



**Technical  
White  
Paper**



## **Presenting Structured Data in Rich Internet Applications using an Open Source Foundation**

The BIRT-based Product Line – from Eclipse BIRT  
to Enterprise-Scale Implementations

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## 1. Overview

With the advent of Web 2.0 and Rich Internet Application technologies, the Internet is becoming increasingly interactive. Popular web sites such as amazon.com, google.com and ebay.com have set user expectations that web content be very graphical, customizable and highly interactive.

The open source BIRT project was founded to bring these capabilities to the web-based reporting of structured data. BIRT is the top-level Business Intelligence and Reporting Tools (BIRT) project of the Eclipse Foundation. The Eclipse Foundation is a consortium of software industry vendors and the open source community that uses an open source development and licensing model to deliver the most widely used integrated development environment (IDE). The Eclipse licensing model was developed to encourage the adoption and distribution of open source Eclipse technology in commercial products and implementations.

Actuate Corporation, the sponsor of BIRT-Exchange.com, is the initiator and co-sponsor of the BIRT project. In addition to being a primary contributor of code to the BIRT project, Actuate offers value-added products for BIRT implementations.

While open source BIRT, available through eclipse.org and birt-exchange.com, provides all the capabilities needed to develop and embed highly graphical and interactive reporting of structured data within a web application, the value-added products meet the requirements of more specialized uses of BIRT.

Open source BIRT includes two major components:

1. The BIRT Designer – a report designer for representing structured data and visualizations in a layout similar to a web page
2. The BIRT Report Engine and Java APIs - a collection of Java classes and APIs used to execute BIRT reports and generate them in a variety of formats and which can be deployed to any Java environment.

The value-added products fall into three categories:

1. End-user interactivity tools: including the incorporation of Flash® Objects and the ability for end users to change the look, feel and data of a report
2. Development tools: with additional features such as the inclusion of Flash Objects, Java scripting to control behavior between objects, and direct drivers for specific data sources
3. Deployment technologies: including a web-based UI for browsing and running BIRT reports; report repositories; and services such as those for automating report runs and adding various levels of security.

This paper will acquaint the reader with the complete BIRT-based product line and how BIRT technologies can be used to take advantage of Web 2.0 advancements and Rich Internet Application technologies to deliver web applications and reports with a highly visual, interactive and personalized end-user experience.

## 2. Structured Data in Rich Internet Applications

The internet plays a huge role in the development and sharing of information. Originally information communication over the Internet was one sided and static as opposed to the current interactive two-way approach. Web 2.0 uses the Web as a platform, allowing developers to create more efficient ways of searching and analyzing web content as well as localizing global data from multiple sources. Web 2.0 leverages Rich Internet Application technologies to enhance dynamic content, metadata and scalability to provide a better and more participatory user experience.

The advancement of the Internet has led to the virtualization of the workplace, which in turn is redefining business applications, process models, business intelligence, and real-time analytics. Today's tools are embodying contextual, role-based information from process and business systems into structured data applications.

The presentation of structured data, i.e. reporting, is an integral part of any business application. Traditional tools to do this, whether commercial or open source, are “banded report writers.” They support a design metaphor that has essentially evolved from the old green-bar report pads used for mainframe production print jobs. Each section in the report writer—header, detail, footer—corresponds to a section in the report, with the detail sections repeating as needed to accommodate rows from the data source.

These tools are not intuitive for web developers, nor do they create a user experience compatible with the expectations of today's web users. Web application developers are comfortable with the web page-oriented designs that are found in modern graphical web development tools. They also expect the support of web concepts—such as tables, graphical object containment and inheritance, cascading style sheets (CSS) and scripting in web-oriented languages like Java and JavaScript— which traditional tools do not support. In turn, users expect contextual, role-based information; rich media; and personalization which these tools do not support.

BIRT, a top level Eclipse project, was founded to address both the design metaphor needs of web application developers and the interactivity expectations of its users. As result, the BIRT project is the open source business intelligence offering with the most momentum, with more than 5 million downloads in a little over three years—3 million in the first three quarters of 2008. BIRT redefines reporting; from design and development to the final user experience. It consists of a comprehensive report development environment, reporting engine and assorted tools for creating rich, interactive reports for client and web applications in a variety of formats. Commercial value-added products are offered on the BIRT open source foundation and provide additional Web 2.0 capabilities.

## 3. The Foundation: Open Source BIRT

BIRT is one of the most prominent software projects within the Eclipse Foundation. With more than 3 million users, Eclipse is one of the most widely used integrated development environments worldwide. It is an open source community whose projects are focused on building an open development platform comprised of extensible frameworks, tools and run-time libraries for building, deploying and managing software across the lifecycle. The Eclipse Foundation is a not-for-profit, member-supported corporation that hosts Eclipse projects and helps cultivate both an open source community and an ecosystem of complementary products and services.

An important aspect of Eclipse is the focus on enabling the use of open source technology in commercial software products and services. This is made possible because all Eclipse projects are licensed under the Eclipse Public License (EPL), a commercial friendly OSI-approved license. The receiver of an EPL-licensed program can use, modify, copy and distribute the work and modified versions. Furthermore the Eclipse Foundation ensures that all source code related to contributions developed outside the Eclipse development process are processed through the Eclipse Foundation IP approval process. This process analyzes the code contributions to ascertain the provenance of the code and license compatibility with the EPL.

This allows adoption and distribution of open source Eclipse technology in commercial products and implementations and gives the developers the option to keep their improvements or additions as proprietary.<sup>1</sup> The open source process facilitates code enhancements, problem diagnosis and quick fixes as a number of users tend to be developers themselves. This guarantees stable source code as it gets tested by a wide variety of users using different infrastructures and also guarantees that the technology will live on irrespective of the project.

Eclipse BIRT, the open source version of BIRT, includes two major components:

1. The Eclipse BIRT Designers – report designers for representing structured data and visualizations in a layout similar to a web page
2. The BIRT Report Engine and Java APIs - a collection of Java classes and APIs used to execute BIRT reports and generate them in a variety of formats and which can be deployed to any Java environment.

