IT MILL

IT Mill Toolkit 5 – Technical description

The number of applications that use a web browser is increasing rapidly and traditional desktop application are being used ever less. The new generation of web applications are generally referred to as Rich Internet Applications (RIA). As these applications spread, not only does web technology change, but end-users also expect more from usability of the web applications and services.

The new technologies also bring changes to development work on web applications. For example, the challenges placed by Ajax techniques, the increase in JavaScript code, differences between browsers and data security in application mean that in order to achieve a successful and error free final result, an ever increasing depth of knowledge of different techniques is required. For this reason most of software developers' time goes to studying new techniques and there is little time left for actually writing and testing application logic.

In order for development work on web applications to remain effective, the work of developers must be made simpler with tools adapted to the job.

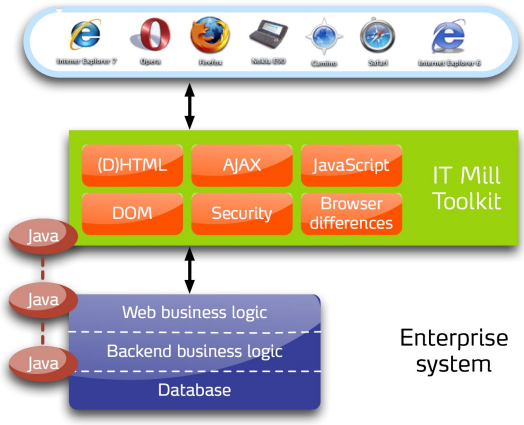
IT Mill Toolkit –user interface library

IT Mill Toolkit is an efficient and productive solution for RIA development.

IT Mill Toolkit is the only Java based user interface library which allows software developers to work only in Java without having to worry about writing JavaScript code for example or communication between browser and web server or the data security architecture of web applications. IT Mill Toolkit is particularly suited for Enterprise systems and development work for software products' user interfaces where the end user's experience of using the application and its ease of use are very significant.

With the IT Mill Toolkit user interface library the application developer's work is made easier and all of the factors that make web application development difficult are hidden behind a simple and integrated Java programming interface. In this way development work can be made as much as over 50 % more efficient compared with other web programming methods.

The application developer can produce a user interface from prepared user interface components just using a Java interface and Java classes. In this way developers can just concentrate on writing re-usable user interface logic. The development and particularly the maintenance of large applications is also efficient when the application logic is not fragmented into various XML and configuration databases in addition to Java code.



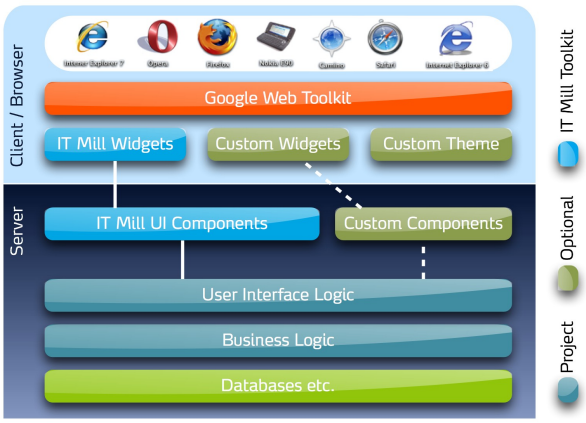
Picture 1: IT Mill Toolkit library place in the range of tools

From a data security perspective, a major challenge as far as RIA is concerned is that application code is transferred to be run on users' machines. This puts programs at risk to hackers making changes to the code which then opens the systems up to the risk of remote attacks. The IT Mill Toolkit provides a particularly strong protection mechanism against this. In accordance with the Server Side RIA architecture, the user interface code written by the application developer is only run on the web server. Application specific operations are never transferred to the web browser and so the applications are more secure by default.

Picture 1 shows the user interface library roles between browsers and the web server. From the picture it can be

seen that all of the presentation layer technologies associated with the web application development are hidden from the actual application and application developer behind a clear and simple Java interface.

Picture 2 shows a typical Enterprise system logical architecture layout using the IT Mill Toolkit user interface library. The IT Mill Toolkit uses the Google Web Toolkit (GWT) library in the browser presentation layer with which the data transferred to the browser by the user is drawn on the screen. Thanks to GWT, browser modules can also be written in Java. GWT automatically takes care of translating the code into JavaScript which can be understood by the browser. The IT Mill Widgets package shown in the picture contains a lot of ready user interface components which provide significant additional functionalities compared to just the GWT components. These include broad browser support and a large number of user interface components designed for Enterprise use. The highlighted User Interface Logic package in the picture is the only part that the application developer has to implement when creating web applications.



Picture 2: Architecture logic layout

In the case that a wider range of components is required, the application developer can do that, again using only Java. In this way GWT can be used to create a browser component which is encapsulated as a Java class in accordance with the IT Mill Toolkit library architecture. Afterwards the new component can be used in the server by Java just like the existing components.

Easy to use web application development cost effectively

As the level of abstraction in web application development is raised as described above, both the application developers and the end users benefit.

Benefits to application developers:

- Development is done in only one programming language: Java
- Over 50 % more efficient working methods compared to other web development tools
- The user interface code produced is browser independent
- The developer does not need to be expert in difficult browser technologies (e.g. Ajax, JavaScript) or choose between differences in browsers
- The Java user interface produced can easily be used again using object programming methods.
- The developer does not need to design the integration between the browser and the web server separately
- Integrating the user interface code with background systems (e.g. EJB, Spring Framework) is simple
- You can use only familiar Java IDE tools (e.g. Eclipse, Netbeans) for development
- Ensuring the quality of web applications is easy with IT Mill Testing Tools which can be used to record events at the user interface level and schedule them
- Applications can easily be linked with other web technologies (e.g. JSP and JSF)
- IT Mill Toolkit applications can be installed in a portal environment and used together with a Liferay Portal product for example
- The developer does not need to worry about or design the user interface data security separately or reusable architecture.

