuration (#version, #label, #copyright)
• HTML Generation
• Create the setup program
• Setup
• File copy (#source, #target directory)
• Eexecution of a .bat, .exe, etc.
• Script execution
• check out/check in of translations (multilingual applications, requires the great WDMSG tool)
• Run WLanguage code
• Send a status update email
• Wait
• Etc.
The errors that may occur during the action plan's execution can be managed.

The actions can be configured, or defined in WLanguage.

THE "SOFTWARE FACTORY" CONCEPT
The software factory concept is used to automate the application creation process.

SOFTWARE FACTORY: COMPILE
With the "software factory", application creation is automated.
The compilation of the source code is handed over to a robot on a build machine.
The report produced by the robot enables the project manager to find out the stability level of the project, and the programmers to immediately correct potential compilation errors, and this in extremely reduced time frames.
This robot can also run automated audits and automated tests.

INDUSTRIALIZE
One of the purpose of the software factory is also to automate all the manual tasks (minor or major) up to the application setup creation process.
Once the final product is obtained, the software factory allows for the automation of the clean up phases, organizing and saving the different elements of the application
The build phase industrialization, is the end of errors and oversights, the end of time spent on menial operations.

CONTINUOUS INTEGRATION
The continuous integration is a set of practices that consist in, among other things, checking that there is no regression for each modification made to the source code.
This check is performed almost in real time, each night in most cases. Every evening, each developer checks back in the modifications made during the day.
An action plan is defined and programmed to start every night on all the projects:
• the retrieval of all the SCM elements
• the retrieval of all external components
• a general compilation
• the generation of all the executables, components, ...
• the running of the tests, etc...
The robots return status report allowing you to know the status of the product version generated.

Responsiveness, time saving, ease of implementation, improved quality, agility: you're a winner.

PROJECT DASHBOARD: MONITOR YOUR PROJECTS

Any project manager would like to have a global and synthetic view **of the status of** his projects.

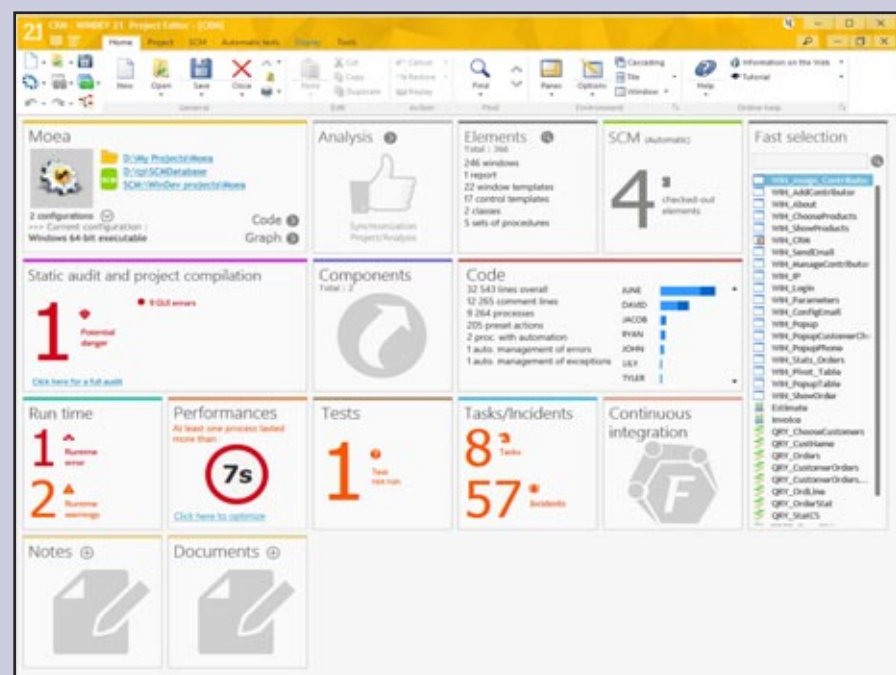The project manager would like a high level overview of his projects.

The QA manager wants to know the number of bugs and their priority, as well as follow their status.

The product manager would like to know what new features are requested by the users.

The **"Dashboard" concept automatically provides this high-level view of a project's progress**, of the overall quality, and for the deployed projects, of the needs for maintenance and bug fixes.

The different lights and dials notify you in real time: bug fixing, optimization, ...

MANAGER
The dashboard allows for a high-level view and for an optimization of your projects. Managing the projects is made easier.

NEW
Telemetry Widget
More complete SCM (Source Code Manager) widget

AAF TECHNOLOGY
Several automatic features are available

MAIN POINTS
High-level view
Suggested optimizations

A SYNTHETIC VIEW OF EACH PROJECT

THE STATE OF YOUR PROJECTS IN REAL TIME

INDICATORS TO MONITOR EVERYTHING!
(Caution: don't confuse this feature with the Dashboard control that is available for your WINDEV applications).

The dashboard's elements are presented as widgets, which you can easily configure, move, resize or hide.

This way only information you care about will be displayed.

MEASURE...
The dashboard lets you display widgets about:

1the project overview
1the project statistics: number of windows, lines of code per developer, ...
1incidents
1tasks
1the current status of the project's automated tests
1code audit, static audit
1the result of the last dynamic audit for the last GO
1the list of elements checked-out from SCM
1the result of the action plans for continuous integration
1quick preview of the latest profiling
1analysis of the executable's size
1status of the components used by the project
1the display of the custom menu commands
1links to documents

1the date for the last extraction and re-integration for WDMSG
1etc...

With the WINDEV dashboard, see your project's status at a glance

---

Information and access to the main project elements

Detected dangers and start of static audit

Indicates the status of components and proposes the suitable action

Code statistiques and code search by author

Project statistics and fast selection of project elements

Indicates the checked-out elements and the ones to retrieve in SCM

Project/Analysis synchronization

Fast selection of project elements

Popup menu
Add a Widget
Edit mode
Auto. reorganization

Ability to create notes

Status report of last GO

Documents about the project

Pending tasks and incidents

Status report of auto tests

Performance analysis and optimization

Status report of action plans

Legend:
Nothing to report
Information
Quick access
List
Caution
Danger
Find
Abc Link

STATIC AUDIT: SECURE YOUR APPLICATIONS' CODE

The static audit analyzes the source code of the project and its elements. You have the ability to perform an audit of your applications as often as you want.

The detailed report that is created indicates: content of the setup, code metrics, potential dangers for the project, unused elements, optimization tips......

You can **improve your application's quality** this way, reduce their size, **increase security...**
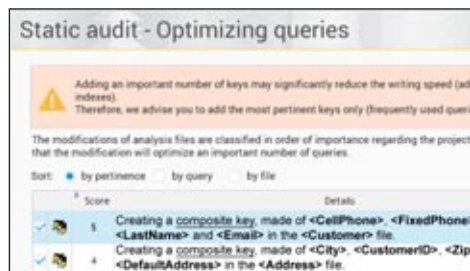
Optimization suggestion example

MANAGER
The static audit analyzes the quality of the source code and offers changes

NEW
New dangers detected

MAIN POINTS
Source code audit
Project cleaning offered if needed

AUDIT YOUR CODE IN 1 CLICK
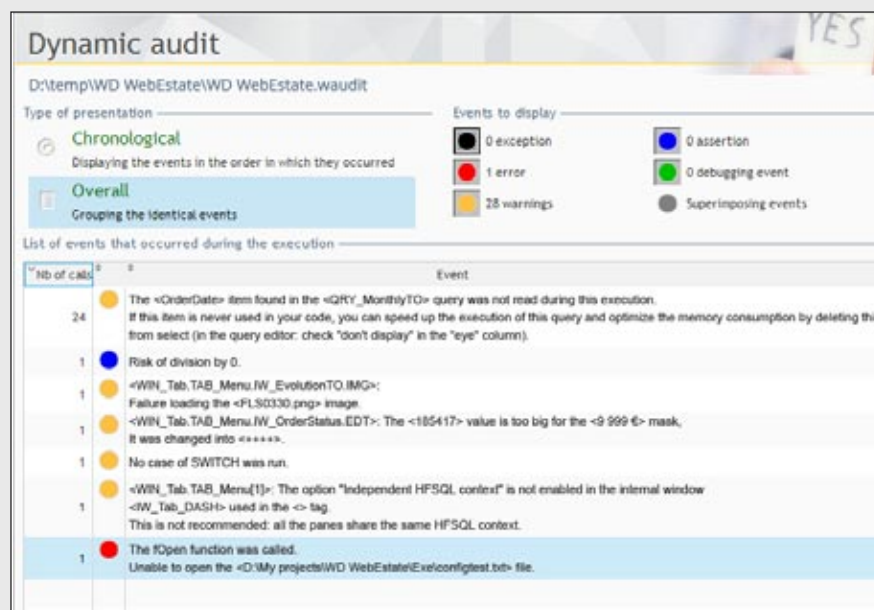
An example of a static audit report: here the potential trouble areas of the project, to correct quickly!

MAKE YOUR APPLICATIONS FASTER AND MORE ROBUST
Installing the static audit is very easy. From the WINDEV 21 environment, it analyses the source project and its elements.

SOURCE PROJECT STATIC AUDIT
The static audit produces a report on the state of the project, as well as recommendations for optimizing and improving performance.

PROJECT CLEAN UP
The following elements are offered for clean up:
• Dead code
• Unused windows
• Unused variables
• Unused multilingual mes-

sages
• Simultaneous backup of a window's history in the editor (.wdw file) and in SCM
• Unused styles
• Unused control groups.
After cleanup, your projects are smaller and faster.

VIEWING THE OCCUPANCY
The content and the size of the .EXE files, libraries (.WDL) and install files can be viewed in one click.
This allows you to reduce their size by removing unused files.

CODE METRICS
This feature combines the code metrics features:
• Comment rate
• Assets use
• Number of rows per process (detect excesses)
• ...

POTENTIAL DANGERS TO THE PROJECT'S QUALITY
The static audit generate a list of potential dangers to the project. Among the noted subjects, you'll find:
• SCM: project elements checked-out for a long time and never checked in
• Template (control, window, page, report templates...) not up to date
• Skin template used by the project not found on the computer
• Native access to a third-party database used by the project but not present
• Project configuration containing several generations
• ...

DYNAMIC AUDIT: INCREASE YOUR APPLICATIONS' PERFORMANCES

The **static audit** is performed on a running application. The execution is performed on a deployment computer or on a test computer.

The dynamic audit allows you to follow the execution of an application on a computer, as well as track its memory usage.

The audit generates a status report containing the runtime warnings, asserts, memory dumps, ...

Coupled with the profiler, the dynamic audit allows you to **increase the speed of your applications**.

Above: the detail of a dynamic audit status report

Opposite: the widget on the dashboard

MANAGER
The dynamic audit analyzes the performance of your applications at run time
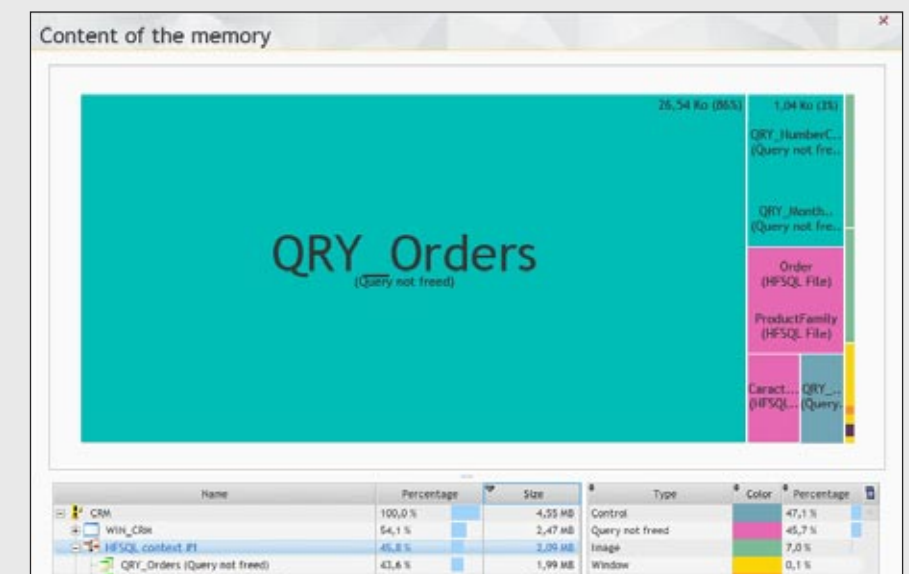
NEW
New dangers detected

MAIN POINTS
Lets you optimize your applications' speed

ANALYZE YOUR RUNNING APPLICATIONS

The dynamic audit shows each module loaded in memory, it also flags the runtime warnings, the non-fatal errors and the asserts (assertive programming). Here we see the memory used by an non-freed query.

AUDIT THE REAL EXECUTION

DYNAMIC AUDIT (APPLICATION IN EXECUTION)
A dynamic audit is performed on a running application, on a production computer or on a test computer.
You don't need to be physically present at the deployment site where the audit is performed.
The audit generates a report listing the dangers and the potential optimizations ...
The generation of the status report can be requested by programming or by the user ([Ctrl] [Alt] [A] key combination).
This file can be analyzed remotely.

MEMORY FOOTPRINT
When running the application, locally or remotely, a computer's memory footprint can be easily analyzed.

RUNTIME WARNINGS
Here's a (non-exhaustive) list of elements that are analyzed and reported on by a dynamic audit:
• Images not found
• File whose access path doesn't exist anymore (timeout)
• Non existing case in a SWITCH statement
• Operation overflow
• Values truncated when displayed (display with "++++")
• **Multitask** in threads and timers (this function is not allowed in a thread or a timer)
...

NON-FATAL ERRORS
An application can generate "non-fatal" errors. These are errors generated by functions, and whose status report is not tested in the application.
It is common to forget to test this type of errors: the dynamic audit detects and lists these "hidden" errors.

AUDIT FROM THE TEST IN THE ENVIRONMENT
Each time the test mode is started, a dynamic audit is automatically performed. The result is displayed in the dashboard.

THE MOST ATTRACTIVE INTERFACES (UI), IN JUST A FEW CLICKS

Your applications benefit from user friendly and attractive windows

21 WINDEV®

The user interface (UI) generator provided with WINDEV 21 is certainly the **most powerful** and the easiest to use in the world!

You easily creates stunning custom interfaces.

No UI design knowledge is required.

UIs are built visually (WYSIWYG), using the mouse.

Better designed UIs **greatly benefit** companies using them: fast training, reduction in data entry errors, ...

CREATE FABULOUS INTERFACES

EASY PROTOTYPING
Thanks to its window creation mode, the UI generator enables you to easily and quickly create interface prototypes that you can also reuse!

MANAGER
An attractive, efficient interface insures a better productivity for the users. And it makes your applications stand out.
WINDEV 21 is the only tool in the world to offer this integrated UI concept.

NEW
Workflow control, Rating control, Round button

AAF TECHNOLOGY
Automatic & assisted input
Input masks
Spell checker
Persistence of the content of controls
Resizing combo boxes
Export to Word, Excel, XML, etc.

MAIN POINTS
Arguably the best interface generator in the world (and the easiest to use).

VISUAL WINDOW CREATION
Creating windows is very intuitive: all you have to do is Drag/Drop the controls from the ribbon with the mouse.
Still with the mouse: • select a control, resize it, move it,
• then edit its properties ("7-tab" technology, see p 40 to 43),
• and lastly enter the code (p 62 to 65) in the relevant events: everything is WYSIWYG.
Click the "GO" icon to run an instant test of the window.
Creating a control is easy: simply slide it into the position you want using the ribbon, then configure it using the "7-tab" window (see page 40). A control can have over 200 features (presentation, security, data link, etc...).
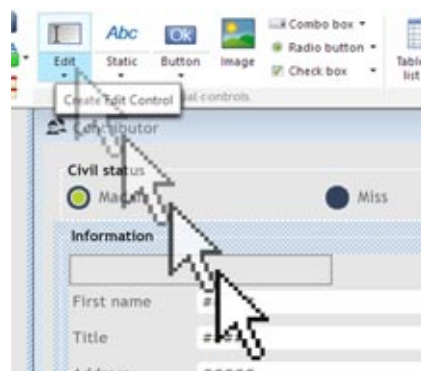
INTELLIGENT MAGNETISM
The positioning and sizing of the controls is made easier by an intelligent snap on mechanism that takes into account the other controls, as well as the basic rules of UI design: margins, space between controls, alignment...
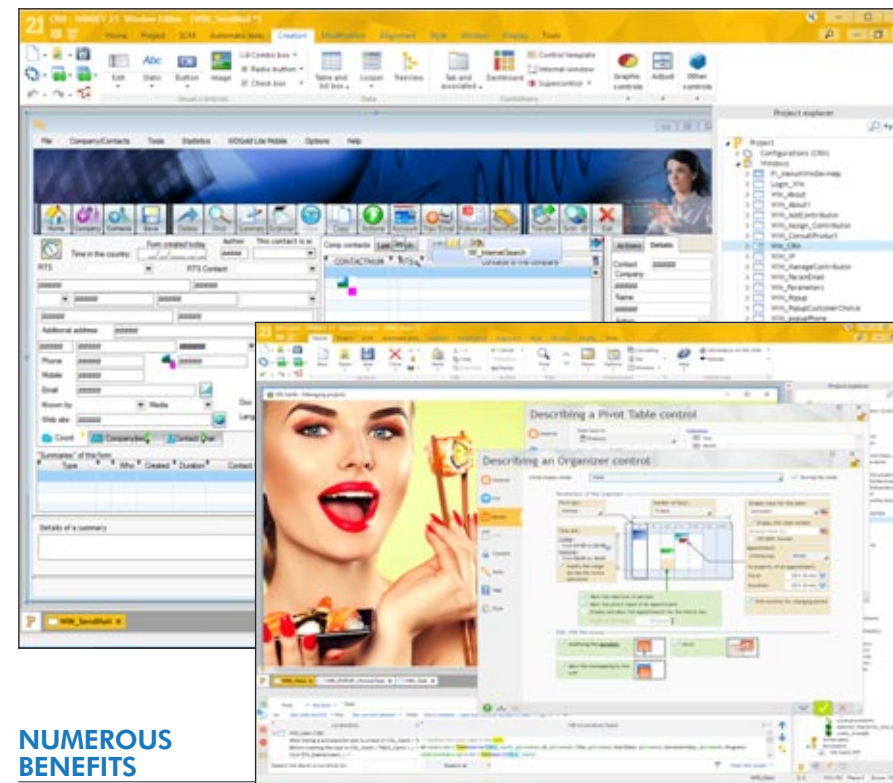
NUMEROUS BENEFITS
• No code generation is required to create objects,
• The supported objects are more evolved than the base objects (input mask, color, fonts, styles, images, tooltip...),
• The codes for initializing and checking the objects can be associated with the object and stored in the window.
The control properties can be modified by programming: size, color, visibility, position, caption... or even to create a control filled with zeros.

This approach for working with WINDEV controls will save you a great amount of time when maintaining your applications, and will make your programs more robust.

You'll never be limited

The windows themselves offer a powerful setting, without having to enter a single code line:
• automatic style book (skin template, see page 48)
• customizable menu bar/ribbon
• background color, background image
• type of border
• icon
• resizable or not
• multilingual (see page 95)
• automatically store the size and position
• animation at opening or closing
• presence (or not) of system buttons
• configurable sizing handle
• clipping (free shape)
• popup menu
• plane management
• MDI, modal window, non-modal window
• toolbar
• inheritance (window templates, see page 68)

• internal windows
• dim disabled windows (DDW)
• initial and maximum width/height
• automatic closing
• AAF (see p 44)
• automatic creation of the window's documentation (see p 92)
• database context linked to the window
• Unicode

The created windows are multi-platform windows. They operate in Windows, Linux, Java, and they are compatible with Mobile and Internet.

The controls found in the windows (up to 10,000 per window) offer even more parameters (see next pages).

CREATE FABULOUS INTERFACES
The WINDEV UI generator allows you to easily create great-looking windows that respect the Windows standard but are custom designed.

STYLES AND SKIN TEMPLATES
The use of style sheets and skin templates help you standardize the entire look of your windows, by applying a sophisticated and user-friendly style book, even without any graphics knowhow.

FULLY CONFIGURABLE WINDOWS
The windows can be fully customized: title, icon, initial position and size, animation at opening, resizing and storing, automatic adaptation to the content size, scrollbars, DDW, popup menu, independent HFSQL context, background image, opacity, message bar, movable menu bar + custom color, toolbar, grip, MDI, border type, splitter and anchoring, plane and tab management, ...
A window can support up to 10,000 controls.
The windows are advanced objects that contain the description of their controls. Therefore, each window knows how to display its controls and manage the input without any programming.
The window editor allows you to create and modify the objects independently from the source code of the application.

UNPRECEDENTED SECURITY
When defining a control, it automatically inherits all the security parameters defined during the modeling and you only have to specify the additional security parameters: checking the existence in a database, number of characters, switch to uppercase characters, date validity...
Without writing any code, in just a few clicks, you've secured your application. This information is printed in the documentation so that it can be checked and modified later by programming.

THE GUI OBJECTS: NO CODE IS REQUIRED
WINDEV uses an innovative approach for managing the interface's elements: the controls are drawn interactively in the GUI editor, and their description is stored in the window directly. No code is required ; you don't have to handle any API, nor any complex or incomprehensible class!

With WINDEV, easily create stunning interfaces.

Continues >>>

Initial status:
- ✓ Visible
- ● Editable
- ○ Read-Only
- ○ Grayed

Management of TA
- ○ None
- ● Control acces
- ○ Accept TAB in

DETAILED EXAMPLE: THE
EDIT CONTROL

A control is equivalent to a thousand lines of code ❗

And even more for controls such as Cube or Scheduler

The **edit control** is one of the most often used controls.

This control illustrates well the power of the WINDEV 21 window editor: by setting its parameters, the developer **saves** dozens or even hundreds of lines of code.

The assisted input is **secure**: the application will receive pre-validated data.

EDIT CONTROL

The WINDEV control filters the information sent back to the application; the end user is assisted during input, the application receives data that has been "verified". Here are some style examples for edit controls.

"7-TAB": HERE ARE SOME OPTIONS FOR A "TEXT" CONTROL

Here are some of the options for a "Text" type edit control. This type of control offers thousands of setting combinations.

All the formating, assisted input, checks are performed by the WINDEV framework, and don't require any coding: your application is more robust, your application is faster, the development time is shorter.

You deliver efficient applications, instantly.

MANAGER
Defining the characteristics of a control without coding allows you to better secure your program. The end user is also helped, while still respecting the style book

NEW
X-close in an edit control

AAF TECHNOLOGY
The edit control benefits from a large number of AAF: calendar, input history, etc.

MAIN POINTS
Interface creation is made easier
The data entered are checked and formated without code

EDIT CONTROLS: SETTINGS EXAMPLE

The "simple" **"edit"** control of WINDEV 21 offers **incredible power**.

Here are some settings possibilities (via the "7-tab" or via programming) for the "Text" edit control (each type of control has its own specificity):

● **Text**: single line or multiline (automatic management of scrollbars, scrolling), RTF, HTML, Unicode management, …

Automatic formating toolbar for HTML and RTF edit controls

● A large number of preset **masks** are available: text (uppercase characters, first letter uppercase), numeric, currency, date, time, duration, password, file path, IP address, zip code, …

The mask can be customized with a regular expression.

The input can be defined as being mandatory or not, it can allow a maximum number of characters, check the numeric bounds (min and max).

The following are also offered for a simple text: associated caption • alignment • enable the spelling checker • assisted input based on the values found in the database (automatic data reading) • display a popup menu • automatically store the values entered beforehand (to propose them again) • automatic drag and drop • context-sensitive help (information text, tooltip, link to the help editor...) • control visible or invisible • control in edit, read-only or grayed • controls accessible via the TAB key • left indent (in pixels) • alignment of the control content (left, centered, right) • action of the right click • call the rollover cursor • presence

WRITING DIRECTION
The writing direction is managed in the windows. The `..TextDirection` avoids having to maintain 2 separate windows to support languages that write from left to right and languages that write from right to left.

of a standard or custom popup menu • keyboard shortcut for accessing the control • plane on which the control is positioned • groups of controls to which the control belongs • position • size • behavior of the control when the window is resized (anchoring) • opacity of the control • automatically move to the next control when the maximum number of characters has been reached • selection of the entire text when entering the control • the ability to select the content of the control when it is read-only • returning the NULL value if no value is entered • ability to change the background color (or border) of the control when the cursor enters the control • the mode for truncating the caption if it is too long (ellipse) • …

Content too big for the control What to display?

A large number of advanced parameters can be defined for the Date, Time, URL, and so on, types of controls.

The **style** of each elements is inferred from the current style book and can be modified: font • color • size • presence and location of a shadow • attributes (bold, underlined, italic, strikeout) • shadow color • position • background color • type of border • frame color, etc.

Positioning of the control's caption: you have choices …

Configuring this feature rich attributes is easy, it's done visually and intuitively with the 7-tab technology (see pages 40 to 43).

CODE/INTERFACE SEPARATION: SECURITY, SPEED
The control definition is done in the window editor, in a very visual way. No risk of error...

SECURE INPUT
The range of available parameters enable you to secure the input: maximum number of characters allowed, type of characters allowed, etc. Therefore the program has fewer checks to perform: decreased risk of bugs, increased speed.

HUNDREDS OF PARAMETERS PERMUTATIONS
All these available parameters make your applications richer and more user friendly.

AAF
Like all the controls, the edit controls benefit from the AAF (see page 44). If the edit control is a date, a calendar can come up. This requires no programming.
Similarly, the previous input of an end user can be stored to allow for faster input.

STYLE BOOK ENFORCEMENT
The created edit control automatically and instantly respects the style book. Everything can be modified, in the editor or by programming.

PROGRAMMING THE CONTROL
Most of the processes don't even have to be programmed. The processes to program are entered in the control's events: control focus, modification, hover, exit control... (see page 62, the code editor)

LESS CODE
Since most processes are automated, and the control benefit from the data binding, the amount of code to write is drastically reduced.

EVERYTHING CAN BE MODFIED VIA PROGRAMMING
there are always special cases! Everything that is created in the window editor can be modified by programming. You'll never be stuck.

ABILITY TO CREATE A CONTROL VIA PROGRAMMING
The usual control creation mode is to use the window editor. You can also create controls from scratch, by programming, and associate processes to them:

The edit control is the perfect illustration of the WINDEV 21 window editor's power.

WINDEV®
21

CONTROL
PIVOT TABLE
(ROLAP CUBE)

Offer data analysis to your end users

Pivot table control: decision makers love it.

The Pivot Table control dynamically displays 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.

Everything, absolutely everything, is displayed dynamically, including row and column headers.

The pivot table performs the calculations.

All the results are automatically calculated.

This pivot table control is also called ROLAP.

This is an extremely powerful control that allows decision makers to look at data the way they want.

YOUR DATA COMES TO LIFE

This pivot table contains several dimensions: countries ①, families ②, years ③. The family and year dimensions have "hierarchies": sub-families ④ and products, quarters and months. Here the end user has expanded the details of the product family by clicking "+". All the data and dates that have a "+" symbol can expose their details. Everything is automatic, no programming is needed to fill it.

THE CUBE IS FLAT!

Why is sometime a pivot table called a "cube"? It's because often it is used to view data in 3 dimensions. The visualized table corresponds then to a "slice" of the cube, knowing that all the slices based on all the axes can be visualized.

Actually, the number of dimensions that a pivot table can handle is unlimited.
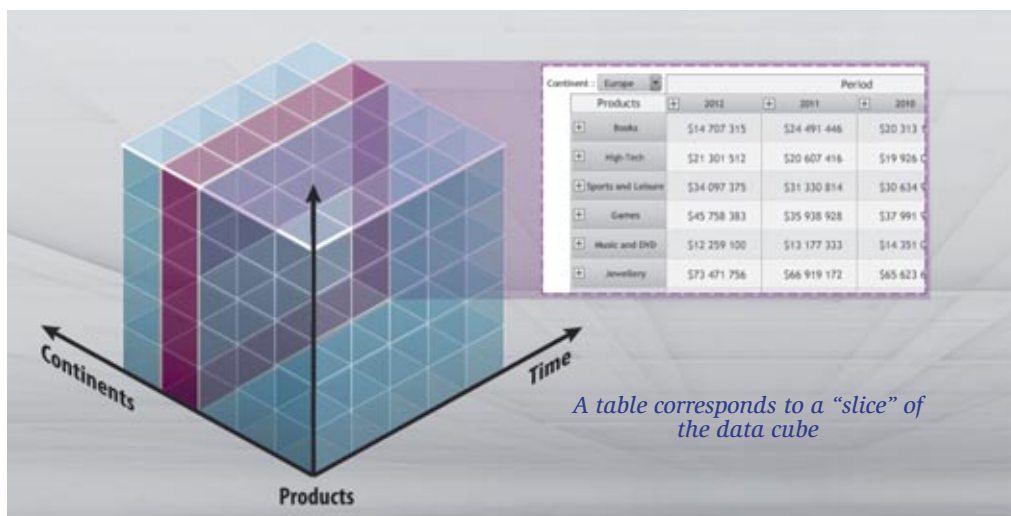
A table corresponds to a "slice" of the data cube

MANAGER
The Pivot Table control, also called "rOlap cube" is great: you can analyze the data from your information system on any dimension.

NEW
Automatic print

AAF TECHNOLOGY
The end user can fully customize the Pivot Table control

MAIN POINTS
An unbelievable control!

Data folding AAF: an end-user click collapses or expands the table!

In this pivot table, the end user has expanded the details for the year 2012 in quarterly format. The months of the quarter can be expanded as well ("+" button)

This pivot table contains an additional dimension: the country, which automatically filters the table. The end user has expanded the details of the "Books" product family.

In this pivot table, the revenue for each family of products is detailed per continent. If the end user expands the continent (by clicking "+"), each country will be displayed

Of course the Pivot Table style can be fully customized.

This pivot table control is a power house. It saves months of development. It pays for WINDEV 21 by itself.

PIVOT TABLE CONTROL: AUTOMATIC FILL

Filling the PVT control is very easy: It is automatic!
The WINDEV 21 ROLAP engine automatically reads the data and performs the necessary calculations for all the possible levels of details. It automatically fills the row headers and the column headers.

AT RUN TIME

The end user can choose the level of details for the data displayed.
The displayed result can be exported like any WINDEV table: Excel, Word, PDF, email, ... or automatically printed.

HOW TO DEFINE IT?

Defining a pivot table control is very simple with WINDEV 21: simply answer the wizard's questions.

Simply define the core content of the table and the dynamic headers of the rows and columns.
The table's content is defined by one or more calculations to perform on one or more items, and/or by WLanguage code.

Then you need to define the data file item that is used to create the column headers, then the row headers.

PERSISTENCE OF THE RESULT

The execution's result can be stored, and then reloaded later, without having to re-read the data files (`olapSave` and `olapRestore` functions).
This allows you to avoid recalculating the entire cube for data that won't change anymore, such as last year sales figures for instance.
You can also reload a saved table, uncrypt it and update part of this table, such as the sales figures for the current year. This speeds up the display of the result.
**A Pivot Table can be easily created, and the result is amazing.**

SCHEDULER CONTROL: RICH AND POWERFUL

Save weeks of programming

WINDEV 21

A Scheduler control is very useful to manage the display of multiple resources and it is used in many applications or sites.

Programming such a scheduler could take several weeks.

Thanks to WINDEV 21, you just need **a few hours** for your applications to benefit from an advanced and fully customizable scheduler.
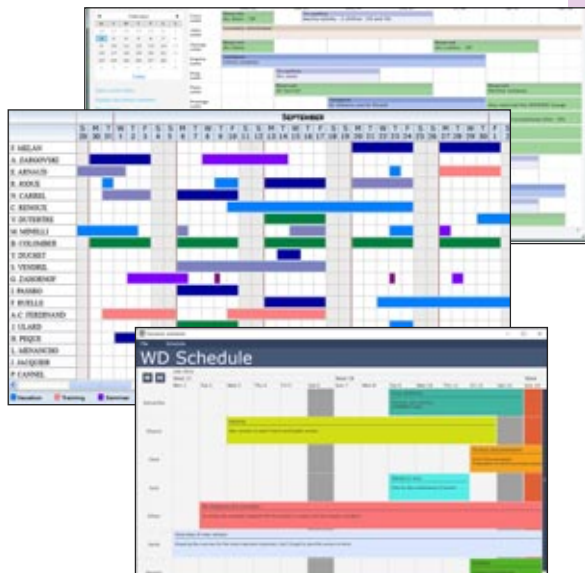
MANAGER
Programming a scheduler control without WINDEV can take several weeks; With WINDEV, it's only a few hours.

NEW
Automatic color

AAF TECHNOLOGY
Add appointments, modify duration, time, assign to another resource: all the required AAF are available

MAIN POINTS
Extremely simple programming
Complete customization

A SCHEDULER IN YOUR APPLICATIONS? EASY!

Configurable width — Change the display mode — Support overlaping appointments — Customizable look — Menu AAF — Move + change resource — Add: editable
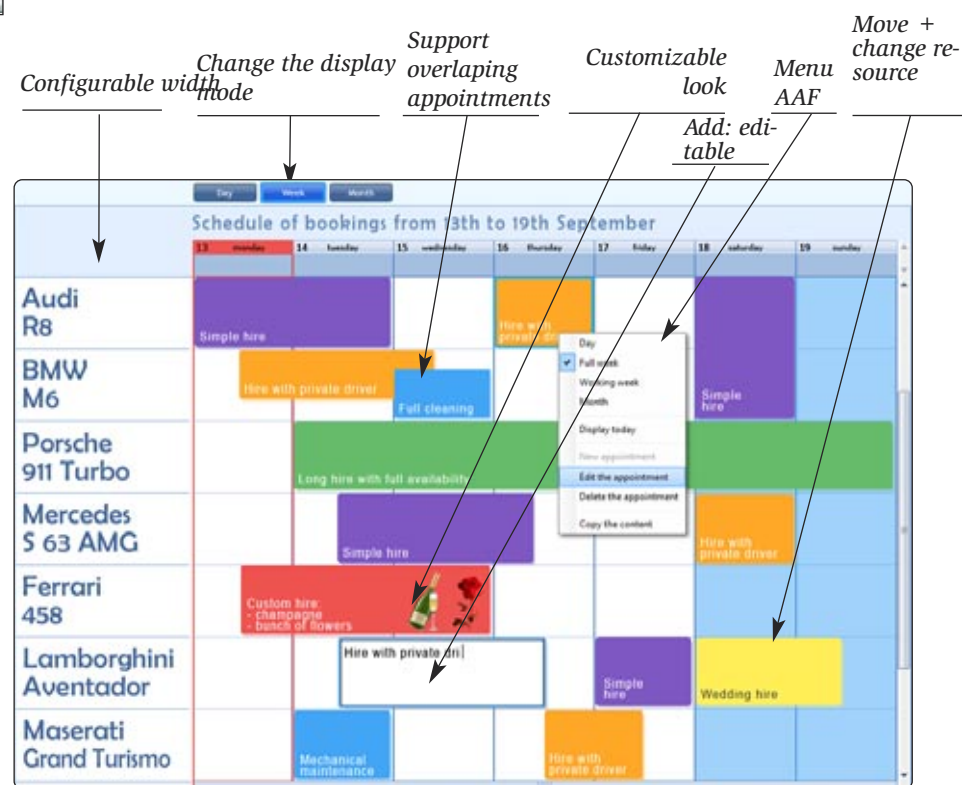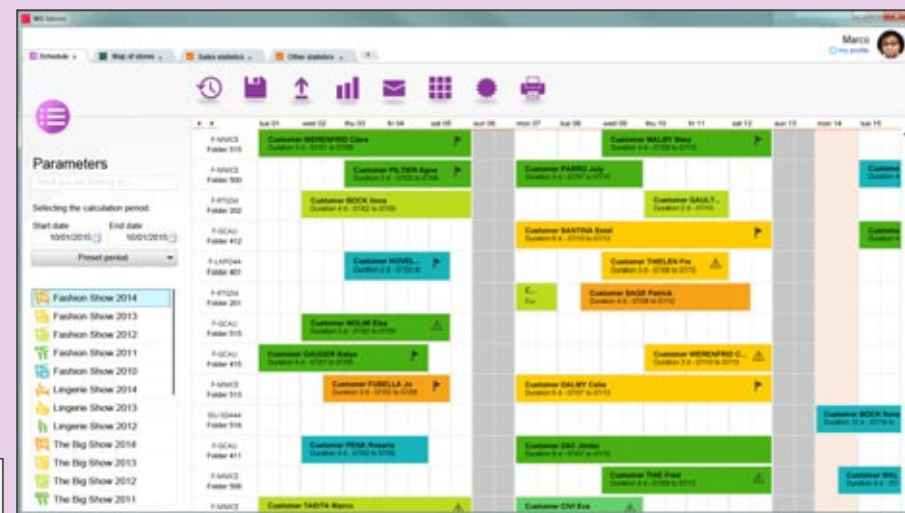
+ Resizing + Background color for holidays

The description of a Scheduler control is done like for all the controls via the "7-tab" technology.

In just a few clicks you define the advanced features of the control.
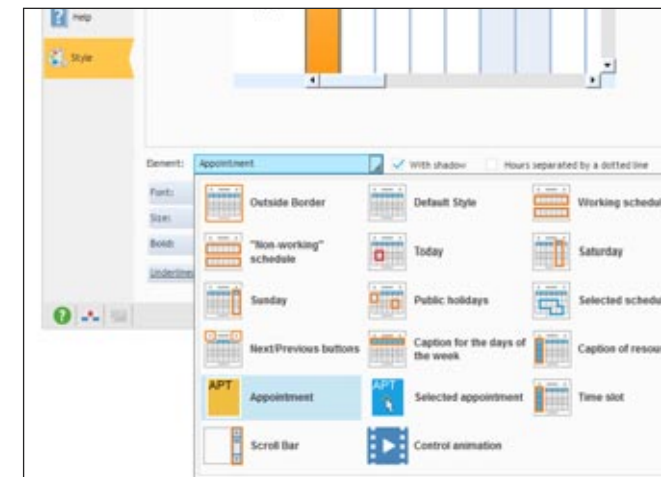
The customization capabilities are very advanced. Here the appointment style changes depending on its status: selected, not selected, etc. Like with any controls, everything can be modified by programming if necessary.
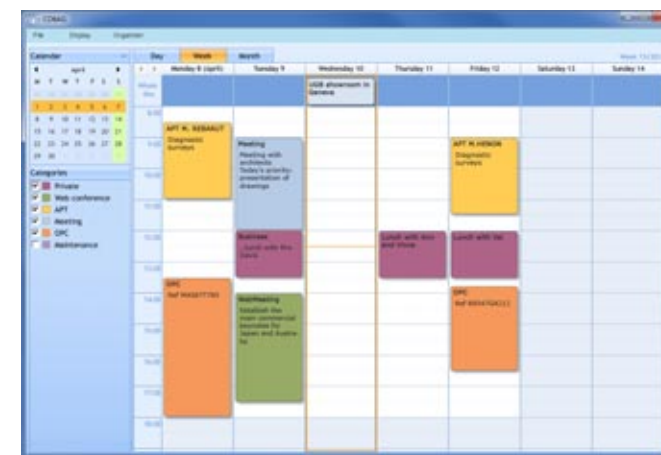
ORGANIZER CONTROL

WINDEV 21 also offers an "Organizer" control.

