CRAFT
Designer

Software platform for rapid development of business applications

http://www.crafterp.com

To application software developers
To specialists in IT departments
To system integrators

Binom soft

Contents

This booklet describes a concept of rapid business applications development for enterprises based on CRAFT platform and its unique capabilities and advantages.

Also, the platform technology, its architecture and main components are considered. The embedded programming language features are reviewed, and the visual design tools are described.

Additional information about the product can be obtained by request to the email address: info@binomsoft.com.

Typical problems when developing business applications

Practical experience shows that very often software developers meet with typical problems when creating business applications. They are:

— Before even starting to implement a particular application task, it is required to program the low-level functions to work with RDBMS, to develop a set of visual components for building user interface, create service functions (for example, sorting or filtering data, data exchange with office applications etc)

— Such kind of technological preparation may also lead to additional expenses, for example: purchasing software development tools (compilers) and 3rd party software libraries

— There can be technical difficulties in separating the application business logic from low-level system functions

— A complexity in providing information security across all application: data access restriction and limitation to execute business functions

— Creating an application “from scratch” requires high professional skills from the developers and knowledge in different areas, from operating system and database programming up to the user interface design

— All mentioned above issues complicate the time estimation for the development project, and the project itself can significantly exceed the originally planned time due to unforeseen technical complexity

— And finally, during the maintenance phase, it is difficult to adapt the application to the constantly changing business process for the customer. Sometimes, implementing even small changes in the system may require significant programming efforts.

Concept of rapid software development

So, what is the concept of rapid application development from the practical point of view? How can a developer overcome the possible problems?

Some time ago there was a very popular concept of so-called CASE-technology (Computer-Aided Software Engineering) for quick software development. However, it appears that in practice CASE-systems are very complex and cumbersome, they can give advantage only in designing the database structures or schematic business logic. But when it came to the actual application development, the traditional manual programming techniques were used.

Then the development systems of 4th generation languages appeared on the market – RAD-systems (Rapid Application Development). Again, almost the same story as with CASE-systems happened to them. Offering power tools to a developer in creating business applications and stepping up to the next level of abstraction in programming, those systems in the end require significant amount of manual coding for almost all application functions, including system level.

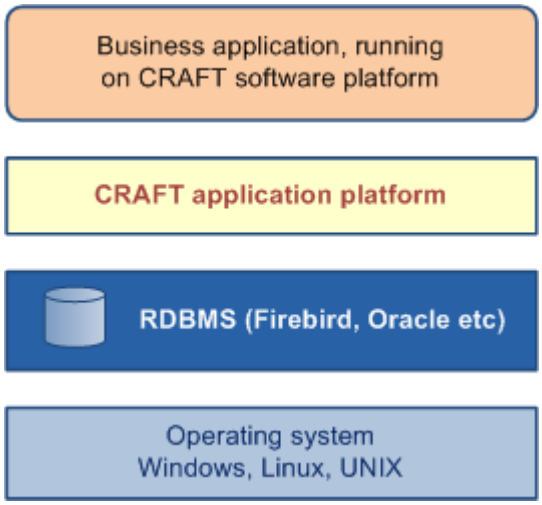
At present time the 5th generation languages (5GL) became available. They are usually called “problem-oriented” (non algorithmic) as opposed to the languages of previous generation. Main areas of their application – the systems of artificial intelligence and expert systems.

Practically, in order to resolve problems that arise in front of developers when creating complex business applications, it is required to unify the capabilities of RAD-systems and 5th generation languages. CRAFT as a platform for developing business applications gives an answer to this challenge and solves the developers’ problem allowing to create applications quickly and effectively.

CRAFT™ is a platform for rapid application development

CRAFT™ is a technological software platform, that provides the following main functions:
— Developing of business applications
— Execution of business applications
— Customization and maintenance of business applications

CRAFT supports the most well known SQL database servers such as: Firebird, Interbase, MySQL, PostgreSQL, Oracle, Microsoft SQL Server. Many of those servers can work on different operation systems (Windows, Linux, UNIX-like systems). The main levels of CRAFT system are presented on the picture below:



Executes application business logic and provides user interface.

Supports the development of application interface and business logic.

Provides repository for metadata and storage for application data.

Allows database server to run.

Practically, CRAFT development platform is a shell over an SQL database server, allowing to create client-server business applications of arbitrary complexity level. CRAFT development system includes embedded high-level problem-oriented language as well as visual design tools for creating user interface and reports. CRAFT application execution environment takes all responsibility for implementing low-level service functions in order to provide user interface for the application module and executing application business logic.

To whom CRAFT platform is intended for?

CRAFT platform is all in one application execution environment and the system for rapid application development. Its distinctive feature is functional completeness and independency from any other development tools. CRAFT is used as a basis for the packaged software suite for enterprises **CRAFT™ ERP** (www.crafterp.com) and the accounting system for offshore companies **ELF** (www.elferp.com). Therefore, potentially the following categories of people (or organizations) could be the users of CRAFT platform:

CRAFT™ ERP users
Using the capabilities of the CRAFT development platform, they can enhance functionality of existing business applications for their companies' needs.