### 3.1 The Eclipse BIRT Designers

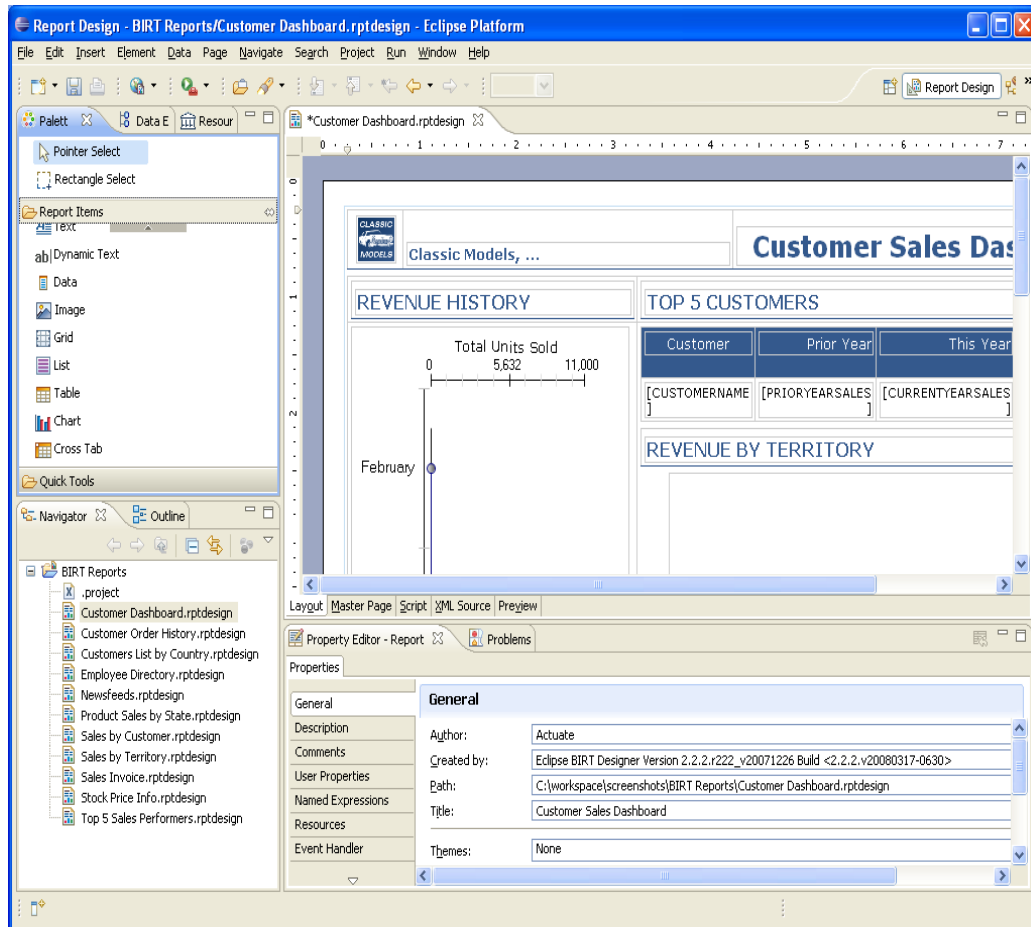
The Eclipse BIRT Report Designers are easy to use tools for representing structured data within a layout similar to a web page. They support rich media technologies and produce reports that can be easily integrated into web applications. In order to meet ever-changing end user reporting requirements they employ a component-based model for reuse; support a wide range of reports, layouts and formatting; and offer programmatic control and data access across multiple data sources.

The Eclipse BIRT Report Designers efficiently integrate data from multiple data sources then transform and manipulate the data based on business logic. They provide facilities to

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<sup>1</sup> The EPL allows the developers to license their changes or additions under any type of license they choose. However, the EPL-licensed part of their derivative software product should be licensed under EPL license.

access various data source types through included APIs, Java scripting and the Eclipse Open Data Access (ODA) framework, which can be used to access non-standard data source types. Regardless of whether the data is coming from another BIRT report, a single query, multiple queries or multiple data sources, the Eclipse BIRT Report Designers can include the data in a single report and multiple places within that report. Developers can specify a variety of functions to perform on data before presenting it in a report such as computations and business logic; sorting, filtering, and mapping; and multi-dimensional modeling.



**Figure 1: Customer dashboard report design using Eclipse BIRT Designer**

### 3.2 The BIRT Report Engine and Java APIs

The BIRT Report Engine and its APIs allow Java application developers to quickly integrate powerful report generation capabilities into their applications without having to build the infrastructure from lower level Java components. The engine includes Java classes that execute a report and generate the output within the context of an application. It includes a sample BIRT Viewer that encapsulates the APIs.

The BIRT Report Engine generates HTML, Adobe PDF, Word DOC, Excel XLS, PostScript, and PowerPoint PPT output and can be extended to support custom formats. It



combines services that read a BIRT (XML) report design; gather and process report data; and create the corresponding report in a variety of output formats.

The BIRT Report Engine and its APIs can be wrapped in a servlet, built into a web service, or leveraged in other areas of your Java application and deployed in a Java application server.

- Embedded - the Report Engine API can be embedded within any Java application, RCP application, or Java-based web application.
- Command Line - the Report Engine can be called to execute a report from a command line.
- Java EE - the Report Engine can be wrapped in a servlet, built into a web service, or leveraged in other areas of a Java EE application and deployed in a Java EE application server.

Since the BIRT Report Engine and its APIs are licensed under the Eclipse Public License (EPL), they have been adopted by many Java, PHP and report developers and embedded in commercial products that provide their services turnkey, such as Yahoo, Verisign, and Yellowfin.

## 4. The Architecture: For Current and Future Reporting Needs

Two key contributors to the success of BIRT are the reusable components and public APIs. The reusable components produce an environment in which to easily create, deploy, and change complex report designs. The APIs assure technical compatibility across open source technologies, commercial products and any architectural changes of applications that leverage BIRT.

### 4.1 Component Reuse

The BIRT Report Designer supports component and design template reuse. These separate presentation, business logic, and data access so that one can be changed without affecting the others to make reports easier to enhance and maintain. Components can be data queries, visualization items or business calculations. Design templates, which contain components, are starting points for report design.

Frequently used components can be stored and organized into report libraries. These libraries can then be used to create new reports. Changes made to components in the libraries will automatically be propagated to report designs that use them. This isolates complexity so that roles and responsibilities can be distributed based on skill level for efficient development and maintenance, while maintaining design consistency.