The main difference between a Scheduler control and an Organizer control?

An organizer is for one resource (a person, a room, …), a scheduler concerns several resources.

CUSTOMIZING THE APPOINTMENTS

You can fully customize the display of each appointment.

You have the ability to display several controls in the same appointment: image control (to display a star, or a distinctive symbol, label of any size, borders...

THE SCHEDULER CONTROL LOOK

The look of a scheduler control is easily defined at a granular level via the "7-tab" window. The settings can be modified by programming.

Among the parameters used to define the style, you benefit from:
• external border
• line
• working schedule
• Saturday, Sunday
• holidays
• non-business hours
• today
• selected schedule
• next/previous buttons
• caption for the days of the week
• appointment
• selected appointment
• time period
• scrollbar
• animation when changing period
• etc.

FEATURES AIMED AT THE END USER

The end user has access to a lot of automatic feature (AAF) in a scheduler control.

You don't need to program anything for the end user to benefit from these features.

Via these automatic features, the scheduler control offers:
• adding an appointment
• editing an appointment's title
• moving an appointment from one time slot to another
• moving an appointment from a resource to another one
• modifying the duration of an appointment
• deleting an appointment

FILLING A SCHEDULER CONTROL

The Scheduler control is filled either by programming or automatically via data binding.

Imagine: your schedules are automatically filled with information coming from your tables and files (HFSQL, Oracle, MySQL...), object instances (OOP), by a file in iCalendar format or by WLanguage advanced types (Outlook appointment, Google...)

These operations can be performed in read and write modes.

A GANTT CHART

A **Gantt chart** lets you graphically represent **the progress of a project**.

A Gantt chart is often used for project management or in production control to view the project tasks and their dependencies over time: dependency of one task upon other tasks.

WINDEV 21 lets you easily create a Gantt chart in an application, and **saves you weeks of development time.**

EASILY MANAGE TASKS

A Gantt chart is easy to create, and automatically gets updated when a task is moved.
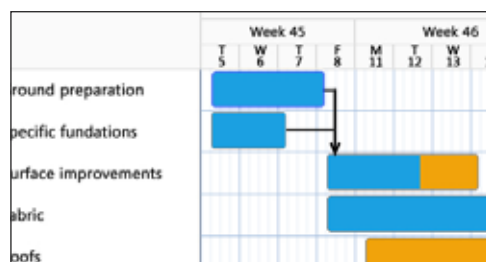
MANAGER
A large number of applications require support for task management: task management, this is automatic in WINDEV 21.

NEW
Various new features

AAF TECHNOLOGY
End users have access to the AAF for managing tasks: create, move, ...

MAIN POINTS
A Gantt chart is a control
Everything is managed by WINDEV
The user can move tasks: The linked tasks are automatically repositioned

CREATING A GANTT CHART
In a Gantt chart, the tasks are organized in rows and the time units in columns.
The dependencies between tasks are materialized by arrows that link related tasks.
It is easy to create a Gantt chart with WINDEV: It is contained inside a table column.

ADVANCED FEATURES
A Gantt chart lets you set:
• the duration of the tasks
• the progress of the tasks
• the dependencies among tasks
• the color of the tasks
• the markers
• the granularity of the display in minutes, times, days, weeks
• the period displayed
• the display or not of the

week numbers.
• a mask for displaying days and times...
You can fully customize the display of a task's bar.

FILLING A GANTT CHART
Programming a Gantt chart is very easy. The `GanttTask` WLanguage type lets you easily fill Gantt type columns.
Simply specify the duration, completion status, dependencies, and so on, of the tasks, .
The display of the tasks according to their dependencies is done automatically.
A Gantt chart can be automatically printed via the report editor (see page 53).

AAF OF A GANTT CHART
The Gantt Chart control offers AAF: These are features you don't need to program...
The end user can move a task. All the related tasks are automatically updated.
The end user can also:
• change the duration of a task
• change the completion status of a task
• change the order of the tasks
• delete and create a task and its dependencies
• print the Gantt chart

There is almost nothing to program.

CREATE DASHBOARDS IN YOUR APPLICATIONS

The software dashboards are in high demand from executives who need to make decisions: CEO, CIO, department heads, managers ...

The **Dashboard control in WINDEV 21 allows you to easily create dashboards** that end users can customize and adapt to their requirements: they'll be able to move widgets, or pick the widgets they want to see.

The dashboard' presentation is customized by the user.

HELP DECISION MAKERS MAKE DECISIONS

Easily create dashboards in your applications using the new WINDEV control

MANAGER
You're a manager: you know how valuable a dashboard can be! WINDEV allows you to very easily create them.

NEW
Various new features

AAF TECHNOLOGY
The end user can move the widgets, view them or not, save his configuration

MAIN POINTS
Programming is very easy
All the WINDEV features are available for each widget

THE DASHBOARD CONTROL
Data is shown in widgets.
These widgets can be moved, hidden and automatically resized, directly by the end user.
Creating dashboards in your applications becomes extremely easy thanks to WINDEV.

PROGRAMMING THE DASHBOARD CONTROL
The widgets found in the dashboard are "internal windows".
The Dashboard proposes advanced WLanguage features for managing its configuration: you can plan several different layouts, and change the one to use based on the use case.
A WLanguage process lets

you refresh a widget at regular time intervals or on demand.

FEATURES OF THE DASHBOARD CONTROL
The end user can:
• place the widgets wherever he or she wants
• resize one or more widgets
• add one or more widgets
• delete one or more widgets
All these operations are done in a user-friendly way, with the mouse, by the end user.
There is nothing to program for the end user to benefit from these functionalities; these are part of the AAF (Automatic Application Features).
End users customize their dashboard themselves.

TABLE CONTROL (DATAGRID): POWERFUL

Only a few clicks away from fantastic tables (grids)

WINDEV 21

WINDEV 21 makes it easy to view (and enter) the contents of the tables. **Easily create** great looking and easy to use visualization windows, that contain all the features expected by the users.

1. Search included in the control
2. Magnifier for automatic search
3. Different fonts, sizes and colors in a cell (RTF)
4. Multiline cells
5. Proportional scrollbar boxes (also displays the record number)
6. Bar code display
7. Automatic menu for exporting to XML, EXCEL, WORD, OpenOffice, for creating charts, for selecting columns to view, for printing ...
8. Image
9. Merge cells
10. Automatic column total (users can add their own with the AAF)
11. Resizable array

Also:
• Automatic fill via a query
• Store custom configuration
• Column moved by the user
• Horizontal tables ...

POWERFUL INTERFACES

With WINDEV 21, you create rich and high-performance visualization tables.
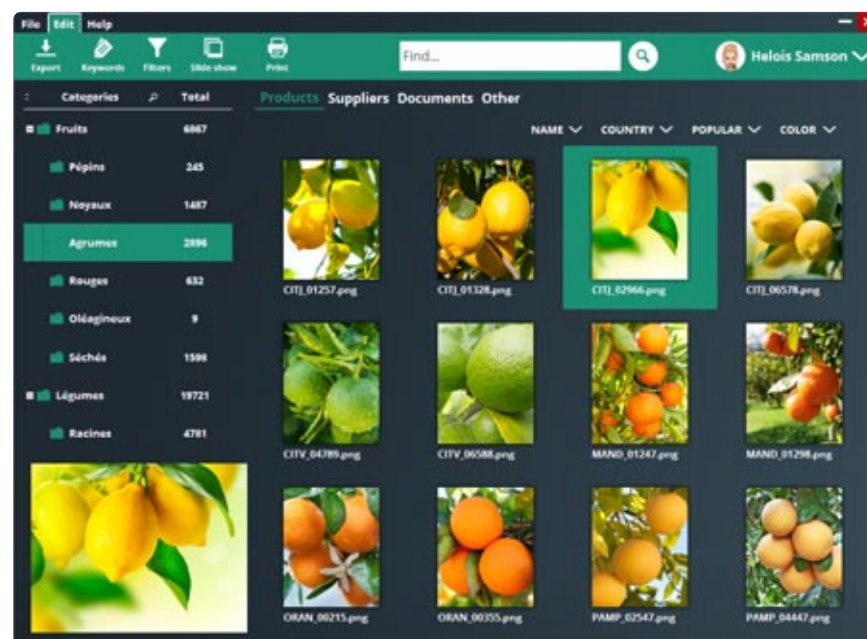
A window that automatically displays an "image memo" item (Blob) from the database.

See the complete list of controls on page 36.

MANAGER
Applications use a lot of table controls. The WINDEV Table control is user-friendly and sophisticated.

NEW
Easier control editing

AAF TECHNOLOGY
Several automatic features are available: sort, move, totals, search...

MAIN POINTS
Very powerful, fully customizable control

SLANTED HEADER
The column headers can be slanted (by degree)
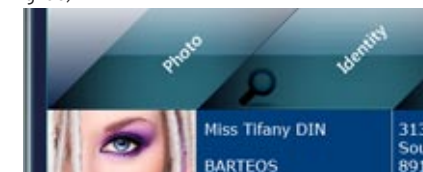
Table with slanted column header

MERGED HEADER
Column headers can be merged, and one or more over-header can be set.

COLUMN TYPES
Several types of columns can be present in a visualization table: text, editable text, combo box, image, check box, progress bar, any control, and even a table inside a column cell (tables inside tables).

Each piece of content is different

CUSTOMIZABLE BAND
A table's band can be fully customized.
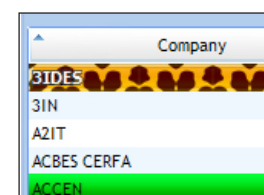
SEARCH INSIDE THE TABLE
The end user can perform searched inside the table starts with, contains, ends with, does not contain greater than, less than, equal to, different from...
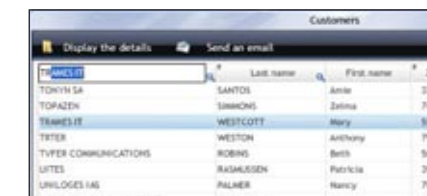
The user can sort based on one column, or multiple columns successively.

ADD TOTALS
The table control offers the user the possibility to define his own automatic totals, counts and averages in a break.

The end user can add a Total to a column

EXPORT TO EXCEL
The end user can also export the content of the table to Excel, to perform calculations or simulations (see page 44)

TABLE WITH BREAKS

A table may contain breaks.
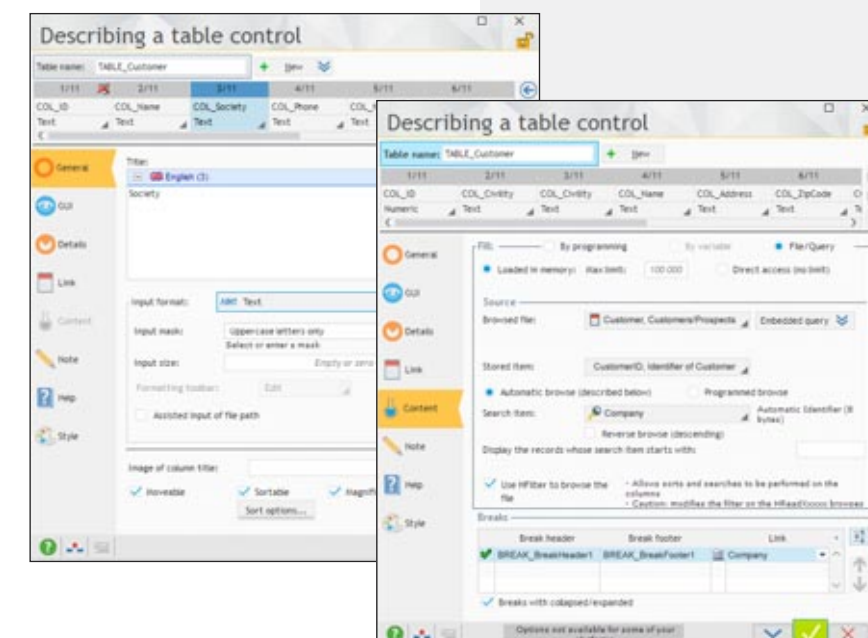
THE TABLE (GRID) CONTROL
Applications often use "table" controls (grid).
A table control can contain a large number of data that can be viewed using scrollbars. The reading of the data is optimized by the table: a table can contain 1 million rows and still be easy to navigate.

EASY CREATION
Like all the WINDEV controls, a table control is easily defined, visually using the "7-tab" technology.
Customization is extensive, with quasi endless possibilities. Everything is totally customizable: row color (even, odd), thickness and color of the grid, fonts, size, color, header height, background image, opacity, scrollbar design, etc.

PROGRAMMING
A Table control can be used for input or display.
It is filled by programming, either automatically or by data binding.
Multi-row selection is available, as well as column selection, single cell selection, etc.

BREAKS
A table may contain one or more nested breaks. You can make the break header always visible.

POWERFUL AAF
The Table control proposes several powerful AAFs (see page 44).
The end user can move columns, sort, search, export the table to Excel ...
The end user can also add totals, average to columns: useful because often the developer forgets to display some information!

The WINDEV Table control is very powerful.

CHART CONTROL: RICH

Charts for users of your applications

A powerful **chart control** is now available in WINDEV 21.

The chart control offers 2D charts and a 3D spatial view for charts.

Creating charts for your applications is **child's play**.

You benefit from advanced setting options.

CHART

An image can be used for a chart background, which makes the chart even more stunning. Here a bar chart showing a night club's receipts.

MANAGER
A chart lets you visualize data, and therefore understand them better: the charts are supported in WINDEV.

NEW
New Heatmap type
Extruded sunburst chart

AAF TECHNOLOGY
The end user can modify: Zoom, chart rotation, Type of chart, axes orientation, legend and title's position, ... it can print...

MAIN POINTS
A powerful chart creation tool

ANY TYPES OF CHARTS!

WINDEV offers all the types of chart:
• Line charts
• Bar charts
• Area charts
• Pie charts and their variations: donut, semi-circle and sunburst
• Scatter charts
• Bubble charts
• Radar charts
• Surface charts

• Waterfall charts
• Stock type charts (Japanese candlestick, bar chart, min/max chart).

A chart is a control like any other control, it can be present in a window with other controls.

WATERFALL CHART
The waterfall chart is a bar chart allowing you to represent the sums (positive or negative) of several series.

Used mainly in finance, it allows for instance to view the evolution of a value over time, or to see the impact that various elements have on this value.

"SURFACE" CHART
A Surface chart is used to represent correlated analogical data, according to 3 axes.

For example, represent the resistance of a material according to pressure and temperature.
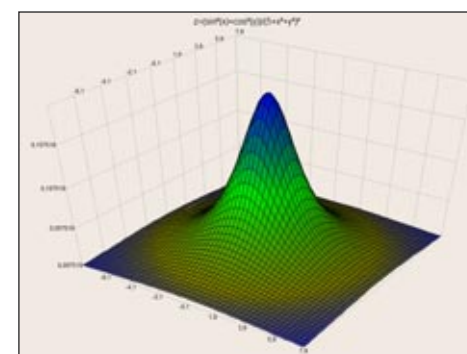
SUNBURST CHART
The sunburst chart is a pie chart containing several levels of hierarchical data.

For example, the chart presents data for the entire world. The first level corresponds to the data grouped by continents, the second level corresponds to the data grouped by countries...
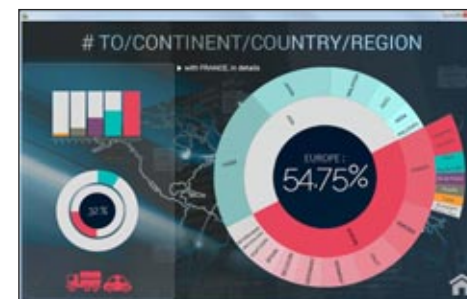
CUSTOMIZE!
The customization features are very advanced: change the color of each bar in a bar chart for instance!

CHART ANIMATION
You can animate the display of a chart. The first time the chart is displayed, each bar seems like it springing out of the X axis.

When a value changes, the bar (or the point on the curve) progressively moves to its new value.

These animations are available for the following types of charts: column, line, area, bubble
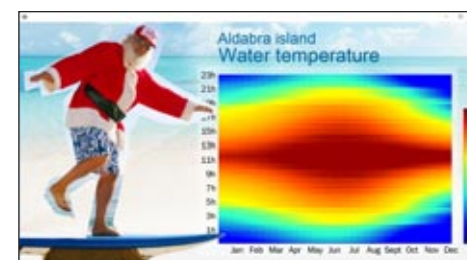
THE CHART CONTROL
WINDEV comes with a powerful and easy to use chart control. This control offers a large number of data visualization capabilities. Thanks to the chart creation wizard, you can create a functioning and dynamic chart with just a few clicks. This chart can then be fully customized.

ANY TYPES OF CHARTS
WINDEV offers all the types of chart: bar, line, pie, bubble, area, radar, scatter, surface, funnel, semi-circle, waterfall, candlestick, ...
It is possible to create series, to overlap different types of charts.

PROGRAMMING
The control is filled by programming or automatically by data binding: file link, array type variable...

SOPHISTICATED OPTIONS
A chart is defined like any other control via the "7-tab" technology: all you have to do is click...

The available options are plenty: axis graduation, time scales, logarithmic scales, grid, size and color of the points, line thickness, bar thickness, legends, titles, ...

CUSTOMIZATION AND STYLE
Charts are highly customizable. There are some parameters common to all the types, and some that are type specific. For example:
• Customization of the series color and use of gradient colors
• Custom tooltip on data
• Animations each time the chart is drawn
• Display an image in chart background
Examples of parameters specific to pie charts:
• Choice of the starting angle
• Pulling out the sections
• Display the labels
• Use of realistic light effects ...

PRINTING CHARTS
Chart printing offers the same richness of options as their visualization.

THE END USER CAN CREATE A CHART HIMSELF
Chart creation is also proposed to the end user via the user menu (AAF feature), allowing all the users of your applications to graphically view the requested data.

The Chart control is included in your product, like all the other controls: your applications look rich.

Continues >>>

AND THE OTHER CONTROLS...

All the **WINDEV control** are very powerful and sophisticated.

All the controls offer dozen of configuration capabilities, **security** and **customization**.

Advanced color picker for control styles

LIST OF CONTROLS

WINDEV 21 offers all the sophisticated controls, ready to use and to be customized, that you can need in your application:
- formatted edit controls
- display controls (formatted static control)
- tabs
- browser tabs
- drop-down list boxes
- combo boxes

- auto-filled combo boxes
- images
- animated images
- scrollbars
- graphic buttons (icons)
- animated graphic buttons
- text buttons
- on/off buttons
- time-delayed buttons
- check boxes
- single and multi-column radio buttons
- arrays

- graphic lists
- treeviews
- treeview tables
- tree map
- hideshow controls
- OLE controls
- ActiveX controls
- map areas
- spin buttons
- controls with soft shadow
- sliders
- progress bars
- HTML controls
- icon bars
- geometric shapes

- splitters
- status bars
- Web camera
- videoconference
- RTF
- loopers
- sidebars
- charts
- bar codes
- range-slider
- carousels
- calendars
- organizers
- schedulers
- org. charts
- ratings
- ribbons
- pivot tables

- timeline
- dashboard
- Gantt chart
- spreadsheet
- Google map
- thread
- ...

MANAGER
The WINDEV window editor lets you create all the types of controls, from the most sophisticated ones to the simplest.

NEW
Wire control
Ranking control

AAF TECHNOLOGY
All the AAF are available for controls (see pages 44 to 47)

MAIN POINTS
The controls created with WINDEV respect the style book of the application
Each control has dozens of possible settings
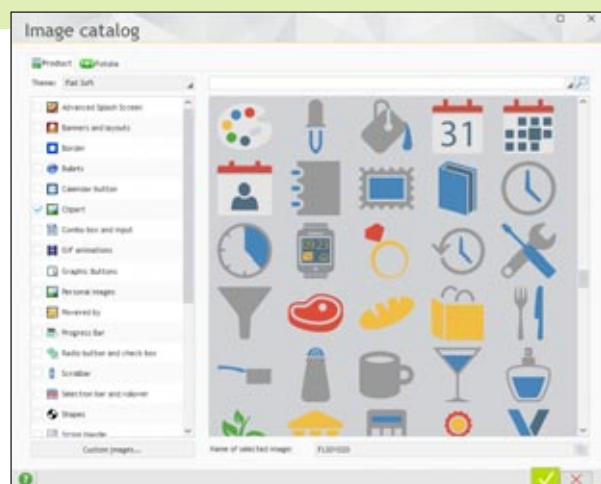
AN EXTENSIVE "CLIPART"
WINDEV comes with more than 10,000 clipart pieces (buttons, images...) You can easily use these clipart items in your windows, buttons, ...

ABILITY TO CREATE NON-RECTANGULAR WINDOWS AND TRANSPARENT WINDOWS
WINDEV 21 enables you to automatically create windows of any shape and to manage the opacity of the controls and backgrounds.

DRAG & DROP
WINDEV lets you easily implement "Drag & Drop" operations between your application's controls.

CONTROL BY PROGRAMMING
The usual control creation mode is the window editor. You can also create controls from scratch, by programming, and associate processes to them:
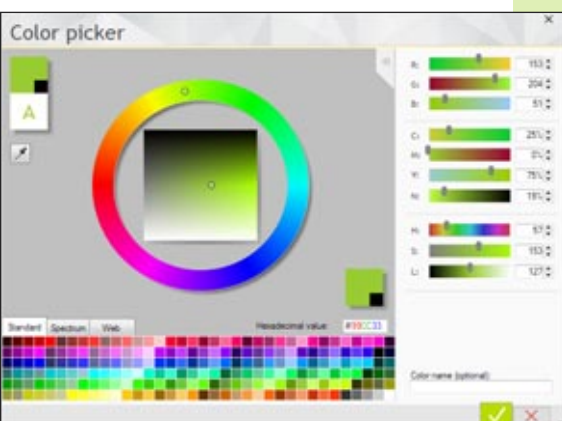You can also clone controls via programming.

PROGRESS BAR CONTROL
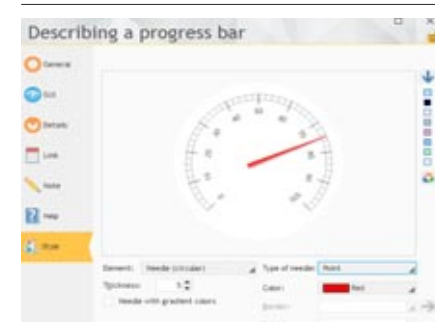
Controls offer unlimited richness and configuration.
Here's an example from the progress bar settings window

THE "DATE" CONTROL WITH AUTOMATIC CALENDAR
This control is used to enter and display a date. The integrated input mask prevents from entering invalid dates.
Even more sophisticated, the control proposes on its right a mini icon that displays a calendar (fully customizable) in order to simplify the input.
The calendar can also be displayed by programming.
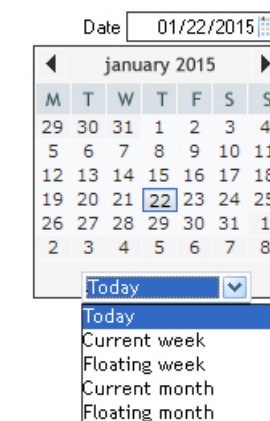
DATE/TIME MASK: ""2 HOURS AGO", "YESTERDAY", ETC...
Powerful date and time masks are available.

Mask	Example
Automatic	Automatic
MM/DD/YYYY	02/08/2014
MM/DD/YY	02/08/14
DDD DD	wed 08
DD/MM/YYYY	08/02/2014
DD/MM/YY	08/02/14
YYYY/DD/MM	2014/08/02
YY/DD/MM	14/08/02
DDDD DD MMMM YYYY	wednesday 08 february 2014
Dddd DD Mmmm YYYY	Wednesday 08 February 2014
Dddd DD Mmm YYYY	Wednesday 08 Feb 2014

Mask	Example
Automatic	Automatic
HH:MM	15:02
HH:MM:SS	15:02:27
HH:MM:SS:CC	15:02:27:00
HH:MM:SS:CCC	15:02:27:000
HH:MM AM	03:02 PM
HH:MM:SS AM	03:02:27 PM

But WINDEV goes further in date formats!
For representing dates and times, a large number of applications use a terminology based on the spoken language.
Instead of displaying "This event occurred at 2:48 pm", automatically display "This event happened 2 hours ago" (or 2 days ago, or 3 weeks ago, etc.)

HEXADECIMAL MASK
The edit and static controls propose a new "Hexadecimal" mask. This allows you to display a binary buffer in a readable way.

TIME-DELAYED VALIDATION BUTTON (TIMER)
This type of button is used to display a countdown stopwatch and to validate the window if no action is performed by the user: very useful to prevent from locking a batch process for example!
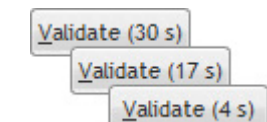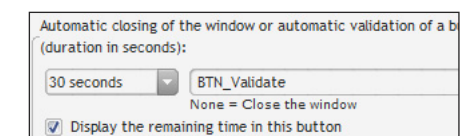
TREEVIEW
Like all the other controls, the Treeview control is very powerful.
Among the many settings, you can benefit from: • input possible • the end user can perform a multi-selection • checkmarks • the element displayed can be multilingual elements • data binding • drag & drop automatically managed between two Treeview controls • configurable background color • a tooltip can be displayed automatically when hovering over a row (content configurable by row) • ability to change the image of the expand button • colors can alternate on the treeview rows • configurable row height • Etc, ...

THE OTHER CONTROLS: VERY POWERFUL, VERY SOPHISTICATED
The window editor lets you create all types of controls: button, check box, radio button, click area, scroll box, menu, tab, plane, spin, image and video (see page 86).
Don't forget that the (free) Express version of WINDEV enables you to try and test all these controls.

WYSIWYG MENU GENERATOR

The menu editor lets you create fully configurable menus based on Windows standard.

RIBBON CONTROL

A Ribbon control offers a menu functionality, but in a ribbon format.

It is used to present in a small section of the screen an important number of controls arranged logically in order to perform choices. This control displays more choices in less space.

EDITING A RIBBON CONTROL

A ribbon control includes several panes. Each pane is represented by an icon and a caption. Each pane contains groupings separated by a vertical line.

A group can contain controls of any type icon, button, combo box, static, edit area, looper... In the editor, to add a control into a grouping, all you have to do is copy it or drop it.

At run time, each group automatically organizes its controls based on the available width.

Depending how the screen has been resized, based on the available space, the buttons come up in the most optimal shape.

PROGRAMMING THE RIBBON CONTROL

Depending on the application context, each pane can be made visible, invisible or grayed.

Each control can be accessed by programming (`RibbonName.PaneName.ControlName`), and all its properties are accessible.

A ribbon can be collapsed. A popup menu can be defined for the ribbon.

RATING CONTROL (RANKING)

This type of control allows the user to rate an element, or an application or a site to display a ranking or a state (availability ...)

The maximum number of stars (or other icon ❤❤❤❤♡) can be configured (1 to 100 stars).

The stars can also show decimal ratings.

SPREADSHEET CONTROL
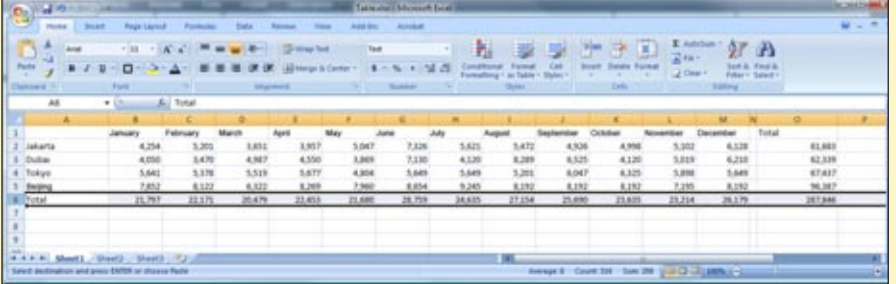
The "Spreadsheet" control is a native control: it doesn't require a spreadsheet software to be installed on the computer (and therefore no license to manage, no plugin or ActiveX). No more back and force between applications, no more external software to control! The Spreadsheet control proposes the main calculation functions and operators: sum, subtrac-

tion, multiplication, division, percentages, mean, min-max, condition (IF), calculation and comparison operators ... You can also use WLanguage functions in the formulas such as the mathematical functions, string functions, date functions, financial functions.

Each cell can be addressed via programming. The content is XLSX compatible.

TREEMAP CONTROL

This type of control allows you to dynamically represent the data, possibly in tree structure, in a weighted way.

This is useful for allowing an intuitive representation of data volumes. The areas are clickable: this allows to display a piece of detail.

RADIO BUTTON CONTROL
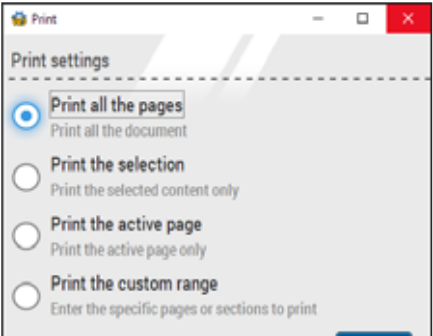
In addition to the traditional radio button controls, WINDEV offers radio buttons with free images and text.

"BROWSER" TAB CONTROL
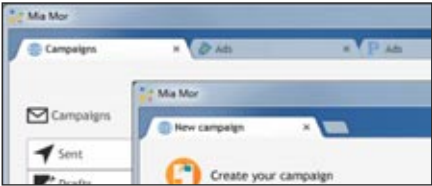
This tab management mode lets you display several windows within the same same window. Going from a window to another one is done via tabs, according to an operating mode close to the one of Internet browsers.

The tabs can be "pulled out" from the main window, to process more data simultaneously for instance.

ORGANIZATION CHART CONTROL

The organization chart lets you automatically display an org chart, a hierarchy of elements, dynamically based on the data found in a database or in variables.

The organization chart can be horizontal or vertical. The data can be displayed from top to bottom and from bottom to top.

Links between elements are automatically deduced and can be direct or broken

A treeview control can contain several trees (several roots).

DEFINITION OF AN ELEMENT IN THE ORGANIZATION CHART
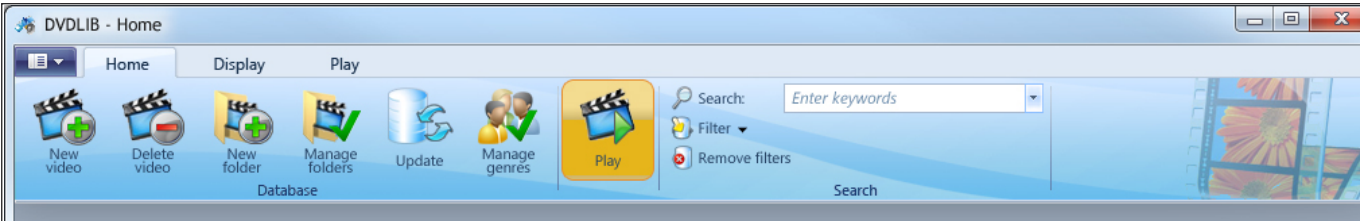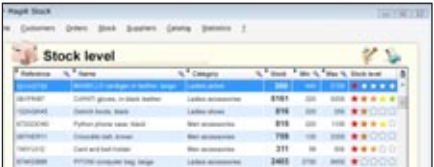
The visual aspect of each element is easily defined via the "7-tab" window: font, size, tooltip, shape, border, link, arrow, color) ...
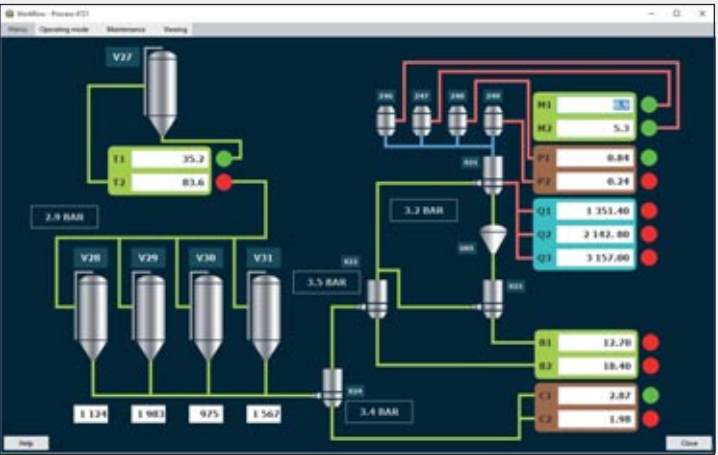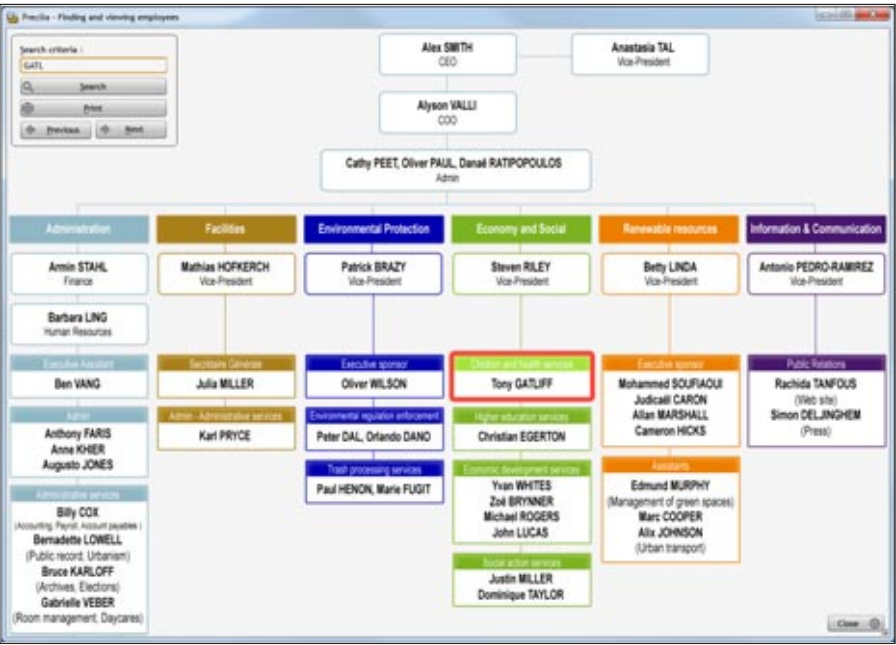
Each element can also be customized via an "internal window".

LINKING ELEMENTS

The elements are organized in the available space, and linked or not by link lines.

The lines may contain arrows.

You have the ability to request lines with right angles, or straight lines (slanted).

FILL THE ORGANIZATION CHART

Filling an organization chart control is easy: either by programming using the `OrgElement` WLanguage structured type, or via one of the "file links" (data binding).

WIRE CONTROL: CREATE WORKFLOWS

The "Wire" control lets you visually link 2 controls.

This control allows you to easily create workflows.

Links are automatically managed, and automatically keep track of the modifications on the linked controls: moving, resizing, visibility...

A wire control is created like any other control, in the window editor.

Simply select the control from the ribbon, then connect 2 controls...

A wire control can also be created by programming using the usual `ControlCreate` or `ControlClone` function.

TIMELINE CONTROL

The Timeline control is used to represent the chronology of close events, which can happen in parallel.

This control is used for example to:
• create a video editing
• represent automated events...

The granularity can be as fine as the microsecond.

The scale of the displayed timeline can be modified by the end user through a slider. The marker can be moved with the mouse or by programming.

REPOSITIONABLE NOTE CONTROL

The "Repositionable note" control can be created by the application's developer or by the end user.

The Note control lets you display instructions, operations to perform or information: operating mode, instruction for a substitute during vacation, ...

"7-TAB" TECHNOLOGY: POWERFUL CONTROLS IN JUST A FEW CLICKS

Technology for improving efficiency

You know how to click: you know how to create controls!

With WINDEV 21, the characteristics of each control can easily be defined via an exclusive **interactive dialog**, which is very simple yet very powerful: the **"7-tab"** technology.

Each tab is used to define, using simple language, the different **characteristics** of a control, a window, a report ...

The content of the tabs depends on the control type; we are only detailing a few of the tabs (see next pages as well).

You also have the ability to create and modify controls via the traditional "modifier" method or by programming.

MANAGER
No knowledge of Windows API or OOP is required to create extraordinarily original interfaces, that are powerful, efficient and secure

NEW
Lighter interface

AAF TECHNOLOGY
Automatic input checks
Viewing the areas
Automatic help

MAIN POINTS
A few clicks replace thousands code lines
Fewer risks of bugs
Create good looking interfaces without graphic designers

THE "7-TAB" CONCEPT ELIMINATES 95% OF THE CODE NEEDED FOR THE UI

The Timeline control being edited: the "7-tab" window is not locking (not modal). Each modified parameter can be viewed instantly on the control. With WINDEV 21, creating controls is intuitive and visual.

Here: customization of a control's style (button). There are a large number of options, developers instantly see the available parameters, everything is visual.
The controls created are better looking and more efficient.

Here the 1st tab: "General". The main control information is defined here: type, input mask, ...

1. Caption in all the project languages
2. Spelling checker
3. Control type
4. Input/display mask
5. Call the automatic translation tool
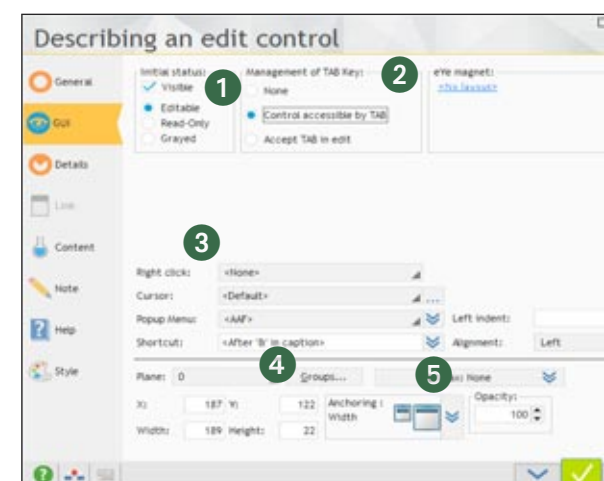
The 2nd tab: "GUI". The interface elements of the control are defined. Remember that any choice can be modified later in your program.

