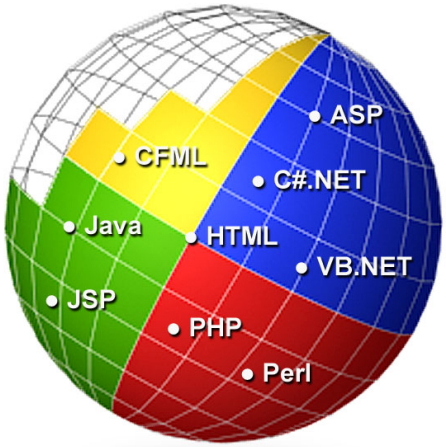
CODECHARGE STUDIO™



Reviewer's Guide

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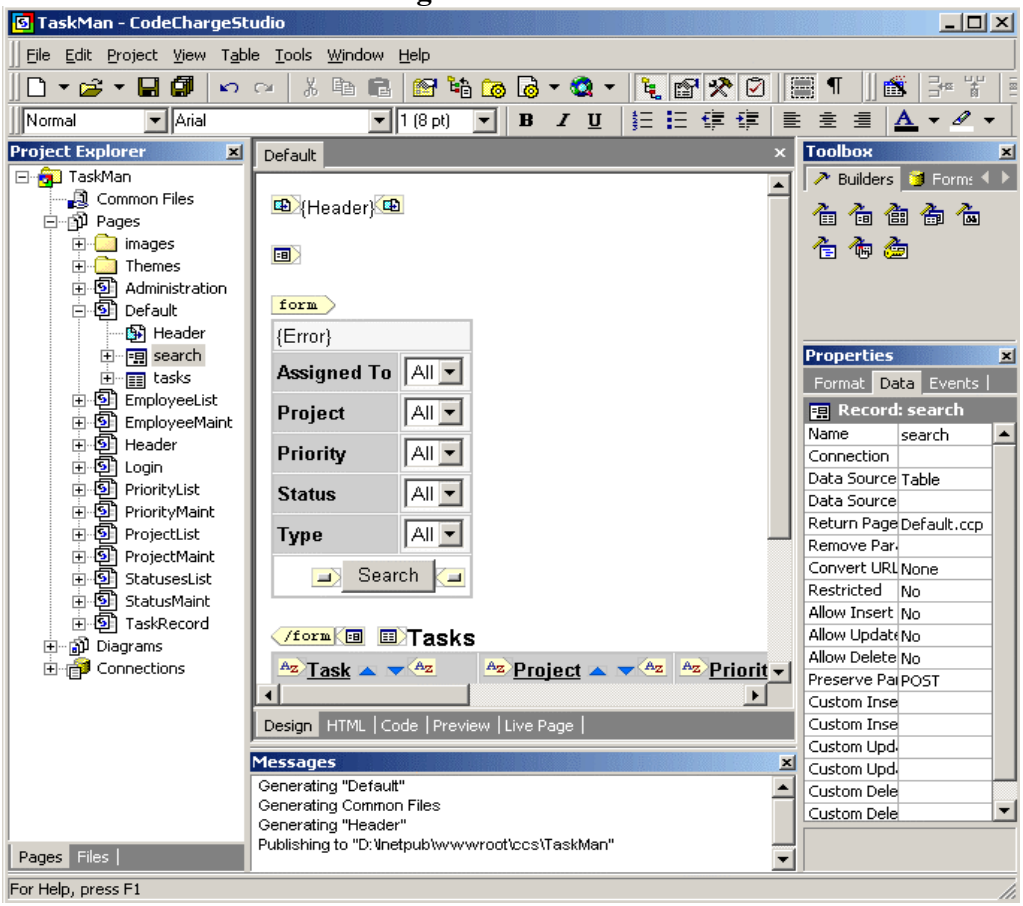
Introduction

Evolved from CodeCharge core technology, CodeCharge Studio 2.0 is a visual application builder and code generator that is the realization of Rapid Application Development for the Web. It is the most productive way available today to create powerful, scalable, secure Web applications quickly. Based on a sophisticated XSL Engine using XML file formats, CodeCharge Studio 2.0 opens up new possibilities for Web developers by automating the creation of virtually all web application components and by generating robust, professional-level server code in any of the following programming languages: ASP.NET (C# and VB.Net), ASP 3.0, PHP 4.0, Java Servlets 2.2, JSP 1.1, ColdFusion 4.01 and Perl 5.