Consider a scenario in which an application development team has been providing reports based on data stored in a CSV file. The team has decided to migrate from the flat file format to using a Relational Database (RDBMS) for data storage. The component which handles data access connections to the CSV file will need to be modified to now handle connections to the database. By modifying only the data access component the team can meet the new requirements without affecting or modifying other aspects of the reporting application such as visual layouts or business logic

Componentized application development cuts cost in the long run as existing components can be reused or enhanced to meet new requirements. Thus, all the development work done initially at the start of the project is a protected investment.

### 4.1 Public APIs

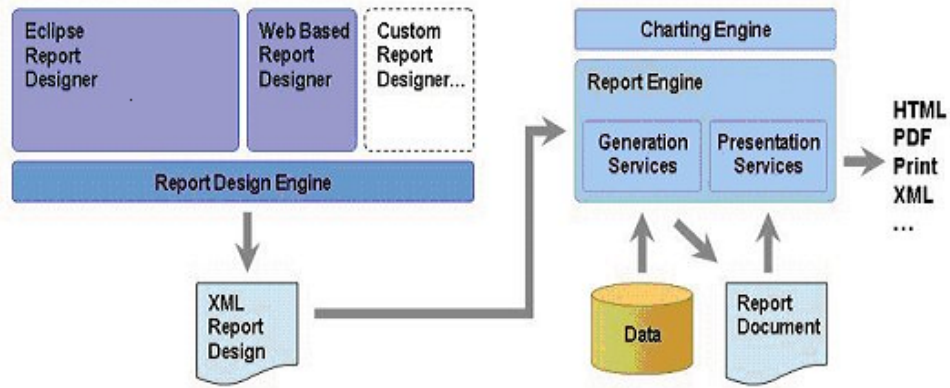
BIRT offers three public Java APIs for creating the report design, libraries and template files.

These open source APIs can be used to embed reporting into Java and Web-based applications. Using the APIs protects reports and report designs integrated into an application from future architectural changes and make the development of value-added technologies that enhance the reporting functionality of BIRT easier.

The three public APIs are:

1. Design Engine API – for creating and modifying the XML report design formats, templates and library files
2. Report Engine API – for producing report output from the design formats
3. Chart Engine API – for creating and rendering charts standalone or through the Design Engine and Report Engine APIs.

Figure 2 shows the various APIs available to aid integration of the reports and report designs into an application, the latter being of particular interest to ISVs wanting to build a report design into their application. Some clear advantages of BIRT lie in the open and documented XML design document and its huge community base. Open source support is freely available and accessible through the online community. Both developers and companies have a large community to tap into for solutions.



**Figure 2: API integration**

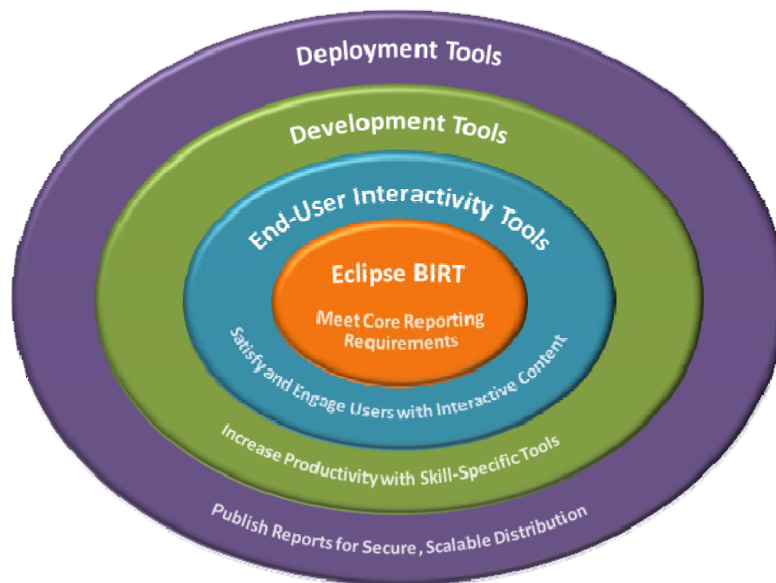
## 5. Value-added Products Built on Open Source BIRT

Open source BIRT provides all the functionality needed to embed interactive, Web 2.0-style, on-demand reporting into any application. If a reporting requirement is universal in nature across all reporting projects, it is included in Eclipse BIRT.

Some applications and development projects have specialized needs with unique requirements; for example; report scheduling, scaling to 100,000s of users, or providing end users the ability to customize their reports. Open Source BIRT was designed to be the foundation upon which multiple vendors and customers can build add-on components, technologies and products to meet these unique needs.

Actuate, the sponsor of BIRT-Exchange.com, is one of the suppliers of these value-added products for BIRT implementations. These value-added products, which are available through BIRT-Exchange.com, fall into three categories:

1. End user interactivity tools: including the incorporation of Flash Objects and the ability for end users to change the look, feel and data of a report
2. Development tools: with additional features such as the inclusion of Flash Objects, Java scripting to control behavior between objects, and direct drivers for specific data sources
3. Deployment technologies: including a web-based UI for browsing and running BIRT reports; report repositories; and services such as those for automating report runs and adding various levels of security.



**Figure 3: Value-added products for open source BIRT**

## 5.1 End user Interactivity Tools

### 5.1.1 Flash Visualizations for Rich User Experience

Rich Internet Applications bring the features and functionality of traditional desktop applications to the Web, with data and functions existing within the client itself to bring a more interactive experience to the end user. Technologies such as AJAX and Adobe Flex can be used to create visual components with which an end user can interact. The addition of JavaScript between visual components can cause one component's behavior or presentation to change based on the user interacting with another component. One of the more common examples is Google, where a user can scroll to various areas in the map without having to refresh the web page.

These objects help deliver customized web services through animated graphics that move upon launch or in response to changes in underlying data. They can be used to create interactive and informative dashboards that are ideally suited to provide at-a-glance data summarization, instant interactive insight to business metrics and performance, and drill-down to underlying details. Customer-facing reports, reports for financial industries etc. benefit greatly from this extremely interactive user interface.

BIRT-Exchange offers two commercial designer products, Actuate BIRT Report Designer and Actuate BIRT Designer Professional, which provide out-of-the box support for embedding Flash Objects of this type in BIRT reports and applications. They provide:

- A library of pre-built Flash charts and gadgets such multi-series bar charts to bullet graphs and spark charts, pyramid charts, geographic maps, as well as speedometers, thermometers, and cylinder gauges
- The ability to drag and drop Flash Objects from a library to a report design within the designer
- The capability to easily embed interactive BIRT reports or interactive Reportlets® into existing standard HTML pages or Web 2.0 mashup pages using the new JavaScript API. The JavaScript API enables developers to link different components of a mashup page (including BIRT reports) to interact.