Specialists in IT-departments
CRAFT development platform can be used for quick and effective development of corporate applications and automation of specific business processes in the company, with their integration to the corporate information system.
CRAFT platform also suites to be used as the main environment for automation in all business fields of enterprise and for creating the corporate information system.

System integrators
IT companies providing system integration can use CRAFT platform for quick development of tasks that can arise during implementation of complex information systems. Also, CRAFT platform capabilities and **CRAFT™ ERP** features allow to use them as a main product for implementing automation systems for enterprises in wide spectrum of business fields.

Independent software developers
Software development companies can create their own business application modules using CRAFT platform. Those business modules can then be licensed by developers and used as a packaged software, distributed in a market on a commercial basis.

CRAFT platform licensing principals

CRAFT Designer is distributed absolutely free of charge. CRAFT Designer is part of the packaged software suite **CRAFT™ ERP**, also the CRAFT Designer installer can be downloaded from the www.crafterp.ru Web site. Basic license for the CRAFT Designer includes: 1 user for application development and 1 user for running of developing application (in a test mode).

Licensing of applications running on CRAFT platform

For commercial use of applications based on CRAFT platform the end users must request a license for the application module (only the CRAFT platform is licensed depending on the number of concurrent database users). Under commercial use it is considered any practical use of applications based on CRAFT platform, that is different from development or testing. The license is provided in a form of electronic key.

Registering application in a CRAFT repository

If a developer wants to get a unique application module identifier (so as this application could be used along with other available CRAFT applications), the application must be registered at the Web-site: www.crafterp.ru. Registration is confidential and is done from the personal developer area on the site. Application registration is absolutely free. For commercial use of CRAFT platform the registration of application module is mandatory. Optionally the developer can publish information about his application at the Web-site www.crafterp.ru for the common access.

Independent software developers

In order to develop and distribute the packaged software based on CRAFT platform, the independent developers must first register a new application module in the CRAFT repository. They can then generate electronic keys for their end users by themselves in their personal area at the Web site www.crafterp.ru.

What CRAFT platform offers to software developers?

Effectiveness
A developer can focus on particular business application task. Everything else is provided by CRAFT platform.

Reliability
Using efficient components of CRAFT execution platform guaranties high reliability of business applications during execution.

Power functionality
Embedded event-driven object-oriented programming language with native SQL support along with power visual designer tools allow creating complex business applications.

Modern technologies
Sybase DataWindow technology provides high speed of data processing and unbeaten flexibility in designing application visual interface.

Professional look and feel for applications
User interface of a business application developed on a CRAFT platform (with a style of MS Office 2010), will satisfy the most demanding user requirements.

Easy application maintenance
All application business logic is available for modification and therefore makes it easy for developer to quickly customize application for the customer needs.

Ready license protection mechanism
Electronic keys generation is available for developers from their personal area at the Web site.

Convenient infrastructure for applications distribution
On-line CRAFT repository is an excellent way of promotion and distribution for developed applications.

CRAFT platform advantages

Low cost of ownership

— Most of supported RDBMS can work on a free operating system like Linux (no need to pay for a license for server software and user connections)
— Using free RDBMS - Firebird, MySQL, PostgreSQL (no need to pay a license fee for the database server and connections to the database)

Powerful tools for application development

CRAFT platform has all required development tools allowing to create complex business applications and then effectively enhance them to satisfy business needs. CRAFT development tools significantly reduce implementation time and require minimum knowledge from the programmers. CRAFT development suite includes:
— Configuration editor that allows creating or modification of business objects like dialogues, lists, documents etc.
— Code editor for embedded programming language (K-Script)
— Visual designer for the input forms (used by business objects)
— Visual designer for reports
— Resources manager (icons etc)
— Users and roles manager
— Application menus editor

Implementing modern user interface by execution environment

A developer is free from necessity to implement basic interface functions, all such functionality is provided by CRAFT application execution platform:
— Modern controls (Ribbon-menus, toolbars, buttons)
— Wide use of context menus and service functions
— Individual user interface customization
— Using "hot keys" to do most frequently used functions without mouse
— Unbeaten abilities for data searching, sorting and filtering

CRAFT platform advantages

Highly reliable data storage and processing

— The ability to use Linux operating system for the database server (advanced resistance to viruses and DOS-attacks)

— The use of modern and powerful SQL database servers (Oracle, MS SQL, Firebird, PostgreSQL)

— Using "client-server" technology - the transactions of data modification are performed on the server

High speed of executing reports

— Ability to separate business logic between client and server (using stored SQL procedures)

—Using "client-server" technology when running reports - the data requests are performed on the server)

—Using patented Sybase DataWindow technology to work with data

Embedded information security

— Access to the system by individual login/password

— Extended multi-level system of roles and privileges

— Access restriction to modules based on roles

— Menu customization and access to objects and functions by roles

Scalability

— Thanks to the use of the "client-server" technology, system performance depends mainly on the server capacity

— The increase in the amount of users is possible by simple increasing of workstation licenses

