

Licensing Technology for Web Based Applications

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Abstract. The paper describes the developed software technology, which handles license distribution, acquisition, and management, as well as protecting software from illegal or improper use. The technology is specifically targeted towards Web based Java applications, where the browser becomes the platform for a lightweight hypertext-based user interface.

Introduction

The software market is undergoing structural changes that will lead to significant, long-term change, centred primarily around the notion of software delivered as a service rather than as a physical package of tightly defined functionality. To accommodate these new models, vendors must develop and expand licensing terms, conditions, and programs while adopting technology to make these changes possible.

We developed a software technology, which handles license distribution, acquisition, and management, as well as protecting software from illegal or improper use. The technology is specifically targeted towards Web based Java applications and provides following main benefits:

- Reducing unlicensed use
- Making highly effective software evaluation programs possible
- Increasing the effectiveness and reducing the cost of CD-ROM and Internet based software distribution
- Ease of use
- Platform independence.

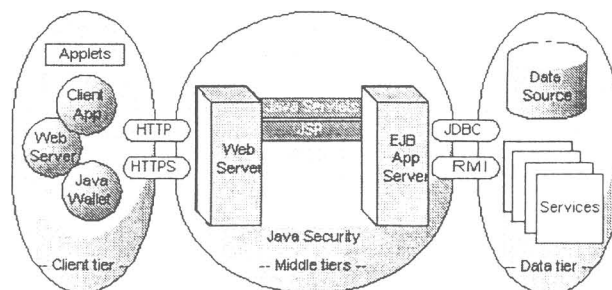


Figure 2: Three-tier Java-based distributed system

The license distribution, acquisition, and management software is based on the three-tier computing model. Such model is ideal for application in the Internet where the browser becomes the platform for a lightweight hypertext-based user interface. Java-based applets, embedded in the HTML pages are used to communicate with the web servers and application servers. Figure 1 demonstrate the structure and the typical modules of three-tier Java-based distributed system, communication protocols and related standards as Enterprise Java Beans (EJB), Java servlets, Java Server Pages (JSP), Java Data Base Connectivity (JDBC), Remote Method Invocation (RMI), Java Security, etc.

Implementation Model

The licensing system contents two functional related modules:

- Module for registration and automatically license generation;
- Module for Web-based software protection.

The first module is based on the three-tier client/server-computing model (Figure 2). On the client side (Tier 1) the front-end software allows the user to fill in license application forms. User can interactively prepare input data for license registration (information for licensed product – product name and version; license type – time limit license, network license, single user license, etc.; customer information – company and user details). After filling data, user can upload them to the server. User can also view and download automatically generated license files - all via standard Web browsers. On the server side (Tier 2) a set of standard servers and custom components handle license request, automatically generates licenses and handle database (Tier 3) with the license details. Server side software is based on Java 2 Enterprise Edition platform.

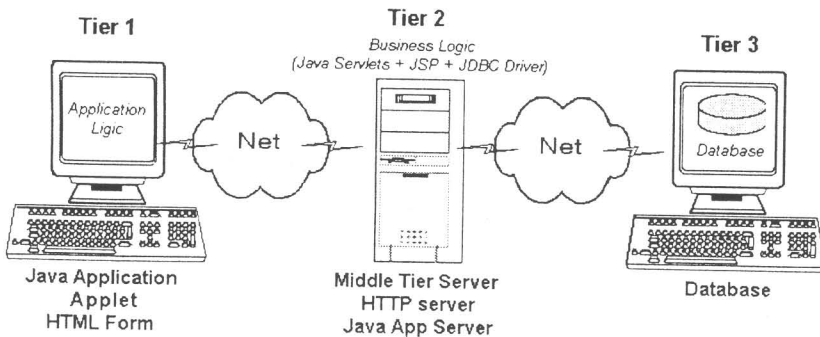


Figure 2: Three-tier computing model with JDBC driver

The protection from illegal use of the software (second module of licensing system) is accomplished by embedding license validation applets in some key point of the Web application (e.g. menu applet, which provides access to applica-

tion content). The validation applets check the license file before granting access to the requested content. The integrity of the license file is cryptographically protected thus making it temper-proof.

Structure

Functionally the Web-based software licensing system is divided into six parts (Figure 3) – license application form, Web/application server, one Java servlet, system for loading and validating license (contains two Java applets) and Web application. To make this system working user must install the license loader applet locally via simple set-up routine.