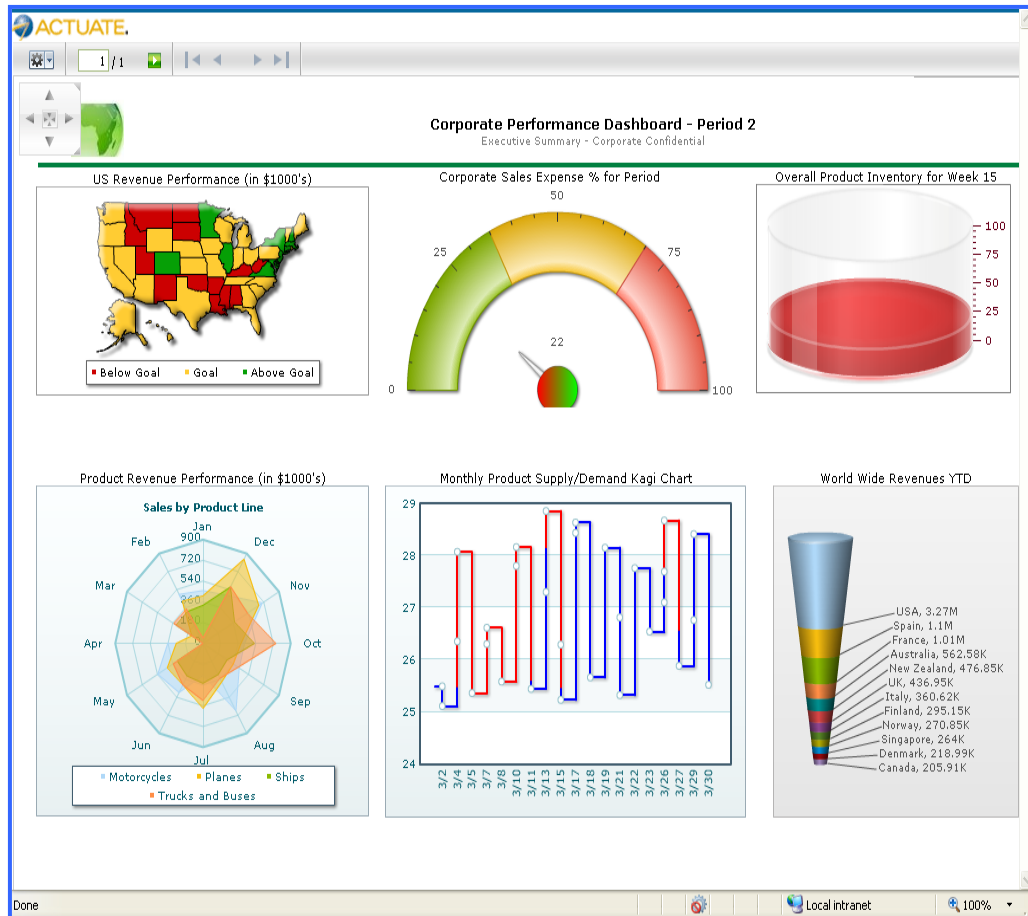


Figure 4: Flash Objects available with Actuate BIRT Designers

### 5.1.2 BIRT Interactive Viewer for End Users

BIRT Exchange also offers the BIRT Interactive Viewer for end users, a web-based report modification tool from Actuate that brings additional interactivity to BIRT reports with ad-hoc report manipulation. It lets users change the look of a report to meet their individual preferences and needs; for example, define headers, labels and page breaks; change data alignment, font or case; change what data is displayed; and apply conditional logic to their formatting choice. The contextualized information helps users quickly scan and access data, easing the burden on IT as they do not have to be involved in report iterations. The Interactive Viewer presents users with an intuitive, AJAX-based web UI that doesn't require the use of plug-ins, the installation of desktop software or training.

For example, in a Product – Sales – Territory report, a sales manager can easily manipulate the report to view sales by territory while a product manager can manipulate it to view the number of sales for each product. This can be achieved without requiring IT to generate different reports for different managers. The managers can sort, group and hide data based on a variety of mathematical functions. They can filter data, change the display and specify that charts stack, overlay or display side by side. End users also have the ability to save the resultant document, and if permitted, can save their modifications as a new report design.