Leveraging CodeCharge Studio's core technology and development environment, users are able to take advantage of a data and database-centric model that creates separate HTML and server code. Generated code can be easily modified using the internal code editor, which locks modified blocks of code to prevent overwriting user's modifications during subsequent code generations – facilitating round-trip editing. CodeCharge Studio includes Security Management/ Role-Based access and is fully integrated with MS FrontPage for those developers who use FrontPage for Web design. Its powerful visual features, fully extensible environment and support for virtually all popular databases and server technologies make CodeCharge Studio 2.0 the ideal Web application development environment.

CodeCharge Studio User Interface



Sample Uses of CodeCharge Studio

CodeCharge Studio can be used for creating an array of database-connected Web applications, from Employee Directories to complex Portals and Content Management systems. Here are some of the examples of where and how this core technology is used:

- CodeCharge was used to build an Intranet system for IBM Australia.
- Gravitymax (http://www.gravitymax.com.au) used CodeCharge to create their Content Management and Customer Relationship Management systems.
- UltraApps (http://www.ultraapps.com) used CodeCharge to create one of the most popular Web-based Defect Tracking and Issue Management systems, as well as a Portal for clubs and non-profit making organizations.
- Goodrich Corporation used CodeCharge to generate over one million lines of code for their Knowledge Management, Configuration Management, HelpDesk/Customer Service, Vendor Data Sheet and other applications. Goodrich is already preparing to use CodeCharge Studio to create an interface between Goodrich and their customers to track the reliability and performance of Goodrich parts.
- Sony Corporation used CodeCharge to create a Web interface to their WebLogic applications.

Who Should Use CodeCharge Studio

CodeCharge Studio is best suited for the following types of users:

- **Web Application Developers**
  CodeCharge Studio provides developers with all the functionality they need to rapidly create powerful, scalable, secure Web applications. Developers can focus on programming the essential business logic behind the application, not the initial application framework, eliminating the schisms that often occur in the development process. This group of users consists of corporate developers, consulting companies and individual programmers/consultants.

- **Database Developers**
  Database developers that are comfortable with visual database and application design tools will appreciate the natural, data-centric nature of CodeCharge Studio. Microsoft Access programmers will especially find the CodeCharge Studio interface strikingly familiar.

- **Legacy Programmers**
  Sophisticated and advanced system architects are often not familiar with Web application development. Visual Studio or other Windows programming environments are often too complex and do not offer an easy way to understand Web application development. CodeCharge Studio simplifies and accelerates the process of Web application development through a variety of features including drag-and-drop components, application builders, and pre-built business solutions.

- **Webmasters and Designers**
  Webmasters and designers are realizing the benefits and need for storing Web content in a database - especially once they find themselves maintaining hundreds of Web pages. They are often expected to produce dynamic content like an employee directory or portal for their company. CodeCharge Studio addresses these needs and allows anyone to create database-enabled applications without the need for extensive programming. For designers comfortable with the host of existing design applications, CodeCharge Studio is tightly integrated with Microsoft FrontPage and can work in conjunction with virtually any design tool.

- **Systems Integrators, VARs and ISVs**
  Companies who produce, sell or support any software applications will find CodeCharge Studio valuable for creating Web interfaces for their solutions. For example a CRM software vendor offering Windows solution now can easily create the Web equivalent of their product, or at a minimum, Web-enable parts of an application and its functionality.