1. Control's initial state
2. TAB key behavior
3. Miscellaneous information: alignment, popup menu to open, shortcut letter...
4. Plane and group of controls management
5. Automatic anchors when resizing a window

Etc.

Let's, see the "Details" tab of a "slider" control. The presentation elements of the control are defined

1. Initial value
2. Shape of the cursor
3. Durations
4. Graduations
5. Bounds...

Etc.

QUICK AND EASY
You save millions of code lines with the "7 tabs".
Great time savings!
What power, security, efficiency for your interfaces!

VISUAL CREATION
Via the 7-tab technology, you can just click to define what would take hundreds of code lines in other environments..
All the choices are visual: alignment, captions, anchors, ...
For each control, even the ones you don't know, you instantly see the available options: Did you know that you can have a millisecond granularity for a timeline control?
The 7-tab window is not locking, and it lets you instantly visualize each choice made. You can for example modify the code of a control while it is being edited.

STYLES
Each control, by default, takes the style of the skin template (from the style book) chosen for the application.
You can modify all the style's attributes: background color, text color, border color, border type, font, positioning, background image ... (see page 48)

THE "7 TAB"
The 7 tabs of a control are:
• general layout • the UI • details • file links • auto fill • the notes • associated help • style.

MODIFIER
A control's characteristics can also be modified using the "Modifier", which offers all the characteristics in the form of a list.

PROGRAMMING
Everything defined in the "7-tab" can be modified by programming.
You can clone controls, and also create controls from scratch by programming.

The "7-tab" concept revolutionizes interface creation. You create much better performing applications, and you do it faster and more easily...

"7-TAB" TECHNOLOGY: EXAMPLES

Easily create sophisticated interfaces (UI)

The "7 tabs" make it easy to configure all the parameters available for the controls by proposing visual choices whenever possible.
Let's see some examples of the "7-tab" windows.
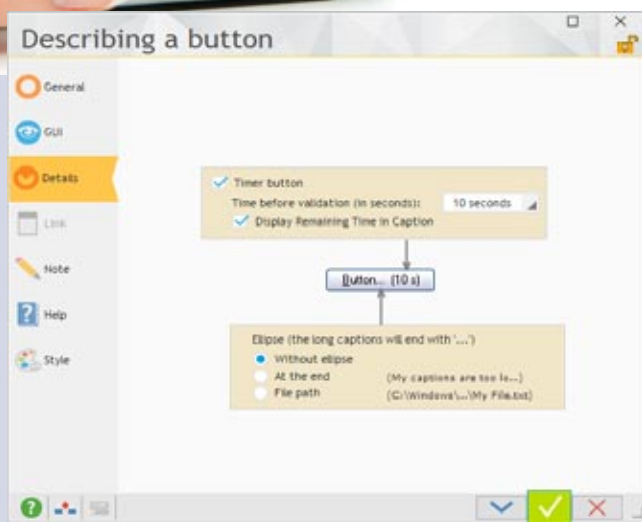
"Button" control
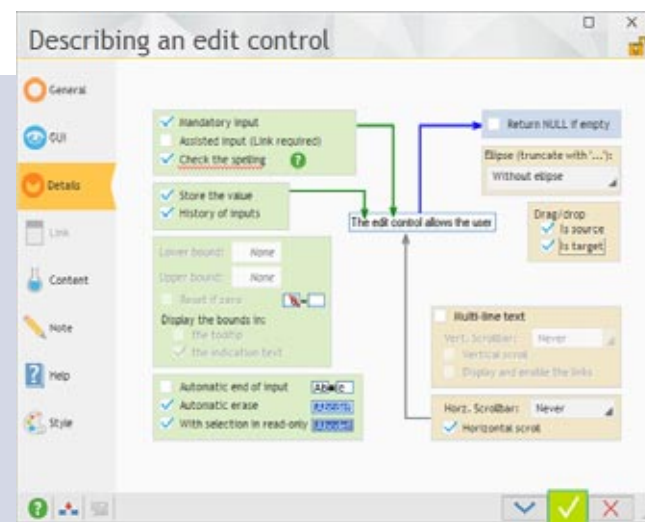
"Edit control" control
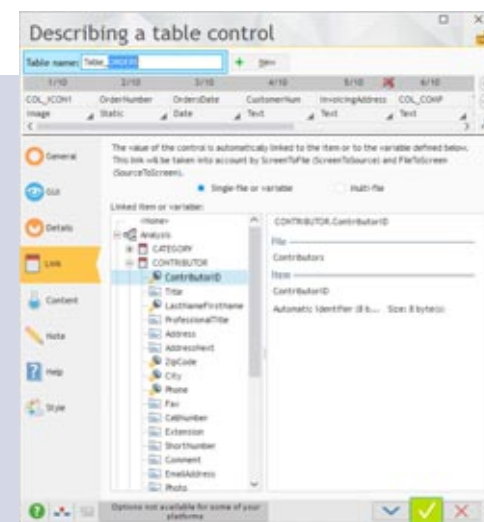
"Automatic link with table column" control
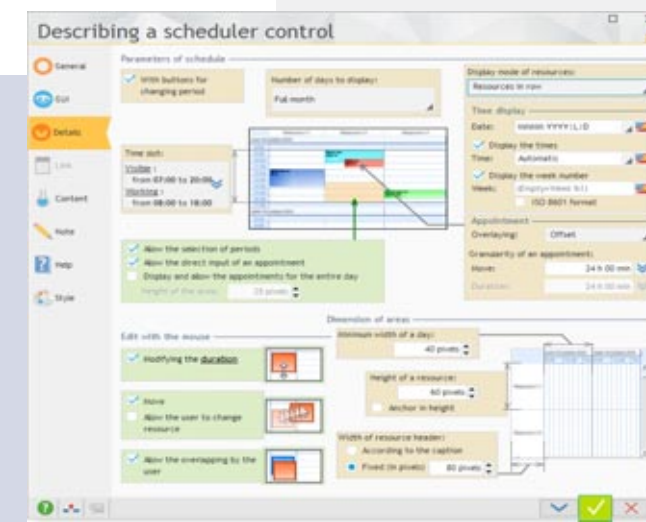
"Scheduler" control

"Bar code" control
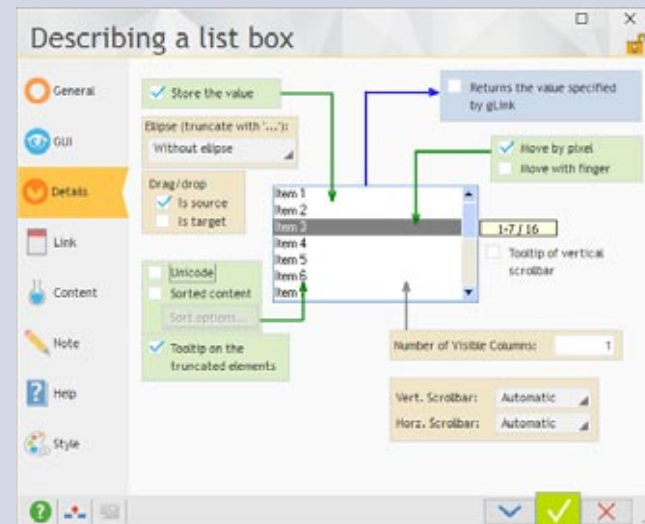
"List box" control
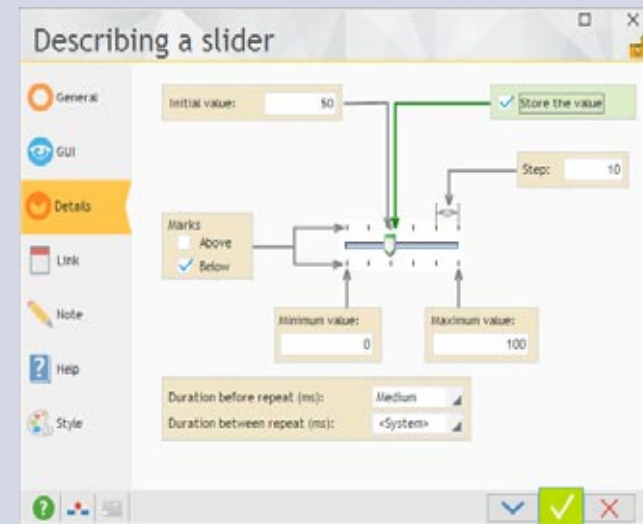
"Slider" control
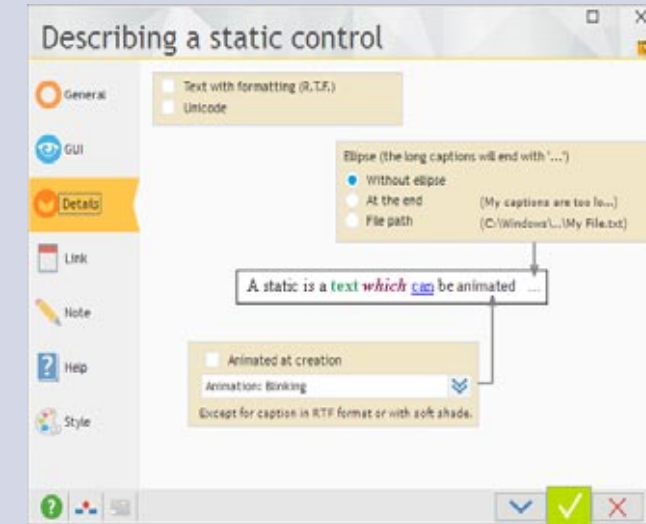
"Static" control
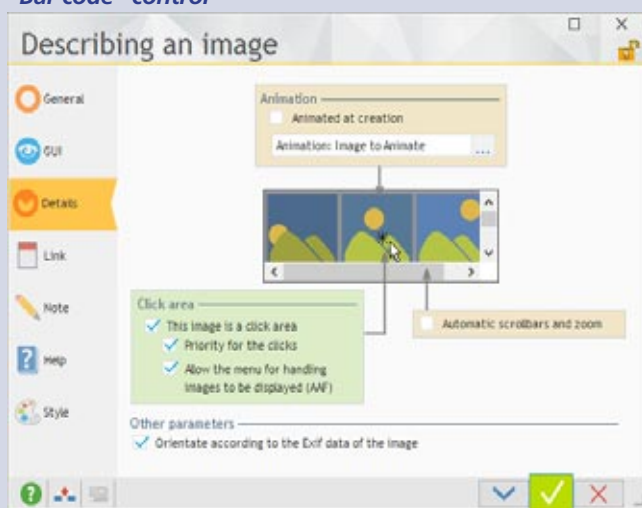
"Image" control
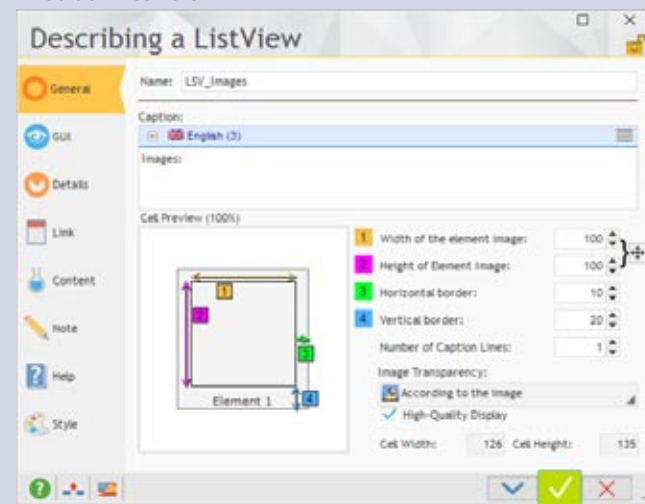
"ListView" control
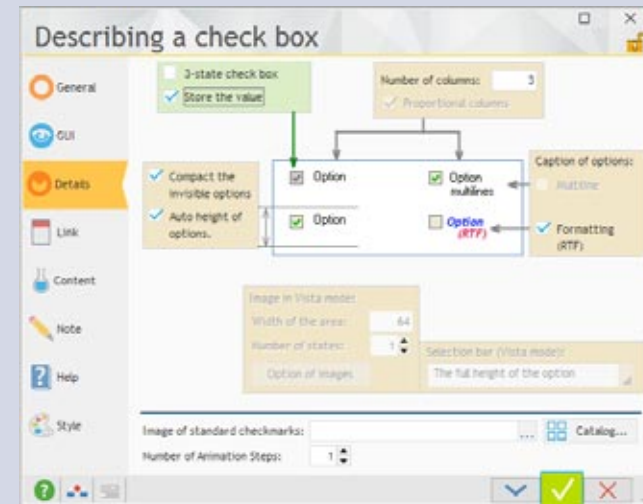
"Check box" control

MODIFYING THE PROPERTIES BY PROGRAMMING

Most of the properties defined in the "7 tabs" can be modified by programming.
But what is the name of the property to use?
The property's name is intuitive. The "7-tab" help tooltip indicates this name in WLanguage.
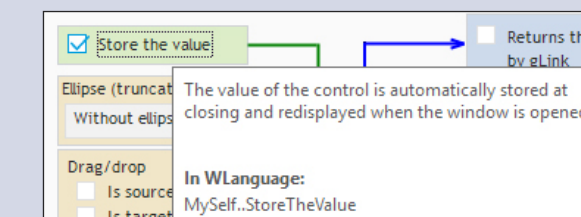
AAF: AUTOMATIC FEATURES FOR END USERS

WINDEV applications are automaticlaly rich

Regardless of the skills of the development team, the user will always want to do something that has not been planned, or modify the behavior of a window!

The UMC (User Macro Code) allows the user to create macros.

The "Reports & Queries" tool can be freely distributed with your applications (see p50 and 55).

And the **AAFs** (Automatic Application Features), present by default in all the applications developed with WINDEV 21, allow each **user** to optimize the applications via rich features without your teams having to code anything!

AUTOMATIC EXPORT TO EXCEL
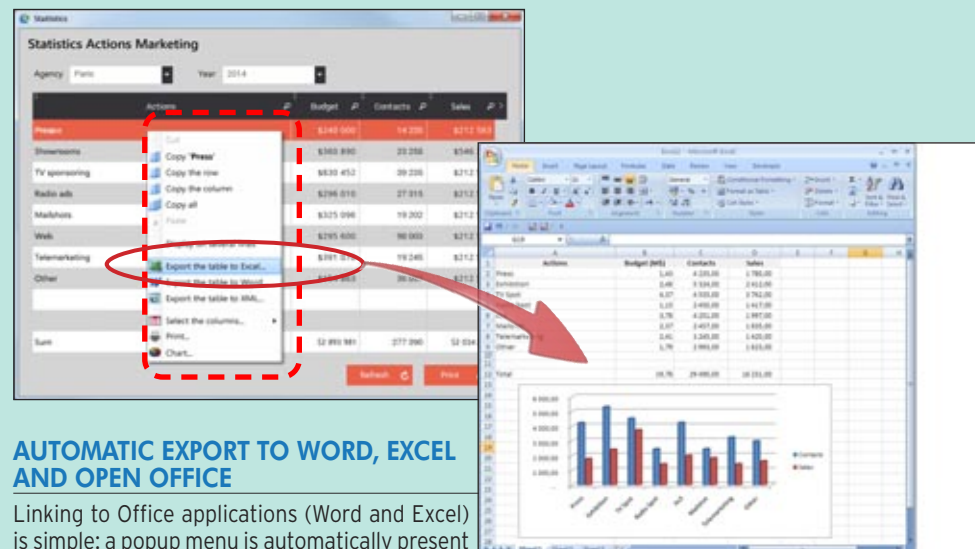
AUTOMATIC EXPORT TO WORD, EXCEL AND OPEN OFFICE

Linking to Office applications (Word and Excel) is simple: a popup menu is automatically present in your applications (accessed by the user via a right click) and it is used to export data from the tables without programming.

Your applications developed with WINDEV 21 are automatically rich in useful features. Note that each AAF can be disabled by programming.

TIMER BUTTON: NEVER BLOCK A BATCH PROCESS!

The Timer button displays a count down in seconds and automatically validate the button at the end of the count down if no action has been performed by the user. Very useful to prevent from locking a batch process for example!

The end user can add a timer himself on any button thanks to the AAF: a simple right click is all it take, the end user indicates the validation time length.

do once

each time run
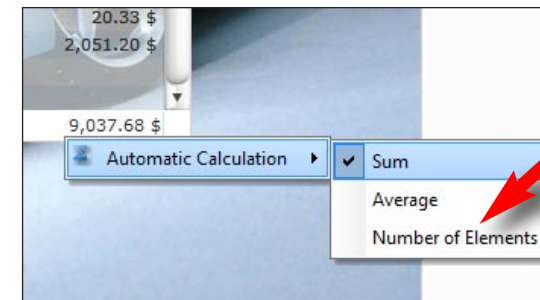
ADDING A TOTAL, AVERAGE...

Forgetting to total a column is unfortunately a common oversight.

With the AAFs, no worries for the end user!

Users can add a total via a simple click, wherever they want (total, average, counter).

CONTROL PERSISTENCE

To avoid having to re-enter a common value, the user can enable control persistence: store a set value, or recall the last entered value.

Very useful for date ranges for instance!

By combining a persistence of controls and a button with automatic validation, you have the ability to easily start recurring processes.

HISTORY

The history of values entered in a control is proposed to the user.

ENLARGING A COMBO BOX

Each combo box can be resized by the user ("grip" at the bottom right). Useful because the developer doesn't necessarily know the number of elements that will be offered in a combo box displaying data, or their length...

DIM THE DISABLED WINDOWS (DDW)

The inaccessible windows (in which no click can be done) are grayed. Convenient!

AAFs continue pages 46 and 47 >>>
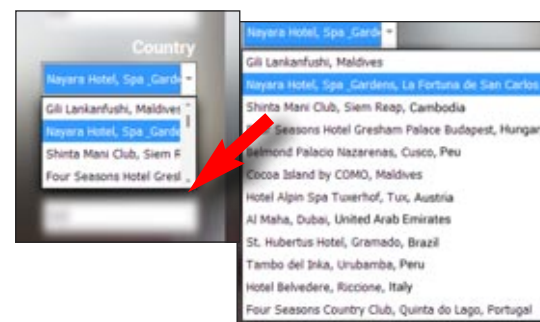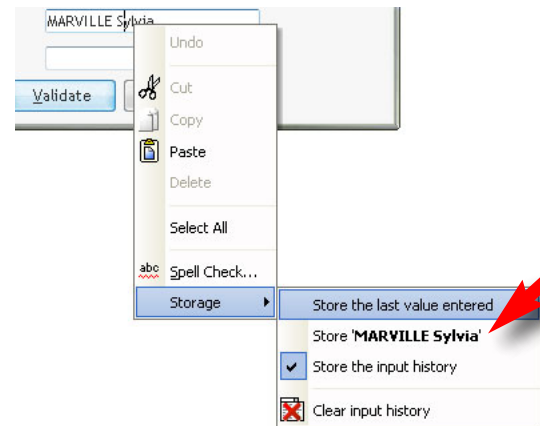
AAF: 3 MAGIC LETTERS

The AAFs (Automatic Application Features) are a set of features that are made available to the end users of applications developed with WINDEV 21, WEBDEV 21 or WINDEV Mobile 21.

Your users certainly appreciate exporting to Word, Excel, sending emails, setting up timers on buttons etc.

Without any programming, AAFs instantly add a set of rich features to your applications and make users more efficient.

By offering so many options to the end users, you improve their performance.

AAF: IT CHANGES THE LIFE OF THE USERS

Imagine: a user must perform an inventory at the last minute that wasn't planned for in the application?

How to get the product list, simulate unit costs?

With WINDEV, it's automatic.

Each table benefits from an automatic export feature to Excel (and Open OfficeCalc).

one click, the export is done...
(No code is required)

THE EXPERT'S OPINION

AAF bring real added-value to your applications.

Users of your applications, and by association the company that employs them, are much more efficient thanks to the AAFs without the development team having to code anything additional ...

The implementation is similar in all the applications, which reassures the end users.

RICH AND POWERFUL AAF

The AAFs are accessible in each application via a right click in the relevant control or window.

The user can enable the storage of a control or the history of inputs, add a total or an average into a table column, create display filters.

The user can also increase the size of the combo boxes displayed (did you notice: they're often too small !).

Via the AAFs, the user is more effective without adding any work to the development team.

Continue >>>

DEFINE YOUR OWN FUNCTION KEYS

The end user can associate a function key of his choice to a window button.

This allows the end user to improve the speed and customize the application he's using, by allowing him to automate repetitive actions.

Let's take the example of a retail store cash register application, which was designed to be used with a mouse.

Some retailers may not have room to have a mouse, and will want to do without it...Thanks to WINDEV, they can, for example, set up the F10 key to validate the window.
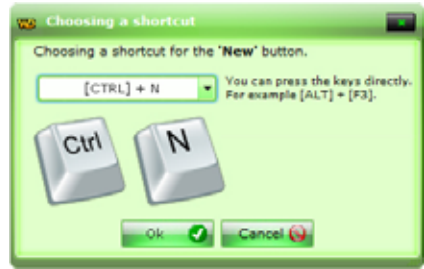
"REPORTS AND QUERIES"

With "Reports and Queries", which can be freely distributed with your applications: it allows end user to create their own reports or queries, in PDF format, send emails, print bar codes (see P 50).

ANNOTATIONS ON REPORTS

The end user can add "annotations" to a report before printing it.

This is very useful for highlighting a specific data or for drawing attention to a specific point!

TABLE CONTROL: SEARCH IN THE DATABASE

In a table control, the end user can perform a search in the database via the entire table.

SEARCH IN THE WINDOW

The user can search a text among all the controls of the window (Ctrl F).

CREATING A CHART

The user can create a chart himself (see charts, p 34), automatically on a range of data.

SPELL CHECKER

Spell checking can be requested by the user in an edit control: useful to prevent spelling mistakes!

GOOGLE SEARCH (POPUP MENU)

The popup menu of AAFs proposes a choice

for "Search in Google".
This allows you to start a Google search in one click on the term(s) selected in the window.

TREEVIEW AND TREEVIEW TABLE: EXPAND ALL THE TREEVIEW BRANCHES

In a treeview or a tree-like table, branches are expanded one by one. In some cases the end user wants to see the entire tree: all he needs is to right click...

TABLE CONTROL: COPY

In a viewing table, the user can copy a cell, a row or the entire table.
He can also copy columns only.

TABLE CONTROL: STORING THE FILTERS

An end user can "implement" a filter on a table to limit the amount of information displayed.

The value of a filter entered by the end user can be stored by the table.

By default, the filter will be re-applied whenever the table is opened.
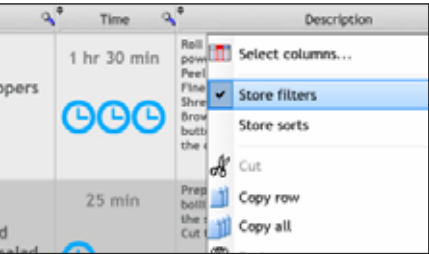
Each time the table is opened from now on, a furtive message (toast: non-intrusive message, that lets you keep on working and closes by itself after a few seconds) will notify the user that a filter has been applied.

The user keeps the filters he's created.

TABLE CONTROL: STORING THE SORT OF COLUMNS

When the user has performed one or more sort operation on table columns, these sorts can be stored in order for them to be applied by default.

From now on, each time the table is opened, a furtive message will display information about activating the sorts.

PASSWORD ENTRY, IN CLEAR

Usually when entering a password, the characters entered are masked.
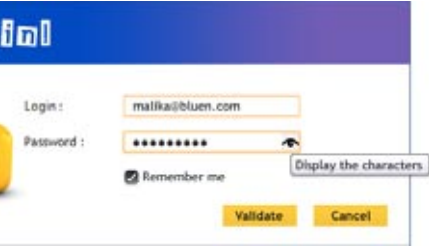
The user can decide to view the password while entering it.

AAF ON SCHEDULER

On a Scheduler control, the user automatically benefits from the following AAF:
• adding an appointment
• editing an appointment's title
• moving an appointment from one time slot to another
• moving an appointment from a resource to another one
• modifying the duration of an appointment
• deleting an appointment
• moving inside the calendar...
The end user can print a schedule, or send it via email, for a set of chosen dates. The schedule will be attached to the email as a PDF docu-

ment.
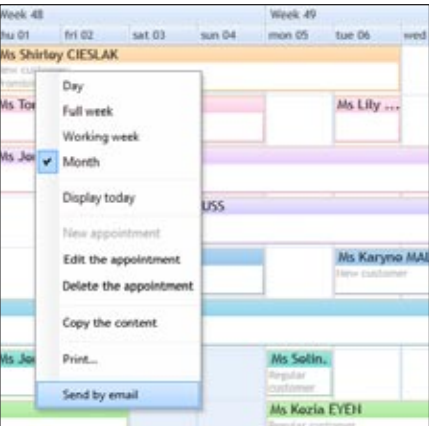
CALCULATOR ON NUMERIC CONTROL

Each numeric control can offer a mini calculator button".

A click on this button displays a calculator that is used to perform basic operations.
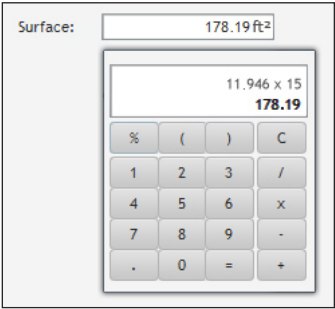
To add the mini-button to the numeric control, all a developer has to do is check the corresponding box in the "7-tab" window.

☐ Display a calculator button
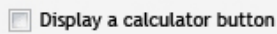
If the option was not activated, the end user can open the calculator thanks to the control's popup menu.

CALENDAR WHEN ENTERING A DATE

Each date control offers to display a mini calendar button.
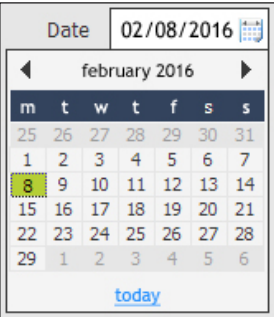
Clicking this button displays a calendar that lets you enter a date.

AAF: ADDING A REPOSITIONABLE NOTE IN THE WINDOW

The end user can add one or more repositionable notes in a window.

The note will be automatically stored and will reappear the next time the window is opened.
Examples of notes:
• Caution, this process takes 3 min at the end of the year • Do not bill Argentina • Jeremy's number during his vacation: 06 06 06 06 06
• ...
With this AAF the end user is more efficient.
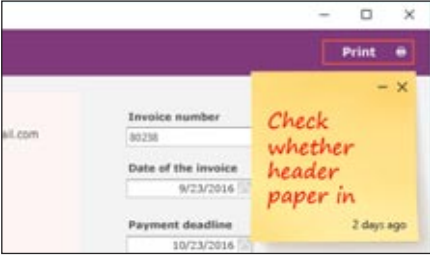
AAF ON A GANTT CHART

When a Gantt chart is displayed, the end user can move a task. All the related tasks are automatically updated.

The end user can also:
• change the duration of a task
• change the completion status of a task
• change the order of the tasks
• delete and create a task and its dependencies
• print the Gantt chart

AAF ON PIVOT TABLE

Pivot table users benefit from a large number of AAF, among which: pivoting the table, reversing the dimensions, expanding or collapsing levels, hiding one or more columns, expanding all the sub-levels from a given level, pasting a cell, printing...

USERS ALSO BENEFIT FROM...

The list of AAF is very long. Using AAF, your applications' users can:
• resize a window
• store the size and position of the window
• modify the width of a table column
• modify the height of a table row
• change the table columns order
• visualizing a report in print preview mode, with zoom capabilities, export bar, search, ...

The users of an application developed with WINDEV 21 automatically benefit from these features that allow them to better use their applications and to be more efficient in their jobs.

END USERS CAN MOVE AND MODIFY THE CONTROLS IN THE SCREEN

The end user has the ability to reorganize the layout of the controls inside a window, and to modify some of the controls' properties.

Today end users chose a large number of parameters associated with their personal and professional life: on smartphones for instance they pick wallpaper pictures, ring tones, elements to keep or discard ...

With WINDEV, the end user controls some of the presentation elements and usage for his windows! This im-

proves user friendliness.
Like any AAF this feature can be turned off by the developer.
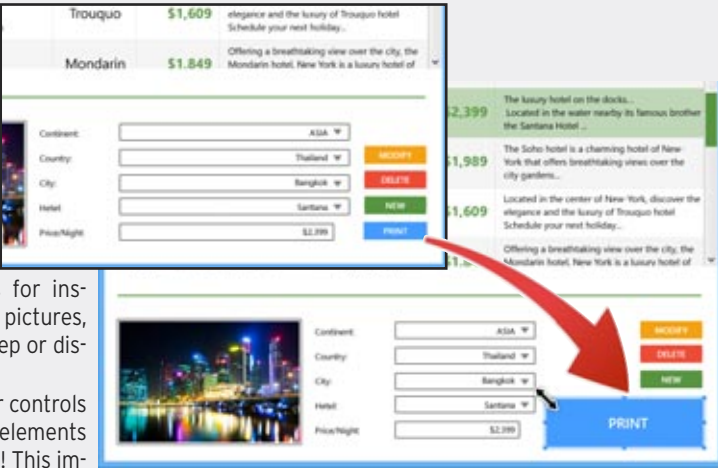
APPLYING A STYLE BOOK IN 1 CLICK

Choose your application's skin template, or create it.

And your entire application benefits from the **style book** defined regardless of the **Windows** version: XP, 2000, 2003, 2008, Vista, 7, 8, 10... on a **Mac** and regardless of the **Linux** version.

3 different styles for the same edit control

MANAGER
The style book of an application is paramount. Thanks to WINDEV 21, even a development team without any user experience or graphical expertise can create great looking applications.

NEW
Skin template creation wizard

AAF TECHNOLOGY
All the AAF are available in the applications created

MAIN POINTS
Automatic style book
Infused user friendliness

A GREAT LOOK, AUTOMATICALLY

DESIGN FOR ALL
With WINDEV, all developers, even the ones without graphic design knowledge, can create great-looking, user-friendly windows: simply choose one of the many skin templates provided.
There's nothing to code.
You have the ability to create your own skin templates.

WINDOW SKIN TEMPLATES: AN AUTOMATIC STYLE BOOK
A skin template is a global concept, which defines the general look of a window (the application's style guide): background, style sheets, lo-

cations of the controls, buttons, ...
WINDEV 21 comes with a lot of ready-to-use skin templates, and you can create your own.
Change skin template, and the entire window or application changes style!
You can offer to the end user the ability to change skin template.

STYLES
A style defines the different attributes of a control: color, type of border, font and size of caption, font of editable area, ...
All the elements of a style can be modified.
Styles can be defined for any

type of control.
By default, when created a control adopts the current skin template .
Benefit: when a style is modified, all the controls that refer to it are immediately and automatically updated, in all the project windows.
Styles can be overloaded.

IMAGES ADAPT
When an image is used in the layout (button, icon, pictogram, frame, background, etc.) it can be resized according to an intelligent algorithm: it won't be just deformed. Margins and areas to stretch or repeat can be defined.

SECURITY: ACCESS YOUR APPLICATION VIA PASSWORD

Control access to your application processes: it's easy with WINDEV 21.

Adding access control to your applications is easily done with the supervisor: by window, by control, by menu choice or by report.

No programming is needed to ensure secured access to your applications, simply activate the "Groupware" option.

MANAGER
Security is a top-of-mind careabout for enterprises: it is standard in WINDEV.

NEW
Various new features

AAF TECHNOLOGY
Password visible or hidden during input

MAIN POINTS
No programming
Support for standards: LDAP, Active Directory
Configurable access to each control

A GRANULAR ACCESS CONTROL AT THE CONTROL LEVEL
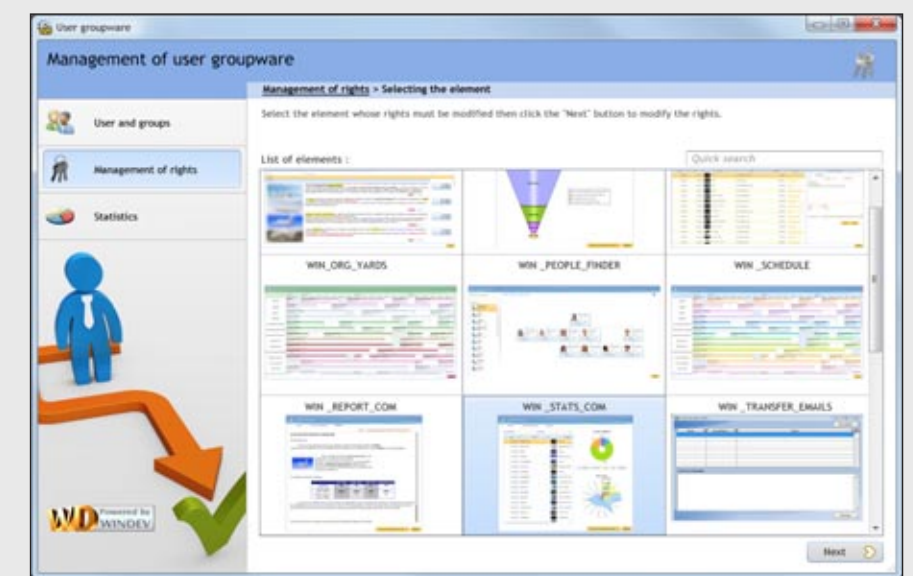
Granular control of application access: decide who can see what, who can use what, at the control level ...

CONTROL ACCESS TO YOUR APPLICATIONS' PROCESSES
Don't hesitate to limit access to your applications' sensitive data (personal data, salaries, revenue, ...)
The password input windows are automatically generated, using your project's skin template.

AN ENHANCED SECURITY CHECK
Access control enables you to filter the access to several elements menu choices, buttons, controls, groups of controls, windows, reports, ...
The protected elements are inactive and either grayed

out or hidden based on your choice.

THE SUPERVISOR MODE
The supervisor of the application can configure the rights granted to the users at any time. A friendly editor allows you to define and manage these rights.
If you want, the rights of the users or group of users can be created or modified by programming.

LDAP
If you want to use an existing LDAP login database, the access control will use it. The access control is connected to LDAP.

ACTIVE DIRECTORY
If you want to use the Active Directory, the access control will use it.

SSO: SINGLE INPUT OF IDENTIFIERS
SSO, acronym for Single Sign On enables you to enter your password only once per session, regardless of the number of applications run.
The end user only needs to log in once, and his or her login is applied to all the applications.
The applications must share the same database for the management of User Groupware rights.

Automatically make your applications secure, without coding anything!

A POWERFUL REPORT GENERATOR (PDF, BAR CODE, ...)

Creating **reports** with WINDEV 21 is easy, either via coding or using the **Report generator** provided with the product.

The PDF format is supported as well as the page backgrounds, the bar codes, the labels and everything you need!

And you can **distribute the report generator itself for free** with your applications.

DISTRIBUTE THIS REPORT GENERATOR FOR **FREE** WITH YOUR APPLICATIONS

EASILY CREATE SOPHISTICATED REPORTS

ANY TARGET

Preview menu, export tab: export the result to Excel or Word, create PDF with a single click... or send the report by e-mail.

Choosing a printout mode

Print preview | Printer
RTF file | HTML file
PDF file | Generic PDF file
dependent on the current printer | Index

Don't display this window anymore
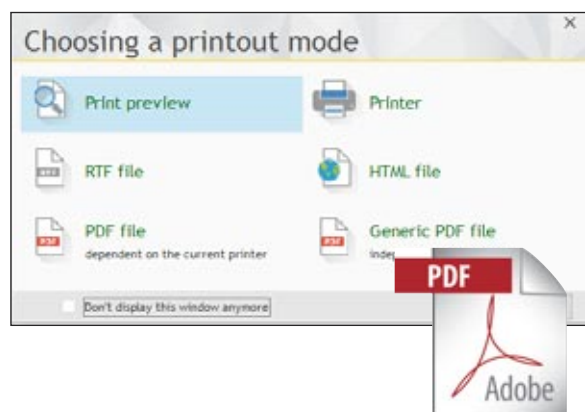
TARGETS
Printer
Page background
Form
Labels
Mailing
Fax
Archive (Duplicate)
Images and photos
PDF, PDF/A

MANAGER
Drawing your reports instead of coding them saves a lot of time. Integrated PDF printing is also an appreciated touch. The distribution of the report editor is free.

NEW
PDF signature
Print spreadsheet and Cube worksheet

AAF TECHNOLOGY
Print preview
Export to Word, Excel, PDF, fax, email

MAIN POINTS
Create reports using drag and drop
Automatic bar codes
Source code can be added to the report
Free distribution
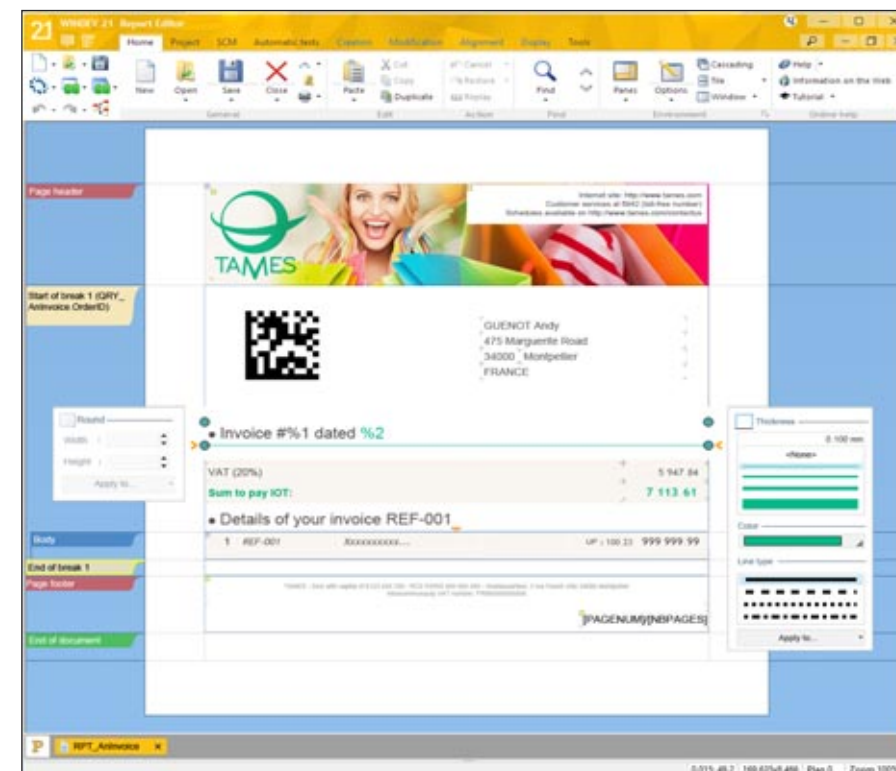
Easy reports

Easily create sophisticated reports thanks to the report (and query) editor of WINDEV 21. The creation is visual.