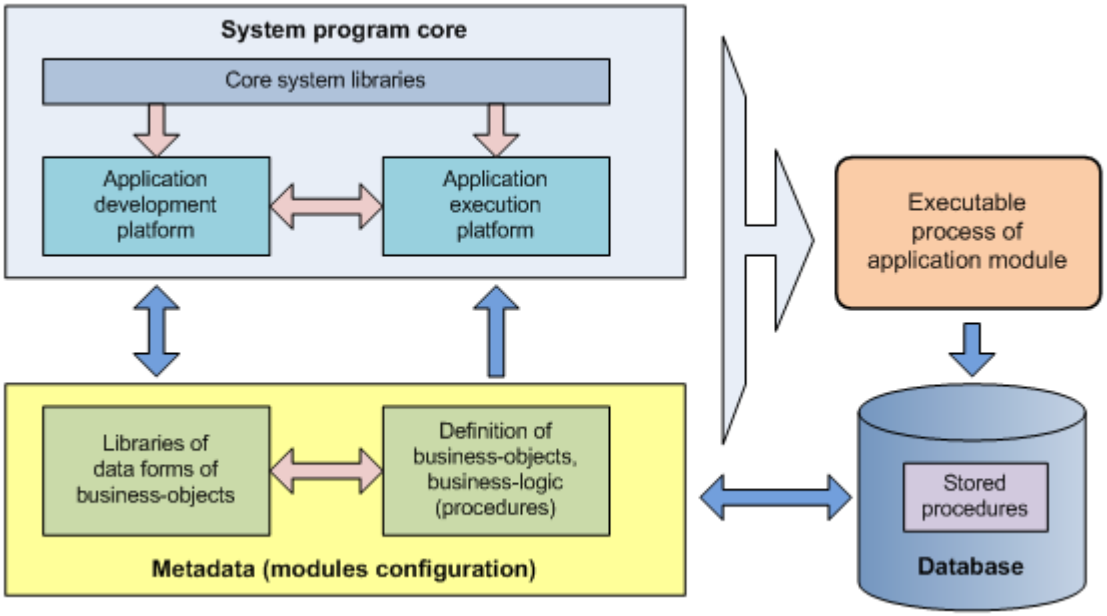
Supporting geographically distributed systems

— CRAFT system metadata structure was developed initially to support possible data replication

— Dedicated module for automatic data replication (Transfer)

CRAFT platform architecture

CRAFT architecture has modular structure as shown on the diagram below. Separating the whole application to the program core and application part (defined in metadata) allows to achieve the highest level of abstraction for the system program code, which provides unique reliability and excellent flexibility and scalability of the system.