System Requirements

Development Environment Requirements

CodeCharge Studio is available for computers running the following operating systems and environments:

- Intel Pentium Processor or equivalent
- 64 MB available RAM
- 30 MB available disk space
- 256-color monitor capable of 800 x 600 resolution
- Windows 95, 98, ME, NT4, 2000 or XP
- Microsoft Internet Explorer 5.5 or higher

Databases Supported

CodeCharge Studio can connect to virtually any ODBC compliant database using appropriate drivers installed on the computer where CodeCharge Studio is present.
Supported databases include:

- Microsoft SQL
- Oracle
- MySQL
- Microsoft Access
- DB2
- Informix
- Interbase
- mSQL
- Sybase
- PostgreSQL

The generated code doesn't require ODBC connectivity and connects to the database using the method appropriate for the particular environment, for example ADO for ASP, JDBC for Java, PHPLib for PHP, or DBI for Perl.

Server Requirements

The generated code runs on all operating systems with installed application servers capable of executing the following programming language versions:

- ASP 3.0 (runs on IIS and PWS servers with VBScript 5)
- ASP.NET (C# or VB.Net) 1.0
- ColdFusion 4.01
- PHP 4.0
- JDK 1.3
- Perl 5

How To Use CodeCharge Studio

CodeCharge Studio is functionally and visually similar to RAD tools such as Microsoft Access and Visual Studio, with the ability to maximize developer productivity while keeping the cost of development at a minimum. While visual programming tools are traditionally used for developing desktop and client applications, CodeCharge Studio is ideal for developing sophisticated Web Applications.

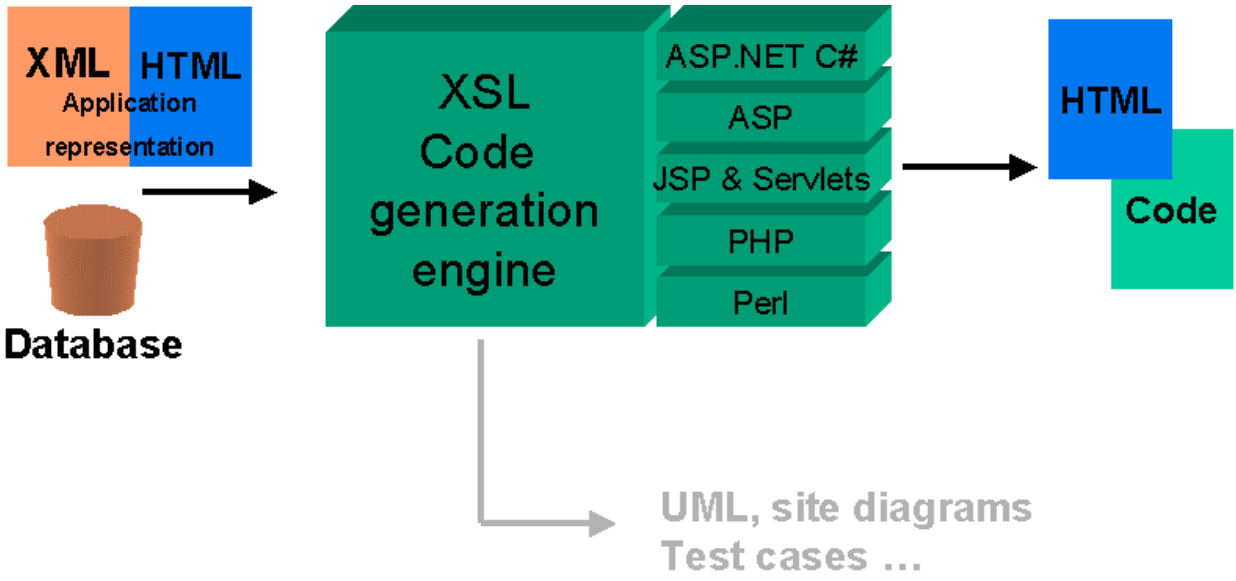
CodeCharge Studio incorporates many features that aid developers in the process of building web applications. These include Builders that build pages and forms, and data-aware Components and Controls that can be placed on a page.

The steps below show how to create a basic application using the Application Builder, which automatically creates web applications based on database tables.