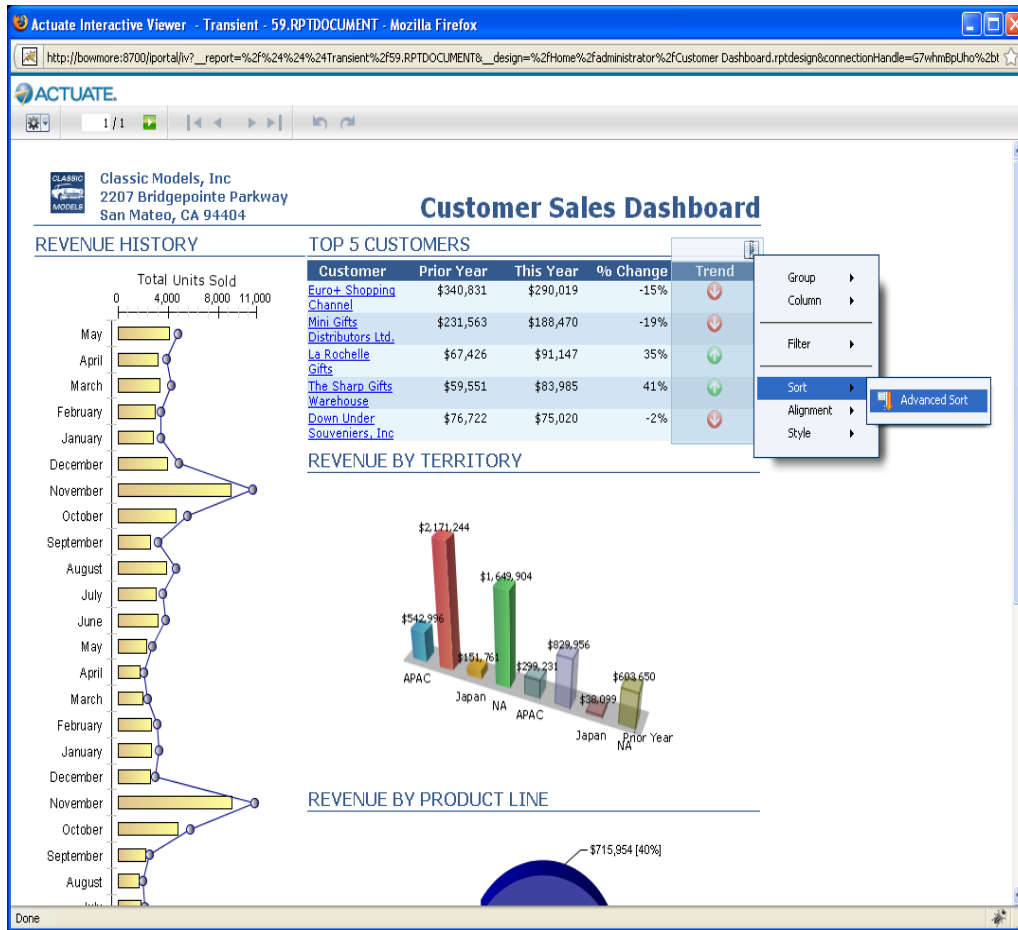


Figure 5: BIRT Interactive Viewer

### 5.1.3 Excel Option

While rich media and applications are key requirements of next generation reporting, some users still prefer their interaction through Excel®. This is extremely beneficial for users with an expertise in Excel or for those who continue to rely on Excel for analyzing data and for “what-if” analysis.

There are four products in the BIRT compatible e.Spreadsheets product line.

#### Read- Write Excel add-on

This is a free API-driven Java component that can read from or write to Excel files. The API allows developers to read, write, and manipulate Excel files in Java. This component does not rely on any aspect of the Excel application, and can be run on any Java virtual machine, including Windows, UNIX, and Linux.

#### e.Spreadsheets Designer

The e.Spreadsheets Designer is an easy-to-use report writing tool for creating authentic Excel file reports that retain formulas, formatting and live charts. It is appropriate for use by Excel experts and developers. Spreadsheets reports can be generated and viewed within e.Spreadsheets Designer itself or through the e.Spreadsheets Engine and API, Deployment Kit or iServer Express products.

## e.Spreadsheet Engine and Excel API

e.Spreadsheet Engine and the Excel API can be used to automate any manual Excel process. They can read, write, modify and generate entire spreadsheets or parts of spreadsheets. The generated reports are fully functional Excel files with populated data, formatting and important Excel features such as pivot tables. They can generate charts and Excel-like grids that can be embedded in a Java application. The e.Spreadsheet Engine APIs read existing Excel files to use their values, formulas, charts and cell attributes in other applications. The engine can perform Excel calculations as part of an application.

The e.Spreadsheet Engine and Excel APIs can be used alone, with design files from e.Spreadsheet Designer or with existing Excel files to act as an Excel calculation engine, a spreadsheet report generator or an existing Excel-spreadsheet-reader. Since e.Spreadsheet Engine and Excel APIs are 100 percent pure Java, they integrate into existing Java environments or applications. The Engine and APIs can be embedded in an application along with the BIRT Engine, where they provide automation of the Excel process in conjunction with the BIRT Engine.

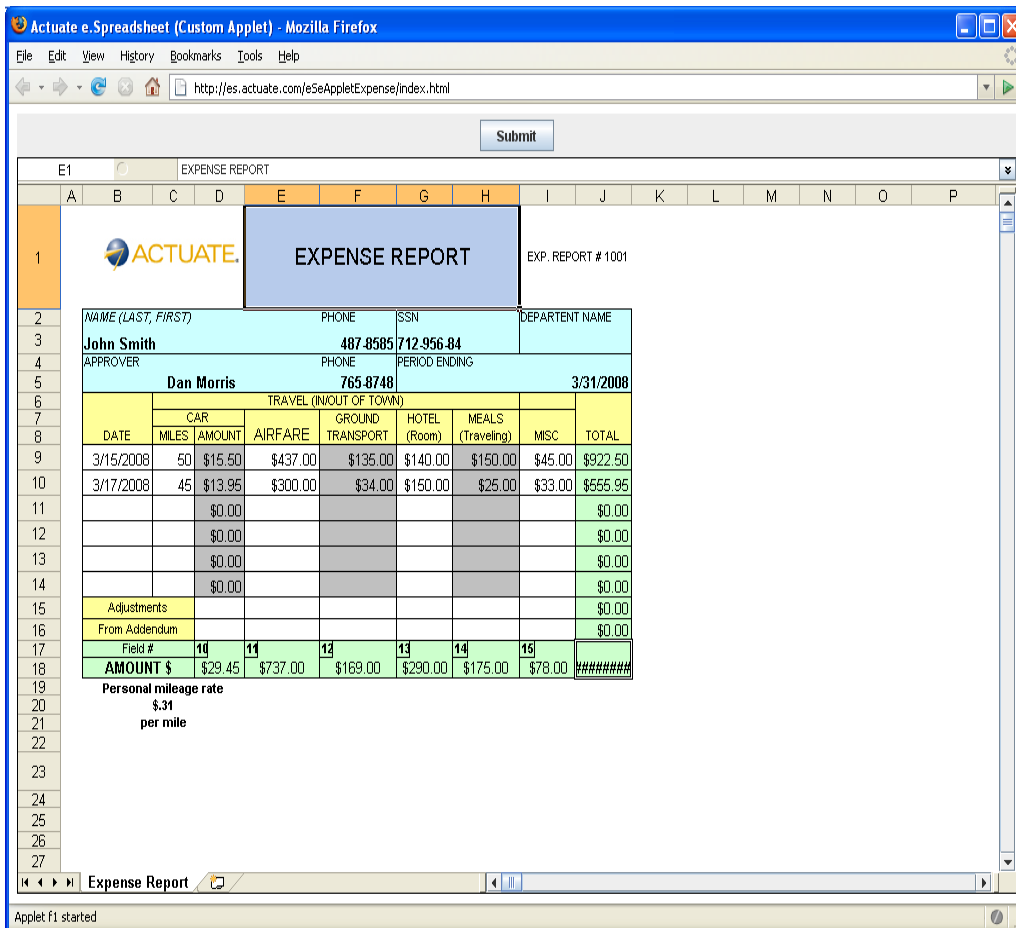


Figure 6: Applets integrate Excel into Java applications



## 5.2 Development Tools

There are two commercially available BIRT Report Designers. Like the Eclipse BIRT Designers, one is targeted for use by report developers, the other by Java developers.