Creating a report
Type of report

Blank report
No control will be generated by this wizard

Form
Prints a list of information for each data read

Table
Prints a table row for each data read

Crosstab
Prints a table containing a cell for each data read

Treeview table
Prints a table by viewing a hierarchy

Gantt chart
Prints a Gantt chart

Organizer or Scheduler
Prints an organizer or a scheduler

Mailing
Prints a letter for each data read

Label
Prints a label for each data read

Report based on form
Printing on a pre-printed form

Wizards guide you at every steps

CREATING A REPORT: EASY

A wizard helps you create reports; it asks questions so you won't forget anything!

You can also create reports via programming, using the standard report commands.

SOURCE CODE WHEREVER YOU WANT IN THE REPORT

WINDEV also lets you include any executable source code anywhere in a report in the visual editor: this enables you to create your most custom reports without any problems.

ALL THE DATA SOURCES

The data used for a report can come from any source: HFSQL, SQL Server, Oracle, MySQL, Access... but also from a query, a text file, a memory zone, a table ...

CLICKABLE CONTROLS

In print preview, report controls can be clickable (and therefore start processes), or even be Internet links.

The UI skin template applied to inserted controls.

PRINTING LABELS

WINDEV allows you to print labels, page by page or on continuous form.

BACKGROUNDS OF PDF PAGE AND FORMS

The report editor supports PDF page background (form image printed on blank paper) and preprinted forms, and allow display and input in these forms.

IMAGES: AUTOMATIC

Including images - BMP, TIFF, PCX, GIF, JPEG, SVG, and so on - in a report is extremely simple.

The image can be an image copied into the report, or it can come from a process or from a file (photo of the product stored in a database, ...)

PREVIEWING: TEXT SELECTION (COPY/PASTE)

Text selection inside the preview lets you perform cut and paste operations from a report preview. You can also perform searches. This is very useful to the end user.

Note that if needed (confidentiality, etc.) this functionality can be disabled by the `iParameterPreview` WLanguage function.

Continue >>>

Text selection from the preview: here the order number, which can be copied then pasted

PRINTING THE HTML CONTENT
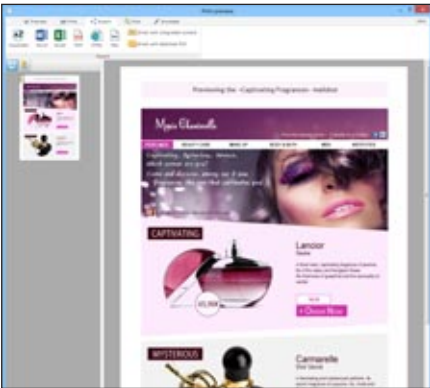
Today a lot of content is stored or handled in HTML format.

Several WLanguage functions can be used to handle this type of content.

The report editor supports the HTML control natively.

Thanks to this control, printing HTML content (with tags, images, etc.) is done directly without any programming.

The HTML content can be static, and directly copied into the report editor when creating the report, or it can be dynamic (found in a .HTM file, in a HFSQL data file memo, etc.) and read when printing.

ANCHORING IN THE REPORTS

The concept of anchors is available in the report editor.

A report will therefore be able to switch from "Landscape" to "Portrait" without having to be rewritten!

The report automatically adapts to the paper's type and size thanks to anchors.

Anchors in reports allow you to change the paper's format or page orientation while keeping the right layout, without having to create several versions for the report.
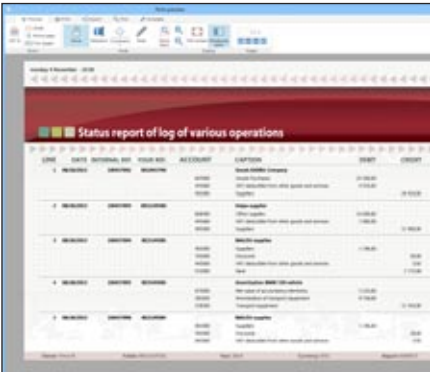
The same report, printed in portrait and in landscape, thanks to control anchors

TYPES OF REPORTS OFFERED BY THE REPORT EDITOR:

• Blank
• Table
• Calendar
• Mailing
• Composite
• TreeView table
• Gantt chart

• Form
• Crosstab
• Scheduler
• Label

TYPES OF CONTROLS OFFERED BY THE REPORT EDITOR:

• Static
• HTML
• Preset
• Check box
• Shape
• Chart
• Edit
• Spreadsheet...

• RTF
• Item
• Calculation
• Image
• Bar code
• Gantt chart
• Link

CHART PRINTING

Charts are printed directly inside the reports.
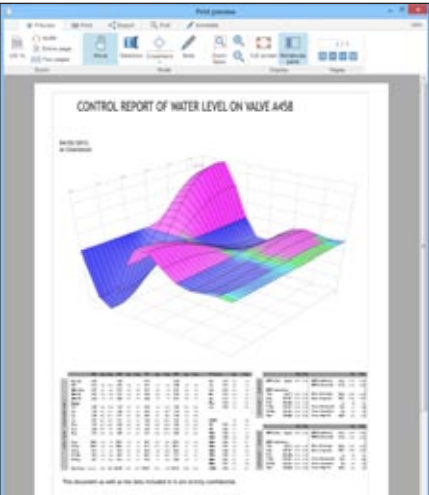
A "Surface" chart in a report.

The developer doesn't need to program anything.

GANTT IN REPORT CONTROLS

The Gantt control automatically prints in this type of report.

If the report is too large to fit on a single sheet of paper, the end user can print it over several pages that can be assembled later (like you would do for a spreadsheet).

PREVIEW: ZOOM AREA AND POSITIONING

In the print preview window, you can display, on the left, thumbnails corresponding to the pages.

The part of the report viewed is materialized in the thumbnail.

The zoom and positioning area can be resized and moved in the thumbnail, the zoom factor can be modified...

PRINT IN BLACK & WHITE FROM THE PRINT PREVIEW

An option lets the user directly change the type of printing, color or Black & White, from the print preview window.

Print in Color or in Black & White? The end user chooses from the preview!

Saves on ink cartridge refill!

DOUBLE-SIDED PRINTING FROM PRINT PREVIEW

An option lets you change the print mode from single-sided to double-sided from the print preview window before printing.

The developer doesn't need to program anything.

MULTILINGUAL

Like in the application interface, multilingual support is offered in the reports: a report can be printed in the language of your choice, regardless of the application's language.

SOPHISTICATED BORDERS

Borders evolve in the report editor.

Several settings are available.
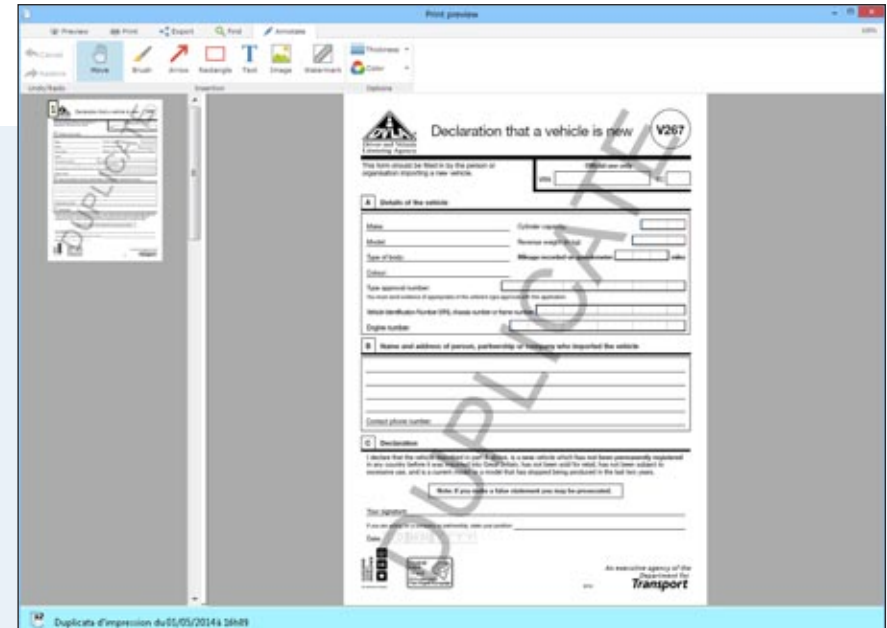
Duplicate

WATERMARK TEXT

A report (and a duplicate copy) can include an additional text in watermark format, such as "Confidential" or "Duplicate" printed across the report!

The addition of a watermark is done either in the editor or the print preview, or

via programming using the `iParameterWatermark function.`

The text can be configured: the text itself, font, size, color, text angle, position (on the current page or on all the pages), background or foreground printing.

The new `..Watermark` function is being introduced.

AUTOMATIC BAR CODES

The WINDEV 21 report editor automatically prints and displays bar codes (horizontal and vertical). The bar code value is set, or passed via a variable.

The supported formats are: QR, UPCA, UPCE, EAN13, EAN8, EAN128, CODE128, CODE39, CODE93, CODE11, CODE128, Intervaled 2 of 5, CODABAR, CB_MSI, Datamatrix, PDF417, Maxicode, Aztec......

A POWERFUL REPORT GENERATOR (PDF, BAR CODES...)>>>CONTINUED
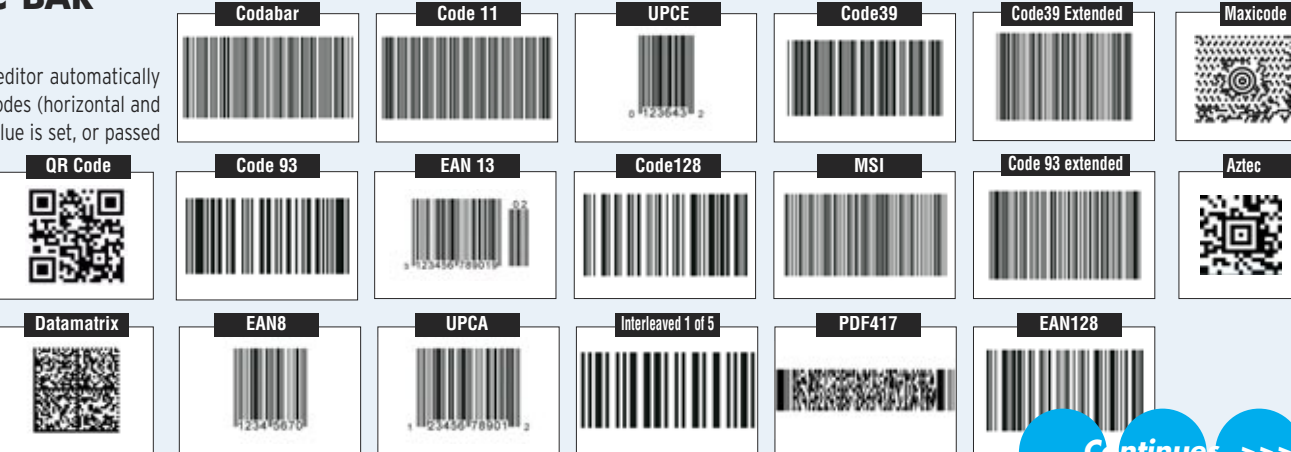
You can define a different thickness for each border, as well as a different color and style.

A rounded corner can be define for each corner.
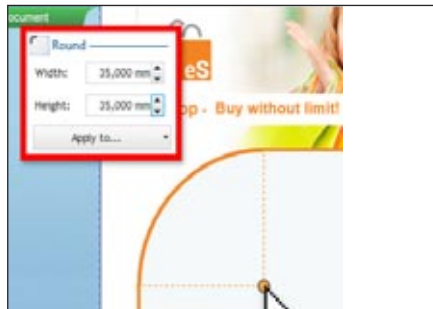
Defining a rounded corner in the editor

If the color of each rounder corner is different, a gradient is automatically created for the border. The border is edited either via the 7-tab technology, or in a WYSIWYG editor.

Of course, keeping the SHIFT key down lets you create symmetrical rounded corners.

REPORT: PRINT OVER SEVERAL PAGES IN WIDTH

A table report (for instance) can be very large, and notably larger than a sheet of paper.

You can specify that a report will print over several pages.

The end user will only have to assemble the pages.

The print preview is WYSIWYG.

A report with a sophisticated border (the 4 corners can of course be rounded!)

PRINT USING ENGLISH UNITS

Reports can be printed using the metric or English unit system: inches, feet, ...

GENERATE "HIGH-QUALITY" PDF

You can specify the quality of the PDF generated: either reduced size PDF, or PDF that restore the original quality of the illustrations.

MERGING PDF AT RUNTIME

WINDEV lets you concatenate several PDF files. For example, if 3 invoices must be sent via email to the same recipient, you can concatenate them in a single PDF document.

This function can also be used on PDFs that were not created with WINDEV or WEBDEV.

The WLanguage function is simply named

PDFMerge.
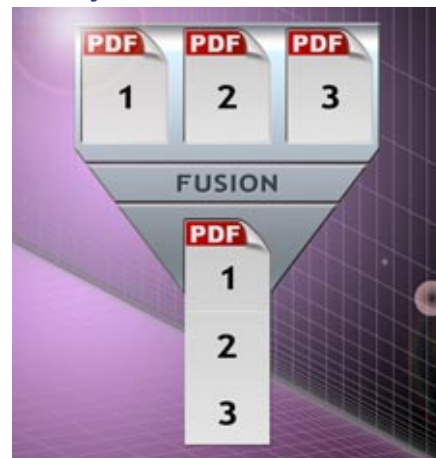
ARCHIVING/DUPLICATING

A report can be generated in a "closed" file format. This file format allows the report to be reprinted later, without having to read the files.

The duplicate can be digitally signed (PKCS7 standard).

PDF/A: PDF FOR ARCHIVING

PDF/A is a standard ISO format PDF.

This type of PDF embeds in the `.pdf` file all the elements needed to display it or print it: for instance, all the fonts are embedded.

It may be useful to keep an identical copy of a report, in the case of an invoice for example.

This format allows long term archiving, and for legal reasons.
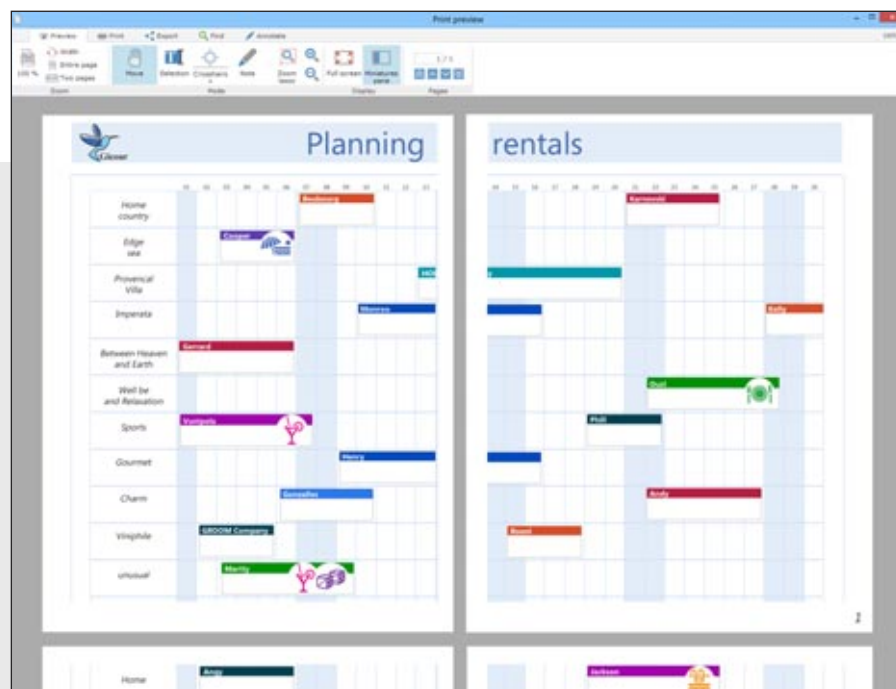
STATES: TRANSPARENCY OF IMAGES AND CHARTS

The report editor supports transparency in `image` type controls.

Simply use an image format that supports transparency: PNG, SVG...

When a `chart` control doesn't have a background, transparency is also active.

Overlaying a clipped image coming from a database over a background is also possible.
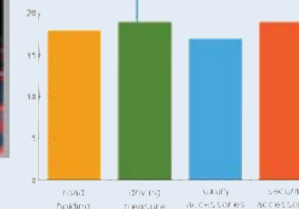
When the application is printing a report, a copy of the report can also be automatically generated in PDF/A format.

This allows you to reprint a duplicate copy of the report at any time.

The data is not processed again, so it prevents modifications, and re-printing is instantaneous.

No need to reprocess the files to see the statistics from January 1st to December 31st for the year 2015!

The generation of PDF/A is activated via programming (`iPDFParameter` function).

The PDF/A file keeps the annotations, as well as the values entered in the report's edit controls.

This feature is also available for programmed reports (used with the `iPrint` family of functions).

PDF: SIGNATURE

There are two types of signature for PDF reports: signatures for approval and signature for certification.

WINDEV 21 supports both types of signatures.

A signature control allows approvals. It lets you include a digital signature in the report, for the PDF export.

You can define the image or the text to display in this signature control, which will appear in the PDF report.

The choice of the digital certificate to use

for the signature is done in the editor or via programming.

This way you can create signed PDF and PDF/A that respect the electronic data transmission rules.
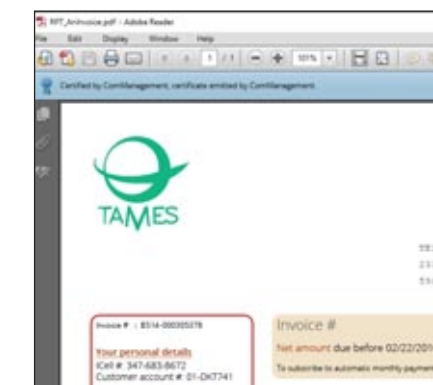
The blue band indicates that the PDF is certified

WRITING DIRECTION

The writing direction is supported in reports. Support for the `..TextDirection` property, which works the same way as in windows, avoids having to maintain 2 separate reports to support languages written from left to right and right to left.

REPORT SEQUENCING

Chaining reports lets you combine several reports inside the same print job.

CROSSHAIR

The print preview offers a crosshair feature. This crosshair makes reading tables with a lot of data easier.

PROVIDE THE COMPLETE REPORT EDITOR TO YOUR CUSTOMERS FOR FREE

You can freely distribute the complete report editor to your customers.

End users will be able to create their own custom reports and queries, and even modify reports you've created if you authorize them to.

By providing the free "Reports & Queries" program, you offer a lot of autonomy to end users, while reducing the amount of work for the development team.

Reports are made easy with WINDEV!

WLANGUAGE: 5TH GENERATION

90% less code

The integrated WINDEV language, **WLanguage**, is powerful, simple and intuitive.

It's a 5th generation language (**5GL**), which means that its commands are highly sophisticated. A WLanguage command can replace dozens or even hundreds of 4GL commands, making programming easier and more reliable.

No more unnecessary complexity, no more incomprehensible APIs, no more out of bound pointers, no more useless programming!

```
SMTPSession is EmailSMTPSession
Emailing is Email

// Read the customer database
FOR EACH Customer ON Company
    // Check the email address
    IF EmailCheckAddress(Customer.Email) =
                         emailAddressValid THEN
        // Send the mailing
        Emailing.Recipient[1] = Customer.Email
        Emailing.Subject = "Exclusive discount in this email!"
        EmailSendMessage(SMTPSession,Emailing)
    END
END
```

The WLanguage code is so clear that it feels you're reading comments! More comfortable with Chinese? WLanguage is also available in Chinese.

```
SMTPSession is EmailSMTPSession
Emailing is Email

// Read the customer database
FOR EACH Customer ON Company
    // Check the email address
    IF EmailCheckAddress(Customer.Email) =
       emailAddressValid THEN
       // Send the mailing
       Emailing.Recipient[1] = C
       Emailing.Subject = ...
             "Exclusive discount
       EmailSendMessage(SMTPSess
```

```
定义SMTP会议为电子邮件SMTP会话型
定义发送邮件为电子邮件型

//浏览客户数据库
对于每个客户根据公司
    //检查电子邮件地址:
    如果电子邮件检查地址(客户.Email) = 电子邮件地址.确认那么
        //群发邮件
        发送邮件.收件人【1】 = 客户.Email
        发送邮件.主题 = "此邮件提供一个专属的优惠！"
        发送邮件.正文 = 文件加载文本("remise_20.htm")
        电子邮件发送邮件(SMTP会议,发送邮件)
    结束
结束
```

MANAGER

A 5th generation language means up to 90% less code: which means faster coding, less chances for bugs, easier maintenance. And you choose your runtime target.

NEW

Over 100 new WLanguage features in version 21

AAF TECHNOLOGY

User Macro-Code (UMC)
Automatic Language Security

MAIN POINTS

Fast learning: it's a 5GL
Easy to use, powerful, fast and reliable
Easy maintenance

JUST IN TIME (JIT) COMPILATION

The principle behind "Just in Time Compilation" -JIT- is as follows: the 5GL code of WINDEV is converted on the runtime computer into "native assembly" code during its execution.

The execution speed is faster for all instructions, and especially for integer calculations and real number calculations.
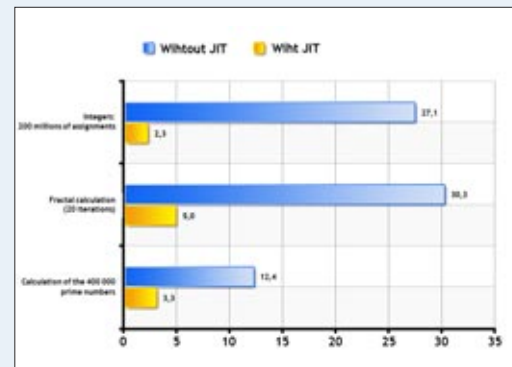
DATA BINDING

Data binding allows you to link variables in memory with controls (in a window or a report).

These variables in memory can be: simple variables, a class, a structured element of the language (Google Calendar, XLS worksheet, RSS feed, etc.).

The content of a table control can be automatically filled by an array of these elements.

Two very easy commands `SourceToScreen` and `ScreenToSource` allow you respectively to trigger the display of data in controls or to send information from the UI to the data source.

Data sources can be data files (tables) or application variables.
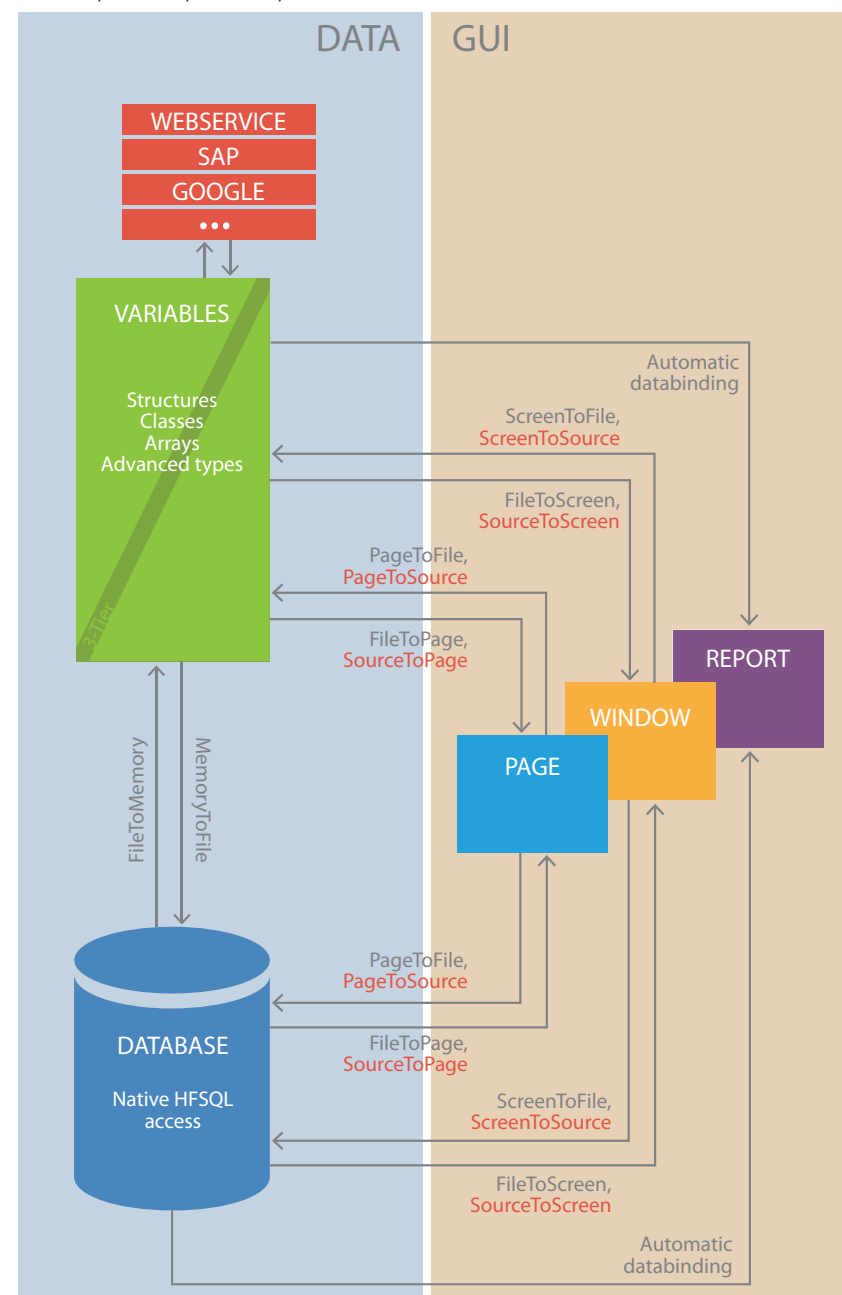
WLANGUAGE: 5TH GENERATION LANGUAGE

The integrated WINDEV language, WLanguage, is powerful, simple and intuitive.

it's a fifth generation language (5GL), which means that its commands are highly sophisticated.

A WLanguage command can replace dozens or even hundreds of 4GL commands, making programming easier and more reliable.

No more unnecessary complexity, no more incomprehensible APIs, no more out of bound pointers, no more useless programming!

EASE AND POWER: A NATURAL LANGUAGE

WLanguage is an easy programming language, close to natural language ; it is quick to learn.

The code is quick to write and especially easy to proofread.

Coding and maintenance are therefore much easier to do.

```
FOR EACH CUSTOMER
   Message is Email
   Message.Recipient=Customer.EmailAddress
   EmailSendMessage(Message)
END
```

Take the test: do you understand this code? Yes, because WLanguage is so readable. WLanguage is also available in Chinese.

VARIABLES AND TYPES

Declaring variables is easy and intuitive.

```
Message is Email
CustomerArray is array of Customers
```

Variable declaration is simple and on the spot.

WLanguage offers the standard simple types, including integer, boolean, currency, numeric with up to tp 38 significant digits, real number or character string.

Over 20 simple types are available.

THE STRING TYPE

WLanguage lets you manage text of different types such as Ansi, Unicode, UTF-8 or binary content thanks to the buffer string type.

Conversions are automatically performed based on the functions or properties used.

```
Msg is string UNICODE
Msg = "Hello! 你好 ！привет！"
```

Text in any language thanks to Unicode.

Continue >>>

```
cObjImage is Class
    inherits from cObjClassic

    PUBLIC CONSTANT
        ImageFile is string       //
Image file path
        Transparency is boolean       //
Transparency flag supported?

    END
```

THE STRINGS

Code that handles strings is clear and concise thanks to operators:

The [ ] operator lets you easily access a piece of the string.

Strings can be compared among themselves thanks to standard arithmetic operators but also thanks to specialized operators.

Equality: =, ~=, ~~ Not equal to, greater than, lower than: <>, <, >=, ... Starts with: [=, [~, [~~ Contains: [=], [~], [~~] Ends with: =], ~], ~~]

BUILD YOUR TEXT IN AN INTUITIVE WAY

The + and += operators let you concatenate strings.

Optional concatenation allows you to quickly build complex strings.

Let's assume a list of products separated by commas. Why lose time managing the first one, the last one, the case of the middle product? Optional concatenation does it for you!

```
ProductList is string
FOR EACH Product
  ProductList+=[","]+ Product.Reference
END
```

POWERFUL STRINGS

A lot of high level functions are available: check regular expressions • searches • replace • switch to uppercase • extraction of pieces of strings separately or into array elements • automatic extraction of a directory name or a file name from a complete path • conversion from and to numeric types, dates or times • ...

Memory needed for string handling is managed in a secure and automated way: no possible overwrite your code is therefore safe and reliable.

ENUMERATIONS AND COMBINATIONS

You can create enumerations and combinations to improve the design and maintenance of your code.

The values of the enumerations and the combination options are not mere integer combined among themselves, but true programming elements endowed with extremely efficient functionalities that improve productivity and limit errors: assisted input in the code, errors at compile time in case of mix up, compatibility of external components,...

```
PaymentMode is Enumeration
        Cash
        Net_30
        Split_3_ways
END
```

Enumerations: the 3 types of payments are offered in assisted input.

ARRAYS AND OTHER CONTAINER TYPES

The WLanguage arrays are advanced elements that allow for easy management of sets of elements with the adding, deleting, sorting and searching functions.

The memory needed for the array elements is managed automatically. The security mechanism prevent the use of outbound elements.

Several container types are available: associative array, queue, stack, list.

THE ADVANCED TYPES

WLanguage comes with a large number of advanced types that let you easily manage complex notions: emails, RSS streams and signatures, XML documents, resources for schedulers and calendars, ...

POWERFUL STRUCTURED PROGRAMMING

Standard programming iterative and conditional structures are available (FOR i, LOOOP, WHILE, IF, SWITCH ...) but each one of them has been simplified to support efficient and quick code writing..

For example the variable declaration for the "FOR i" loops are implicit, the SWITCH statements can use the entire extend of the WLanguage comparison portfolio, ...

```
SWITCH BookReference
  CASE "A" <= * <"H" : Floor = 1
  CASE "H" <= * <"P" : Floor = 2
  CASE >= "P"        : Floor = 3
END
```

Note that the SWITCH statement is also available on strings.

You can use complex intervals to define the cases.

"FOR EACH"

The "FOR EACH" loops let you parse all the elements in a set, for example all the records in a data file, all the elements in an array, all the elements in a list, all the sub-string in a string, ...

```
FOR EACH email NOT READ OF MailServerConnection
END
FOR EACH SELECTED ROW OF OptionList
END
FOR EACH Customer WITH Country ="England"
END
```

3 examples, a single way of coding!

PROCEDURAL PROGRAMMING

The WLanguage procedure is not a simple sub-routine for sharing a few code lines but an integral part of the application design and architecture.

Procedures are recursive.

A WLanguage procedure can have several parameters and return values.

The parameters can be optional and their number can vary.

Their type can be strict or flexible.

Depending on the type of code currently written, choose the best suitable mode. The flexible mode is useful for generic code. The strict mode is more rigorous.

OVERLOADING PROCEDURE SYNTAX

A procedure can have several syntaxes (overload).

The adequate syntax is automatically determined based on the parameters passed (dynamic dispatch).

ADVANCED PROCEDURE FEATURES

Procedures have integrated functionalities at their disposal.

Runtime automation allows for scheduled execution: in 1 minute, in 1 hour, after inits, ...

a procedure's execution can also be repeated.

the "end of procedure code" is systematically run when exiting the procedure, which simplifies programming.
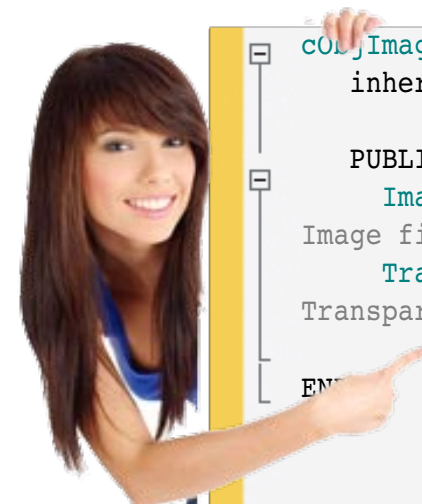
OBJECT-ORIENTED PROGRAMMING (OOP)

The use of Object oriented programming is optional with WINDEV.

The classes and the syntax of WLanguage allow for modern and efficient object-oriented programming.

The base method classes can be redefined visually from the project explorer; virtual methods are automatically supported.

Management of the instances' memory si completely automated in most cases, when allocating as well as when freeing memory.

EMBEDDED DATABASE ACCESS

OOP (OPTIONAL USE)
Classes
Abstract classes
Inheritance, multiple inheritance
Reflection
Overload (dynamic dispatch)
Abstract and virtual methods (polymorphism)
Properties (get and set)
Constructor
Destructor
Data encapsulation: public, private, protected
Easy programming in 5GL
Automatic freeing
"is one" operator and downcast
Low reference

WLanguage includes all aspects of database management.

The structure of the database is automatically recognized by the compiler, which allows you to easily handle the different items of the current record of a file (table row).

It is very easy to program secure database accesses thanks to this current record revolutionary concept.

```
HReadSeek(Customer,Name,Customer-
```

Name)

```
telDial(Customer.TelephoneNumber)
```

In 2 lines: search for a customer in the database and phone call.

The Record type of variable is used to perform a copy of a database record at any time in order to perform operations, independently of future searches in the database.

XML DOCUMENTS

The XML documents can easily be handled by WLanguage.

The structure of the XML document is automatically imported in WLanguage (with XML or XSD model).

The WINDEV 21 editor offers assisted entry for the names of the document's elements, syntax-based coloring, automatic case correction, ...

The structure of the WLanguage code highlights the structure of the XML document: by typing the code, you instantly imagine the result!

The example below presents the building of an XML file.

Read access functions the same way; the code:

```
Fleet.Vehicle[1].Make
```

returns "Ferrari".

WLANGUAGE CODE

```
WITH Fleet
  WITH .Vehicle[1]
    .Make = "Ferrari"
    .Model = "458 Special"
  END
  WITH .Vehicle[2]
    .Make = "Mercedes"
    .Model = "SLK 350 Roadster"
  END
  WITH .Vehicle[3]
    .Make = "Maserati"
    .Model = "GranTurismo Sport"
  END
END
```

GENERATED XML CODE

```
<Parc>
  <Vehicule>
    <Make>Ferrari</Make>>
    <Model>458 Special</Model>>
  </Vehicule>
  <Vehicule>
    <Make>Mercedes</Make>>
    <Model>SLK 350 Roadster</Model>>
  </Vehicule>
  <Vehicule>
    <Make>Maserati</Make>>
    <Model>GranTurismo Sport</Model>>
  </Vehicule>
</Parc>
```

HANDLING DATA

Operations on data require that this data be copied from the database to some variables, modified, saved or reloaded into another format.

All these common operations are very easily accomplished thanks to the WLanguage syntax.

The WITH syntax for instance, allows you to quickly access a sub-element of a database element.

The homonymic copy lets you copy in a single operation the sub-elements with the same name between two heterogeneous elements.

The serialization and deserialization functions let you save and reload the content of complex elements.

JSON DOCUMENT

JSON is an often used data exchange format. For this format, the WLanguage syntax allows for simple read and write that follow the JSON standard.

The principle is the same:

```
WITH JSON.Fleet
```

```
WITH .Vehicle[1]
  .Make = "Ferrari"
  .Model = "458 Special"
END
WITH .Vehicle[2]
  .Make = "Mercedes"
  .Model = "SLK 350 Roadster"
      END
```

WEB SERVICES

Handling web services is very easy in WLanguage.

The data handled by the web services appear as simple structures and the operations appear as simple procedures (see page 67).

HANDLING UI VIA PROGRAMMING

The UI controls are natively very powerful. But it is also possible to modify their states and their behavior via programming using the `Control type:` the 270 display properties (position, width, ...) as well as the code to run according to the user's actions can be modified according to your own requirements.

The `CreateControl` and `CloneControl` functions allow you respectively to create a new control or to duplicate an existing control.

DYNAMIC COMPILATION

WLanguage is not a static language, it is a dynamic language.

The dynamic compilation lets you execute code built on the fly.

DEFENSIVE PROGRAMMING

Defensive programming consists in testing in the code itself the input and output of each procedure; the potential errors will only be displayed in "debug" mode.

GENERIC CODE!

Dynamic compilation
Flexible typecast
Indirections
Reflection
Static and dynamic inference

WLanguage offers powerful debugging functions `dbgAssert`, `dbgCheckEqual`, `dbgCheckDifferent`, `dbgCheckTrue`, `dbgCheckFalse`, ...

The creation of unit tests (see page 16 -software factory- and page 91 -automated tests-) lets you test an application at any time.

MULTITHREAD/PARALLEL PROCESSING

To take advantage of the power of multi-core computers and improve the speed of your applications, WLanguage offers advanced thread management.

Threads allow you to distribute the work to perform among the machine's cores. Variables are automatically protected.

Synchronization techniques are available: critical sections, mutex, semaphores, signals,...

MULTI-PLATFORM

Code written in WLanguage is multi-platform:

32 or 64 bits, Windows, Linux, Android, iOS, Java, Javascript, PHP, ...

Components can be shared among several platforms.

EXECUTION SECURITY

The execution of the WLanguage code is secure: if the application's execution presents a risk (major bug), the execution is stopped, and a clear message comes up.

The WLanguage security mechanism prevents any data corruption.

WLanguage manages errors (non fatal) and exception (fatal).

Error and exception management can be accomplished automatically or via programming.

SECURE MEMORY ZONE

Access to memory zones is controlled, which limits the risks of buffer overflow.

OPENNESS

You have access to all the features and all the standards: API, DLL calls, COM, ActiveX, .NET, J2EE, events...