1. Start CodeCharge Studio.
2. Start a new project.
3. Name the project and select "Application Builder".
4. Specify project settings such as the programming language and path to the web server.
5. Specify the database connection type and establish a database connection. (Alternatively, you can select one of the sample databases: *Intranet* or *Internet.)*
6. Configure site authentication by specifying the database table and columns that contain user login and password information as well as security groups/roles.
7. Select the database tables based upon which the web application will be created.
8. Specify the type of Web page to be created for each of the previously selected database tables. Specify if you want to create Search & Grid and Record Maintenance pages for each table.
9. Specify a theme to be applied to the site. This will define the fonts and colors for the application.
10. The Application Builder will then automatically create a project with sets of pages that make up the web application. You can then publish the pages to the server and test them.
11. If you wish, you can make further modifications to the created application by using the IDE.

Code Generation Engine

CodeCharge Studio users create Web applications by connecting to a database and placing data-aware forms and components on a page. During the page design process the representation of the project and all of its pages are saved in XML format in addition to HTML code that contains the page design. During project publishing the HTML files are copied to the server, while saved XML files contain the project model from which CodeCharge Studio generates server code via the use of XSL code templates. This flexible architecture allows users to regenerate their web application in any programming language at any time. For example users can generate a C# application then regenerate it in Java. More advanced users can even create their own XSL processing templates that automatically generate the documentation and UML diagrams for their application. Advanced versions of CodeCharge Studio (under development) will generate these types of documents, as well as automated test scripts that can be used to test generated applications.



On the server, the generated code is fully separated from HTML. During execution, the code files load corresponding HTML files into memory, replace static content with database values and output HTML to the browser. This method of separating the code from the HTML design content allows designers to make future changes to the site without having to modify code.

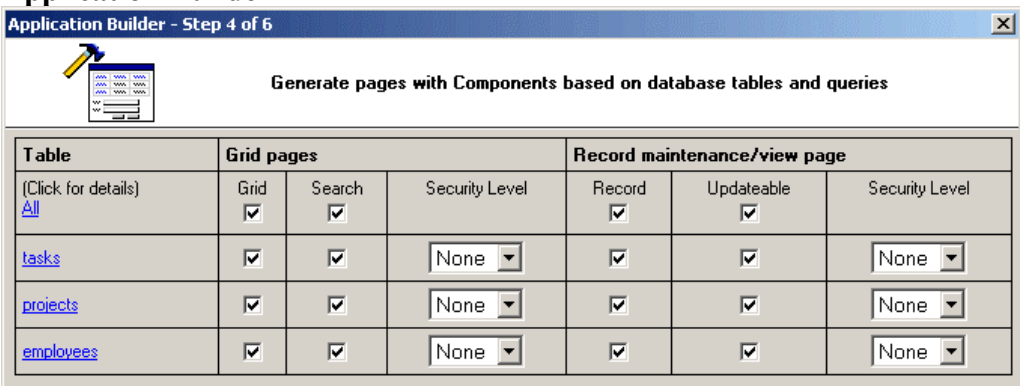
Key Features and Benefits of this Technology

Productivity and Rapid Web Application Development

CodeCharge Studio generates structured object-oriented code that is easy to maintain and extend. CodeCharge Studio makes code generation very practical by taking the hassle out of the process of generating professional-level code. Developers can easily modify any part of the generated code using a powerful code editor included with CodeCharge Studio. Code that has been modified in the editor is not overwritten during subsequent code generation

CodeCharge Studio offers an unprecedented way for users to quickly build powerful database-driven Web applications. By using a simple point and click interface, users can select desired components, programming language, presentation schemes and database queries - without any programming or without having to fully understand the underlying Web technologies.
What further sets CodeCharge Studio apart from all other products is sheer speed. For example, CodeCharge Studio makes it possible to create a simple task management system in under five minutes. Several pre-built application templates are included and can be adapted to the developer's needs and extended into full-featured Web systems.

- **Application Builder**

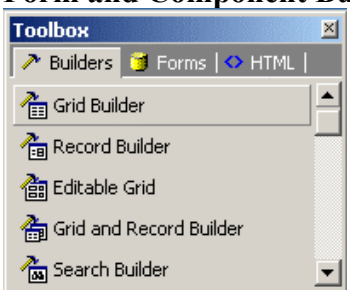


The Application Builder is perhaps the most advanced Web development automation tool available to Web developers. With just a few clicks, users can create complex database-enabled Web applications with dozens — or even hundreds — of Web pages for data management and administration. For example, a user with a database of employees, projects and tasks, can use the Application Builder to automatically create a Task List page, Employee Search page, Employee Maintenance page and Project Maintenance page, and complete an entire application project in a few short minutes.