### 5.2.1 Actuate BIRT Report Designer

The Actuate BIRT Report Designer, like the Eclipse BIRT RCP Report Designer, is for developers who want a stand-alone report designer to create reports from a template or blank report working outside the Eclipse IDE. Both support programming with JavaScript to add custom report functionality, behavior and business logic without compiling.

The Actuate BIRT Report Designer is a Windows-based designer that comes with

- Support for embedding Flash Objects in BIRT reports
- Library of over 350 pre-build Flash Objects
- Runtime license for a BIRT Report Viewer that supports Flash
- Direct access to popular data sources such as MS SQL Server, Oracle, DB2, Sybase, Informix, MySQL
- Support for Information Objects, Actuate's metadata and data integration layer
- Commercial indemnification and support, additional documentation and one-click installation.

### 5.2.2 Actuate BIRT Report Designer Professional

The Actuate BIRT Report Designer Professional, like the Eclipse BIRT All-In-One Report Designer, is for Eclipse, Java, PHP and report developers who need to create and maintain their own libraries, templates and programmatic extensions with or without the full Eclipse IDE. Both support programming with JavaScript, Java and Eclipse-like IDE capabilities to further control report layout, data access, data transformation and report rendering. Actuate BIRT Report Designer Professional is a Windows-based designer that comes with:

- All of the capabilities of the Actuate BIRT Report Designer
- Eclipse IDE functionality - such as creating and manipulating Eclipse projects, working with source code control, and invoking other tools such as Java development tools
- One-button publishing of and access to designs and components stored on an iServer.

### 5.2.3 BIRT Report Studio

BIRT Report Studio is a web-based report development tool for business users to access the data they need and create BIRT reports without direct IT intervention, but within IT control. It allows business users to work with pre-defined templates and out-of-the box themes, or themes that developers create for them. These templates and themes define overall report layout, structure, look, and the data available to the report developer. As an AJAX tool, built on the BIRT Report Engine, it can be accessed from a web browser without requiring any software installation. With the BIRT Report Studio users can

- Create charts and graphs; add, rearrange, reformat, show and hide data; and change report rows, columns and format cells

- Add columns, calculations, aggregations, conditional formats, filters, parameters, charts, tables or pre-built report objects
- Sort, group and organize data; format columns and fonts; and validate the design of the report as they are building it.

BIRT Report Studio supports business user analysis. Consider the following usage scenario: Each divisional manager has a set of Key Performance Indicators (KPIs) to track and to deliver to the CEO in a designated format. With BIRT Report Studio, IT can create the format for this report. The Business Analyst can then add his KPIs to this template and forward it to his Divisional Manager, who can then personalize this report for the CEO via the Interactive Viewer.

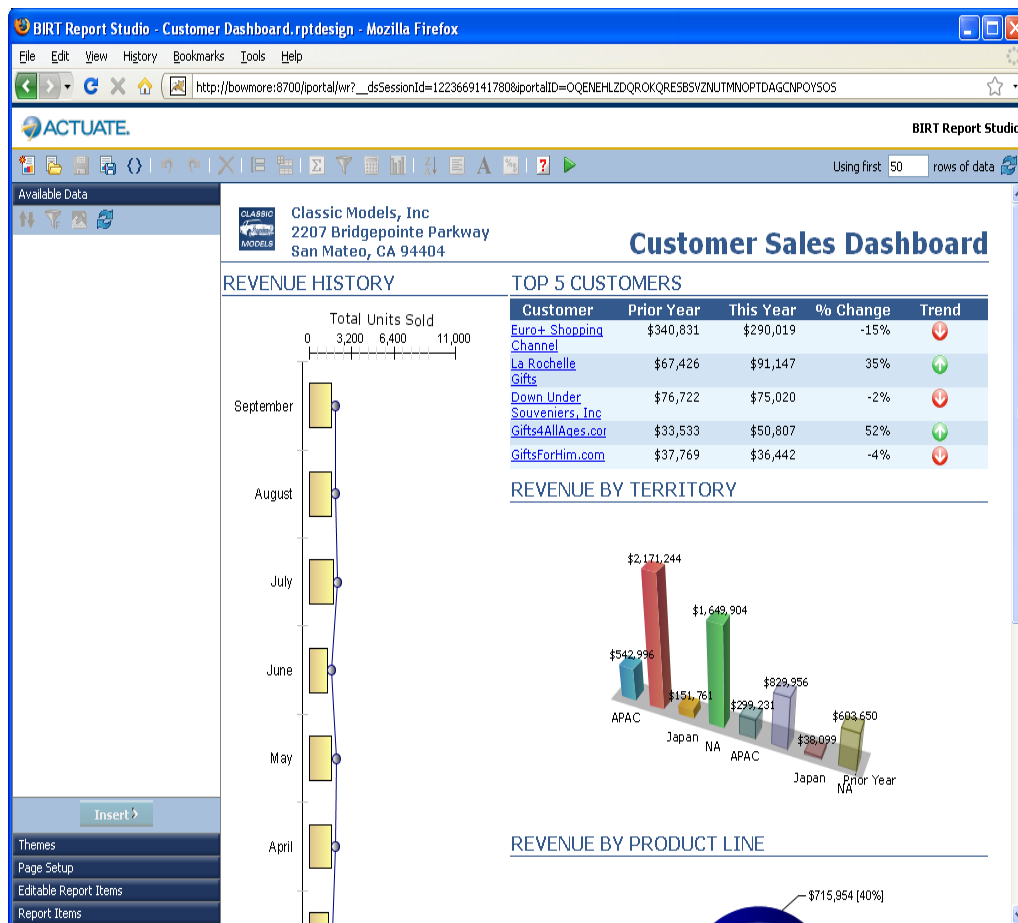


Figure 7: BIRT Report Studio

## 5.3 Deployment and Services for Scheduling, Sharing and Securing Reports

All projects require the publication of BIRT reports to end users, user management, report management and report security. These services are provided by the host application, built to the application's specifications, or licensed from a vendor. Actuate offers several products that provide these services out-of-the-box; two of these are available through BIRT-Exchange.com and one directly from Actuate.