THIRD-PARTY LANGUAGE: JAVA, C++, C#, VB, COBOL, FORTRAN, ETC.

You have "existing" code.

WINDEV lets you use this code. You can enhance your legacy applications or migrate them smoothly.

WINDEV 21 is open to third-party languages and interfaces with your existing code regardless of the language!

You can call a third-party language from WINDEV.

From your third-party language, you can call WINDEV (source code, windows, and so on).

Your legacy code is preserved.

From WINDEV you can also call programs written in another language (compiled as DLLs or assemblies).

C and C++ language

```
void Display_Customer(void) {

nWDExecute("hReadSeek(Customer,Name,\"SMITH\")"

nWDExecute("hFound");
if (bWDGetReturnValue())

{

    nWDExecute("FileToScreen");
```

JAVA

```
void Display_Customer(void)

{

    CALLWD("hReadSeek(Customer, Name,\"Smith"

    CALLWD("hFound");

    if (WDInt()!=0)

    {

        CALLWD("FileToScreen");

        CALLWD("ValidateButton..Color=iLightGr

    }

}
```

COBOL

```
* Opening the window
  call CALLWD using
  by reference "Open,search" & x"00"
* Searching for the client
  call CALLWD using
  by reference "hReadSeek(Customer, Name,""Smith"")" & x"00"
  call CALLWD using
  by reference "hFound" & x"00"
  call CALLWD using
  "FileToScreen" & x"00"
  call CALLWD using
  "ValidateButton..Color=iLightGreen"" & x"00"
```

VB

```
Sub DisplayCustomer()
Call callwd("hReadSeek(Customer, Name,""Smith"")")
Call callwd("hFound")
If WDInt =1 Then
    Call callwd("FileToScreen")
    Call callwd("ValidateButton..Color=iLightGreen")
End If
End Sub
```

In addition to the traditional commands of a programming language (For, If Then Else, While, ...) WLanguage offers 5th generation type function families.

These families enable you to program using clear, intuitive language, without having to "reinvent the wheel" every time.

Details about these families, as well as the syntax of the functions can be accessed on the Internet.

Here are the "function families"":

- Window management
- Window control management
- Mathematical functions
- View table management
- Character string management
- Popup menus, scroll-down menu, ribbons
- Dates and times
- Calendar functions
- Organization Chart functions
- Scheduler functions
- Organizer functions
- Treeview
- Pivot table OLAP functions
- Timeline functions
- Multiline Zone functions
- Internal Window functions
- Functions for managing radio buttons and check boxes
- Wi-Fi functions
- Toolbars
- Functions for managing the messages and the dialog boxes
- Drag and drop
- Drawing functions

32 or 64 bits: the source code is 32-bit and 64-bit compatible; you choose at compilation time.

- Business chart (bar chart, line chart, pie chart...)
- .NET functions
- J2EE, SOAP functions

- HTTP functions
- Domotics functions
- Emails
- Telephony (TAPI)
- General exception mechanism
- Software Management
- Fax
- User Groupware
- ODBC specific functions
- Database management functions (HFSQL and others)
  - SQL
  - Assignments
  - Read commands, modification
  - Useful commands
  - Remote access
  - Describe a connection (not described in the analysis) on a third-party database: Oracle, MYSQL, etc.
  - Temporary table description
  - Custom error management
  - View management (temporarily load part of the table in memory)
  - Filter management (temporarily store part of the table on disk)
  - Trigger management
  - Logs
  - Replication

  - Transactions
  - Other functions
- Big Data functions
  - HBase functions
  - Hdfs functions
- Print functions
- Font management
- Java functions
- Third-party languages: Java, C++, C#, VB, Cobol, Fortran, etc.
- List box and combo box control management
- Binary value management functions
- Financial functions
- Matrix management
- Statistical functions
- Image animations
- Multimedia functions (video, sound, ...)
- TWAIN device management: scanners, camera, ...
- MDI functions (non modal multi-windowing)
- Memory zone management functions
- Multilingual functions
- FTP functions, secure FTP
- RPC
- Control applications via OLE automation
- ActiveX
- DDE management functions
- Various Windows & Linux functions (API call, DLL)
- Windows certificates
- Windows events
- Miscellaneous WINDEV functions
- XML native functions
- JSON native functions
- Excel native functions
- Serial and parallel ports
- Clipboard and trash
- Project management
- Action plans (Continuous integration)
- The registry
- Socket functions (SSL,...)
- The mouse
- The system functions

- Threads
- OPC
- Disks, files and directories
- Network management
- Archiving and compressing files (ZIP, 7Z...)
- USB
- CD and DVD burning
- EXIF (numerical images)
- 3-tier
- LDAP functions
- SAP functions
- Bluetooth functions
- SNMP functions
- Lotus Notes functions
- Google functions
- RSS functions
- OBEX functions
- Service functions
- Task scheduler
- Application update functions (Live Update)
- Debugging functions
- Array functions
- UMC functions
- Automated test functions
- Lock functions
- DNS functions
- Xaml functions
- Spreadsheet functions
- Map functions
- Function allowing the end user to manipulate the UI
- Facebook functions
- Telemetry functions
- ...

THE CODE EDITOR : THE DEVELOPER'S FRIEND

The code editor contributes to the ease of development

The **code editor** is fully integrated with the environment.

It is intuitive to use for both novice users and accomplished developers.

A **constant assistance** is proposed at each step of the input.

Powerful **formatting and coloring** features make it easy to type and read code.

The source code can be managed **in team** via the SCM, the integrated versioning tool (see p76).

A REVOLUTIONARY CODE EDITOR

Process executed when?

- Control initialization
- Entry in the control
- Exit from the control
- Whenever modified

Initializing EDT_END_TIME

Entry in EDT_END_TIME

Exit from EDT_END_TIME

Whenever modifying EDT_END_TIME

ASSISTED CODE ENTRY

ENTERING CODE

The code is directly entered in the appropriate "event". It's simple and intuitive: you feel like you're just entering comments!

Auto-complete and constant help, as well as a large number of very sophisticated features make the programmer's job easier.

PROGRAMMING CHARTER

The code editor allows you to enable a programming charter (prefix the variables), and it even allows you to define your own prefixes. These prefixes are colored and they can be made invisible.

The editor even adds the prefixes while you're typing if you've activated this option.

The prefix is set based on the variable's type: local, global, according to the control's type...

INTELLIGENT RENAMING

When a variable is renamed, WINDEV offers to rename this variable everywhere it's used.

SEARCH

The editor's search features are very advanced.

For example you can include or not the comments or the text strings.

Several search windows can be opened at the same time.

EASY TEAM WORK

The versioning tool (SCM) is fully integrated to the environment; it simplifies teamwork as well as the comparison of versions, and backups (see p 76).

Each version of your application is automatically backed up.

COMPARE CODE, WINDOWS, UI...

A window that used to work three weeks ago has been modified by an intern, and does not work anymore. How do you find the differences? All you have to do is use the "element comparison" feature: the two elements are analyzed, and their differences (code, UI, etc.) are displayed on the screen.

OPEN TO OTHER LANGUAGES

The code editor also lets you enter SQL code, Java code, PHP code (in a PHP WEBDEV project), ...

A developer spends a lot of time in the code editor. Therefore it is important that this editor be the most efficient possible.

Dozens of wizards help generate code (see p 89), here the FTP connection code generator

The FTP connection wizard ...

... and the generated code

MULTILINGUAL PROJECTS

When a multilingual string is hovered by the mouse cursor in the source code, the value of this string in all the project languages is displayed in a tooltip.

AUTOMATICALLY GENERATE A CLASS DIAGRAM

Starting from existing classes (project reuse), WINDEV automatically builds a UML class diagram with its relationships (inheritance, aggregation). This provides a global view of the architecture.

UML CLASS DIAGRAM: AUTOMATIC SYNCHRONIZATION

When you modify the code of a class or structure (add a new member for example), your UML diagram is automa-

tically updated to reflect your modifications.

No more out-of-sync UML diagrams!

Conversely, if you'd rather like to modify your classes or structures from the UML diagram to benefit from a more global view, your modifications will be automatically applied

to the source code of classes and structures.

MANAGER
The WINDEV 21 code editor assists the code writing process. It is fully integrated with the environment, which improves its performance.

NEW
Visual scrollbar
Off-configuration elements flagged

AAF TECHNOLOGY
User Macro-Code (UMC)

MAIN POINTS
Complete integration
Constant assistance
Extreme user friendliness
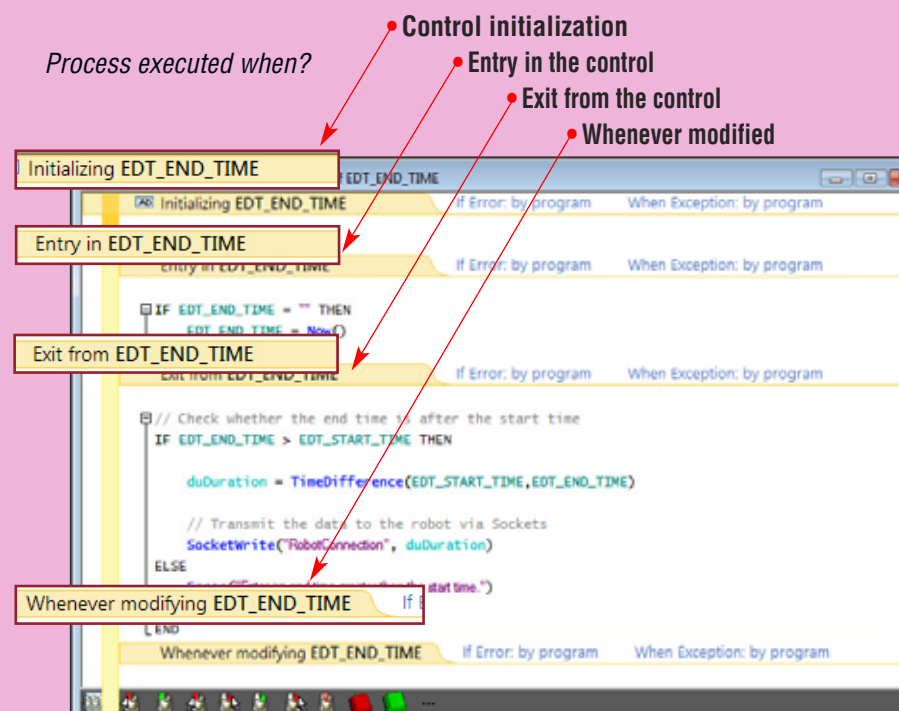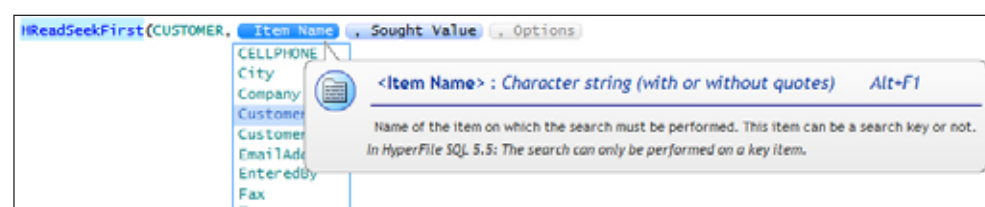
CODE ENTRY IS INTUITIVE

Simply enter the process to run in the corresponding event (above, in an edit control): when initializing the control, when entering in the control, when inputing in the control, when exiting the control.

The row of icons at the bottom can be used to add elements: rollover for instance, etc.

ASSISTED INPUT

The assisted input proposes an help for each parameter as well as the possible values according to the project data (variables, global variables, data structures).

SOPHISTICATED ASSISTED CODE ENTRY

The self-complete code feature is powerful for entering commands, variable or

control names. Whenever required, a wizard proposes to generate the code for you (150 wizards).

CONDITIONAL TARGET CODE

For a given process, you can enter different lines of code depending on the runtime platform.

The right code will be automatically selected at runtime.

Continue >>>

A POWERFUL DEBUGGER

*Bug tracking
is made easier*

The user-friendly **debugger** is very powerful and offers advanced features:
- break points
- step-by-step execution
- variable visualization
- "edit & continue": modification of the running code
- real-time call stack
- thread and component debugging
- formatted display of HTML data, image, RTF...
- "set next statement"...

A USER-FRIENDLY DEBUGGER

```
Click on BTN_Validate - Debug in progress
1   // Read the information entered
2   ScreenToFile()
3
4   // Modifies the input information
5   Product.EnteredBy = gsCurrentUserName
6   Product.EnteredOn = Today()
7                       Product.EnteredOn = "20140217"
8   //If it is a new record
9   IF Product..NewRecord = True  THEN
10      // Add it
11      HAdd(Product)
12  ELSE
13      // Modify it
14      HModify(Product)
15  END
16
17  // Return value of the window
18  MyWindow..ReturnValue = True
19
    Preset action: <Close the window and return a value>
```

The debugger offers all the features you expect

Breakpoints

- IW_FindCustomers.IW_FindCustomers.BTN_Find, line 1
- IW_Pane_LOOP_ProductVariation.IW_Pane_LOOP_Pro
- TPLC_Filter.PROCEDURE.DefineCharacteristic, line 25
- TPLC_Filter.PROCEDURE.DefineCharacteristic, line 33
- IW_Pane_LOOPProductVariation.IW_Pane_LOOP_Prod
- IW_Indicators.PROCEDURE.OrdersToFollow, line 13
- IW_Filter.Procedure.AddCharacteristicValues, line 25

It is possible to view the list of all the break points that have been set. You have the ability to delete some of them, or all of them, in a single operation

MANAGER
Applications always need to be fined tuned: an efficient debugger is essential for your teams.

NEW
New trace window
Displaying the content of the current record

MAIN POINTS
Debugging in test mode in the editor or on a running application
Local and remote debugging
Scheduled debugging

PROFILER: ANALYZE AND IMPROVE YOUR CODE'S PERFORMANCE

The profiler is a tool provided with the product, allowing you to measure in a detailed way the amount of time your code takes to execute.

The analysis of the time spent in each instruction is very detailed: for example, property assignments are detailed.

The visual representation of the execution times is presented in a hierarchical way.

This makes analyzing nested processes duration easier since the chart is more readable.

Note that the profiler can be started at any time on a user computer with the Win + Shift + F10 key combination.

Statistics collected at run time

C:\My Projects\CRM\CRM.WPF
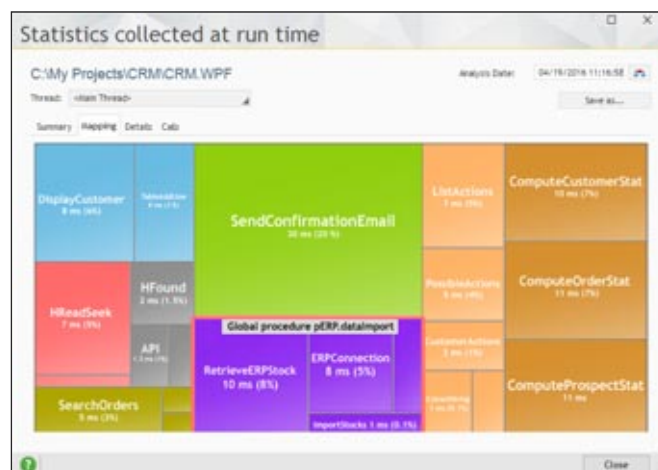
MAIN FEATURES
1. Managing the breakpoints
2. Executing code step by step:
- line by line,
- by block of lines,
- by ignoring the breakpoints,
- by directly modifying the code to execute ("Edit and continue"),
- by indicating the code line to run (Backspace).
3. Variable visualization. Ability to display a Watch window.
4. Display the process hierarchy (call stack)
5. Evaluation of expressions and set up of auto-stop expressions (enable you to start the debugger as soon as a condition is verified or as soon as a variable's value is modified).
6. Display the content of the data file items
7. Display the query content
8. Display the system elements
9. Display the information of the debugging dump
10. Display the values of the classes, members and advanced types
11. Display the HFSQL return code
12. Display the WLanguage return code
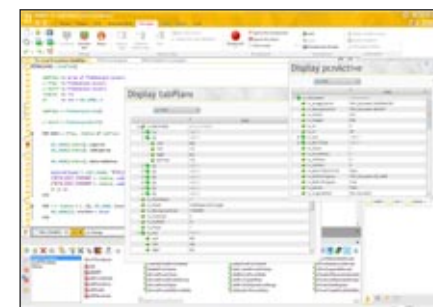
NON-MODAL EDITING WINDOW FOR WATCH

A Watch window lets you visualize the content of a structured variable: array, multiline RTF string, structured type of language, class, ...

This edit window is a non-modal window.

You can open several watch windows (on different variables) at the same time.

All the open watch windows are updated each time an instruction is executed.

This window allows you to save the variable's content on the drive.
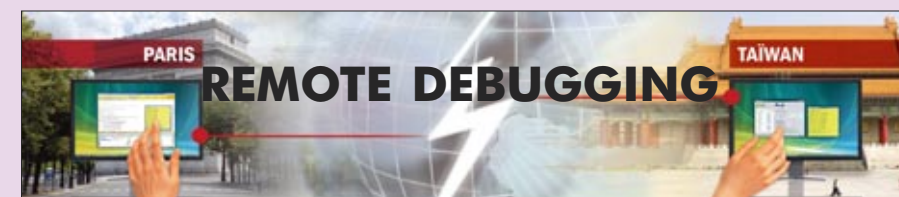
REMOTE DEBUGGING

IMPLEMENTATION AND REMOTE DEBUGGING

You can debug an application that is running on another machine, connected through the network or Internet.

You debug without having to go anywhere, directly on the customer's configuration.

The traditional trace window can also be displayed on the debugging machine.

DEBUGGER: DEBUGGING DUMP

It can happen that an application has a problem on a customer machine that is physically far away.

If you don't want (or cannot) perform a remote debugging (a standard WINDEV feature), or if you're not available at the time the failure happens, you can ask the application to create a dump file that will allow you to analyze the problem later on your own machine.

This dump file allows you to go to:
- the line of code that triggered the problem
- with the content of the variables
- with the stack of calls.

This provides indications that may be very precious to remove the problem.

The dump file can be associated with a bug report in the Project Monitoring Center.

It is available at later times, without bothering the end user, which allows for a later analysis of the problem on a remote machine.

WLANGUAGE DEBUGGING FUNCTIONS

In addition to the usual operations available in the debugger, some WLanguage functions are used only during the debugging phase and they have no effect on the deployed application.

These functions only have an effect in test mode.

In "Automated test" mode, these functions produce a detailed error in the test's status report.

In "Manual test" mode, these functions trigger an Assert.

For example, the dbgCheckEqual and dbgCheckDifferent functions check whether two variables are equal or different, and dbgCheckNull and dbgCheckNotNull specify whether a variable holds the Null values or is not Null.

CUSTOMIZING AN ERROR PROCESS IN THE DEBUGGING STEP

The new dbgOnError function is used to customize the error process to perform when an error is triggered in the debug code (dbgAssert, dbgError, dbgCheck functions). You improve your defensive programming technique this way!

NON-FATAL ERRORS

An application can generate "non-fatal" errors. These are errors generated by functions, and whose status report is not tested in the application.

For example, the return code from a query's execution, failing to open a parameter file, ...

This type of functions can return errors that are never processed.

These errors can appear for example only on some computers and not on others (because of configuration) and make the behavior of the application hard to understand and its debugging difficult.

AUDITS

The audits are very useful for debugging applications. See page 20.

FORMATTED DISPLAY OF HTML DATA

The HTML content of a variable can be displayed as is or formatted.

This feature is also available for the RTF format.

DISPLAY OF IMAGES

The watch window lets you directly display an image found in a variable or in a memo control (blob).

LOCAL VIEW IN HEXADECIMAL MODE

The hexadecimal viewing window can be limited to a watch window.

CREATE
COMPONENT:
SHARE YOUR CODE!

THE development teams always try to re-use their existing programs instead of **reinventing the wheel**.

WINDEV 21 innovates by offering the "automatic component" concept".

A "**component**" is simply an encapsulated, secure, piece of code (with or without windows, files, etc.) that several applications (written with WINDEV, WEBDEV or WINDEV Mobile) can share.

Professional development just became easier.

DON'T KEEP REINVENTING THE WHEEL
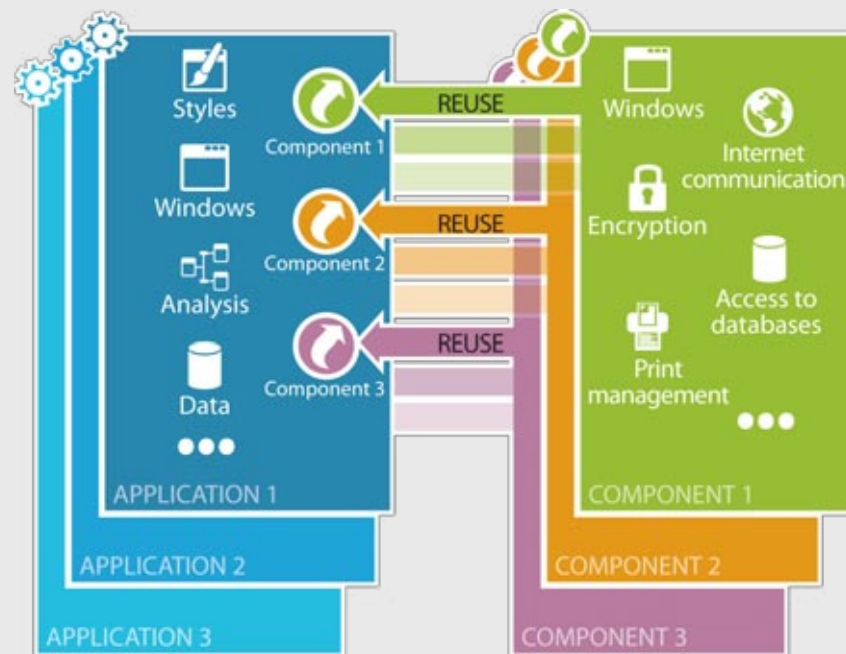
Components offer a modular approach to development.

Creating a component only requires one click

MANAGER
A component is a building block that can be reused. A WINDEV component prevents you from reinventing an existing routine.
A WINDEV component is as easy to create as an application.

NEW
Various new features

AAF TECHNOLOGY
Automatically adapt to the skin template of the host application

MAIN POINTS
Easy creation
Hot update
Protected source code
Shared with WEBDEV and WINDEV Mobile

FACILITATE REUSE
A component is a black box, created by a developer who can then reuse it. Only the entry points and the type of information returned are made public.

CREATE A COMPONENT, THEN REUSE IT ENDLESSLY
A component can be used simultaneously by several applications.

THE CODE IS HIDDEN
The components that you create are obfuscated, that is that nobody can see inside them or copy the source code, ...

A COMPONENT: A REUSABLE PROGRAM
A component may be simple or sophisticated.
A component can include an analysis, tables, windows, source code, classes, queries, procedures, reports, etc.

A component can itself use other components, or external data: database, Internet access, ...

SECURE YOUR DEVELOPMENTS
Once a component has been tested, each program that uses it benefits from its reliability. Without any additional work, the quality of your applications automatically improves.

AUTOMATIC SETUP
The installation of a component is automatic.

SECURE TEAMWORK
The benefit of using components when working in teams

within a company for instance is the productivity gain for the whole team:
• no unauthorized user can modify the source or the analysis.
• the access to the database can be totally encapsulated into a component. This way you can secure access to the database.

Create component for each building-block of your applications. You'll make your applications more robust, and you'll save some time.

WEB SERVICES
(SOAP & REST)

EASY WEB SERVICES

WINDEV 21 lets you **consume**, **create**, **deploy** and easily host **Web services**.

A native syntax is offered.

WINDEV 21 makes it easy to set up **SOA** (Service Oriented Architecture) architectures in your projects.

Creating and using Web services is easy with WINDEV 21

MANAGER
The Web services are often used in the current applications. You need to be able to use them and create them.

NEW
Generation from the WSDL
Send multiple values

MAIN POINTS
Easy creation of Web services
Easy hosting of the created Web services
Easy use of Web services

CONSUMMING SOAP AND REST WEB SERVICES
It is very easy to use a SOAP or REST Web service from WINDEV. The structures of the WSDL file automatically become native types of WLanguage.
For the REST Web services, all you have to do is use the `httpRequest` function.

EASY CREATION OF WEB SERVICES
The creation of the SOAP Web service is easy: simply define the set of procedures that make up the Web service interface.
The complex types (structures, XML content, ...) are supported. The WDSL description file is automatically generated.

EASY WEB SERVICE DEPLOYMENT
The Web services are hosted on a computer that includes a WEBDEV application server. The setup procedure is automatically generated.

EASY WEB SERVICE HOSTING
The hosting technology is based on the robust WEBDEV standard application server.
This technology helps ensure the Web service availability as well as its speed.
Requests are executed simultaneously, in separate processes, which ensures security.
The Web services can be consumed by any type of application, created in WINDEV, WEBDEV or with any other third-party language.
The PCSCloud.net cloud al-

lows for easy Web services deployments.

EVERYTHING IS MANAGED
The management of Web services is very powerful in WINDEV; here's a list of supported features:
• Array type results (SoapArray)
• Data binding Web services
• Inclusion of Web services
• Attributes in wsdl
• Multiple responses
• Multiple headers
• Message signature
• WS-Addressing
• Circular references in schemas
• SPNEGO authentications

INHERITANCE AND OVERLOADING OF UI (WINDOWS, CONTROLS), REPORTS AND CODE

Automatically propagate UI modifications

WINDEV 21

The size of your projects can be large.

You major projects can have thousands of windows.

Inheritance and **overloading** enable you to easily perform "overall" modifications on some control properties and source code for a set of windows: WINDEV 21 offers templates, inheritance and overloading.

It's easier to manage your modifications.

MANAGER
The very powerful concepts of templates, inheritance and overloading let you easily manage the future modifications of the entire UI of an application, without having to retool each single window.

NEW
Various new features

AAF TECHNOLOGY
Windows and controls inherit from AAF

MAIN POINTS
Easy modifications of a set of windows
Customize modifications for each control setting

EASY WINDOW EVOLUTIONS (ALSO AVAILABLE ON REPORTS)

Window template

A first window derived from the template with overload.

Note that the little yellow square represents the inheritance link with the template's controls.

A second window derived from the template with overload of the template's "size" property: the size of the window has been modified.

Control properties (UI and code) can also be overloaded.

OPERATING MODE

1. The first step consists in creating the template (window template). You simply create the window as you would normally do. All the properties and code defined for this window will be applied to the window derived from this template.

2. Controls will usually be added to the template. Properties and code are entered.

3. When creating a new window, you can specify that it derives from a template.

4. You can also apply the template to an existing window or create a template on template.

5. In the "derived" window (which inherits from the controls' properties), it is possible to overload the window: resize it, make it non-resizable, add a background image, ... The same is true for the code.

6. The operating mode is the same for controls. You can move them, make them invisible, change their size, overload their code. You can for example run some verification code before executing the click code defined in the template.

To illustrate the concept, a simple example: Window 1 is the template.

Window 2 is a window based on the template Window 3 is based on the template, and the buttons are overloaded (position, gray)
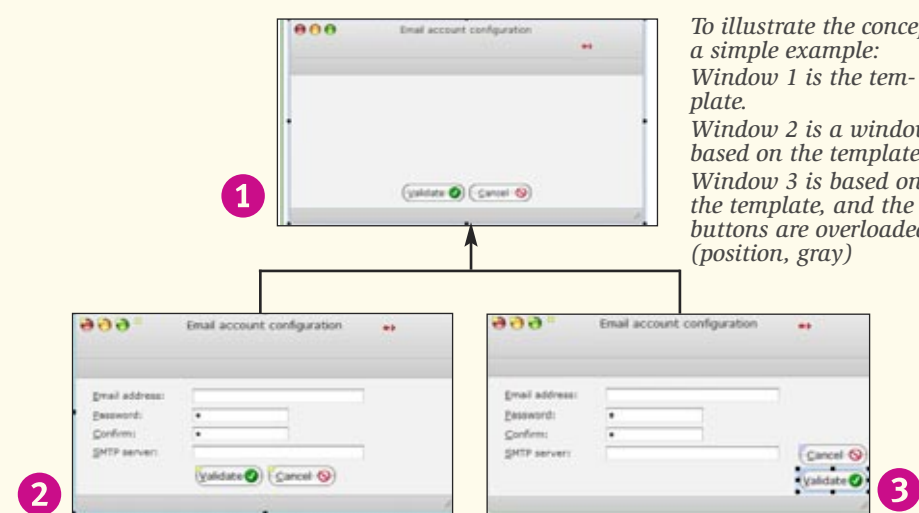
WINDOW TEMPLATE
A window template is a sample window that you define.
You define its contents (background, controls, code, local procedures, etc.) and the position of these elements.
Then, whenever a new window is created, it can be based on one or more templates.
Window creation becomes standardized.
You can also apply a template to an existing window.

INHERITANCE
When a template is modified, WINDEV 21 offers to modify all the windows that use this template.
If some windows based on a template should not evolve with this template any more, you can dissociate them from the template.
You can define several level of inheritance by basing templates on other templates.

OVERLOADING
You easily can take advantage of the inheritance and overloading concepts, at code level, but also and mainly for the other properties of the controls (position, ...)
In your windows, you can overload properties: for example positioning a control at a very specific location, hide a control, modify the size of the input area, ...
These new concepts allow for an optimized and easily modified UI architecture.

CONTROL TEMPLATE
Inheritance and overloading can also be applied to "controls".
You can define a control template that will be reusable in several windows or several times inside the same window.
The same way, these template controls can be overloaded in terms of their UI properties (location, state...) and/or at the code level.

REVERSE MODELING
On an existing project, upon request WINDEV generates an inheritance diagram for the windows and templates.
This provides a general overview of the inheritance links.

Large projects are easy with WINDEV 21.

HFSQL : SQL DATABASE PORTABLE, FREE, UNLIMITED

HFSQL

Client/Server, Network, Local, Embedded, Mobile, Cloud

WINDEV comes with the **HFSQL database**, which is both very **powerful**, very **fast** and extremely **robust**.

HFSQL is used on several millions computers throughout the globe.

HFSQL is available in Client/Server, Network, Local, Embedded, Mobile and Cloud mode.

HFSQL works on Windows and Linux, on mobile devices (iOS, Android, Windows), on networks of any size, across the cloud.

HFSQL can be freely distributed with your WINDEV applications.

DETAILED DOCUMENTATION

Discover HFSQL in all its details with this 24-page documentation available on www.WINDEV.com

MANAGER
HFSQL is a major benefit of WINDEV. Its reliability, its capacity, its speed and its free deployment make it indispensable

NEW
23 New SQL commands
Visual Explain
New Cluster feature

AAF TECHNOLOGY
Automatic management of concurrent access
Automatic reindex after hardware failure
History of modifications viewable
Secure access

MAIN POINTS
Truly free deployment
Speed and reliability
Compatible with Windows, Linux, iOS, Android
C/S compatibility, Network, Local, Mobile, Cloud
Automatic administration
Automatic structure change management

POWERFUL DATABASE
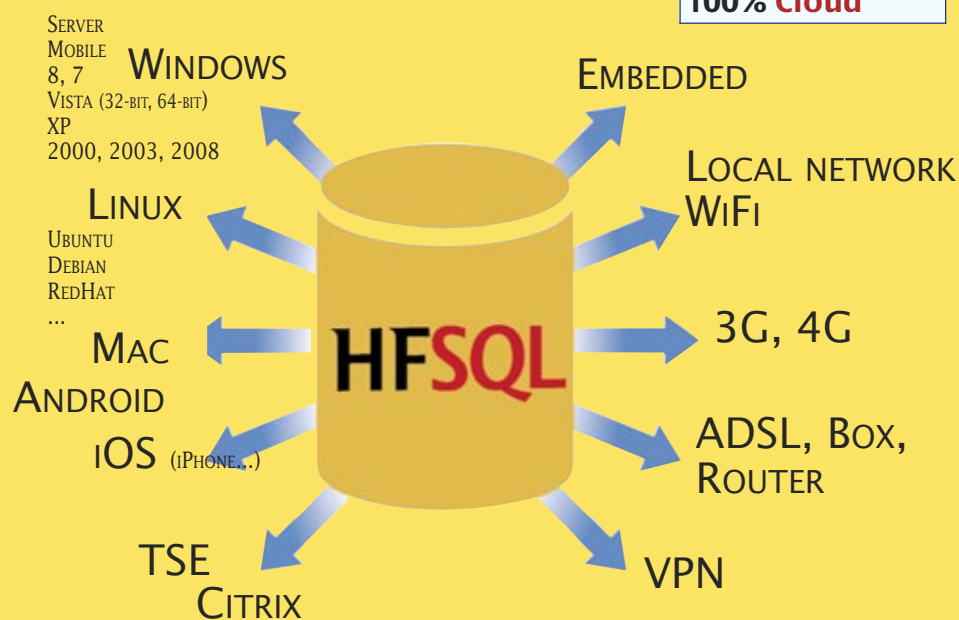
| 100% **Windows** |
| 100% **Linux** |
| 100% **iOS** |
| 100% **Android** |
| 100% **Cloud** |

SERVER MOBILE 8, 7
WINDOWS
VISTA (32-BIT, 64-BIT)
XP
2000, 2003, 2008

LINUX
UBUNTU
DEBIAN
REDHAT
...

MAC
ANDROID
iOS (iPHONE...)

TSE
CITRIX

HFSQL

EMBEDDED

LOCAL NETWORK WIFI

3G, 4G

ADSL, BOX, ROUTER

VPN

CROSS-PLATFORM

HFSQL offers a binary storage format compatible between all the platforms.

Mac 32 and 64bits
Linux
Windows 32 and 64bits
iOS iPhone, iPad
Android
Classic Local or network
Windows Mobile, CE, pocket PC
Mobile
HFSQL
Windows 32 and 64bits
Client/Server
Linux
Cluster 32 and 64bits
Acces Databases
ODBC
OLE DB

Oracle	Informix	Progress	SQLite
SQL Server	Sybase	MySQL	MariaDB
DB2	AS/400	PostgreSQL	XML ...

Native Access
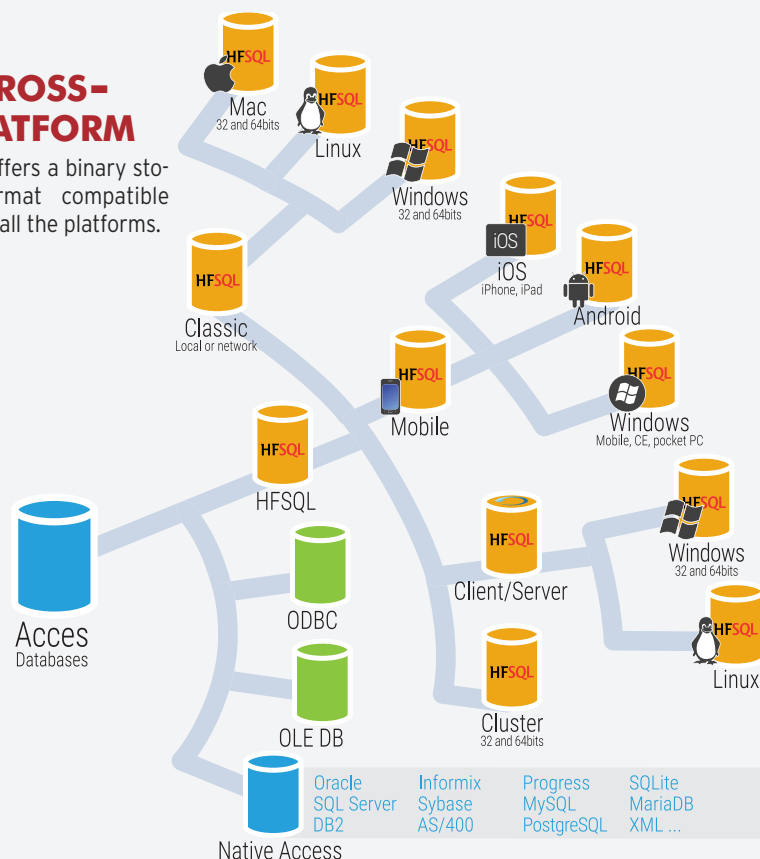
CLOUD
HFSQL databases can be hosted in the cloud, on PCSCloud.net for instance.

PCSCloud

MAXIMUM CAPACITY	
Rows per table	329 millions of billions
Size of a table	4 millions of tera
Size of a row	2 GB
Columns per table	65,535
Size of a column	65,535 bytes
Index per table	65,535

FEATURES
128-bit encryption
Referential integrity
Logs
Multi-server replication
Transactions
Triggers
Import Export
Cluster
Stored procedures

TECHNOLOGIES
Automatic maintenance (DDS)
Concurrent access management
No management
Resume automatically after incident
Automatic deployment

CLUSTER (SERVER FARM)
Thanks to the 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).

The read load charge is distributed on all the servers (load balancing for reading).

When a user is connected to a server that fails, the application won't be disconnected but automatically reconnected to a valid server (automatic fall over).

A PROVEN ENGINE COMES WITH THE PRODUCT: HFSQL
The HFSQL relational database engine comes with WINDEV.
It is a reliable, robust engine, already used on millions of computers, servers and terminals throughout the world.

HFSQL: THE NEW NAME FOR HYPERFILESQL
HFSQL is the new name for HyperFileSQL. HFSQL is fully compatible with HyperFileSQL.

COMPLETELY UNIQUE
HFSQL is the only database whose data is binary compatible among Windows, Linux, iOS and Android.
Cross-platform development is made extremely easier.

HIGH SPEED
HFSQL is extremely fast.

329 MILLIONS OF BILLIONS OF ROWS (RECORDS)...
HFSQL enables you to work with large volume of data (up to 329 quadrillion rows).
You can plan for the natural data growth with peace of mind.

SQL PROGRAMMING
HFSQL includes an optimized runtime engine for SQL queries. All the types of queries are of course supported.
A visual SQL report editor is also provided.
SQL programming is standard:
```
SELECT * from CUSTOMER where NAME= 'SMITH'
```

WLANGUAGE PROGRAMMING
You can also use WLanguage to program the access to the database. The power and the simplicity with which WLanguage manages databases is amazing.
For example, seeking a table row and all the associated processes (opening the table, assigning data, etc.) is done via a simple yet powerful code line:
```
HReadSeek(CUSTOMER,NAME,"DOE")
```
Plain English commands makes it easier to use: the code is self-commented!