- **Integrated Development Environment (IDE)**
  CodeCharge Studio features powerful HTML and code editors, HTML design component, project explorer, property browser, dockable tool windows and many other features desired by professional developers. CodeCharge Studio gives users full access to the generated programming code via a full-featured, customizable code editor with syntax color highlighting and smart indenting to help distinguish different source code elements. Developers can modify any part of the generated code without losing their customization during subsequent code generations. This translates to having complete control of their programs and no need to use external code editors. The built-in HTML editor allows

users to design the site, or modify Builder generated forms.

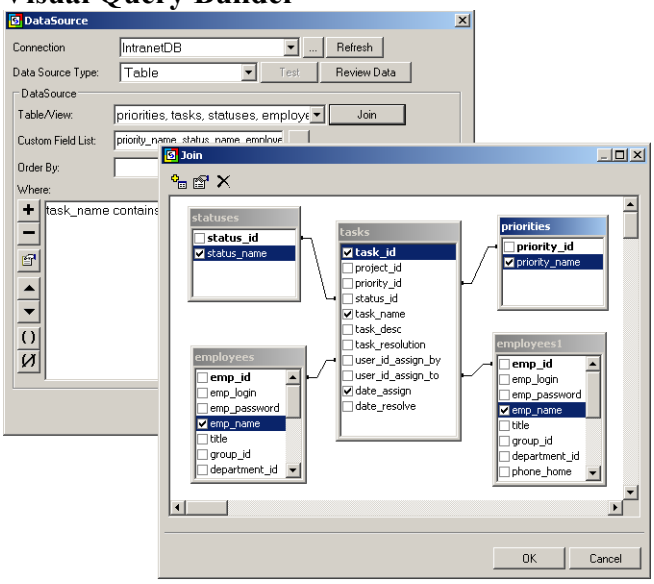
- **Form and Component Builders**



Component Builders are key constituents of CodeCharge Studio and help users assemble Web pages from multiple components such as Grid, Editable grid, Record, Directory, Login, Search or Menu. A Builder is a dynamic wizard that creates the appropriate component on the page by allowing the developer to specify the database table and fields that are used to display, validate or accept information. Builders can also be used to create advanced components such as the File Upload component, which is used to upload files from a remote machine to a specified location on the Web server machine. The component can be used to allow users to upload files to the server, for example, in the case where users are allowed to submit images.

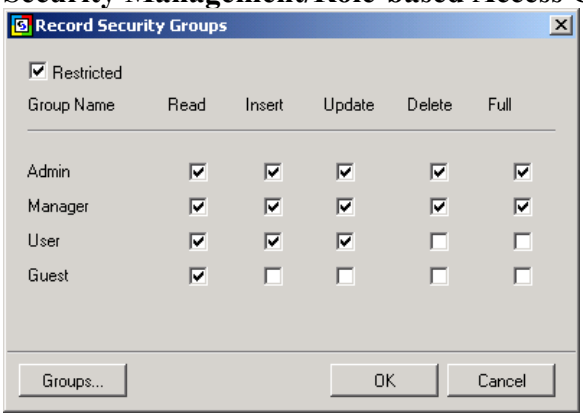
CodeCharge Studio 2.0 also heralds the introduction of a Directory form builder, which is specifically intended for displaying hierarchical content. The content that is displayed in a directory form is stored in such a manner that there are top level items which have subsequent sub categories. So essentially, the directory form implements a drill down of information starting from parent categories and proceeding to successive subcategories. The directory form produces output similar to the yahoo site directory or the directory of most search engines.