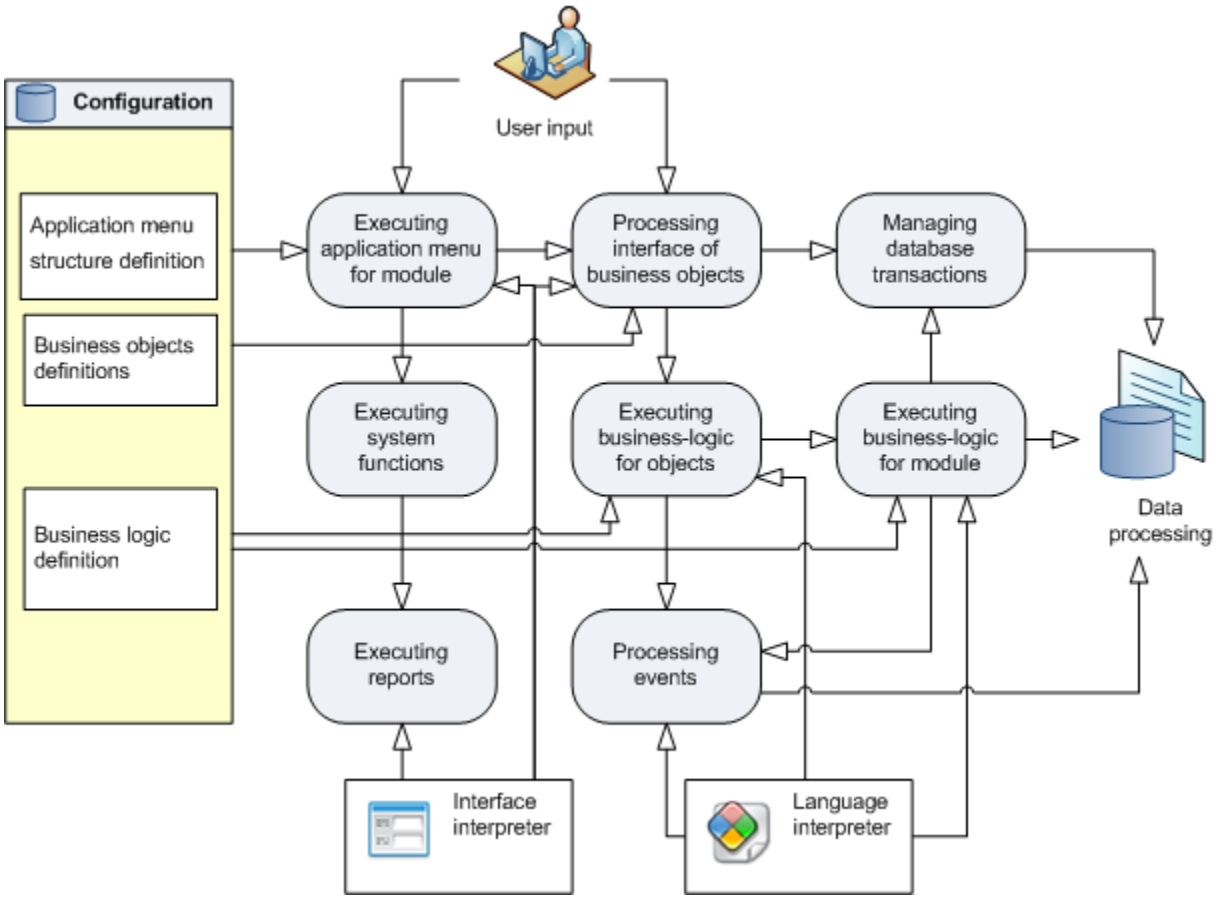


The availability of the embedded program language for defining the application business logic in configuration metadata provides high speed of developing the new business objects that are ready to use just after creation. At the same time the CRAFT application execution environment allows easy debugging of application configurations and stability of application modules execution. The distinctive feature of CRAFT platform is pre-compilation of business-logic procedures (written on embedded language), that provides high reliability and speed during execution of application procedures (as opposed to the similar systems with interpretive languages).

CRAFT application execution platform

CRAFT application execution platform is a set of program libraries, that can be run and function on Windows environment, and comprises the main program core. Those libraries are the required part of the CRAFT platform to function and therefore is always installed when setting up the program on a client computer. An attractive feature of the CRAFT client execution platform is its ability to automatically update executable libraries from the common location (for example from network drive).

Common functional scheme for the CRAFT application execution platform:



CRAFT application execution platform

Execution platform bears the following main functions:
— Checking the presence of electronic license key and license validation
— User sessions control in the database
— Initial boot load of application module configuration from system metadata
— Automatic update of executable libraries of client program
— User authentication and authorization by his role
— User interface dynamic generation according to his role
— Managing the application user interface
— Access control to the business objects and functions by role privileges
—Execution of application business logic
— Managing data locking for business objects during modifications
— Providing low-level functions for data processing in RDBMS

CRAFT development platform

CTRAFT platform provides for programmers advanced tools for creating and modifications of business applications. CRAFT system architecture implies building of application modules from standard components (objects) provided by the development platform and that can be further used by the CRAFT application execution platform. This approach ensures unified user interface across all applications as well as stability and reliability of the application modules during execution.

The set of visual components (business objects) available in CRAFT platform are:
— Dialogues
—Wizards
— Lists
— Registers
— Documents
— Journals
— Reports

For business logic definition the following elements are used:
— Global constants and variables
— Global macros (SQL-requests)
— Global events and procedures (on the module level)
— Events and procedures on the business objects level
— System functions

All those elements comprise the application module configuration (metadata) which is stored in the system repository (in a database). Using development environment, the programmers can easily create and modify any element of the application module configuration. For each element in configuration the creation and modification date-time is stored, that allows to manage versions of the objects during configuration updates at maintenance phase of business application on the customer site.

K-Script programming language

The unique feature of the CRAFT development platform is the availability of embedded programming language (K-Script). K-Script language is a problem-oriented language with objects support and native SQL support. By means of embedded language it is possible to control the application interface and manage the business objects' behavior using events or procedures associated with objects.

K-Script language syntax is compatible with PowerScript language that is used in Sybase PowerBuilder development environment. Therefore, those programmers who already have experience working with PowerBuilder can easily start programming in CRAFT development platform language. CRAFT development environment provides a convenient code editor with syntax highlighting for the procedures written in K-Script.

Main advantages of K-Script language:

— event-oriented
— more than 500 different embedded functions!
— strong type checking during compilation
— OLE objects support
— a set of functions to work with XML
— native SQL support, allowing to create data processing procedures of any complexity, including working with database cursors
— compiling language, events/procedures are compiled in Designer before run
— compiler outputs all errors with hints and references to the error lines
— un-compiled procedure or event will never run in execution environment which eliminates possible problems
— pre-compilation of events and procedures significantly increases the application performance during module execution

Main features of K-Script language

Supported data types:
Boolean, Number, String, Date, Time, Datetime, BLOB, Object

Object types:
— Transaction
— Message
— Window
— DataWindow, DataStore
— OleObject

Main language elements:
— Comments
— Constants, Variables
— Dynamic arrays with variable size (one- and two-dimensional)
— Functions with passing arguments by value or reference
— Conditional commands (IF .. THEN, CHOOSE CASE ..)
— Cycle commands (FOR, LOOP, CONTINUE, EXIT)
— Branch commands (EXIT, GOTO, RETURN)
— Commands for creating and destroying objects (CREATE, DESTROY)