AND THE CODE IS GENERATED!
This very simple, very fast and very reliable routine is generated upon request by RAD or by the different wizards during window or report creation!

TOTAL INTEGRATION
The description of a data schema is done via the data model editor.
At any time, in any editor, you have access to the data dictionary.
The interaction between the user interface and the database allows for easier and fas-

'INDEV®

HFSQL Control Center

HFSQL CONTROL CENTER

The Control Center lets you monitor all the servers and databases installed on your company's network or remote through the Internet.

This center also allows you to:
• visualize and print data
• directly execute queries
• manage the user accounts (groups), rights, list of current connections
• gather accurate statistics on the server use: computers, queries, logs, parameters, ...
• user disconnection
• the management of transactions: view, cancel, ...
• backup management (hot backup)
• view the record locks
• scheduled tasks
• server replication
• display the number of rows processed
• cluster management
• ...

ter programming.

SPEED OF YOUR APPLICATIONS

The multithread HFSQL Client/Server engine performs automatic load balancing in order to optimize the response times. This allows for fast execution of the queries.

OPEN TO OTHER APPLICATIONS

The ODBC and OLE DB drivers, which can be distributed freely with your WINDEV applications, let you read and write HFSQL data from third-party programs.

RIGHT MANAGEMENT

User account management is automatic and very rich: password, IP restriction, groups, read write access rights, to a database or some tables, right to start a backup...

DETAILED STATISTICS

The HFSQL Control Center displays precise statistics about server access: computer, SQL query's content, execution time. Studying this data enables you to better organize your applications.

USEFUL TOOLS

A set of useful tools is provided: import data, check database, view data, performance optimizer, and more...

AUTOMATIC SETUP, "ZERO ADMINISTRATION"

HFSQL installs instantly and is easy to maintain, without any prerequisites. For example, if the database must be reindexed further to a physical problem, it is automatically done. Database administration is automatic: no need to involve engineering resources!

ALL THE TYPES OF DATA ARE SUPPORTED

HFSQL manages all types of data in the tables.
• character strings (phonetic find is available) and binary string
• numeric (integer, real, currency, etc.)
• dates, times, durations
• text and binary memo (BLOB, LOB, image, sound, video etc.)
• the "NULL" value is also supported
All types of keys are supported: automatic identifier, text, numeric, date, time, composite key.

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 get automatically activated during idle times.

The following types of indexes can be created: simple index, composite index (multi-column), partial index, full text index.

HFSQL ensures data integrity by managing: unique constraint, cardinality constraint, automatic identifier, primary and foreign keys.

FULL TEXT SEARCH

The "full text" search allows for very fast string searches inside your data.

The index supports rich text (RTF, HTML), ignoring their tags during the indexing process.

Results are offered according to a relevance order ("ranking").

UNICODE AND INDEX SORTING BY LANGUAGE

HFSQL supports Unicode type text and memo columns. The indexes can be sorted according to the alphabetical order of each language (Russian from Russia or Ukraine, Chinese from Singapore, Taiwan, Hong Kong, Macao, ...).

IMPORT/EXPORT DATA

The WDCONVER module, provided with WINDEV, lets you import data in various format: Access, dBase, Text, Oracle...

CLIENT/SERVER

The engine for the Client/Server version is available for Windows and for Linux. The compatibility with HFSQL Classic and Mobile is complete.
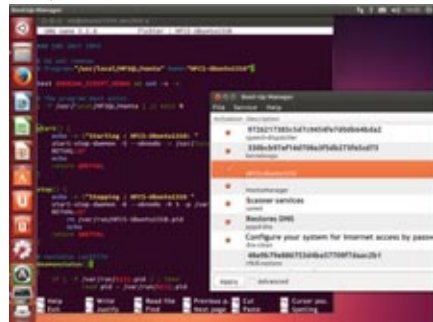
The HFSQL engines can be distributed freely with your applications.

FAST REMOTE ACCESS

The communication layer is integrated with the multithreaded engine, which allows access through IP addresses and very good response times.

MULTI-DATABASE, MULTI-SERVER

The same machine can host several HFSQL servers, and each server can contain several databases.

FRAME COMPRESSION (DSL, 3G, 4G, EDGE, VPN, ETC.)

The frame compression allows you to reduce the size of the packets traveling over the network (up to 95%).

The speed for remote connection is improved. The volume of data traveling over the transmission media is reduced.

SECURITY: "SQL INJECTION IMPOSSIBLE"

You can create configurable queries, which prevents server attacks through "sql injection".

32-BIT, 64-BIT

64-BIT SERVER — **64-BIT CLIENT**

32-BIT SERVER — **32-BIT CLIENT**
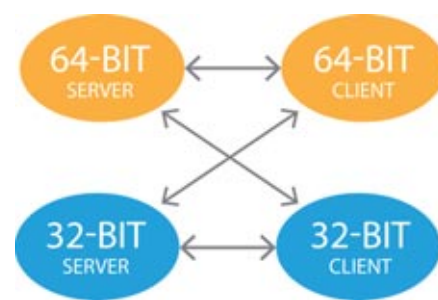
HFSQL operates both in 32 bits and in 64 bits. Servers and clients can be mixed.
Some of the supported Windows servers:
• Windows Server 2012
• Windows Server 2008
• Windows Server 2003
• Windows 2000
• Windows XP, Vista, 7, 8 and 10.
in all their versions.
A 32-bit application can access a 64-bit server, and vice-versa.

STORED PROCEDURES

The stored procedures and triggers are available. Programming is done simply in WLanguage.

ISOLATION OF HFSQL TRANSACTIONS

HFSQL Client/Server 21 proposes 4 isolation modes for transactions.
• Unvalidated data (READ UNCOMMITTED)
• Validated data (READ COMMITTED)
• Instant transaction photography (REPEATABLE READ)
• Serializable transaction (SERIALIZABLE).
These 4 transaction modes let you set the isolation level.

HOT BACKUP

You can trigger a database backup while the database is being used.

There can be read, write and query database accesses happening. Data integrity of the saved data is ensured.

The backup can be triggered by programming (at a certain time for instance) or through an action of the DBA.

You can also perform incremental backups.

AUTOMATIC DATA MODIFICATION

HFSQL manages the evolution of the data schema transparently thanks to the DSS (Data Schema Synchronization) technology.

Each data schema modification is automatically applied to the structure of the implemented database, and this regardless of the age of the database. There are no scripts to write (Alter table ...)

REPLICATION

HFSQL allows for the replication of databases and the replication of servers, unidirectional and bi-directional, scheduled or continuous.

Replication with mobile devices is also supported.

AUTOMATICALLY RESTORE CONNECTION

This feature automatically takes care of dropped connections.

Usually, this problem occurs with hardware whose connection with the server is not always on: mobile devices (Wi-Fi, 3G, 4G) notably...
.

In a Wi-Fi connection for example, the link between a remote device and the server can be interrupted briefly.

This can also happen on regular wired networks.

When the application is reconnected, we need to resume the application 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. Automatically, your applications are more reliable, faster and you have less to code.

You can also manage the connection interruptions by programming.

HFSQL, which comes with WINDEV 21, is an undeniable asset. Reliable, fast, secure, free...
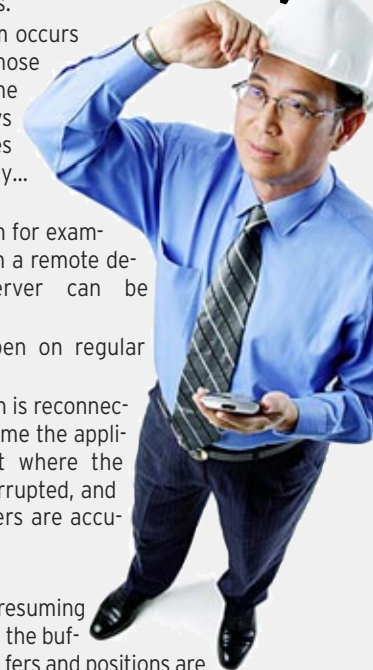
"CONCURRENT ACCESSES": AUTOMATIC

HFSQL 21 automatically supports concurrent accesses to a row, without any coding (also manages integrity and duplicates). In case of access conflicts, a customizable window is automatically displayed.

This automated process ensures the security and reliability of your applications.

You can also handle concurrent access in your program for special cases.

Accountancy
Caution! Another user is modifying the same data as you at this time!

Here, 2 users are trying to modify the same table row at the same time!
A customizable window is automatically displayed and it asks for the correct value.
No programming is required.
Data integrity is automatically ensured.

SQL QUERIES AND NATURAL 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** .

The visual query editor lets you generate the **SQL** queries that will be used in your programs.

The editor also allows the end user to create his own queries.

The query will be generated in **natural language** as well so you can verify that it corresponds to

Everyday language

SQL

Chart
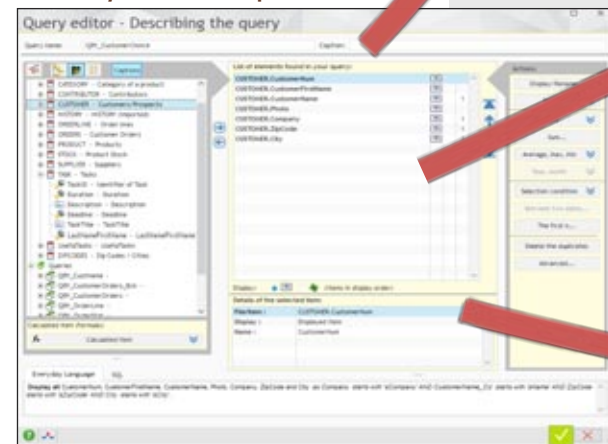
A few clicks in the editor are all it takes to create an SQL query and check it.

what you intended!

It is also generated **graphically**. This way there's no risk of error.

MANAGER
The WINDEV query editor lets you "draw" your queries for any database. You can distribute it for free.

NEW
Better parameter naming

AAF TECHNOLOGY
Free distribution. ""Reports and Queries" lets end users create their own queries

MAIN POINTS
No knowledge of SQL is required
Free distribution with your applications

NO NEED TO KNOW SQL TO CREATE POWERFUL SQL QUERIES
Choose the columns to include, specify the selection conditions using the wizard, and the query is built (in optimized SQL code). The editor automatically creates queries on any database, even the most complex queries.
You can, of course, modify the code generated by the query editor.

VISUAL QUERIES
The query is simultaneously generated in SQL, in natural language and graphically as you make your choices in the editor.

OPTIMUM SPEED
WINDEV 21 detects missing keys in order to provide optimal speed.

QUERIES BASED ON QUERIES
The result of a query can be a visualization table, a printed report, even a HFSQL table. A query can use the result of another query as its source.

REVERSE ENGINEER EXISTING QUERIES
You already have an existing SQL query? WINDEV 21 presents it graphically!
If you have Access queries, note that these are automatically imported (see page 78).

QUERIES BUILT ON ANY DATABASE...
The data source can be a HFSQL database or a third-party database: Oracle, MySQL, SQL Server, DB2, AS/400, Access...

DISTRIBUTE THE QUERY EDITOR FOR FREE
The end users will be able to create their own queries. To prevent errors, deleting and modifying data is not possible for the end-user (see page 50 and 55)

RETRIEVE LEGACY CODE

EASILY BENEFIT FROM THE POWER OF WINDEV
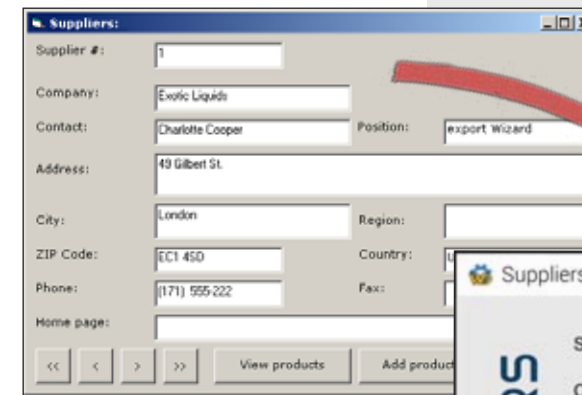
Who doesn't have any legacy code?

Who doesn't wish to **migrate a maximum of applications to WINDEV 21** in order to benefit from all its fabulous potential?

WINDEV 21 assists you with bringing legacy applications and UIs over.

WINDEV 21 offers to retrieve windows from other languages.
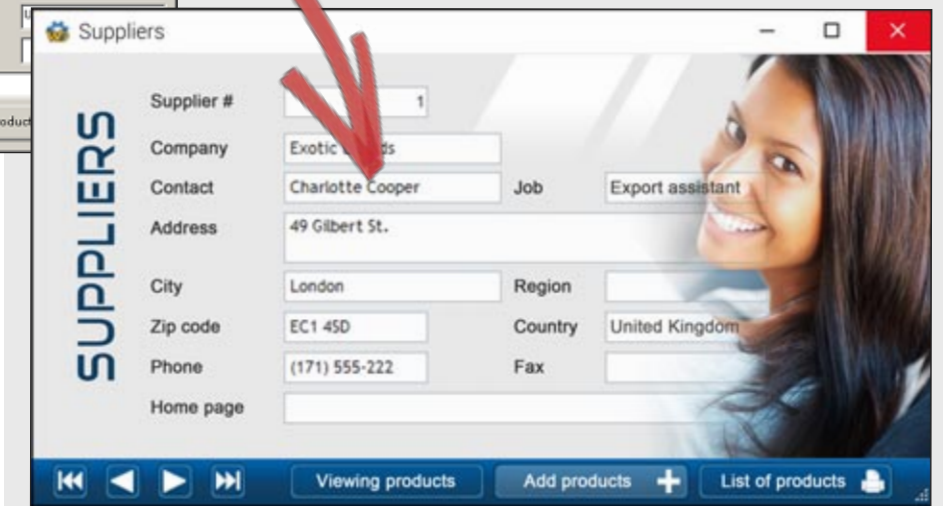
IMPORTING A GUI FROM A THIRD-PARTY LANGUAGE
For other languages (C++, C#, and most other ones), WINDEV 21 imports a window and its "controls", in order to transform them into WINDEV windows.
This is very useful when you

want to rewrite an application in WINDEV!
The window must be opened in Windows in order for the retrieval module to operate.

RETRIEVING ACCESS AND VB CODE
WINDEV also knows how to retrieve source code from

older Access and VB versions.

Link to third-party languages, legacy import, WINDEV 21 acknowledges your legacy applications!

MANAGER
Retrieving windows and code from other languages is easy with WINDEV

NEW
Various evolutions

AAF TECHNOLOGY
The end user benefits from all the AAF of the WINDEV applications

MAIN POINTS
Retrieve a large number of existing elements
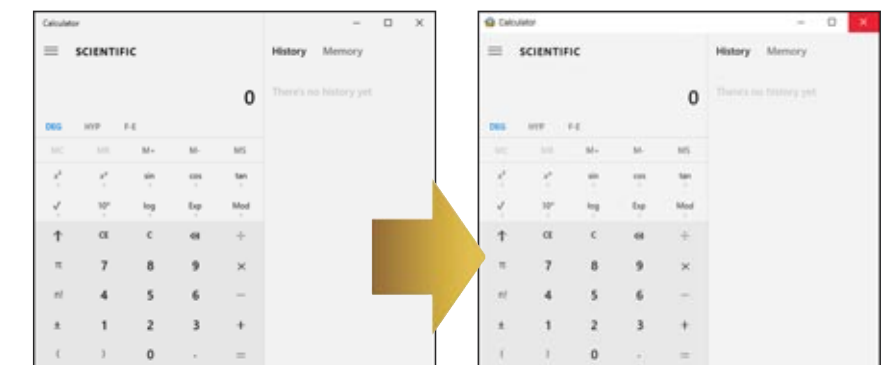
Example of UI import: a C++ window retrieved in WINDEV

TEAMWORK: INTEGRATED VERSIONING TOOL (SCM)

Work in teams, share source code in complete security

Totally integrated to the environment, the versioning tool (named SCM: **Source Code Manager**) manages team work, the **history** of modifications and versions, the simultaneous management of several versions of the same application (branches), and the automation of the source backup (code, windows, reports, ...) for the members of the development team.

The versioning tool brings **security** to your developments **as a team**.

MANAGE SEVERAL VERSIONS OF YOUR APPLICATIONS, ALONE OR IN A TEAM, LOCALLY OR REMOTELY

SCM IN THE CLOUD

WINDEV 21 lets you easily put the SCM database directly in the cloud (subscription required).

All the developers in the team have constant access to projects then, regardless where they're physically located.

The developer simply needs an Internet connection to read and write in the SCM.

With SCM in the cloud, distributed teams can remain up to date easily.

Another benefit of the cloud is you don't have to manage the SCM database.

MANAGING THE RIGHTS IN THE SCM

SCM offer access management for the project elements.

Access to each element (window, code, ...) can be restricted based on the developer's rights (his/her "connection" account).

A developer can only access the elements that were authorized by the project manager.

The following rights can be defined: read only, write/check out, reversible deletion, permanent deletion, renaming...

THE SOURCE DATABASE

With SCM (Source Code Manager), the project elements are grouped in a database. Before being used an element is checked out, once it has been modified it is checked back in. Therefore team members use up-to-date elements.

SCM stores all the project's elements: procedures, sets, classes, pages, reports, components, queries, analyses, dependencies (images, ...), ...

The database is installed either on a dedicated server, or on a network computer in a shared directory.

POWERFUL FEATURES

• SCM is entirely integrated in the environment; for example, the SCM offers to check out an element when you try to modify it.
• The database supports several projects; an element can be shared.
• A history of all elements, since their creation, is stored in the repository (a purge can be performed).
• The project is also found on all the development computers; therefore you can work on an offline machine.
• Branches are supported: you manage several different versions of the same application at the same time.

1 TO 1,000 DEVELOPERS

SCM is meant to accommodate teams of 1 to 1,000 developers.

Even if you develop on your own SCM is useful because it keeps track of your applications' history, and allows resources to be shared among projects.

CONNECTED AND REMOTE

SCM accepts remote connections through the Internet. This way you can work on a project from a customer site, without fear of losing your modifications. The SCM can also be used in offline mode (in a train, on a plane, ...).

DIFFERENCES BETWEEN 2 VERSIONS: CODE AND UI

Thanks to SCM, you can check the differences between two versions of a project element: see opposite.

INTERACTION WITH THE CONTROL CENTERS

When checking an element back into the SCM, the SCM proposes to associate the checked-in version with the task or bug correction coming from the task list on which the developer is working.

The development history is commented without any extra effort.

SCM is inescapable.

BRANCHES

SEVERAL CONCURRENT VERSIONS OF THE SAME PROGRAM

Branch management is used to manage several versions of the same application in parallel.

The most common case is as follows: you have deployed a version of your application and you are working on the next version of this application. Meanwhile, you would like to apply the bug corrections implemented in the current version to the deployed version and therefore create and deploy intermediate versions.

This way you can distribute updated versions of your application to customers without major effort: no need to code the same things twice. Obstacle to patches availability disappear...

Another case is a program distributed on a large scale with users running different versions.

The number of branches is unlimited, and you can have "branches of branches".

BRANCH CARRYOVER

Branch carryover lets you carry over in a single operation all the modifications and fixes (code and/or UI) from one branch to another, or from a branch to the main trunk.

Window modification history

SAVE THE ENTIRE HISTORY

INDICATORS TO MONITOR EVERYTHING!

SCM keeps all the versions of all the project elements, for each developer: code, class, project, window, query, data model, image...

Each modification is identified by its author and date. A commentary can be entered by the developer.

You can retrieve an older version.

Entire project history

THE 7 DIFFERENCE GAME

FIND THE DIFFERENCES BETWEEN 2 VERSIONS OF AN

ELEMENT

SCM lets you check the differences between two versions of a project element: code, class, project, window, query, data model, image. Not just the code!

SCM detects for instance the difference in a control's properties, like the "Automatic input" property enabled or not ...

DIFF AND MERGE

You can easily carry over the modifications from one version to the other.

MANAGER

The versioning tool allows for secure team work, the sharing of elements, the management of different versions of a same application and ensures that automatic backups are performed.

NEW

New look for the administrator
Automatic project check-in
Labels for analysis generation

MAIN POINTS

Local and remote access
Automated backups
Share elements among a team
Free source code repository
Automatic change history

UML MODELING WORKFLOW

Define your data structures easily

With WINDEV 21, **modeling** a database is very easy!

You create a "**UML**" model without knowing UML!

WINDEV 21 technology is truly revolutionary: it graphically represents the organization of the data and processes.

Thanks to WINDEV, any developer can automatically create a UML analysis. Impossible to make cardinality errors (1-n, 0-1, and so on)!

Of course, WINDEV 21 also works with **all the** other **data models** and **modeling** methods.

MODELING IN **4** QUESTIONS

Answer 4 easy questions to create the relationships and integrity constraints.

Describing the link

| Order | 0,n | | 0,n | Product |

Each "Order" has at least one "Product"
- Yes
- ● No

Each "Order" can have several "Product"
- ● Yes
- No

Each "Product" has at least one "Order"
- Yes
- ● No

Each "Product" can have several "Order"
- ● Yes
- No

Check the integrity between the relation file and ...
- "Order" file
- "Product" file

☐ Display the advanced cardinalitie

RE-USE EXISTING CODE (ORACLE, XML, AND SO ON): AUTOMATIC

HOW TO RECOVER AND USE EXISTING INFORMATION

The link with database or third-party file management systems (XML, Oracle, SQL Server, MySQL, Access, DB2,

Informix, etc.) is easier. To retrieve the description of a database, all you have to do is move this description from the server to the data model editor of WINDEV and specify the selected tables: can't be

any easier than that!
If the structure of the imported database evolves, WINDEV detects it and offers to modify the application's analysis!
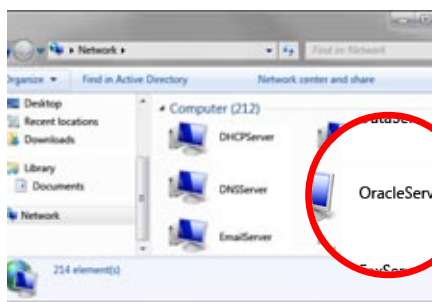
Here on a server: an Oracle database. Simply slide the server name toward the data model editor of WINDEV.…
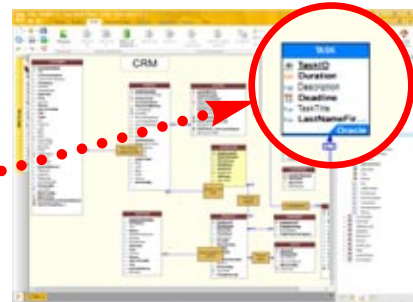
…to transfer the description in the WINDEV 21 editor Here, the database itself stays in Oracle format (blue header).

MANAGER
Defining an application and its rules using the modeling tools provided in WINDEV is simple and easy.

NEW
LDM branch copy

MAIN POINTS
Automatic data dictionary, with bi-directional impact
Generate complete application from the model
Generation, reverse analysis and real-time class synchronization from UML

Modeling a data schema is very easy thanks to the editor integrated in the environment.
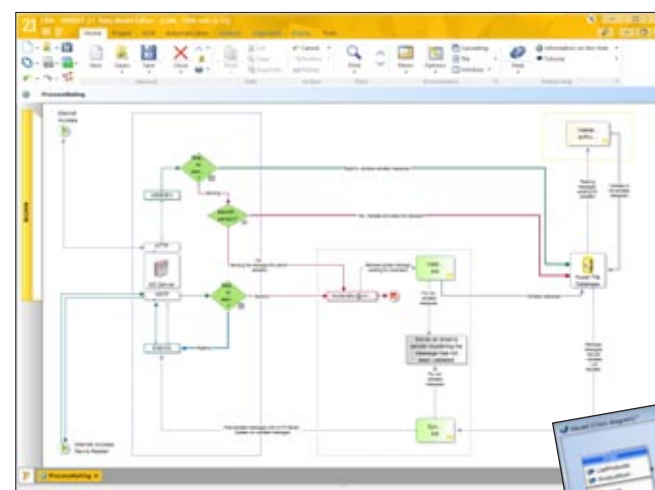
The workflow editor lets you define in a realistic fashion processes, organizations, workflows, … without any format constraints.

UML
WINDEV supports the 9 UML models.
These models are, of course, edited and documented in the "Program documentation" (see page 92).

UML GENERATION AND REVERSE-ANALYSIS
WINDEV automatically generates the source code from the class diagrams, and reciprocally, offer reverse-analysis of existing classes.
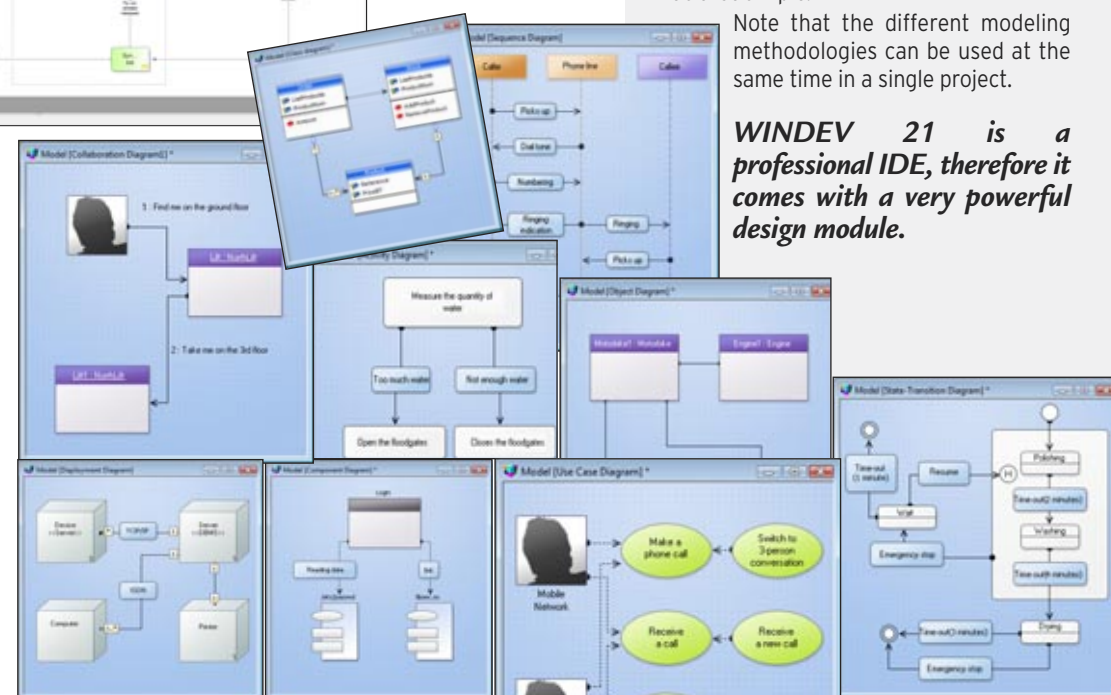
HOW TO CREATE AN ANALYSIS?
Let's look at a simple but representative example of data schema creation in the editor.

1. We simply need to define the structure of the tables that make up the analysis; columns are defined or retrieved from a data dictionary. We specify the type of columns, the type of key...
Any new column is stored in the data dictionary.

2. Then we define the relationships between tables.
To link tables, simply draw a link with the mouse.

3. WINDEV then asks some simple questions, in natural language to automatically determine the type of relationship between the two tables (see opposite page).
WINDEV will check for referential integrity (can be turned off).

4. If the relationship type requires it, WINDEV then asks if it must generate the relationship table, use an existing table, or if you prefer to describe it "manually": the relationship is defined.

5. WINDEV then asks for the relationship names

That's it, the tables are linked, your work is done.

To create the application, all there is to do now, is generate the windows, menus, reports and source code using the RAD tool or code the old fashion way, and then print the documentation...
It's that simple.

Note that the different modeling methodologies can be used at the same time in a single project.

WINDEV 21 is a professional IDE, therefore it comes with a very powerful design module.

.NET

USE YOUR .NET ASSEMBLIES

A .Net control in a WINDEV window

Need to create .NET?

WINDEV 21 offers the.Net features you're expecting.

WINDEV 21 knows how to use your .NET assemblies.

WINDEV 21 knows how to use classes and controls found in assemblies.

WINDEV 21 also lets you create .NET assemblies.

In WINDEV, visualization of the .Net assemblies

MANAGER
WINDEV is open to all languages and all technologies, especially to .NET.

NEW
Generic instantiation
Extension method

MAIN POINTS
Ability to create .Net assemblies
Ability to use .Net assemblies

SHARE CLASSES WITH .NET: IMPORT & EXPORT
WINDEV classes can be used directly and without any modification to generate .NET applications.

And vice versa, WINDEV 21 lets you use.NET classes built using other languages as native classes (with all the advantages of the code editor, documentation editor, etc.).

USING .NET CONTROLS
The "WinForm" and "WPF" controls can be directly inserted in WINDEV windows.

Third-party visual components can be integrated quickly in your applications.

Interactions with these components are easy to program thanks to calls to methods and delegates.

ACCESS .NET API
WINDEV 21 lets you access.Net APIs.

PROGRAMMING SIMPLICITY
The accesses to .NET classes and structures are similar to the accesses to the classes and structures of WLanguage, the calls to methods have the same syntax.

No need to learn a new language to integrate third-party .NET assemblies: take advantage of the WLanguage ease of use.

COMPILE IN .NET
You want to compile a .Net application: nothing's easier, click the relevant menu choice in WINDEV.

You can create your .NET API in .net mode.

3-TIER: UI, PROCESSES, DATA ACCESS

3-Tier: this technique is used to separate application code into **3 independent layers**.

WINDEV 21 allows **3-tier** development, and facilitates the communication between the layers with the **automatic serialization** and **deserialization** functions and the **data binding**.

MVP
MODEL-VIEW-PRESENTER GUI ARCHITECTURE
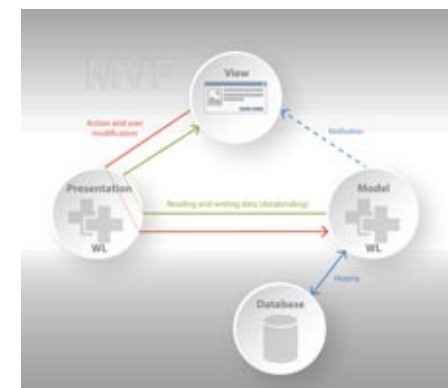
MANAGER
WINDEV allows n-tier development.

NEW
Various optimizations

AAF TECHNOLOGY
UIs benefit from AAF

MAIN POINTS
Automatic serialization/deserialization WLanguage functions
Real time synchronization

SUPPORT FOR THE 3 LAYERS
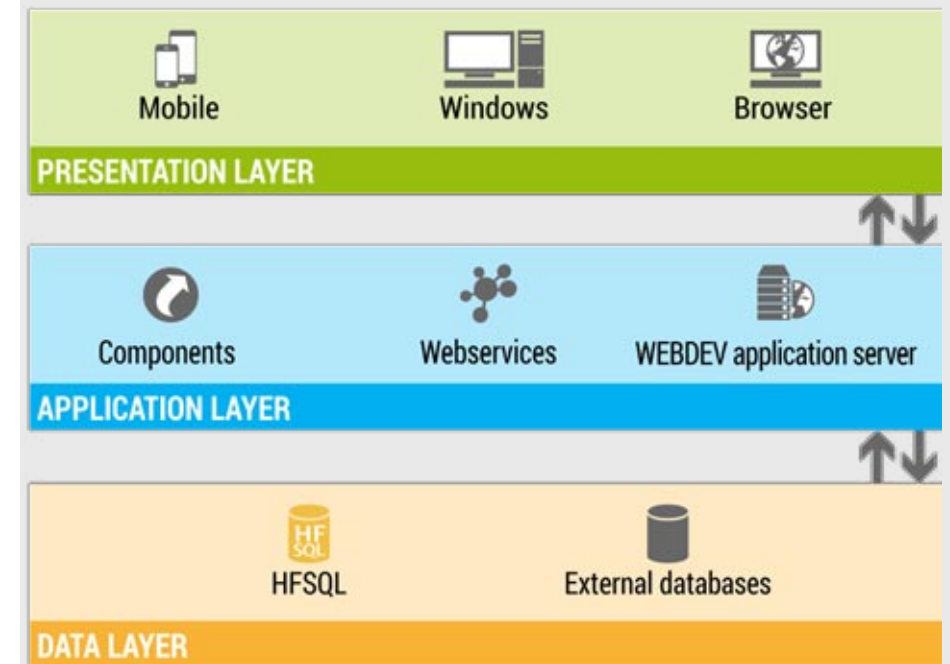
EASY 3-TIER PROGRAMMING
The purpose of 3-tier programming is to separate the 3 layers usually found in an application: UI, processes and data.

An application is then made of 3 independent layers:
• presenter layer,
• process layer,
• data access layer,
that communicate with each others.

The reason for separating the layers is to simplify the maintenance and the future evolutions of the application.

This ensures better security because the access to the database is authorized by the process layer only.

IMPLEMENTATION
The dialog between the layers is done through classes or structures, which are automatically generated by WINDEV.

1- Choose the data sources (tables or queries) that will be used in 3-tier.

2- WINDEV automatically builds the class diagram that corresponds to the classes and structures

3- The classes and structures are generated in WLanguage.

4- Synchronization between classes and diagram is done in real time.

5- Use these classes to transfer information between the "logic" and "presentation" layers.

6- In the presentation layer, use data binding to assign data.

For the communication between layers: Depending on the communication protocol between the 2 layers (components, Web Services, HTTP, WEBDEV site, ...), the classes can be serialized in XML or in a binary format (WLanguage functions named **Serialize** and **Deserialize**).

THE PRESENTATION LAYER: MVP
The presenter layer can be structured by using the MVP (Model-View_Presenter, optional) model.

3-tier is easy with WINDEV

OPEN YOUR APPLICATIONS TO ALL STANDARDS

Yes to standard

WINDEV

Openness is fundamental to development: **a developer should never be stuck**!

WINDEV 21 is **open** to all the market standards: this adds simplicity to any action...

With WINDEV 21, you can easily access any standard!

Connect and drive any device.

And do this the most easily and naturally in the world, because WINDEV 21 is open to all **standards**.

Open

WINDEV 21

MANAGER
WINDEV is open to all the market standards. You'll never be stuck, you'll benefit from all technologies.

NEW
gzip, tar, tar.gz formats
XPath query on native XML type
iCalendar

AAF TECHNOLOGY
Exports Word, Excel, OpenOffice, PDF, XML...

MAIN POINTS
Total openness

STANDARDS LINKED TO INTERNET

INTERNET
Thanks to the compatibility between WINDEV 21 and WEBDEV 21, easily transform your Windows applications into dynamic Internet or Intranet sites.
All the project elements (analysis, windows, queries, reports, code classes, etc.) are compatible.

HTTP
Get and Post type HTTP requests can be programmed to retrieve data on an Internet server: submit a form, retrieve a site's page (to automatically analyze its content in your program), ...

SOCKETS
Using sockets (including SSL and UDP) in your programs offers a lot of freedom in many areas: communication, ...
It is easy to create a multithreaded socket server for instance.

FTP AND SECURE FTP
A family of functions is used to access an FTP server, enumerate the files, send or receive a file, ...

RSS
Your applications can read or write RSS streams natively.
The streams, channels, owners are read/write accessible.

WEB SERVICES
The SOAP and REST web services are supported.

You can read them, you can create them, you can host them.

SMTP, POP AND IMAP
These outgoing and incoming e-mail standards are supported natively by WINDEV 21.

GENERAL STANDARDS

TSE & CITRIX
The applications developed with WINDEV operate in the TSE and CITRIX distributed environments.

CONTROLLING SOFTWARE
It's easy to automatically control Word or Excel. A lot of source examples are supplied.
It's even easy to control tools that have an "OLE" mechanism, such as Outlook, MS Project, Notes, ... as well as OPC..

OPC
OPC is a communication standard for automation, machine tools, ... that is used a lot in industrial settings. WINDEV 21 supports OPC (Data Access part").

XML
XML is supported natively.

LDAP
LDAP is a communication standard for accessing directories. The family of LDAP

functions allows you to access and perform searches in the directories (read, write). ActiveDirectory and OpenLdap are accessible through this family of functions.

PDF
PDF is supported natively, in read, display and document creation mode (see page 50).

BAR CODES
Bar codes are supported in read and write mode (see page 53).

MS OFFICE DOCUMENTS

Documents from the MS Office suite are supported: XLS, XSLX and DOCX in read and write mode.

IMAGE FORMATS

All the image formats are supported (see page 86).

DLL CALL
A WINDEV application can communicate with DLLs.

.NET
It is possible to create .Net applications and assemblies. You can also call.Net assemblies (see page 80).

API
The "API" function lets you manage all the MS Windows APIs.
A wizard manages the structures needed for calling the API.

ZIP, RAR, CAB, 7Z, GZIP, TAR, TAR.GZ
The ZIP and CAB compression formats are supported in read/write mode. The RAR format is supported in read mode.

ICALENDAR
The iCalendar format is native.

DEVICES

TOTAL OPENNESS
WINDEV 21 is open to all technologies. You'll never be stuck.

TABLET, SMARTPHONE, MOBILE, DEVICE
With WINDEV Mobile, immediately move your WINDEV application on to tablet, Smartphones and mobile devices.
Instantly convert a Windows application into a mobile application (Android, iPhone, ...): it's the same code, the same windows, the same databases, ...!

PARALLEL PORT
WINDEV 21 also allows you to easily manage the parallel ports.

USB PORT
WINDEV 21 supports USB ports (USB 1, USB 2, USB 3). An application can enumerate the devices, display the tree structure of a hub, be called when a device is connected or disconnected, get information about a device (manufacturer, ID,...).

DATA ACQUISITION THROUGH SERIAL LINK (RS 232) AND USB
There are plenty of uses: badge reader, electronic scale connection, robot control, etc.

BLUETOOTH
WINDEV 21 lets you manage and list Bluetooth devices, establish connections and communicate with devices.

TWAIN: SCANNERS, ...
Most scanners, digital cameras, etc.. can be controlled by programs that use the TWAIN standard. WINDEV 21 supports this standard easily through... `Twain` commands in WLanguage!

DOMOTICS
Domotics is supported: X10, CM 11, CM15, DLNA (see page 87).

SNMP
The SNMP standard is used by a large number of network devices: switch, router, network card, network printer... A family of native functions allows you to communicate with these devices.

TAPI
TAPI is a standard for communicating with phone devices (PBX, ...). The family of TAPI functions allows you to manage these devices.

WINDEV 21 is open to all standards.