- **Visual Query Builder**



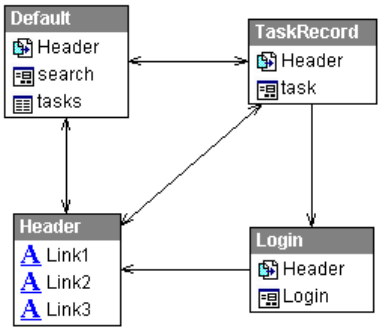
Developers can easily select tables and stored procedures or custom SQL as the data source for their data-aware forms. A Visual Query Builder is provided for visual creation of SQL statements. For example, a user can create a query that displays the list of employees, along with corresponding departments and roles, if any. Developers can also specify filtering criteria, for example, to display only the employees with names that match search criteria entered in another page or form.

- **Security Management/Role-based Access Control**



CodeCharge Studio goes the extra mile to protect generated Web applications by implementing additional security features that prevent users from externally modifying forms and submitting invalid data to the server. CodeCharge Studio allows developers to define secure role-based access to each page or form. Web users who don't have sufficient privileges to access a page will be automatically redirected to the login page. Users who are authorized to access a page but are not permitted to view or update a particular form, will see the page without the form or will not see the Insert/Update/Delete buttons needed to update the form.

- **Site Diagrams**
  For any existing project within CodeCharge Studio, users can create one or more site diagrams as a visual representation of all or some of the pages within the project. A site diagram could be thought of as a map of the pages within a project as well as the links that join the pages.



  The visual nature of site diagrams makes them ideal for creating site documentation as well as creating presentations about the site.

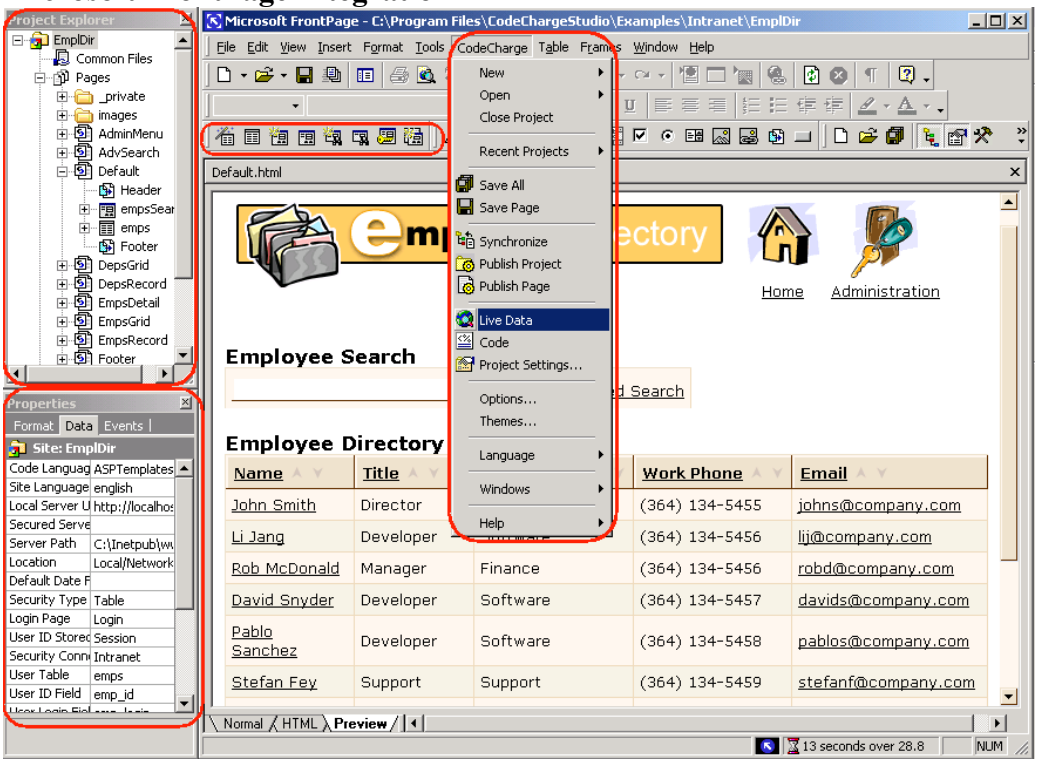
- **Support for Multiple Programming Languages**
  CodeCharge Studio generates programming code in any of the following server programming languages: C#, VB.Net (ASP.NET), VBScript (ASP), ColdFusion, Java (Servlets or JSP), PHP and Perl. Because the project model is stored in XML format, the programming language can be changed at any time and the same project can be regenerated in multiple programming languages.