Benefits to application users:

- RIA offers the familiar feel of desktop applications and methods linked to the accessibility provided by browser applications
- The application can be used using an ordinary web browser without any additional installations
- Use of Ajax techniques means that user interfaces work faster because there are no page refreshing as is typical with web browsers. Instead only the changed parts of the application are loaded into the browser

- More effort can be directed towards usability, workflow design and the user experience
- A common programming approach and easy re-use of components means that applications become more consistent
- Applications look better since they can now have more versatile ways of displaying information and graphics
- The expert user can now be offered the familiar ways of working such as keyboard shortcuts and windows
- The straightforward maintenance means that maintenance and additional development requests can now be answered quickly

Application and licensing

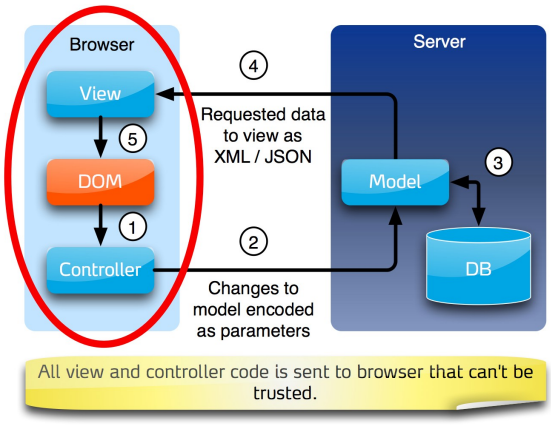
The IT Mill Toolkit is excellently suited for producing web applications with user interfaces that are comparable with traditional desktop applications. Ready components – menus, tables, windows etc. Provide a quick starting point for building easy to use and consistent user interfaces.

The reusability and expandability of the clean code that is compatible with Java architecture also provides good support for developing large network and enterprise resource planning systems. Application developers can concentrate on modelling the actual operations and processes of the application area without in-depth knowledge of web techniques. In addition, object programming methods provide good support for parallel development and agile application development models.

The IT Mill Toolkit user interface library is a tool using only open source code and the whole source code is always supplied with the library. The Apache 2.0 license allow the library to be re-used freely including as part of commercial applications.

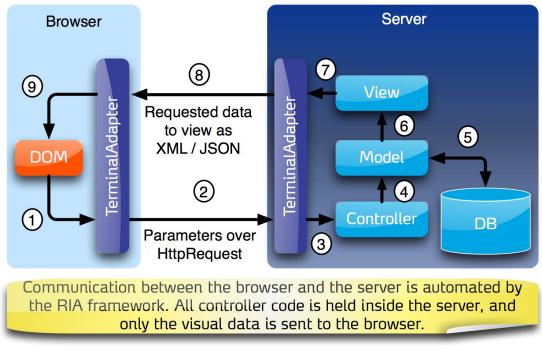
RIA and data security

One of the largest challenges to RIA is data security. Browser based libraries (e.g. simple GWT and Dojo Toolkit) produce the user interface business operation logic as JavaScript code which means that the code is transferred and executed as it is in the end user's browser. Picture 3 presents the situation from the perspective of the traditional Model-View-Controller (MVC). Transferring the code to the browser is particularly problematic from the point of view of data security because once transferred the code can be examined and changed freely. This opens up the possibilities of several different forms of remote attack directed at systems. For example careless programming could reveal the SQL database queries and even user right information.



Picture 3: Typical RIA application architecture

Picture 4 shows data security architecture where all sensitive application logic is stored and executed only in the web server. The IT Mill Toolkit library uses this kind of approach. There are separate communication modules in the library which look after communication between the browser and server automatically. A request made in the browser executes the desired operations in the server and after that the library returns to the browser only the information needed for visualisation in the user interface (text, numbers, pictures etc.) and so the actual application coded is not put into the hands of possible attackers.



Picture 4: Secure RIA architecture on the server side

Testing and quality assurance of user interfaces

The IT Mill Toolkit provides the possibility to use IT Mill Testing Tools for testing the user interface by browser. The tool allows the user interface tests to be recorded directly in the browser without the user having to have a knowledge of programming. Recordings can be repeated either manually or automatically whenever changes are made to the application. The tool can easily record, for example, all the user events required and carry out the required acceptance tests. In this way a large amount of user interface tests that earlier had to be carried out manually can be automated. The best end result is achieved when the user interface tests are carried out automatically, for example as part of the nightly build development cycle of the system being implemented as an aid to other unit tests.

Compatibility and environments supported

Browsers:

- Internet Explorer 6+
- Firefox 2+
- Apple Safari 3+
- Opera 9+
- Limited support: WebKit based browsers in intelligent phones (e.g. Nokia E90 and iPhone)

Operating systems:

- Windows 2000+
- Mac OS X 10.3+
- Linux Debian/RedHat/Ubuntu/Suse

Application servers:

- Apache Tomcat 5+
- BEA WebLogic 8.1+
- IBM WebSphere 5.1+ J
- Boss 3.2.7+
- Jetty 5+
- Oracle Application Server 9i+
- Sun Application Server 7+
- Glassfish v2+
- Liferay Portal 4+