### 5.3.1 BIRT Deployment Kit

The Deployment Kit is a lightweight Java EE application with a report repository and a web front-end for users to browse, select, and run BIRT and Spreadsheet reports. It is ideal for Java development teams, report development teams and Excel experts who want to generate and share on-demand reports with multiple users over the Web quickly, easily and at a low cost, and for applications that do not already have their own portal.

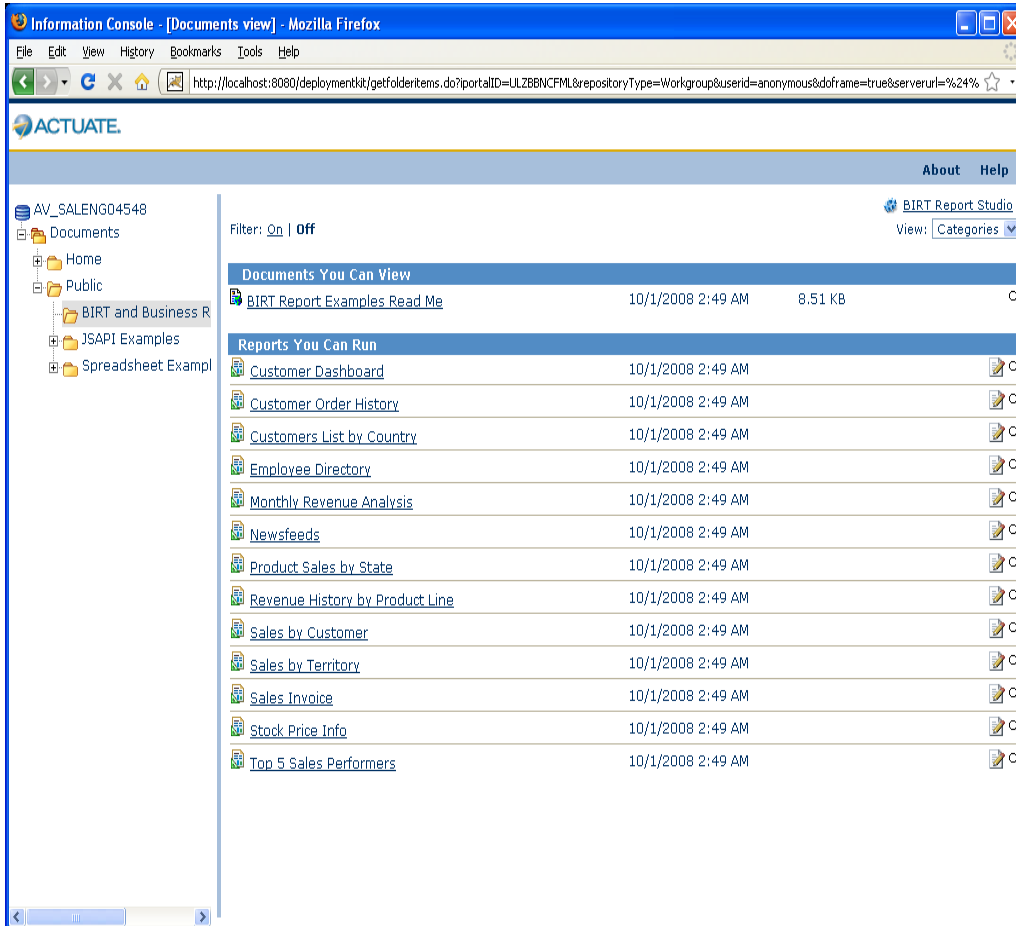


Figure 8: BIRT Deployment Kit

### 5.3.2 iServer Express and iServer Enterprise

iServer Express and iServer Enterprise embed the BIRT Report Engine in a report server that deploys, manages, schedules, secures, runs and distributes BIRT and e.Spreadsheet reports. They are designed for software development teams that want to automate report delivery and can be deployed as stand-alone report servers or as behind-the-scenes reporting services for other applications. They help eliminate the burden of manually fulfilling user requests for reports, which is beneficial as new employees can subscribe to a report distribution list in order to access reports without having to rely on IT to fulfill their report requests.

The servers provide report versioning and scheduling options to end users and administrators. Report run schedules can be based on a combination of events, business rules and calendars. For example, a report regarding KPIs has to be run weekly and distributed to users based on certain business rules. The process of running and distributing this report can be automated through the scheduling and distribution features of iServer Express and iServer Enterprise.

iServer Enterprise shares all the functionality of iServer Express, but on an enterprise-class scale. It is able to run in clustered environments, support hundreds of thousands of users and concurrently provide multiple applications with scheduling, security and other key reporting services.

The screenshot shows the 'Schedule' tab of the ACTUATE Information Console. The browser address bar indicates the URL is `http://localhost:8900/portal/submitjob.do`. The page has three tabs: 'Schedule', 'Parameters', and 'Save As'. The 'Schedule' tab is active and contains the following fields and options:

- Headline:** Text input field containing 'My Sales Invoice'.
- Output location:** Radio buttons for 'Home folder' (selected) and 'Other'. An empty text input field and a 'Browse...' button are associated with the 'Other' option.
- Document name:** Text input field containing 'Sales Invoice' with an asterisk.
- Version name:** Empty text input field.
- Document format:** Dropdown menu set to 'PDF'.
- Notification:** Check box 'Send me an email notification with' followed by a dropdown menu set to 'No Attachment'.
- Conversion options:** A sub-section containing:
  - Page range:** Empty text input field.
  - Page style:** Dropdown menu set to 'Auto'.
  - Text wrapping:** Check box (checked).
  - Font substitution:** Check box (checked).
  - BIDI processing:** Check box (checked).
- If the file already exists:** Radio buttons for 'Create a new version' (selected) and 'Replace the latest version'. A checkbox 'Keep only the latest' is followed by an empty text input field and the text 'version(s)'.

At the bottom of the form are four buttons: 'Cancel', 'Back', 'Next', and 'Finish'.

Figure 9: End user report scheduling options

### **5.3.3 User, Single Sign-on and Page-Level Security Services**

Report and data security is one of the most vital functions of a reporting application. Security is the process of directing and managing the right information to the right people, and keeping it from the wrong people.