- **Extensibility**
  CodeCharge Studio has an open architecture and is fully extensible. Most of the functionality is implemented as HTML, JavaScript, XML and XSL. Users can customize almost any part of the built-in functionality or develop their own components, such as Builders, Components, Actions, Themes, etc. In the near future users will be able to obtain the CodeCharge SDK and develop their own code generation templates.

- **Multiple Database Connections**

  CodeCharge Studio supports multiple database connections to allow Web applications to utilize multiple data sources, for example, to validate user access against an external user database.

- **Microsoft FrontPage Integration**

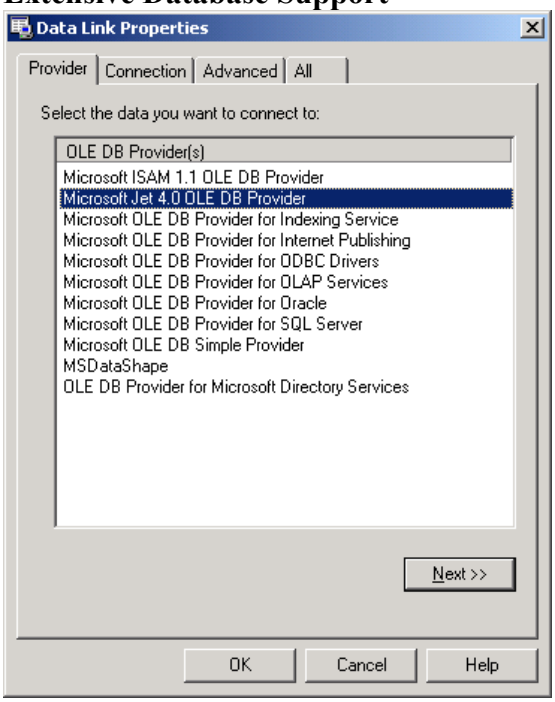


CodeCharge Studio can be installed as an Add-In for Microsoft FrontPage. The Add-In extends Microsoft FrontPage using a set of code-generating Builders, a project explorer, properties browser and code editor. FrontPage users can utilize all CodeCharge Studio features directly within the environment they are familiar with.

- **Separation of Code from the Design**

  CodeCharge Studio fully supports the separation of code from the design by (optionally) generating source code files (.asp, .php, .jsp, etc.), which are entirely separate from their corresponding HTML files (HTML templates). This approach allows Web teams to utilize best practices by allowing designers to work separately and in parallel with developers. Many other technologies force developers to perform design tasks and designers to deal with code. The CodeCharge Studio approach allows the developer to produce applications that later can be further customized by modifying the HTML template files within CodeCharge Studio's IDE or by using a suitable design environment, all this while leaving the code untouched.