Communicate easily

- Component
- Web service
- SNMP network
- FTP
- OPC DLNA
- Socket
- Twain
- USB, RS232
- Bluetooth
- HTTP
- DLL
- **Application WINDEV**
- API
- XML
- TAPI (telephony)
- Replication
- SOAP J2EE .NET
- email POP, SMTP, IMAP

NATIVE ACCESSES:
GOOGLE, OUTLOOK, LOTUS NOTES, SAP, EXCEL, ...

Communicate between applications!

A large number of companies use **standard software** such as Lotus Notes, SAP, Outlook, Excel, Google ...

Google also provides a large number of applications (Contacts, Maps, Calendar, ...) that you may want to control from or include in your applications.

The link between applications built using WINDEV 21 and these software is easy to implement thanks to the native access functions provided with WINDEV 21.

CONTROL AND COMMUNICATE WITH STANDARD APPLICATIONS

You're already familiar with version 20? There is a 92-page technical document dedicated to the 921 new features of version 21. Printed version available by simple request; PDF version available on www.WINDEV.com.

MANAGER
WINDEV is open to all the standard software on the market. Your applications can interact easily (read, write) natively.

NEW
SAP in 64-bit mode

AAF TECHNOLOGY
Exports Word, Excel, OpenOffice, PDF, XML...

MAIN POINTS
Native links with other common industry programs

NATIVE **LOTUS NOTES** SUPPORT

Accessing e-mails found on the Lotus Notes mail server, in incoming and outgoing modes, is standard in native mode.

Programming is child's play: these are functions you already know from WINDEV!

All you need is to add a line of code to connect to the Notes server: **EmailStartNotes-Session**.

The usual security of Lotus Notes is respected, of course, via the Lotus certificate.

Access to contacts, appointments, tasks and documents found on the server is easy.

It can be done in read and write mode through a set of specific WLan-guage functions (**Notes** family).

NATIVE **OUTLOOK** SUPPORT

Access to Outlook mails, in incoming and outgoing modes, is standard.

Access to contacts, meetings and tasks as well as participants is easy, in read and write mode.

Exchange is supported.

NATIVE SAP SUPPORT

SAP ACCESS VIA NATIVE BAPI CALL

SAP is a widely used ERP.

Many SAP users implement add-on applications in addition to their software.

Native SAP support by WINDEV allows you to do so with our famous ease of use.

A BAPI (Business API) is a function that interacts with an SAP system.
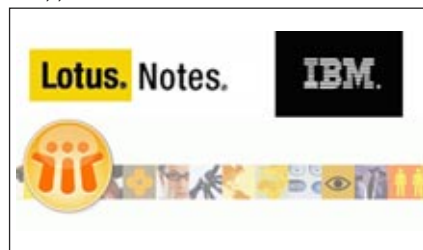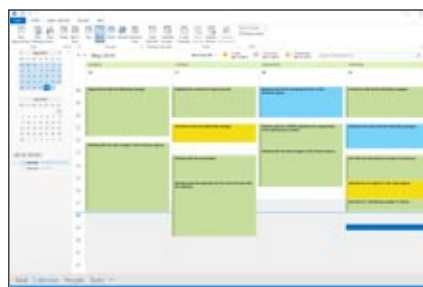
Some BAPIs are provided with SAP, other are written by other developers or software publishers.

A family of functions enables you to establish a connection (with authentication) and call BAPIs and pass them parameters.

A wizard helps import automatically the structures used.

You don't need to install the SAP UI module.

This access through BAPI allows the database security to be respected (no need to create an account with database modification rights).

Access to the database is managed directly by SAP, respecting the priority management.

"WINDEV style" UI in SAP!

"Report and Queries" type reports in SAP!
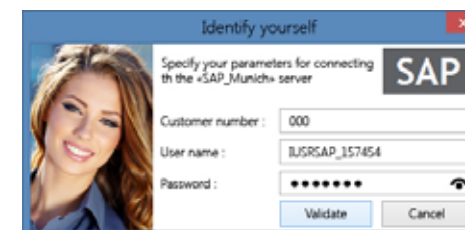
NATIVE **SALESFORCE** SUPPORT

Salesforce is a very popular CRM software worldwide.

Thanks to WINDEV 21 native functions, your applications can now interface with SalesForce.

Google provides a lot of applications, accessible through the Internet, that may be useful.

The features offered by version 21 let you create rich clients, automate actions, ...

LINK WITH GOOGLE MAPS

The Google Maps service is an Internet mapping software proposed by Google. It lets you display a map or itinerary, with a lot of viewing options.

Examples of processes that can be implemented natively in WLanguage:
- you can get a map and display it in a window control or a report control, send it by e-mail.
- request the drawing of a route on a map.
- position custom markers on a map.

The "Google Map" control enables easy processing.

LINK WITH GOOGLE CONTACTS

Google Contacts lets you manage contacts over the Internet.

The WLanguage functions let you retrieve your contact list, groups of contacts, as well as the details of each contact: name, notes, im address, telephone, address, e-mail, ...

LINK WITH GOOGLE CALENDAR

The Google Calendar service is an Internet application provided by Google that is used to manage a calendar on Internet.

The native WINDEV 21 functions let you for instance, create an application for synchronizing a calendar with an already existing application: use of a meeting room, vehicle... These functions also allow you to build specific interfaces (for specific business needs, more user friendly, ...) and add specific processes (print, ...).

Read and write data in Google Calendar from your applications!

IMAGES, SOUND, VIDEO: AUTOMATIC

WINDEV manages **images**, **sound** and **video** easily and with incredible power.

Support for all formats is standard without the need to code anything.

· BMP	· TIF · ION	· PNG
· RLE	· GIF	· TGA
· WMF	· anim-	· PDF
· ICO	ated	· SVG
· SVG	GIF	· AAC
· PCX	· PCD	...
· JPEG	· PSD	

· AVI	· WMA	· Ogm
· MP3	· 3GP	· Oga
· MP4	· ASF	· Ogv
· H.264	· WMV	· mkv
· WAV	· flash	· webm
· MPEG	· MOV	· ...
· MPEG-4	· AAIF	
· DIVX	· Ogg	

FORMATS: ALL!
WINDEV 21 supports standard image formats.

An image can be stored as an independent file or in a table row of a HFSQL database.

AUTOMATIC DISPLAY
Managing images with WinDev 21 is child's play.

Assign the name of the image file to the name of the image control, for instance:

`PART="VALVE.JPG"`

It's that simple.

If the image is found in a table row, the display is automatic.

IMAGE AND VIDEO CAPTURE
WINDEV enables you to dynamically capture an image or a video.

This image can be saved in a file (BMP, JPEG, PNG, ...), enhanced, emailed, ...

SAVING IMAGES
WINDEV 21 allows you to handle, modify, enhance and store images on disk. This feature enables you to change the image format (switch from JPG to PNG for example) by programming, or to store annotated images, or to read and modify their EXIF parameters.

EFFECTS ON IMAGES
WINDEV 21 enables you to add effect to images: scrolling, display from the center, ...

These effects can be defined in the editor or by coding.

SOUNDS
All the sounds (.WAV, .MP3 and all the formats whose MCI driver is installed) are supported. Programming is child's play: simply type:

`Sound(Sound_name)`

THE VIDEOS ON PC
WINDEV can easily drive your video sequences (tutorial, advertising, movie, ...)
WINDEV supports files in AVI, MPEG, DivX, and so on format

VIDEO CONFERENCE
The videoconference control lets you display the video from a webcam on another computer, local or remote.

It lets you create video conferences and video monitoring applications.

DOMOTICS

Managing **the electrical appliances** of a building via the existing wiring paves the way for easy remote control by programming.

Control electrical equipments through applications created with WINDEV 21.

Simply use a plug or switches compatible with the **X10** standard.

WINDEV 21 also supports the **DLNA** standard, which allows interaction among equipments that support it (tv, fridge, ...).

You can also use the WINDEV TCP/IP communication functions to communicate with a large number of connected objects.

Control your house from a WINDEV application

DLNA
DLNA means Digital Living Network Alliance, which is a collaborative trade organization that is responsible for defining interoperability guidelines to enable sharing of digital media between multimedia devices.
DLNA is based on existing network connection methods: Ethernet and Wi-Fi.
Thanks to the support for this standard in WINDEV 21, it is easy to use WINDEV for writing applications that communicate with a TV or a fridge!

## CONNECTED OBJECTS
Information sent by the connected objects can be collected by servers. Linking to these servers via WINDEV applications is usually done using the `httpRequest` or `Web service` function.

SUPPORT FOR THE X10 STANDARD
The X10 standard is used by some electronic equipment to communicate.
The `Domo` commands let you control devices and find out their state using regular power lines
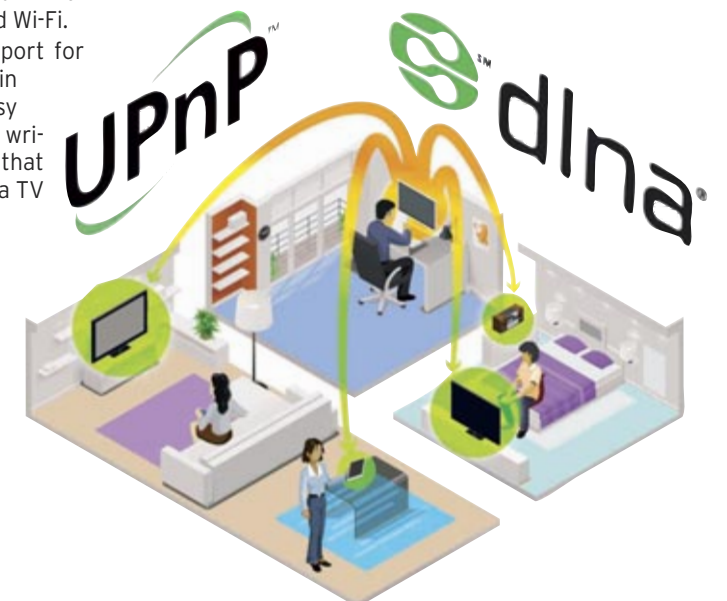
A CATALOG RICH IN
EXAMPLES AND WIZARDS

Hundreds of examples and wizards provided

WINDEV 21 comes with an impressive set of examples.

These examples serve a dual purpose: tutorial first, financial second. Retrieve a single example and save entire days of programming.

Reuse them in your applications!

Before you start writing code, check that it doesn't already come with WINDEV!

REUSE THESE EXAMPLES
LET THE WIZARDS GUIDE YOU
USE COMPONENTS

LIST OF PROVIDED EXAMPLES

Here is a selection of examples provided with the product that can be reused in your applications or can be used as learning tools.

- Complete CRM
- Secured remote access to data via Internet
- Click area in an image (geographic map)
- Handling the XML functions
- Using ZIP type compression functions
- Using a Web Camera
- Secured remote access to data via Internet
- Using sockets
- Using threads
- Trigger
- Multiwindowing
- Treeview
- Transferring files by FTP
- Drawing curves
- Remote monitoring by Web Camera via Internet
- Telephony (CTI): auto-dial, display caller ID on PC, etc.
- Synchronize data files
- Statistics
- Service: application without UI running as background task on a server
- Scanner controlled by TWAIN
- Using queries
- Optimized search using composite keys
- Task list
- Search on Internet from a Windows application without displaying a browser

- Network: find out who is locking a table record
- Custom setup
- Graphic slider
- Configuring POP3
- Managing 3D shapes with the mouse
- Managing graphic schedules
- Managing holiday and flex time
- Phonetic search, without using the exact spelling
- Controlling Outlook
- Transforming a number into words
- Live Messaging
- Mathematical management of matrices
- Mailing by email
- Mailing by fax
- Line smoothing
- Reflexive link
- Report examples: different types
- Printing by programming without using the report editor
- Direct print to a printer (using ASCII code); useful for industrial printers
- Print preview
- Automatically import into an application the content of an Internet page (full or partial content); retrieving a price list, financial information, schedule, etc.
- User groupware: define specific rights for each category of user
- Stock chart
- Managing computer hardware
- Using OLE DB to access databases
- Financial functions
- Advanced Excel management features
- Close Windows by programming
- Programmed table export: addition

to the automatic function for automatic export
- Simulation of keystrokes
- Screen saver
- Drag and drop between windows, applications and Windows
- Dictaphone
- Drawing by programming
- Data encryption
- Dynamic compilation: how to create code that will be compiled and executed on demand by an application
- Calendar
- Calculations on dates and times
- Automatic image animation: Parameters illustration
- Alarm
- Create assistants (similar to WINDEV's wizards) for your own applications.
- Using DCOM and COBRA (older protocols)
- Controlling word processors and spreadsheets (Word, Excel, OpenOffice)
- Generate a PowerPoint document
- Support a mulit-touch screen
- Include OpenGL or DirectX code
- Create a dashboard
- Query MongoDB or Riak databases
- Sharepoint interaction example

SUPERCONTROLS

You can create your own supercontrols, to share them among your applications or among developers. Numerous ready-to-use supercontrols are provided.

- RTF toolbar, to create text edit areas

- Find/Replace function in a text
- Screen capture, to perform hard copies by programming or when clicking a button
- Counter
- Spelling checker (using the Word dictionary, which must be installed on the computer)
- Industrial graphic check box
- Progress bar
- Assisted input of a date range
- File and directory picker
- Check the validity of a credit card number

COMPONENTS

You can create your own components; a large number of ready-to-use components are provided.

- Image annotation
- Protecting the information displayed in a window
- List of French zip codes
- SQL connection wizard
- Managing and sending emails
- Managing and sending faxes
- User management
- Network and system information
- Managing the bank holidays
- Managing a tips & tricks window
- Application protection (number of users, number of computers, duration)
- Search engine management
- Secure payment
- Display the content of a memory zone
- Manage Socket client and server
- Glossary content
- Import an HTML page

WIZARDS

Wizards are very useful: they generate for you the code required for building your application.

To do so, the wizard asks questions and generates the corresponding code (and windows if necessary) according to your answers.

The generated code is clear and of course can entirely be customized.

A wizard can help you with an area you're not familiar with! For example, performing a RS 232 serial link data acquisition only requires 3 minutes, timed!

- Acquiring information about the serial port • Calculating the key of an INSEE number • Calculation of the date corresponding to the Monday in a given week • Calculate a deadline • Center a window in the screen • Load a dynamic link library (DLL) • Time a process • Compress a file • Check the existence of a disk • Conversion between decimal and hexadecimal numbers • Convert a HFSQL table into a text file • Convert a text file into a HF table • Convert a xBase file into a HFSQL table • Convert a date into words • Convert a date into a string of a given format • Convert an angle measurement • Create an HTML page from the table data (memory or browsing table) • Trigger a process at a given time • Decompress a compressed file • Last day of the month • Determine the number of mouse buttons • Determine whether the mouse button are reversed • Status of mouse buttons • Status of a control key • Create a hard copy of the window •

Functions for print layout • Managing sounds by multimedia • Manage an audio CD via multimedia • Multimedia management of Windows animations • Insert a string into another string • Run the control panel • Limit the mouse movements • Input mask for a real number with an exponent • Modify the window background • Number of the day in the year • Open the dialog box used to format a diskette • Open a window at mouse position • Browse through two nested tables • Control Word • Control Excel • Find a file or a directory • Retrieve the word that was clicked • Retrieve the elements selected in a list • Retrieve a disk error • Transfer the content of a HFSQL view to an Excel file • Transfer the content of a HFSQL view to an HTML file • Transfer the content of a HFSQL view to a text file • Transfer a HFSQL view to the clipboard • Transforming a number into words • Check the Luhn key • Check whether a year is a leap year • Check whether the mouse is connected • Check whether a program is already running • Check a RIB key • Zoom on an image

"FUNCTION" WIZARDS

These wizards generate parameters for functions.

For example, the RGB color wizard directly proposes the name of the colors and then changes them into the corresponding RGB values...

TreeAdd • TreeModify • LoadImage • BuildBrowsingTable • CreateShortcut • Crypt • Cursor-

Pos • DateSys • dCopyBlt • Uncrypt • dPixelColor • dSaveImage • dSaveImageGIF • dSaveImageJPEG • EmailSendMessage • EmailStartSession • EmailStartSMTPSession • EnumControl • Event • ExeInfo • ExtractString • fCrypt • fUncrypt • fDriveInfo • fWrite • fWriteLine • WinSize • fExtractPath • FinRedemption • FinDecreasingRedemption • FinLinearRedemption • FinPeriodInterest • FinPaymentNb • FinInterestRate • FinCurrentVal • FinNetCurrentVal • FinFutureVal • FinRepayVal • fRead • fReadLine • fOpen • fDir • fSelectDir • fSelect • fImageSelect • fTrackFile • fTrackDirectory • FTPConnect • grCreate • HAddScheduledOptimization • HAddScheduledBackup • HAlias • Random • HChangeName • HChangeRplDir • HCreateView • HDeclare • TimeSys • HFilter •

HImportText • HReadFirst • HReadSeekFirst • HOpenAnalysis • HIndex • iPreview • iBorder • iCreateFont • iPrintReport • iPrintImage • iMargin • BitmapInfo • INIWrite • INIRead • iParameter • iParameterDuplicate • iParameterWatermark • ExeRun • ListSeek • NumToString • NetworkConnect • NetworkDisconnect • NetworkDirName • RGB • SelectColor • sParameter • sOpen • StatCorrelation • StatCovariance • StatAverageDeviation • StatStandardDeviation • StatStandardDeviationP • StatMax • StatMin • StatAverage • StatSum • StatVariance • StatVarianceP • SysColor • SysEnvironment • CurrentTitle • Confirm • Error • Info • Password/Login • OK/Cancel • YesNo

To develop faster, an example is always useful!
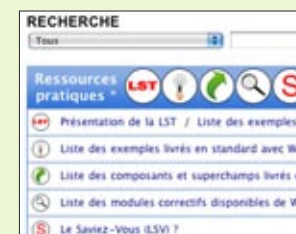
ONLINE RESOURCES (FREE ACCESS)

Before starting any new development, run a search in the examples!

You will probably find pieces of code that can be reused in your application!

This feature may save you hours, days or even weeks of development.

The www.windev.com site proposes several development resources.

You can download these resources freely.

CREATE AUTOMATED TESTS

Automatically generate regression tests

WINDEV 21 offers the creation of unit tests and integration tests.
The creation of test suites is made extremely simple.

WINDOW TEST

A set of recording buttons comes up when requested, and allow you to start and stop recording a UI test scenario.

All the tests related to one window are grouped into the same script file, which is saved with the project.

UNIT TEST FOR PROCEDURES AND CLASSES

To directly test a procedure or a class, simply use the popup menu that offers to create (and then replay) a new unit test.

APPLICATION VALIDATION RATE

The testing center displays the list of existing tests, the version of the application on which each of these tests has been run and the result of the test.
This information is also displayed in summary mode in the project Dashboard.

THE TEST SCENARIO EDITOR

When running a test, if an error is found in the application, clicking the script error positions you directly where the error occurred in the code.

TEST VERIFICATION DURING CURRENT OPERATIONS

Each time you create a client version, WINDEV 21 displays the validation rate of the application and alerts you if it is not acceptable (configurable rate).
Each modified element that has not been tested and for which a test exists is flagged.
If there's no tests for a window that has been modified, the Testing Center indicates whether this window has been run at least once since the last compilation
A history of the validation rate is automatically stored, which allows the application's quality to be tracked over its life cycle.
This verification is also performed when you check in elements in the source code manager.

Tests are critical!
*With WINDEV 21, you benefit from all the necessary testing tools, with your product.*

The **quality** and the **security** of an application depend on a large number of parameters external to the coding: complexity or ease-of-use of the language, complexity or intuitiveness of the environment, need or not to use third-party software, UI generator limiting the number of user errors, etc.

The **automated test** phase is only one of the phases that ensure the high quality of your software, but it is an important and required one.

WIINDEV 21 offers **regression** tests, unit tests, integration tests, load balancing tests.

By simply saving your actions, test scenarios are created that can be replayed later to **validate** each new version of your programs.

SYSTEMATICALLY TEST YOUR APPLICATIONS
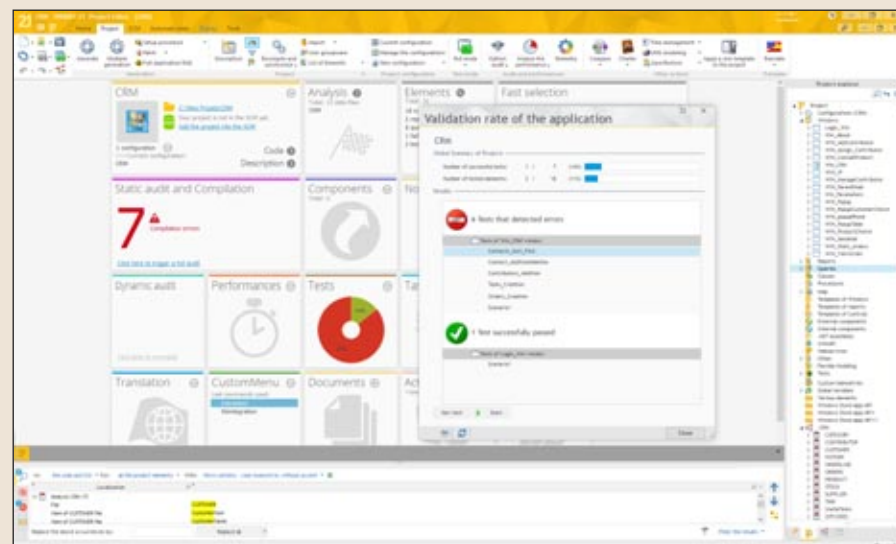
WINDEV automatically calculates the application's validation rate, and lists the tests that warrant attention (tests being created or tests flagging an error).

THE TEST SCENARIO: IN WLANGUAGE, SIMPLE

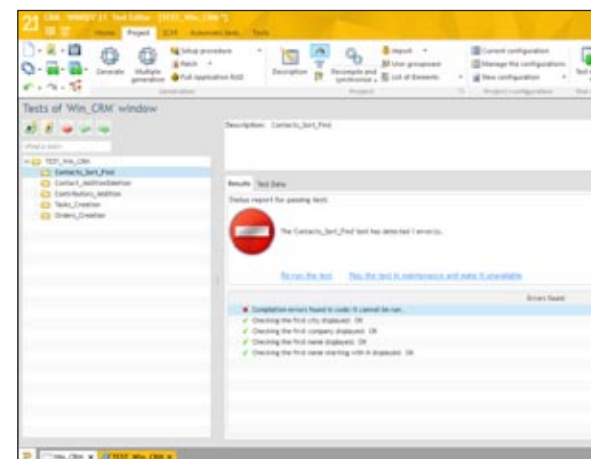The saving of an automated test generates a test scenario.

A benefit of this test scenario is that it is created in WLanguage.

Using WLanguage as the scripting language makes it a lot easier to modify and customize these scripts.

The **Emulate** family of functions are available in WLanguage for this purpose.

This allows you to modify the scenarios in order to add or modify the values to check, to add a column, to change the name of an external database...
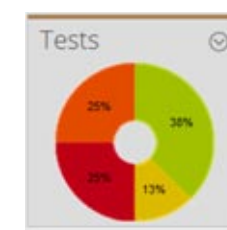
The use of WLanguage also enables you to easily perform loops on actions to test in a given scenario. Load testing is easy.

Note that these tests use "smart renaming"; if a control name changes in the project, the test continues to run automatically!

MANAGER
The ability to create unit tests for code and UI directly from the environment lets you improve the quality of the applications.

NEW
Replay tests at reduced speed

MAIN POINTS
Integrated with the development environment
Scenario generated in WLanguage
Execution without leaving your code
Automatic GUI tests, without coding

Menu to save or replay a scenario

Excerpt from the dashboard: the "Tests" widget indicates the percentage of successful, failed tests.
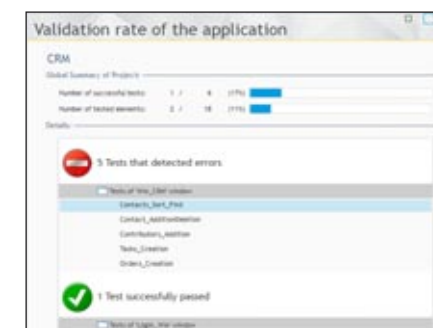
List of tests available per window, status of each test, and summary

A FULLY INTEGRATED TOOL
Test management is fully integrated with the development environment: window editor, code editor, executable creation...
The Dashboard (see page 18) displays the result of the tests, and it allows you run them.
The tests and their results are automatically available to all the members of the development team.

In the environment: creating a unit test for a procedure is done by right clicking

TECHNICAL DOCUMENTATION IN 1 CLICK

WINDEV 21 includes an analysis and programming docu-

TECHNICAL DEVELOPMENT FOLDER
Application developed by DEV COMPANY
2297 Redbud Drive
New York, NY 10011
www.devcompany.com

CARRENT
10.5

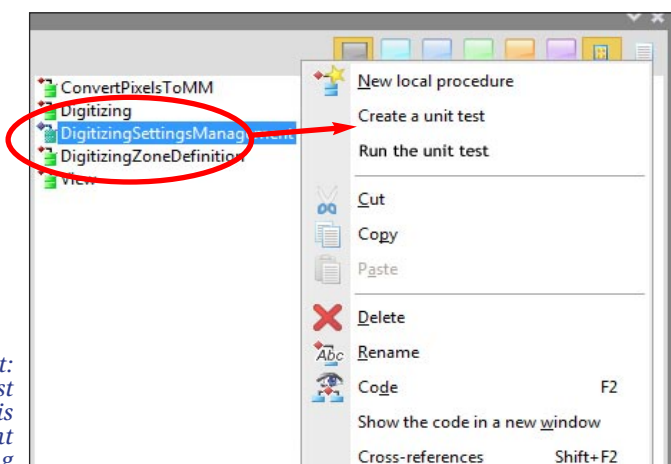mentation generator as **part of the product.**

The full documentation is created in a single click via **reverse analysis** of your project and it can be edited at any time, it will always be updated.

This documentation generator will save you days.

A complete documentation usually contains several hundred pages

MANAGER
A technical documentation is fundamental for a subroutine, or simply to help a new member join the team.
Here the documentation is automatically created.

NEW
Telemetry documentation

AAF TECHNOLOGY
AAF can be printed with the documentation

MAIN POINTS
Always up-to-date documentation
Print on paper, HTML (for Intranet), PDF, Word, OpenOffice...

AUTOMATICALLY GENERATE AN UP-TO-DATE DOCUMENTATION

A complete documentation contains 12 sections

1• Cover
2• Project description
3• Dashboard
4• Scheduler
5• Business rules
6• Data schema
7• UML models
8• Window description
9• Report description
10• Query description
11• Description of classes (OOP) and Web services
12• Main index and appendices

DOCUMENTA-TION? 1 CLICK!

THE WHOLE DOCUMENTATION IS ALWAYS UP-TO-DATE IN ONE CLICK
Thanks to WINDEV 21, and its reverse-documenting technique, you benefit from a complete and accurate documentation at any time.
And this only requires one mouse click...

SIMPLIFIED MAINTENANCE
The documentation is essential for easy maintenance. New developers assigned to a project can easily get familiar with its features and architecture.
This, in turns, makes it easier for them to join the team, and

allows them to be productive much sooner.

CONSULTING FIRM: MAKE SIGNING CONTRACTS AND COLLECTING A LOT EASIER
For a consulting company, an analysis documentation is often required by the client when signing the contract, and later when taking delivery of the application.
At each revision of the documentation, you save days thanks to WINDEV.
And the documentation is always up-to-date...

EASILY DISTRIBUTE THE DOCUMENTATION: HTML, PDF, WORD...
You'll be able to easily distribute the documentation: in paper format, on your company's intranet (using HTML),

by integrating it into a word processor (Word, Open Office, etc.), or in PDF format, to attach it to an e-mail for example...

CUSTOMIZABLE DOCUMENTATION
You can customize many parts of the documentation: fonts, size, images, etc.
Several documentation templates are available.

SHARED RESOURCES
The documentation is part of the shared resources necessary for working as a team.

A documentation is a requirement for any professional development. This is of course a standard feature of WINDEV 21.

TELEMETRY: WHAT FEATURES DO YOUR END USERS USE?

With WINDEV 21 telemetry, you will finally know **how your applications are used**, what are the most often used choices, the choices that are least used or not used, what are the compute and response times ...

You know which windows, processes are used the most, and therefore what you need to optimize.

You also know which processes and windows are never used, **and you can remove them from the application**.

By default, all the data collected by the telemetry feature is anonymized.

A pane from the telemetry dashboard (Analytics)

Use (average per user and per day): **233**
WLanguage error(s): **0**
Average process time: **30ms**
Maximum process time: **3s**

Find

The data collected for each control is visible directly in the editor

MANAGER
The telemetry feature allows you to understand how your deployed applications are really used and to know which features to concentrate on.

NEW
New feature of version 21

MAIN POINTS
Understand how your applications are really used
Detect dead code

AMONG THE COLLECTED DATA...
The telemetry feature collects a large number of data: regarding the hardware, the use, by window, by report, by process, by control, by menu choice, ...
The telemetry feature also collects the potential application shortcomings.
The amount of data collected is very large: maximum, minimum and average number of users, number of times run, version used, usage frequency, wait time, ...
The telemetry feature also displays some very useful "Top 10" lists:
• most used windows • most used queries • most used reports • least used windows • least used queries • least used reports • longest processes • most used pro-

cesses • most used AAFs

TRANSPARENT COLLECTION
The data can be collected from your servers, or from the cloud (for instance PCSCloud offers a turnkey telemetry solution).
The data collection has no impact on your applications' performance.

WHAT DO WE MAINTAIN BUT NOBODY USES?
Elements of the application that are not used anymore are flagged: windows, reports, queries...
And even more precisely, per window, the unused controls (buttons that are never clicked for example) are flagged.
After taking the necessary

precautions, you may consider removing these processes from the application.
Be careful though not to delete a process that is only used once a year (like a yearly report for instance).
The application will be lighter, and maintenance easier.
Your teams save time.

A better understanding of your applications will allow you teams to create even more performing programs.

PROVIDE HELP WITH YOUR APPLICATIONS

WINDEV comes with a **help generator** in "HLP" and "CHM" format.

This generator enables you to provide a professional help with your application, which will improve your users efficiency.

Upon request, WINDEV 21 also inserts a "?" menu in your application, which contains the link to the help system, a link to the list of all the new features, some backup options...

MANAGER
An online help lets you make better use of an application and therefore makes it more profitable.

NEW
Generate the help with Continuous integration

AAF TECHNOLOGY
The end user benefits from an online help

MAIN POINTS
Integrated with the environment
Automatic structure

HELP USERS TO BETTER USE YOUR APPLICATIONS

*In the help editor.
… and the result from
the final application.*

CREATE YOUR APPLICATION'S HELP

WINDEV 21 allows you to easily create 4 help levels in your applications:
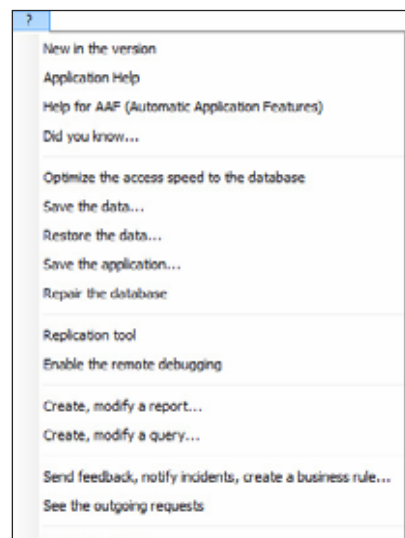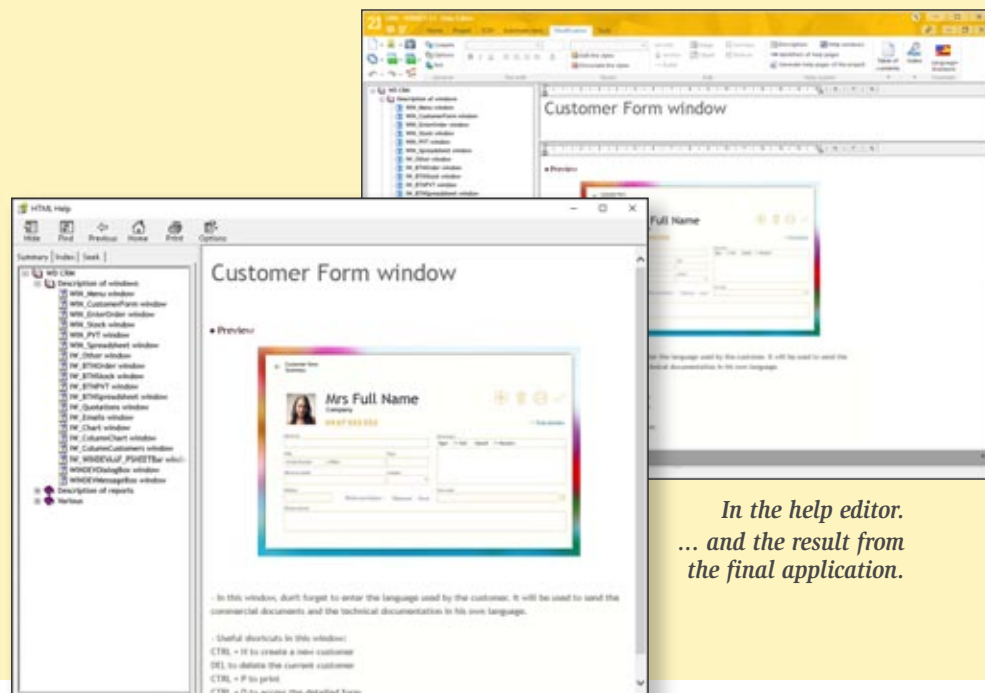• WinHelp and CHM help (HTML help)
• tooltip
• status bar
• help related to a control

Tooltip, status bar and control help are created directly in the development environment through the "7-tab".
The CHM or WinHelp help is created by using the help editor.

AN EASY-TO-USE EDITOR

The help generator automatically creates:
• help pages
• screen copies of the application

• links to the corresponding processes of the calling application.
Several elements can be configured (colors, buttons, background image, and so on)

SOME OF THE AVAILABLE FEATURES

The help generator offers features that allow you to easily build help systems:
• create link with keywords
• detection of broken links
• adding information to an image: arrows, text, ...
• text style management
• link to Internet page
• link between different CHM help systems
The help generator lets you easily create an interactive help system.

With WINDEV 21, the help generator comes as standard.

TRANSLATE YOUR APPLICATIONS AUTOMATICALLY
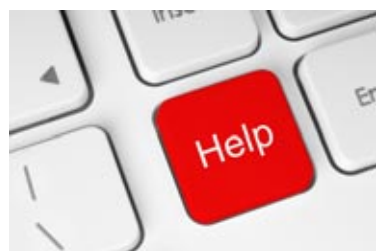
Developing **multilingual applications** has become more and more a necessity.

There are of course countries that use several official languages: Belgium, Switzerland, Luxembourg, Canada ...

And then there's Europe of course! WINDEV offers an innovative and powerful solution for supporting foreign languages (Latin character sets, **non-Latin character sets** -Unicode UTF8-, left-to-right and right-to-left writing).

For applications targeted for the North American continent, English, Spanish and French ensure the largest possible distribution of your software.

And there're the emerging countries as well: China, Russia, ...

Translate your applications into multiple languages, distribute them worldwide!

MANAGER
Translating an application for a new market has never been this easy. WINDEV 21 comes with all the tools needed.

NEW
Choose the languages' order
Naming the custom languages

AAF TECHNOLOGY
Combine all the languages into the same EXE or limit an EXE to one language

MAIN POINTS
up to 64 languages per application
A single executable
Instant visualization in the editor
Your own terminology dictionary that grows automatically

UP TO 64 LANGUAGES PER APPLICATION

French

English

Arabic

Hebrew

An application in Greek

UP TO 64 LANGUAGES PER APPLICATION

Multilingual support (up to 64 languages per project) is automatic for your applications: specify the languages to use, and translate texts, labels, etc. Unicode is supported.

USE AN AUTOMATIC TRANSLATION SOFTWARE

You have the ability to call a translation software or site to translate each caption in real time directly from the editor.
The multilingual support takes into account the specificity of each language: input/display mask (date,...), centering, ...

DIRECT INPUT IN DIFFERENT LANGUAGES

Can it be any easier!
The input is directly performed in each language (Russian, Chinese, French...). This feature is available for the screens, the reports, the messages in the code...

AUTOMATIC TEXT EXTRACTION

The WDMSG tool, available separately, lets you extract all the "text" in a project, and reintegrate it after translating it. Useful if you want your application to be translated by a translation agency or a software!

CREATE YOUR OWN DICTIONARY

WDMSG also creates a database containing the source texts and the translated texts of your programs, and automatically proposes a translation whenever possible.

Developing multilingual applications is child's play with WINDEV 21!
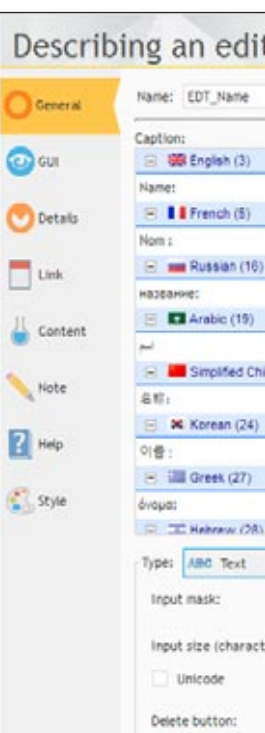
DEPLOYMENT, VERSION MANAGEMENT AND MAINTENANCE: AUTOMATIC

Deploy in one click

WINDEV 21 **automates** the **deployment** phases in all the possible cases: software publisher, consulting company, internal IS department, Internet distribution etc.

The **setup generator** automatically creates the procedure that suits your case.

Everything can be modified and **customized**.

After its development and deployment, an application starts evolving. WINDEV 21 also automates the maintenance tasks, including

Install 2,500 Computers

MANAGER
Automatically managing the installation and the maintenance of applications make them more reliable, more accessible. Time saved is also quite impressive.