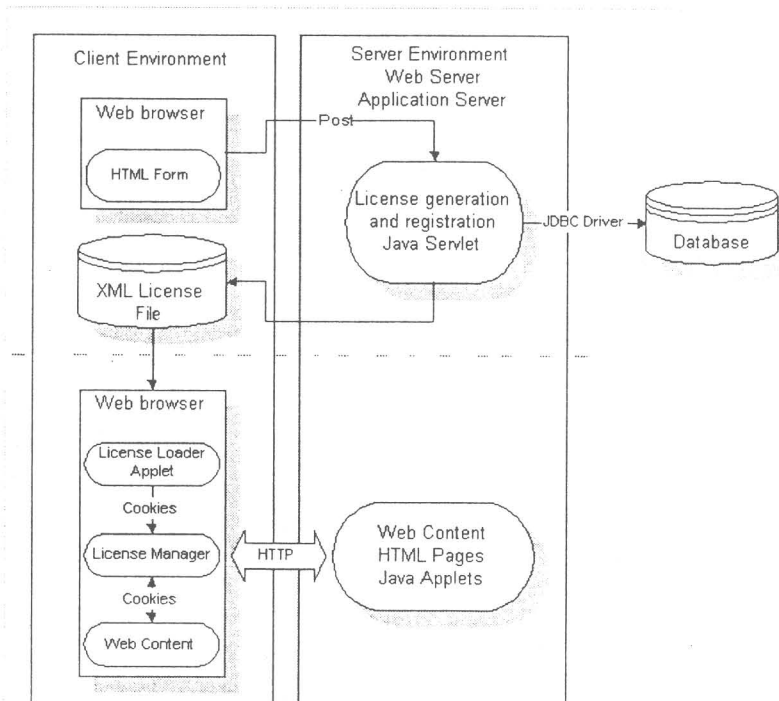


Figure 3: Licensing System Structure

The license application form is implemented as a HTML form and allows user to fill in required data. Once the form fields are filled the license request can be submitted to the server by pressing *Submit* button. The data is transferred to the servlet via POST method. At this stage the browser opens http connection to the Web/Application server and invokes the license generation and registration Java servlet that stores information for request in the database by using JDBC driver,

generates license file and send it back to the user. This file must be saved in the same directory with the license loader applet because the Java virtual machine security model does not allow applets to access files from different location.

User can start Web-based application by starting HTML page with embedded license loader applet. This applet loads license file in browser cookies and invokes Web application start page with license manager applet in it. Once the license manager is started it take the license file from browser cookies and check it for correctness. If the result of this check is positive it will grant access to the requested content.

The screen-shot of the Web-based application, which uses this licensing model, is shown in Figure 4. The license manager is implemented as menu applet, which provides application navigation. There is information about user name and license type on the top of this menu. They are obtained from the license file. The menu applet allows other applets to load themselves.

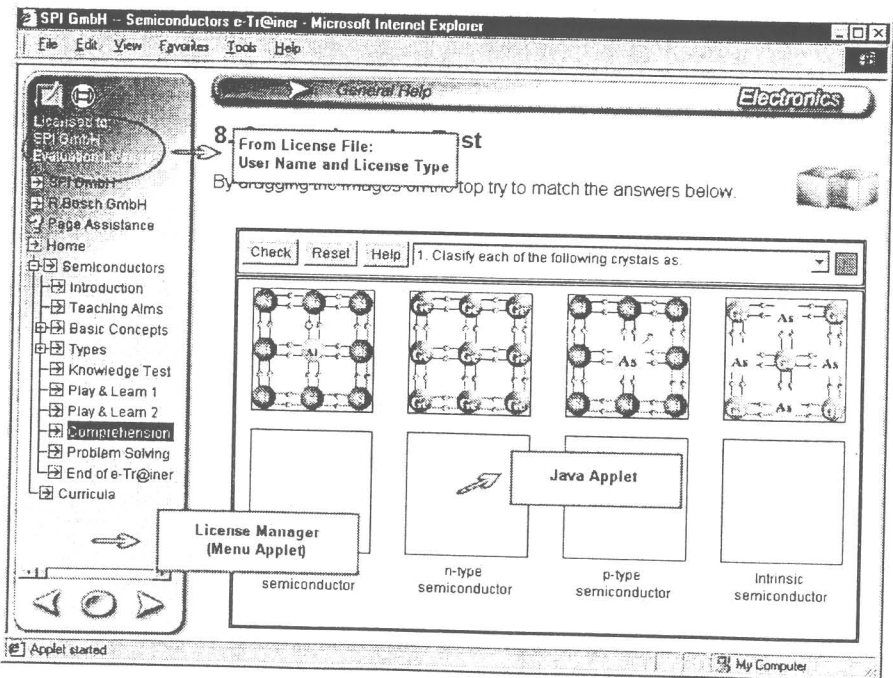


Figure 4: Licensing System In Action

Implementation Tools

The Web/application server is running under Microsoft Windows NT 4.0. The final implementation is based on Tomcat 3.1 [1] which works without a glitch. The licensing system is tested under Netscape Communicator and Microsoft Internet

Explorer. The main problem during the development was to make system work stable with both of the browsers above.

Conclusion

Developed licensing system gives one possible solution, which permits Internet available software to be protected from unauthorised access. License management and control technology has the following main features:

- Flexible software licensing (time limited evaluation licenses, custom selected features licensing, single user and network licenses);
- Automatic license request/generation/management software;
- Portability (Java based).

The system automatically generates license, checks it for correctness, supports customer database.

References

- [1] The Jakarta Project, Tomcat for Windows, <http://jakarta.apache.org>
- [2] Extensible Markup Language (XML), <http://www.w3.org/xml>
- [3] Java™ 2 Platform, Enterprise Edition (J2EE™), <http://java.sun.com/j2ee/>