Security can be built into any BIRT implementation using the Public APIs. Value-added products are available from Actuate through BIRT-Exchange.com that provide out-of-the-box security capabilities for project teams wanting to focus their development efforts on other areas of their application. These products support various levels of granular user access to reports, functions within a report and report data. Users can be restricted based on the type of report they are trying to create, generate or view and by the data they are trying to access.

With BIRT, security can be implemented within a report; come from an external directory or application; or be offered within a report server or web portal.

#### **User Management Security**

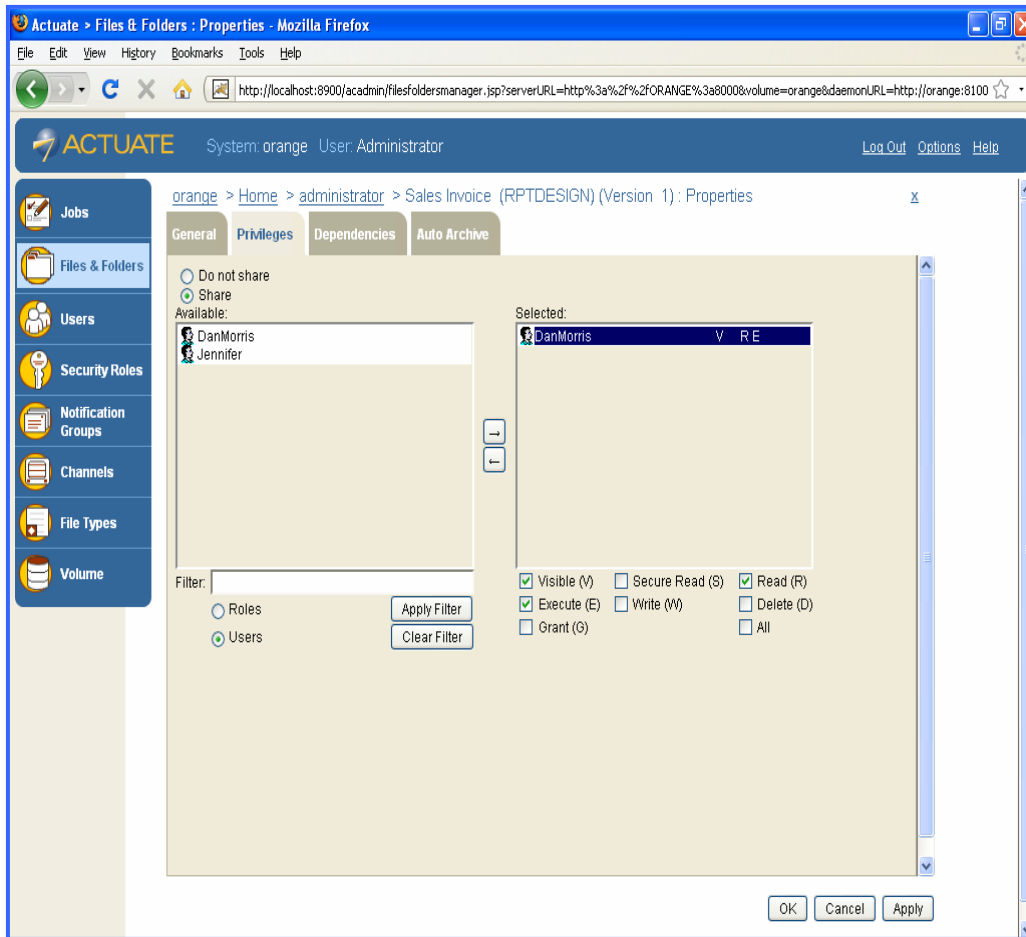
Minimal security for reporting applications consists of user management, providing users access to the reporting environment and determining which users can view reports. These can be managed and self-contained within the product themselves.

- Deployment Kit and iServer products: provide this level of user management security
- iServer Express and iServer Enterprise: add hierarchal role-based security with multi-level access permissions.

#### **Single Sign-on**

BIRT projects can integrate with existing security models that span multiple applications to provide an organization with single sign-on.

- Deployment Kit – provides some APIs to ease the development of the security integration
- iServer products – provide extensive integration capabilities to LDAP directories, Active Directory and other security directories.



**Figure 10: Creating user access permissions**

### **Page Level Security (PLS)**

Page Level Security is a unique and powerful capability that generates a single document, which includes security rules that determine which pages a user can see, print or save. Page Level Security is an option available from Actuate through BIRT-Exchange.com that works with iServer Express and Enterprise. Page Level Security allows a single piece of content to be generated and deployed that addresses the secure information distribution needs of many users.

For example, consider an organization's weekly sales forecast. Often individual account managers should only see the accounts for which they are responsible, regional managers should see all the accounts and account managers in a region and vice presidents see all accounts in the organization. With Page Level Security a developer can create Access Control Lists (ACLs) and add user attributes to them. At view time, the attributes of the user viewing the content are compared against the ACL for each page. Only when the user's attributes match the elements of the ACL is the user allowed to see the page.

Page Level Security reduces the number of report instances to one. It uses one query and generates one report, yet still restricts the information each individual is allowed to see.

## 6. Summary

The BIRT-based product line offers the foundation and optional building blocks to represent structured data in any Rich Internet Application—large, small, simple or complex. BIRT can be implemented as a stand-alone service, embedded in web applications, or deployed as an end-user reporting portal.

Eclipse BIRT (Business Intelligence and Reporting Tools) provides the foundation for representing structured data in Rich Internet Applications in highly graphical and interactive visualizations. It addresses the design metaphor needs of today's web application developers, the interactivity expectations of their users, and will meet the needs of the majority of application development projects. The BIRT reporting technology was designed to live in a world of other systems; it is extensible, programmable and integrates well into existing applications and infrastructures. BIRT can leverage existing security systems, web servers, data sources and other infrastructures.

Actuate, a co-sponsor of the BIRT Project and sponsor of BIRT Exchange, builds on this foundation to deliver value-added products that meet the requirements of specialized uses of BIRT.

The value-added products provide additional business and end user interactivity and customization of BIRT reports, including support for embedding Flash visualizations and automation of Excel spreadsheets. Add-on report servers are available that bring security and scheduling services to BIRT applications. A report server is available that can scale to 100,000s of users, with sophisticated clustering and the ability to concurrently service multiple applications.

The BIRT product line will grow with the needs of your project and provide the flexibility to be used in a wide range of applications while still leveraging a common open source foundation.