Embedded functions:
— Common system functions (files, arrays, data conversion, number, string, date-time)
— Object functions (Window, Transaction, DataWindow, DataStore, OLE)
— Interface functions (managing windows and dialogues, data exchange)

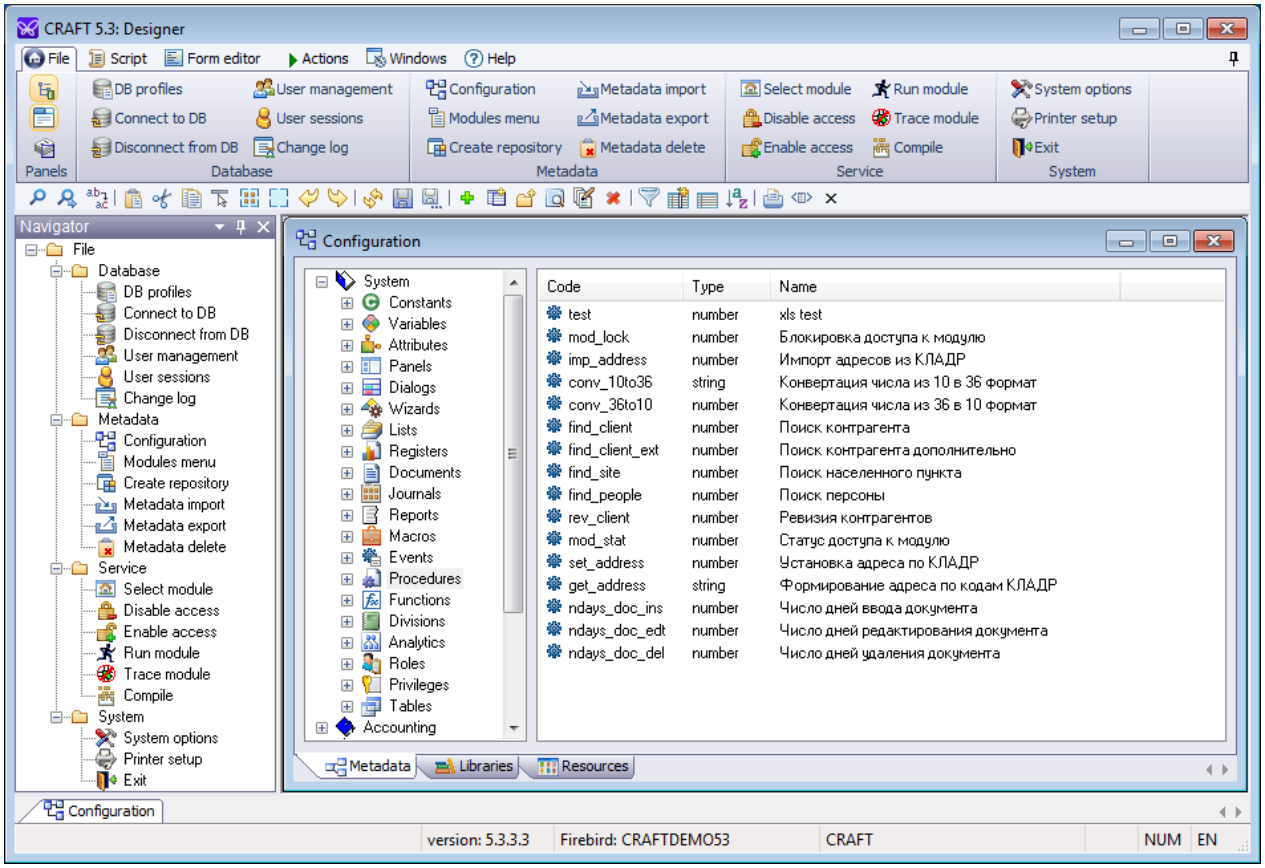
Native SQL support:
— SELECT INTO
— INSERT, UPDATE, DELETE
— SQL cursors (DECLARE, OPEN, CLOSE, FETCH)
— Dynamic SQL statements execution (EXECUTE)
— Stored SQL-procedures call (EXECSQL)
— Managing transactions (COMMIT, ROLLBACK)
— Result codes (SQLCode, SQLErrText)

CRAFT platform development environment

CRAFT platform development environment provides for the programmer power and convenient tools for navigation through all configuration components of the application modules. Embedded tracing and debugging capabilities significantly reduce application development time.

Main configuration management window allows working with application modules metadata, input forms and reports libraries for business objects, resources (icons, pictures etc), and users and their roles.