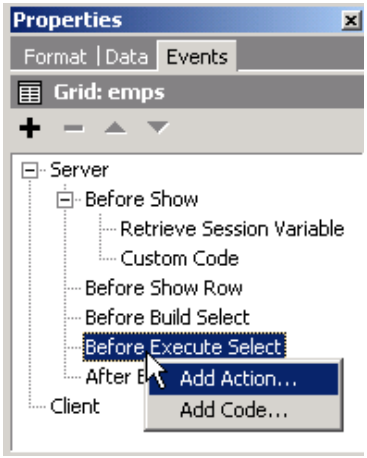
- **Extensive Database Support**



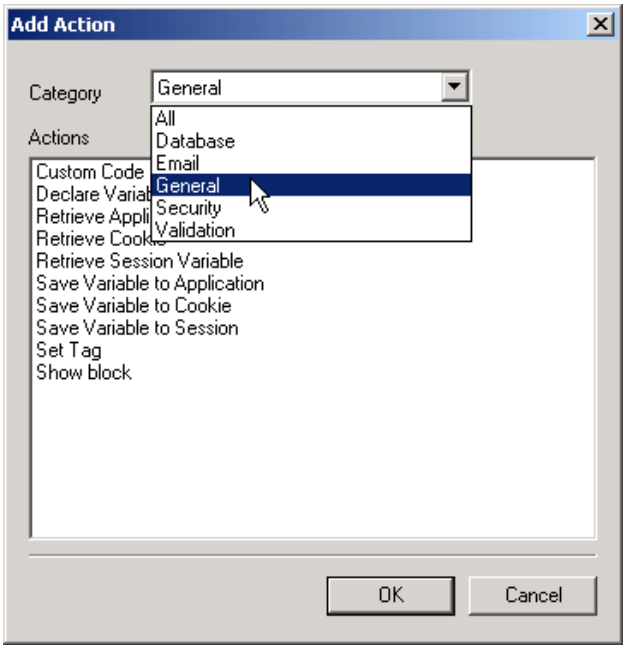
CodeCharge Studio supports most existing databases via JET and ODBC during the design mode, while utilizing JET, ODBC, JDBC, ADO, DBI and PHPLib in the generated programs to connect to databases during run-time. For example, the connection from a JSP project to an Oracle database can be established using the Oracle JDBC driver. CodeCharge Studio goes as far as implementing bug fixes to the PHPLib library for reliable use of PHP with Oracle.

- **Application Templates (Solutions)**
  CodeCharge Studio comes with five templates/examples of pre-built Web applications, which can serve as starting points and are ready for customization and adaptation for organizational needs. The provided templates include Intranet applications such Task Management systems and Employee Directory. Internet application examples include: Community Portal, Discussions Forum and Registration Form.

- **Custom Code and Actions**



Applications generated with CodeCharge Studio can be easily extended by adding custom code or by utilizing any of the predefined Actions. Actions are user-definable code components that insert blocks of code into event procedures. Many actions are provided with the product, while additional Actions can be created by users and shared with others. Internally, actions consist of XML and XSL code that can be easily customized.



Unlike manually edited code that cannot always be recovered without the use of a versioning system or a backup, actions can be regenerated at any time

- **Fast, Practical Code Generation**

One of the biggest challenges of making code generation practical is to provide developers with full flexibility of modifying the generated code while not losing the advantage of automation. Our core technology and CodeCharge Studio handles these requirements very well and gives users full flexibility of working with the generated code. Modified portions of the code are locked from being overwritten during

subsequent code generations, thus eliminating the need of importing modified code back into the application source.

When publishing a project or page, CodeCharge Studio generates source code that is then copied to the Web server to run the application. Users can choose and change the programming language at any time, for example, generate an application in Active Server Pages on their local Windows computer, then generate the same application in Java (as Servlet or JSP) for final deployment on any Java application server. The code generated by CodeCharge Studio is very similar to human code and can be easily enhanced outside of CodeCharge Studio by any developer. No other software on the market generates usable, practical programming code in as many technologies as those supported by CodeCharge Studio.

- **Documentation**
  Extensive documentation is provided both for the IDE as well as the underlying programming code. The User Guide shows how to work within the CodeCharge Studio IDE while the Component Reference contains programming level information about the various components that are used to construct web applications. The documentation also includes a number of tutorials containing step by step instructions on how to perform various tasks.

Future Direction

The future direction of CodeCharge Studio is to bring its code generation capability to other IDEs and Web editors such as Microsoft Visual Studio.NET, Adobe GoLive, NetObjects Fusion, and Macromedia Dreamweaver MX. CodeCharge Studio is already tightly integrated with Microsoft FrontPage and allows FrontPage users to move from developing static Websites to creating dynamic Web applications.

Other features being planned include:

- Integration with source control and versioning systems
- NT and LDAP authentication
- Field based security
- Generation of test scripts
- SDK for developers wanting to create their own CodeCharge-based code generation solutions
- Additional Components and Builders
- Enterprise CRM, CMS and team collaboration solutions built with CodeCharge Studio

More information

For more information on CodeCharge Studio, please refer to www.codecharge.com

CodeCharge Studio documentation can be found at:
http://support.codecharge.com/tutorials.asp

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