NEW
Setup in 1 click
Advanced customization

AAF TECHNOLOGY
Automatic update of table structures by comparison with the application's version
Remote control of applications and connected users

MAIN POINTS
Install push
The application manages the updates itself

DEPLOY FREELY AND AUTOMATICALLY. ON DEMAND, PUSH

Enterprise server
INTERNET, CLOUD
DVD, CD or USB key
User computers

"PUSH" INSTALLATION
With WINDEV, installing an application on 2,500 PCs without leaving one's chair is possible… easy, thanks to the "Push" mode.
In this mode, instead of each user starting the setup himself on his computer, a remote software administrator will do it for him.
If ActiveDirectory is used, the defined groups can be

used by the administrator. The push install administrator provided allows you to:

• View the computers and groups on the network
• Define the computer on which to install the application

• Trigger the PUSH installation, or schedule it
• View the version numbers of the application installed on each computer
• Trigger updates
• View the setup status report
This setup mode avoids the need to physically be present at the end user machine.
It prevents additional operations, oversights and errors.

Welcome to the setup wizard of WD Mail

Easily create "standard" setup programs for your applications.
Note that you can also create "MSI" installs.

Creating the setup
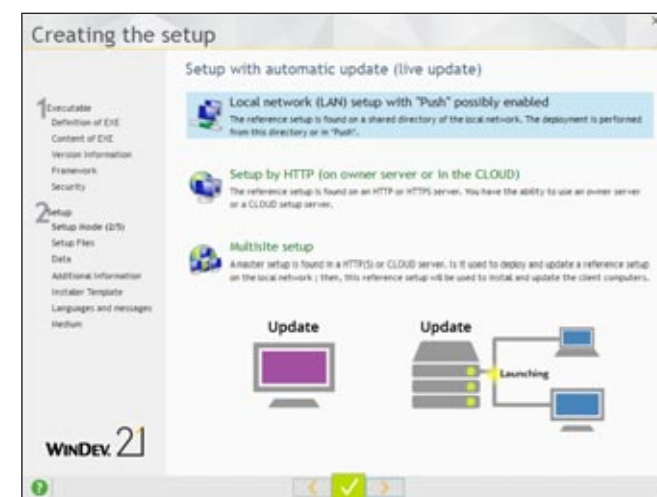
Live-update options
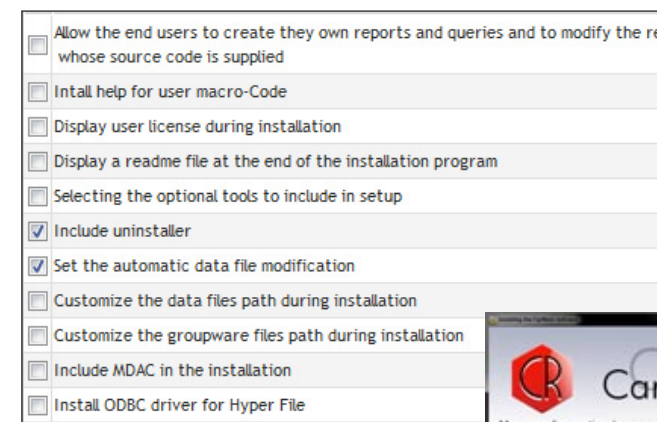
Examples of setup configurations

CarRent

AUTOMATIC INSTALLATION
The integrated environment knows your project, the databases it uses… Therefore, it knows how to automatically create a full setup program in just a few seconds.
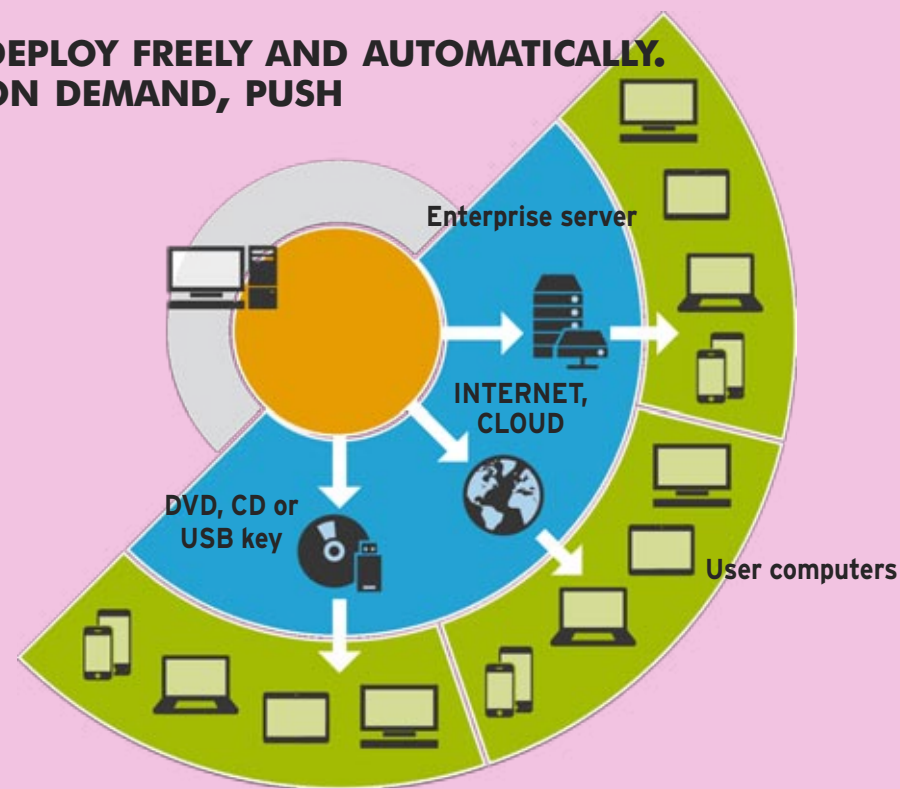Of course, you can modify this program, set up parameters, etc.
As with all the other modules, this module comes with WINDEV.
Setups are multilingual.

ASSISTED CUSTOMIZATION
The elements to install are easily picked from lists; By default WINDEV offers elements from the modules you used in the application.
All the elements can be customized: title, background image, logo, end-user license text, readme, etc.
The program group(s) will be created automatically using the icons you specify.
The setup program can be fully customized since its source code is provided.

LIVE UPDATE, CD, DVD, USB KEY, INTERNET, CLOUD …
The setup program generator allows for flexible deployment. It creates programs on CD, DVD, USB key, HTTP, and any media.

LIVE UPDATE: ALWAYS UP-TO-DATE INSTALLED BASE
All you have to do is install the new version on the server and each user computer will be updated automatically on its own (live update), via the company network or via an Internet connection or even in the PCSCloud cloud.
Therefore, you can be sure that all the computers are always updated.
There's nothing special to install to benefit from live-update.

SETUP FROM THE CLOUD
You can place a reference setup (in 1 click) in the cloud.
This way all your authorized users can install and update their applications from anywhere in the world, without you having to worry about anything!
Installations and updates are easier for distributed teams.

Create easy and powerful "Setups" with WINDEV 21

Continue >>>

NETWORK UPDATE

The "network" setup is used to install a reference setup on one or more reference severs (for example on a reference server per branch, on an FTP server, in the cloud…).

Users will then install their application from the reference server.

The end user machines will automatically detect new updates on the reference server, and will trigger if needed an update request.

Each time it's launched (by default), an application installed via a network setup checks whether an update is available on the reference server.

If during the verification a more recent version is found on the server, the application update is offered to the end user.

NETWORK UPDATE: VERIFICATION SCHEDULE

The frequency for checking the availability of
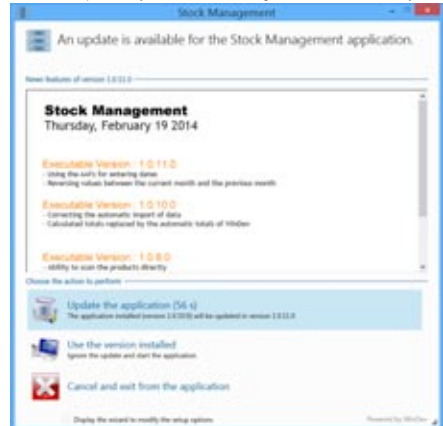
a new update (see above) can be configured:
• each time the application is opened (default choice),
• the first time of the day its opened,
• Every X days,
• only if the machine is connected to the network.

You can check the verification schedule this way, to avoid useless processes and connections.

MULTI-SITE SETUP VIA HTTP

With the multi-site install, a Master install program is released on a server accessible via HTTP.

This master install program lets you deploy the same network install on several sites. Once the network install is installed on the target sites, in a shared directory on the network, each client computer can install the applica-
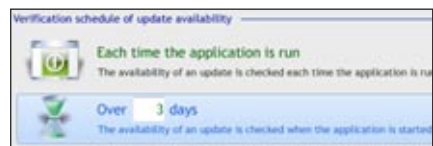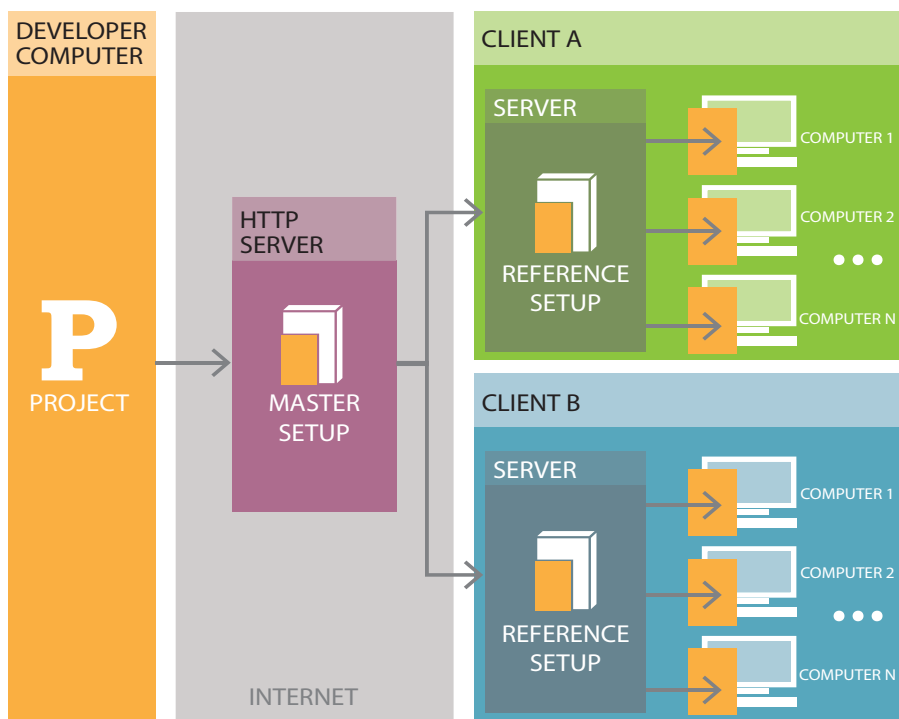
tion from this reference install (can be combined with the "push" method).

In case of update to the Master Install, the update is automatically propagated to each site hosting the corresponding reference install. Then, each client computer retrieves the update, like for a standard network setup.

This methods eliminates peak access to the server. This mode is useful for large scale deployments.

HTTP INSTALL: PROXY SUPPORTED

You have the ability to deploy an HTTP setup on a network that uses a proxy.

INSTALL HTTP: MANAGING THE HTTPS SECURED MODE

For installation via HTTP, the https secure protocol is now supported.

This protocol guarantees the authenticity of the install to the end user.

The setups are protected.

DEVELOPER COMPUTER

P PROJECT

HTTP SERVER

MASTER SETUP

CLIENT A

SERVER

REFERENCE SETUP

COMPUTER 1
COMPUTER 2
• • •
COMPUTER N

CLIENT B

SERVER

REFERENCE SETUP

COMPUTER 1
COMPUTER 2
• • •
COMPUTER N

INTERNET

Install from the Cloud

HTTP INSTALL: AUTHENTICATION

An HTTP server may ask for a login and password.

You can specify a connection login and password for the http server when installing on the client machine: your installations are secure.

HTTP INSTALL: CONFIGURING THE SERVER ADDRESS

You can specify the address of the http server when creating the installation.

You can specify that the HTTP server address will be entered during the reference installation on the HTTP server.

One click: the setup program is automatically created

Each time the application starts, it checks whether there is a newer version available

Automatically checks the version number: if the user skipped one or more updates, it is handled by the update.

Minor update? A patch!

Automatic database update: no more "hack jobs"!

SINGLE USE PASSWORD

This feature lets you manage the unique remote activation of a program or an update.

A key is generated on the client computer.

The client sends an activation request (via Internet), receives another activation key, then can activate its application.
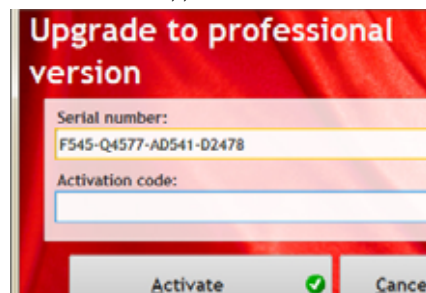
APPLICATION PATCH

For a minor application update, you can provide additional resources (windows, reports, …) as patches or as independent objects.

RESTORING VERSION N-X

Who has never had to reinstall the previous version of an application in an emergency? This ability is offered over the network. On the reference server, you can configure the number of successive versions to keep.

The administrator can decide at anytime which version is the reference version (it doesn't have to be the latest one, for example you could reserve the most recent version for

beta testers).

Remember that when using the application on the client computer, it automatically checks whether it is synced with the reference version, and only performs the necessary updates.

The user can also take the initiative and change the current version on his or her machine. This option can be disabled.

The "?" application menu offers the list of versions.
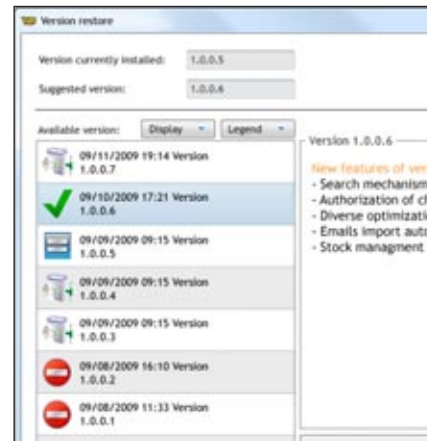
Choosing an older version on the end-user machine

AUTOMATIC MAINTENANCE OF HFSQL DATABASES

Which developer hasn't had the thankless task of writing some quick and dirty hack to increase an item size or add an item to an existing table?

The problem is even more complex when several versions of the application are in use: the application version as well as the database version have to be checked.

Writing those hacks is always tricky because they alter the data.

With WINDEV 21 these will be things of the past!

SETUP SIGNATURE

WINDEV lets you sign your setups.

Just select a certificate in the setup creation wizard.

The integrity of the installation pack is guaranteed.

If the installation pack is altered (due to a network transfer error, a virus,…), the setup will not run which will avoid installing a corrupted version or introducing malware..
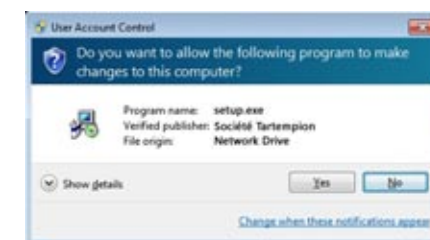
You can sign your setup programs

Furthermore, the user is reassured about the installation: he knows the program's publisher!

ANALYZING THE CONTENT OF A SETUP

The audit lets you analyze the content of a setup that has already been created.

Content of the generated setup

Managing the installation and update of your programs is easy with WINDEV.

WINDEV will automatically create the procedure to update the file and will automatically install it and execute it when updating your application,

This procedure will have all the old versions of the application (up to 100), and will update the "old" HFSQL databases if necessary.

ROBOT (WATCHDOG): IT MONITORS YOUR APPLICATIONS AND YOUR SERVERS

A monitoring engine comes with WINDEV 21.

The goal of this engine is to check that an application or a server **works** all the time, or at a given time.

If the monitored element fails (hardware failure, loss of Internet connection, system shutdown, and so on), the robot **triggers the alerts** that have been defined.

You're instantly notified.

Warning message sent to a cell phone

ALERT
via SMS, Email...

MONITORING

WEB SERVER • APPLICATIONS • DATABASES • SITES

MANAGER
The monitoring robot is used to ensure an uninterrupted service for the applications, the file servers or the Internet sites.

NEW
Various new features

MAIN POINTS
Service continuity
Rich and easy configuration
Easy implementation

SURVEILLANCE: POWERFUL AND EASY

WHAT TO MONITOR?
The engine lets you monitor the following elements for instance:
• HTTP server
• NNTP server
• SNMP server
• file server
• email server
• WEBDEV application server
• HFSQL server
• WINDEV 21 application (one line to add in the application)

WHICH WARNINGS?
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).
You have the ability to choose a combination of these warnings.

Among the monitoring parameters that can be specified, you'll find:
• the frequency: run the test every X, from 1 second 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, ...)

ALERT
Location: serv82.res.net
Failed Web server
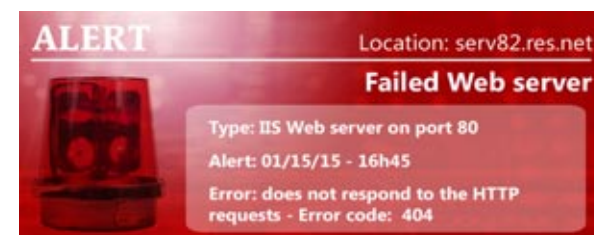Type: IIS Web server on port 80
Alert: 01/15/15 - 16h45
Error: does not respond to the HTTP requests - Error code: 404

MANAGE USER FEEDBACK

How to manage **user feedback**? The bugs they report as well as their suggestions?

WINDEV 21 comes with the **feedback** component that you can include in your applications.

It helps the user enter the information and manages structured customer feedback (via an internal network or via Internet).

The requests are then stored and managed by the Project Monitoring Center which can assign them to a team member.

If it is a bug, the request is turned into an issue and stored in the "Project Monitoring Center" (see p 15).

The users are guided when filling out their requests that are structured. **Information doesn't get lost anymore**, your applications' quality improves.

MANAGER
The feedback component, included in your applications, enables users to send back their suggestions and requests automatically.

NEW
Various evolutions

AAF TECHNOLOGY
Feedback is an AAF component

MAIN POINTS
Be responsive and analyze your users' requests
Automatic integration in the Control Centers

LEARN FROM YOUR USERS' EXPERIENCE!

Suggestions, incidents, business rules...
RACESOFT
Choosing the type of request to perform
I want to:
Submit feedback for improvement
- Improving the interface.
- Taking new types of files into account, ...
Signal an incident
- Error in a calculation.
- Incorrect display,...
Define a business rule
- Modify or complete the initial specification defined for the application.
- Modify the criteria and the actions of a process, ...

RACESOFT
Suggestion Description
Trebuchet MS   8   B I U
Displaying an option from this window that allows you to (see the screen shot)

suggestions, incidents, business rules...
RACESOFT
Screen Shot: click the image to add a note

THE USER COMMUNICATES
From the "?" menu of the application (automatically generated by WINDEV 21 upon request), the user can send a message to the program's creator (or the IT department).
If the application runs into a bug, the wizard can be started automatically.

MESSAGE ENTRY
The user describes his problems or needs.
The hardware and software configuration is automatically detected and added to the message.

ANNOTATE SCREEN COPIES
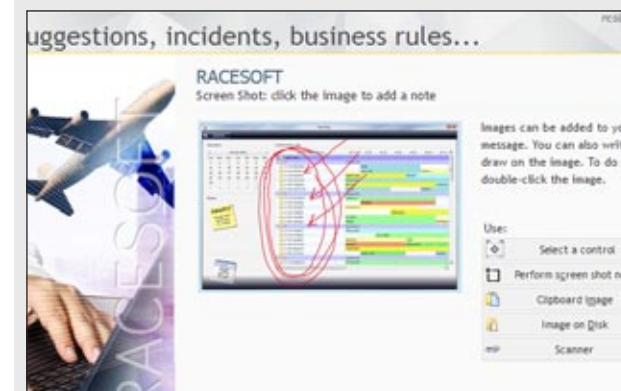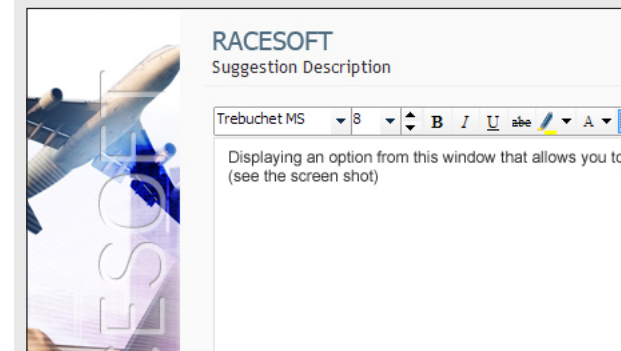The copy of the current screen is automatically attached to the message. The user can annotate the image using the integrated editor. Other screen copies or attachments can also be included.
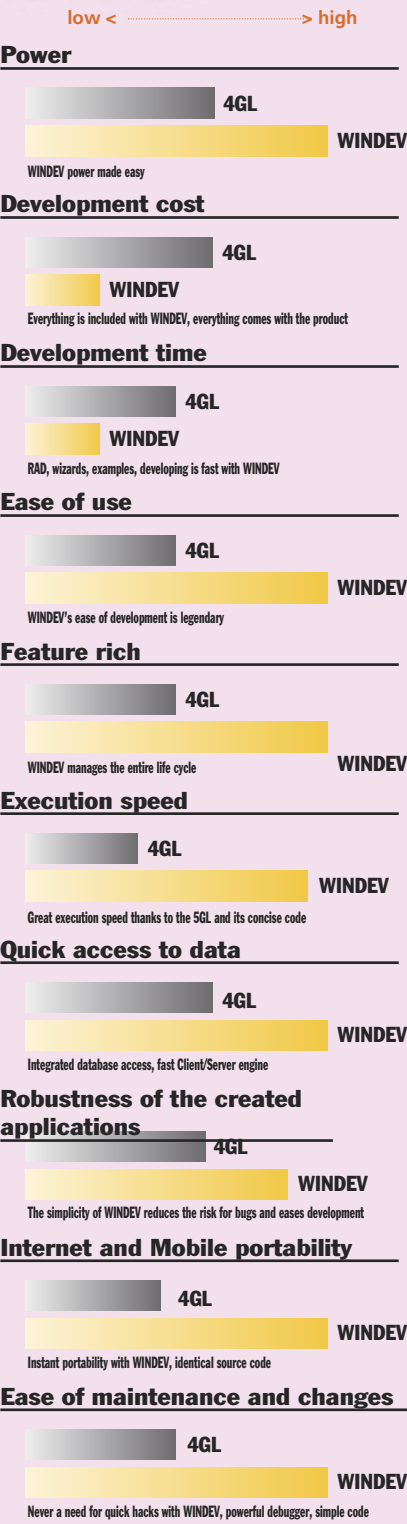
IMPORT INTO THE CONTROL CENTER
Then we see the user's message in the development team's Project Management Control Center: It is ready to be acted upon!

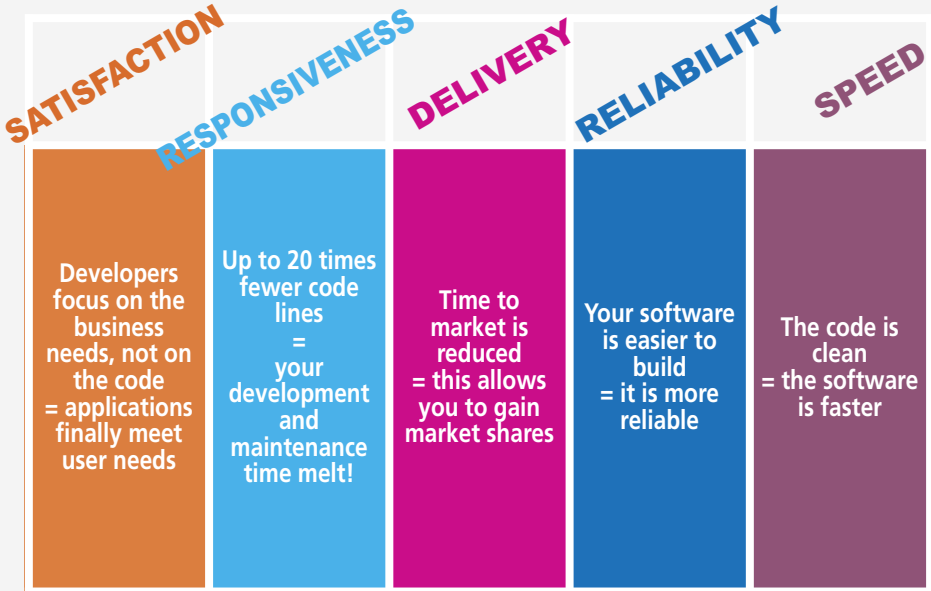*With WINDEV 21, keep in touch with your end users.*

WINDEV 21: THE BEST ASSET FOR YOUR ENTERPRISE

COMPARE FEATURES!

low < ———————— > high

Power

4GL

WINDEV

WINDEV power made easy

Development cost

4GL

WINDEV

Everything is included with WINDEV, everything comes with the product

Development time

4GL

WINDEV

RAD, wizards, examples, developing is fast with WINDEV

Ease of use

4GL

WINDEV

WINDEV's ease of development is legendary

Feature rich

4GL

WINDEV

WINDEV manages the entire life cycle

Execution speed

4GL

WINDEV

Great execution speed thanks to the 5GL and its concise code

Quick access to data

4GL

WINDEV

Integrated database access, fast Client/Server engine

Robustness of the created applications

4GL

WINDEV

The simplicity of WINDEV reduces the risk for bugs and eases development

Internet and Mobile portability

4GL

WINDEV

Instant portability with WINDEV, identical source code

Ease of maintenance and changes

4GL

WINDEV

Never a need for quick hacks with WINDEV, powerful debugger, simple code

AN UNPARALLELED ALM ENVIRONMENT!

SATISFACTION	RESPONSIVENESS	DELIVERY	RELIABILITY	SPEED
Developers focus on the business needs, not on the code = applications finally meet user needs	Up to 20 times fewer code lines = your development and maintenance time melt!	Time to market is reduced = this allows you to gain market shares	Your software is easier to build = it is more reliable	The code is clean = the software is faster

WINDEV 21 is the only development environment that allows for such a fast professional development.

FOR YOUR TEAMS: MANUALS AND TUTORIAL INCLUDED

WINDEV 21 comes with 3 printed manuals: concepts guide, report editor and tutorial (with DVD exercises).
Real hard copy manuals are always useful!

Community-contributed online help
A powerful online help is available as well as a large number of educational examples.
The online help can be accessed through Internet in a community-based format, which means that developers can add their own comments, details about each topic.
Get started in 1 week
Usually it only takes about one week for a developer to become comfortable with WINDEV 21.
More time saved!

WINDEV, PLAIN COMMON SENSE: 10 PROOF POINTS

YOUR PROJECTS ARE SUCCESSFUL WITH WINDEV

Read these testimonials, then find more on the www.windev.com site.

CUSTOMER TESTIMONIALS

Customer testimonial*
"Since we've installed WINDEV, the department hasn't stop growing. New contracts keep coming in, and it's not unrelated"

Customer testimonial*
It took only one week for our team to become fully productive which really illustrates how simple developing with WINDEV is.

Customer testimonial*
"WINDEV is the best choice in terms of productivity and reliability"

Customer testimonial*
The WINDEV IDE is the only product on the market to offer such development productivity

Customer testimonial*
"The productivity that WINDEV brings us in our development projects gives us the means to execute all our ideas and improves our market exposure"

Customer testimonial*
"WINDEV offers a set of **rich features** well suited for complex projects. Without WINDEV we would have never been able to carry out such project, especially in the required time frame"

#		
1	your clients are in a hurry: they demand short project cycles	Develop 10 times faster with WINDEV. Your teams respect their deadlines.
2	you're not part of an experimental lab: your projects must come to an end	Project success rate with WINDEV is impressive: your teams are successful
3	power comes from simplicity	WINDEV is easy to use. Your teams perform better with WINDEV.
4	developers should focus on the business needs, not the tool or OS	The time of the techies that produce code by the mile is over.
5	your customers want to keep their current systems and hardware	Applications developed with WINDEV are less resource hungry, and are cross-platform.
6	a project should be documented	The documentation guarantees a long life for the application. Automatic with WINDEV!
7	deploy without any constraints	Freely deploy locally, via the network, over Internet, in the cloud.
8	teams perform better in English	Clear, easy to read English commands improves code readability and makes maintenance easier.
9	a single language for all the platforms	The "single language" approach of WINDEV is the perfect answer to platform heterogeneousness.
10	budgets must be respected	Rapid development with WINDEV 21 results in controlled budgets.

COUNT YOUR SAVINGS

W INDEV is a complete development environment. Its very competitive price is made possible by its success and the large volume of sales.

The first quality of WINDEV is its power.

Its second quality is its reliability.

Its third quality is its ease-of-use, now stuff of legend.

Its fourth quality is its openness.

The fact that the price of WINDEV 21 is so low is only one of the elements that make its success.

A day without

MANAGER
The very low price of WINDEV and its very low learning curve are nothing next to its reliability and its power. But a reasonable price is always a plus.

NEW
More than 921 new features in version 21

MAIN POINTS
All in English
Everything is included and integrated
Very short training time

FEATURES		Other tools
UML modeling tool	*included*	...............€
Unlimited multi-OS database	*included*	...............€
Cluster	*included*	...............€
Software Infrastructure Supervisor	*included*	...............€
Report generator	*included*	...............€
PDF document printing	*included*	...............€
Bar code printing (QR code, EAN,...)	*included*	...............€
Fax and email sending (one at a time or mailing)	*included*	...............€
Query editor	*included*	...............€
Pivot table (Cube)	*included*	...............€
Remote debugger	*included*	...............€
Performance profiler	*included*	...............€
Data acquision/sending via RS 232, USB and // link //	*included*	...............€
Versioning tool (SCM)	*included*	...............€
Static audit, Dynamic audit	*included*	...............€
Software integration (agile development)	*included*	...............€
Translation in 64 languages	*included*	...............€
online help generator	*included*	...............€
Setup program generator (including "push" and "relay")	*included*	...............€
Monitoring robot	*included*	...............€
Control Centers: Scheduling, Quality, Requirements	*included*	...............€
Analysis and program documentation generator	*included*	...............€
Regression test center	*included*	...............€
User feedback management center	*included*	...............€
Self-training time	*1 week*	...............€
Custom hotline (email, 15 inquiries)	*included*	...............€
Version 100% in English (product, documentation, help, examples, ...)	*included*	...............€
Development time (1 to 10 ratio)		...............€
Product price list		...............€
TOTAL		...............€

KEEP ON BUDGET, WIN CONTRACTS

WEBDEV 21 is a very complete and powerful tool, yet very simple to use and with very short training time required.

With WINDEV 21 you'll reach all of your objectives.

Its incredibly low price in relation to its feature set and extended services, is only made possible by our large number of customers.

You will save a lot of money by using WINDEV 21, while bringing total satisfaction to your most demanding users.

The ROI is immediate.

PC SOFT AT YOUR SERVICE FOR OVER 25 YEARS

F or over 25 years, PC SOFT has been helping professional developers develop their strategic applications better and faster.

Who else has such confidence in its products that it offers free technical support?

The ease-of-use of our environments and their reliability allow us to offer you this service, which is fundamental for your efficiency, free of charge. For over 25 years!

MANAGER
PC SOFT answers all your requests. Our free technical support (we have total confidence in our products) is real guarantee for your teams.

NEW
WINDEV, WEBDEV and WINDEV Mobile are all up to version 21, and share projects

MAIN POINTS
Free, personalized, technical support
Intervention on site

In order to help you reach your objectives faster, PC SOFT provides you with more than 25 years of experience in the professional development market.

SERVING DEVELOPERS SINCE 1984

PC SOFT has been creating development tools since 1984. This is why we know what we're talking about, and above all, it's why we know you.

Several millions of applications developed using PC SOFT tools are running worldwide, in all kinds of fields.

QUICKLY TRAIN YOUR TEAMS IN WINDEV 21

Many simple, efficient, and accessible ways are available to get you trained quickly on WINDEV:
• Tutorial (500 page manual included), examples
• Consulting services

FREE HOT LINE

A simple e-mail to the Hot line can save you hours or days!

We are so confident about our product that we offer free technical support: it is free (15 inquiries).

Note that the hot lines of most of our competitors are more expensive than the cost of WINDEV itself.

PROFESSIONAL NEWSGROUPS

PC SOFT offers exchange forums for developers. PC SOFT newsgroups are moderated, which means their content is technical and professional.

AN EXPERIENCED CONSULTANT IN YOUR PREMISES

PC SOFT can make an experienced engineer, who is familiar with your field, available to you in your offices, for a duration from 1 to 5 days.

The PC SOFT consultant will help you so you can maximize your investment in WINDEV for your specific project, will audit existing code and will guide you in your strategic choices.

WINDEV 21 enables you to easily reach your objectives

PRESTIGIOUS REFERENCES

Go to the www.windev.com site to read several detailed testimonials from companies that are using WINDEV, WEBDEV and WINDEV Mobile.

Several customers among PC SOFT's tens of thousands share their experience.

You'll be able to see for yourself the variety of use WINDEV can be put to.

DEVELOP ANY TYPE OF APPLICATION

While you are reading these few lines, millions of PCs in the world are running applications built using WINDEV. Software with over 200,000 deployed copies, that manage billions of dollars, that work with databases containing several dozen millions of rows, or on networks with thousands of remote machines in real time, ...

You too, like them, build your software more easily with WINDEV.

MANAGEMENT

- CRM, ERP, EAI, EDI, mail order, KM, CAPE, CAM, sales, accounting, payroll, management, amortizations, portfolio, budget...
- Various business applications: auto sales and auto repair, trade, food, match making, hair salon, fashion, photo stores, airline fret agent, city IS departments, cemetery, fresh produce warehouse, workers' council, marina, dry cleaner, SPA, oil distributor, home owner associations, optician, express shipper, temp agency, maritime company, airport, cosmetic industry, publishing house, toy industry, newspaper publisher, etc.
- Genealogy software
- Applications linked to ERP, SAP, Mapix, Sage...
- Management of computer inventory, helpdesk
- Industrial packaging
- Real-time inventory management, with laptop and PDA linked by radio and GPRS
- Complete management of a 500 food store chain, with connection to cash registers, to the headquarter mainframe, ...
- Real-time management of ID cards
- Organization and optimization of stores
- Worldwide logistics management for a car manufacturer
- Tool for optimizing inventory in the fashion design industry
- Census and poll
- Work time management (vacations, clock...)
- Print giant labels (with bar code)
- Personnel management using picture
- Crop optimization based on quotas and type of culture
- Statistics, reporting
- Consumption billing debited from a smart card
- Account receivable management
- Athlete management (Olympic games,...)
- Entry and management of classified ads for a daily newspaper
- Geographical and historical atlas
- Process and prevention of work-related accident, with printing of legal documents
- Repair planning and train circulation...

MEDICAL

- Automatic analysis of medical samples
- Management of: Hospital, Clinic, Medical building, Doctor, Dentist, Nurse, Pharmacy, Chiropractor, Emergency technician
- Ultra sound optimization
- Management of thousands of employees for "Médecine du Travail" (work health department)
- Measure the volume/pressure of internal organs...

SPACE

- Stellar seismology study (software loaded on a space probe)
- Calculation of comet orbits
- Editing the sky maps
- Automatic generation of an airplane flight log
- Interface for the defense system of a large country
- Monitoring a stratospheric balloon...

EDUCATION

- WINDEV is used in a lot of engineering schools
- Tutorial including 3,000 windows
- Student self evaluations
- manage the report cards (grades, ...) for students in several thousands schools
- CAL training for a banking software running on mainframe and distributed at 50,000 copies...

FINANCE

- Financial transaction management for clients on 15,000 computers spread over 400 connected networks
- Banking back office
- Insurance premium and claims
- Stock price retrieval
- Banking terminal interface (men/computer, computer/central site) (ATM)
- Commercial land management, on laptop, connected to main system via Client/Server...
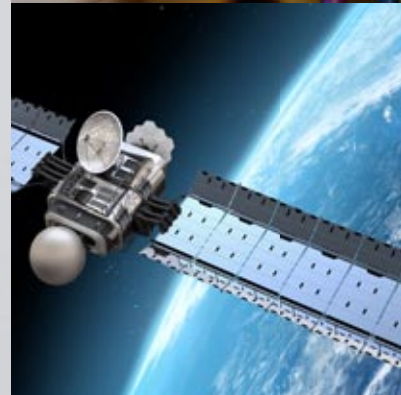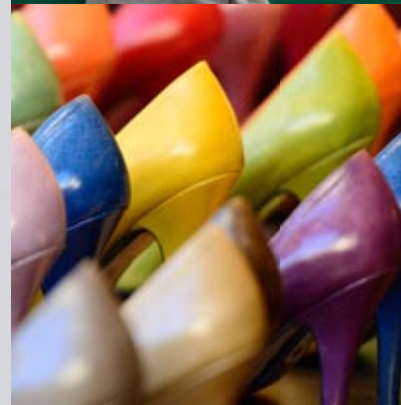
INDUSTRIAL

- Supervision software
- Control of an automatic feeder for livestock
- Airbags testing
- Engine testing management
- Monitoring of tests for train braking system
- Monitoring and simulation of flow for dams
- Data entry in a vineyard at the ripening stage of grapes, with GPS positioning
- Real-time entry of veterinary procedures
- Controlling an electronic microscope
- Monitoring of printed circuit presses
- Calculation for building design
- Control of automatic industrial wood cutting operations
- Control drilling/milling equipment
- Control of a viscosity measure instrument
- Analysis of mechanical chocks
- Control of automated paint mixing equipment
- Controlling an interactive vocal server
- PABX and PCBX Management
- Modeling of a drinking water network
- Creation of artificial images of mechanical parts
- Remote surveillance of sensitive areas
- Remote surveillance of a network of water reservoirs
- Monitoring of car making robots
- Checking the access to nuclear central areas
- Send/receive message on a laptop from a boat
- Acquisition and process of weather related data
- Remote control of an extended network of diode display panel
- Automation of adhesive film cuts
- Examination of combustible radioactive chips
- Interactive terminal issuing transportation tickets
- Interactive information terminal in a department store
- ISO normalization programs
- Technical construction calculations
- Help pre-cabling a building
- Technical documentation management (aviation)
- Workshop Management...

ETC.

This list is not exhaustive of course, but it gives you a good idea of the power of WINDEV and how our customers use it.

Don't let your competition get ahead, choose the best development environment to build your applications: WINDEV 21.

WINDEV®

INTEGRATED DEVELOPMENT
PLATFORM

PC SOFT