CRAFT Designer common development environment screenshot:

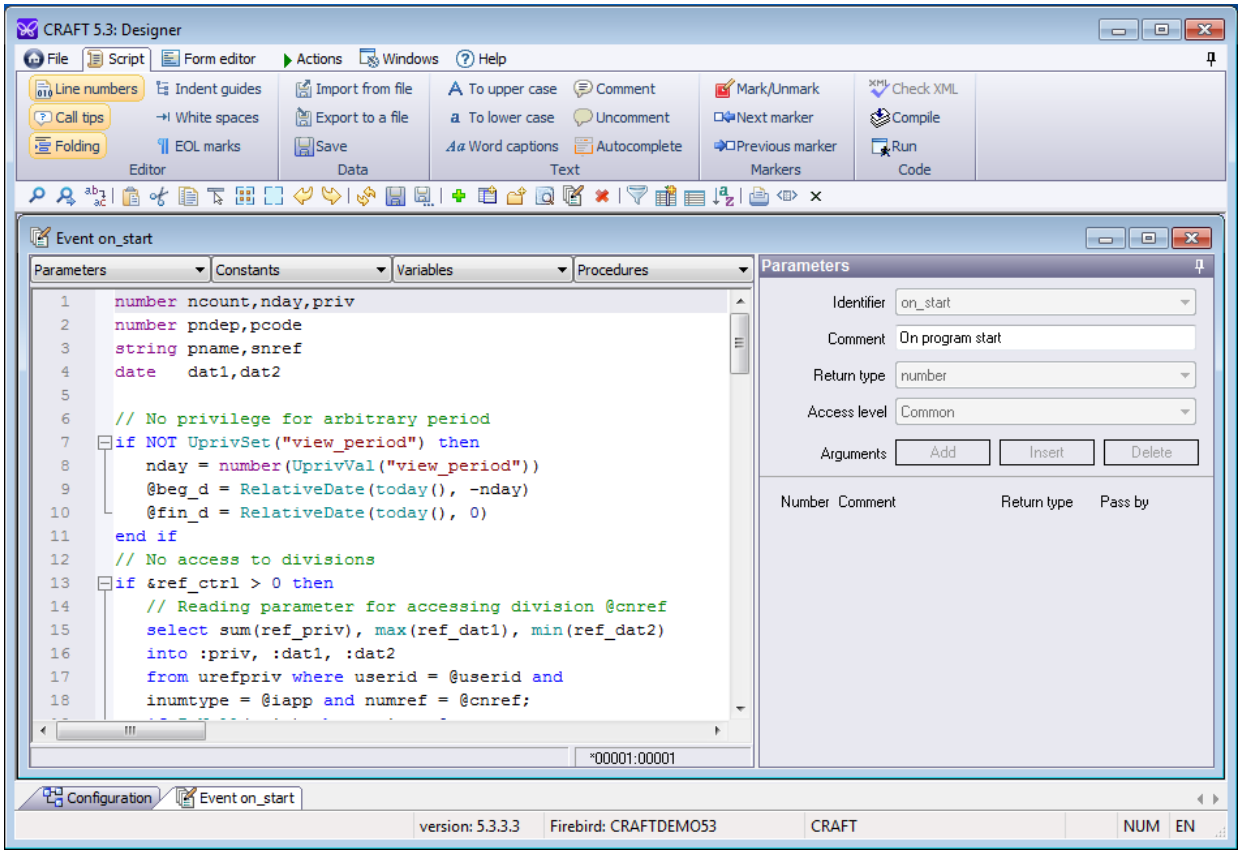


Code editor for K-Script language

Efficiency of programming in a development environment depends on how convenient and comfortable is for the developer working with the source code. CRAFT development environment provides for a programmer powerful and convenient code editor with syntax highlighting and text searching.

CRAFT code editor has also code completion assistant (allowing to choose available in a module constants, variables, embedded system functions and global procedures, as well as procedure arguments). Directly in a code editor it is possible to compile the procedure.

CRAFT Designer K-Script procedures code editor screenshot:

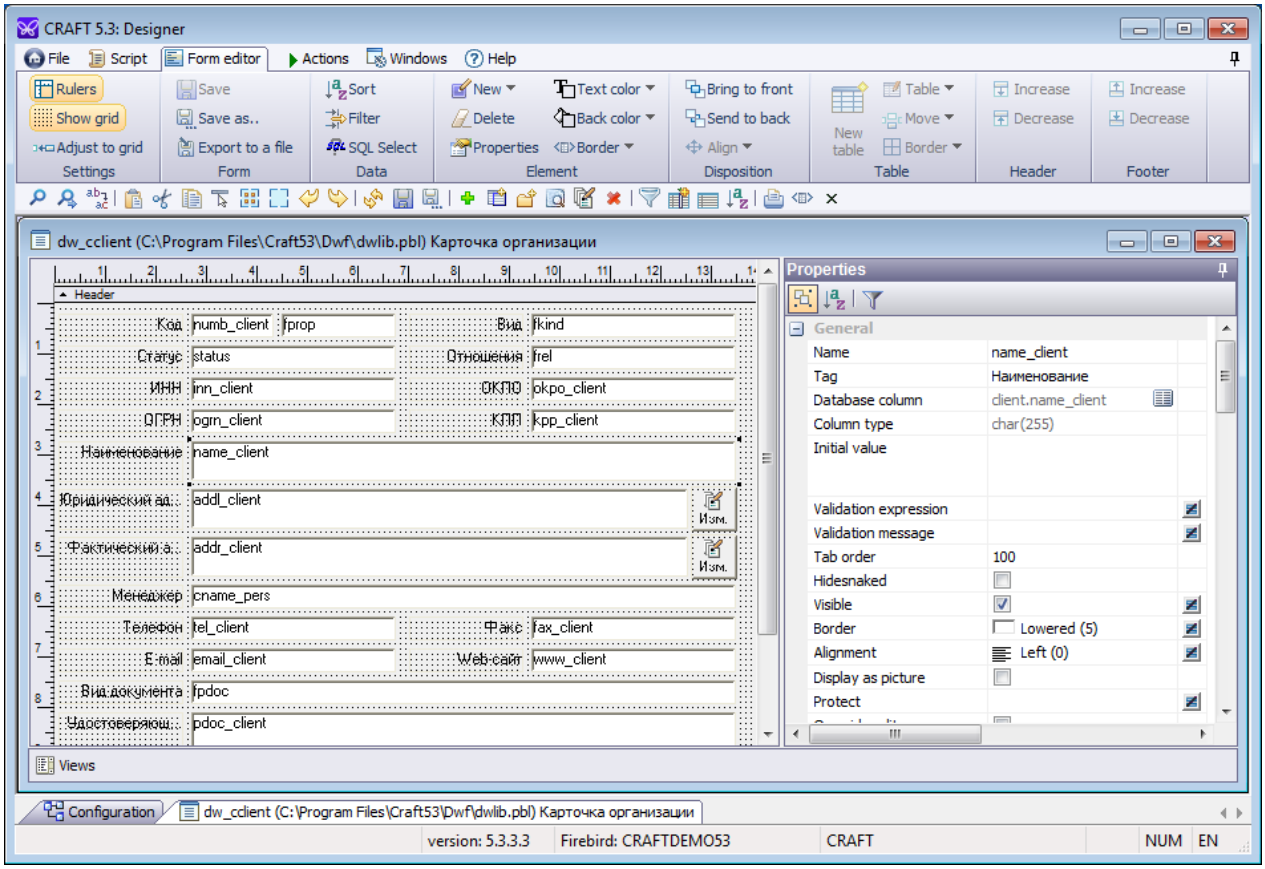


Forms editor

Input forms editor allows creating user interfaces for the application business objects developed on a CRAFT platform. Using forms designer it is possible to define SQL-query for the form as well as visual representation of data in form elements, including definitions of all required elements' attributes (for example, font, color, edit styles etc).

Data forms in CRAFT are completely compatible with DataWindow syntax in Sybase PowerBuilder development system.

CRAFT Designer forms editor screenshot:

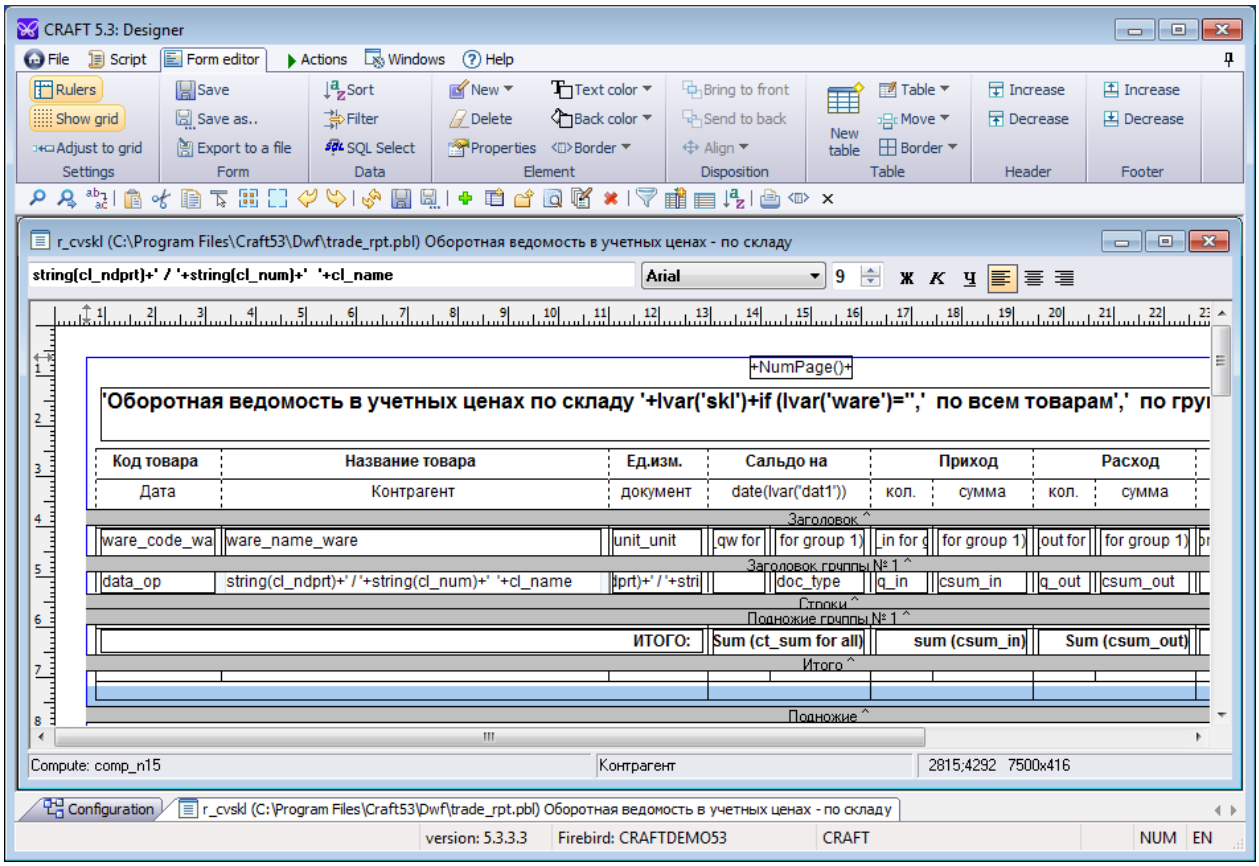


Reports editor

Reporting forms designer allows creating reports of any complexity for the application business modules developed on CRAFT platform. Reports editor helps defining SQL-query for the report and also allows to design visual data representation including complex elements like tables and computed fields.

Report forms in CRAFT are completely compatible with DataWindow syntax in Sybase PowerBuilder development system.

CRAFT Designer reports editor screenshot:

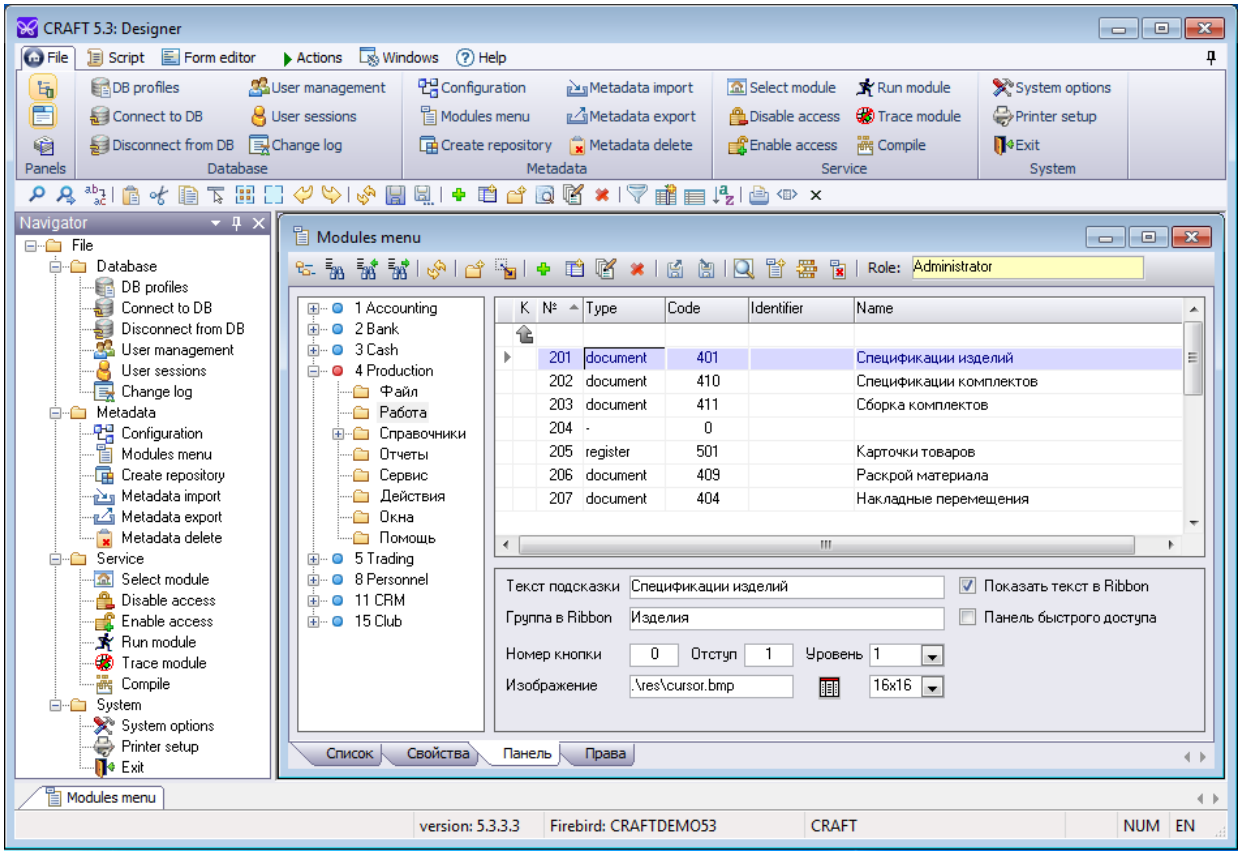


Application menu editor

Menu editor is intended for definition of main menu for the business application module. Application module menu is defined for each user role separately which provides required flexibility in managing access restriction to the module functions depending on the current user role.

Menu editor allows to set all required properties in order to build complex menus in a “Ribbon” style as well as to define access levels and “hot keys” for menu items.

CRAFT Designer application menu editor screenshot:



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